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# Indexing

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## Research Article

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Research Article

# Does Attitude towards Grammar Affect High-Level Reading Comprehension Skills?

Hatice Güneş

Aydin Adnan Menderes University, Faculty of Education Department of Turkish and Social Sciences, Education Department of Turkish Education, Aydın, Türkiye,
hatice.altunkaya@adu.edu.tr

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**Abstract:** Grammar is a learning area that functionally contributes to effective language skills. The aim of grammar instruction is the acquisition of the four basic language skills based on Turkish language rules. Reading skill, a lingual comprehension skill, aims accurate structuring of the ideas of the author of a text by the reader. The present study aimed to determine the possible effects of the attitudes towards grammar on high-level reading comprehension skills (HLRCS) based on certain variables (gender, final Turkish language course grade, and parental education level). In the current quantitative study, data were collected with the Grammar Attitude Scale and the High-Level Reading Comprehension Test (HLRCT). The study group included 427 8th grade middle school students. In the study, the regression analysis conducted to determine the causality between the Grammar Attitude Scale and HLRCT scores, revealed significant findings. Grammar attitude explained 4% of the variation in the HLRCT scores. Grammar attitude improved the achievements in high-level reading comprehension.

**Keywords:** Reading Comprehension, High-Level Reading Comprehension, Grammar, Attitude, Middle School, Turkish Language, 8th Grade

## 1. Introduction

Comprehension skills are key to both academic and social success. Individuals start to acquire the reading skill, a comprehension skill, in formal education. The aim of reading skills is to achieve a holistic understanding of communicated emotions and ideas by an author based on prior knowledge, and to reach an original novel idea based on the latent messages in the text. The comprehension process entails the reconstruction of the ideas of the author based on vocabulary, linguistic, semantic, global, and topical knowledge of the reader. Several educational and instructional processes could achieve the target objectives through the acquisition of reading comprehension skills by the students.

The present study aimed to determine the effect of grammar on HLRCS. Thus, the following research questions were determined:

1. What is the level of the attitudes of 8th grade middle school students towards grammar?
2. What is their mean Turkish language course grade?
3. Are there differences between grammar attitudes based on gender, final Turkish language course grade, and parental education level?
4. What are the HLRCS levels of these students?
5. Are there differences between HLRCS level based on gender, final Turkish language course grade, and parental education level?
6. Is there a correlation between high level reading comprehension skills and grammar attitudes?

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### 1.1. High-Level Reading Comprehension Skills (HLRCS)

Reading comprehension is among the most important lifelong skills. This skill area requires the reader to comprehend the main idea in a text, the author's purpose in writing the text, the information presented in the text, to distinguish the similarities or differences between the ideas in the text, to associate these ideas with those in the texts they read before, to adopt a critical approach towards the text based on various hypotheses, to analyze implicit semantics in via inferences.

The processes require the instruction of critical reading, problem-solving, decision making, and creative thinking skills. The instruction of reading skills aims the comprehension, interpretation, deduction, ordering, classification and analysis of the author's message. Reading comprehension basically entails understanding a text and explicit messages conveyed in the text, while HLRCS requires a critical approach, questioning the intended messages, analysis, and deduction of certain ideas. High-level reading skills are measured in the PISA exam, namely the Program for International Student Assessment implemented by the OECD, which evaluates student knowledge and skills in mathematics, science, and reading comprehension.

The reading skills are graded with a 6-point scale in PISA. The highest grade (6) requires high-level reading comprehension skills that require abstract thinking, ordering, classification, critical thinking, and comparison skills.

**Table 1**

*Mean Annual Turkish Reading Scores in PISA (MEB, 2019)*

| | 2003 | 2006 | 2009 | 2012 | 2015 | 2018 |
|---|---|---|---|---|---|---|
| Mean Turkish Reading Scores | 441 | 447 | 464 | 475 | 428 | 466 |

In Table 1, it could be observed that the mean score was 441 in 2003, 447 in 2006, 464 in 2009, 475 in 2012, 428 in 2015, and 466 in 2018. The PISA exam is regularly held every three years, but it postponed fto 2022 due to the Covid 19 pandemic.

### 1.2. Grammar instruction

Accurate and effective learning of the language skills is closely associated with grammar education that entails intuition about lingual logic and functions and the discovery of lingual rules based on intuition. Güneş (2013) reported that grammatic achievements were as effective as reading and writing skills in comprehension, and should be acquired.

Native Turkish language education is conducted based on the Turkish Language Course Curriculum (2019) published by the Ministry of National Education. The curricular reading skill achievements directly or indirectly emphasize the significance of grammar, demonstrating the significance of the attitudes towards grammar and the instruction of reading skills. Based on the principle that the four basic language skills support one another, it could be suggested that grammar attitude could have an impact on HLRCS.

### 1.3. Grammar attitude

Grammar is a science of the sounds, morphemes and sentence structures in a language and determines the rules associated with these properties. Grammar instruction should be based on texts and intuitive methods, and the courses should be instructed with an approach that would allow the students to learn these rules with examples. The main objective in grammar instruction is to train students who could employ all lingual rules functionally and accurately as they perform language skills.

It could be suggested that in addition to cognitive factors, affective factors such as attitude, motivation, self-efficacy, anxiety, etc. are important in learning. The positive or negative emotions and ideas that emerge in a situation are called attitudes. Kağıtçıbaşı (2003) described attitudes as unobservable tendencies that are assumed to lead to observable behavior. Grammar attitude entails student reactions when learning language rules. A positive attitude could have a positive effect on academic achievement. The constructivist educational approach replaced traditional grammar instruction with functional grammar instruction, and emphasized that it is important to learn grammar to employ the four basic language skills.

### 1.4. The correlation between High-Level Reading Comprehension Skills (HLRCS) and grammar attitudes

Goodwin and Ahn (2013) reported that morphological education, the instruction of word structure in a language, has a direct impact on reading comprehension. Kuo and Anderson (2010) also indicated that morphological awareness is an increasingly significant indicator of reading measurements as children grow older, and is associated with other aspects of metacognitive awareness and linguistic competence, especially phonological and syntactic awareness, and vocabulary.

Literature review revealed certain studies on reading and grammar. Onan (2012) reported that nine reading instruction objectives in the Primary Turkish Language Curriculum (2006) were directly associated with grammar instruction.

Several studies were conducted on the factors that affect reading comprehension. These studies emphasized the impact of reading strategies instruction on reading comprehension achievements of middle school students (Benzer & Bozkurt, 2020; Altunkaya & Sülükçü, 2018; Duman & Arsal, 2015; Özyılmaz & Alcı, 2011; Coşkun, 2011; Temizkan, 2008; Arpacıoğlu, 2007), the correlations between reading comprehension skills, reading motivation, and the attitudes of the 5$^{th}$ grade students towards the Turkish language course (Türkben & Gündeğer, 2021), and the impact of the reading circle method on reading comprehension skills of seventh grade middle school students (Pilav & Balantekin, 2017). A study conducted by Rand and Rand (2022) on reading comprehension emphasized the impact of reading five simplified texts on the same topic on reading comprehension. 335 4th - 8th grade students read one of the five texts on Newsela.com and took a reading comprehension test. The analysis demonstrated that there were no significant correlations between grade, reading level and text variables. Pairwise comparisons demonstrated that the scores of the low-level readers improved only in lower text levels and the scores of high-level readers did not change significantly in all text levels.

In the literature, there is no study on the impact of grammar attitude on high-level reading comprehension achievements. The determination of the effect of attitude, a significant affective learning component, on HLRCS could lead to various predictions for reading comprehension achievements. Based on the study findings, various suggestions could be made about HLRCS acquisition. It could be suggested that these recommendations could be employed to plan reading instruction, could reveal the factors that teachers should consider during instruction and when writing textbooks, and contribute to the improvement of poor reading achievements as demonstrated in the 2018 PISA exam that were worse than the 2012 results.

Türkiye ranked 40th in reading skills among 79 countries that participated in PISA 2018 and 31st among 37 OECD countries (MEB, 2019, p. 37). These findings demonstrated that reading comprehension skills of the Turkish students were unsatisfactory. Thus, to improve the reading comprehension skills of Turkish students, further instructional plans should be developed based on the reading instruction strategies, instructional methods and techniques and the factors that play a role in reading proficiency. The recommendations could guide future reading instruction planning, significant factors associated with instruction and textbook writing.

## 2. Method

The present study that aimed to determine the impact of grammar attitudes on HLRCS was conducted with the quantitative relational survey method. Karasar (2016) argued that the correlations between two or more variables and the level of variations in these variables could be determined with the relational survey model.

### 2.1. The study group

The study group included 427 8th grade students attending six middle schools in central Efeler district in Aydın province during the 2022-2023 academic year. The study group was determined with the non-random convenience sampling method (Creswell, 2013).

**Table 2**

*Student Demographics*

| Group | Frequency(n) | Percentage (%) |
|---|---|---|
| Gender | | |
| Female | 204 | 47,8 |
| Male | 223 | 52,2 |
| Maternal Education Level | | |
| Primary School | 99 | 23,2 |
| Middle School | 111 | 26,0 |
| High School | 125 | 29,3 |
| College | 92 | 21,5 |
| Paternal Education Level | | |
| Primary School | 87 | 20,4 |
| Middle School | 107 | 25,1 |
| High School | 129 | 30,2 |
| College | 104 | 24,4 |

As seen in Table 2, 204 (47.8%) students were female and 223 (52.2%) were male.

The mothers of 99 (23.2%) students were primary school, 111 (26.0%) were middle school, 125 (29.3%) were high school, and 92 (21.5%) were college graduates.

The fathers of 87 (20.4%) students were primary school, 107 (25.1%) were middle school, 129 (30.2%) were high school, and 104 (24.4%) were college graduates.

### 2.2. Data collection instruments

#### *2.2.1. Grammar attitude scale*

The Grammar Attitude Scale is a 31-item five-point Likert-type scale developed by Er and Topcuoğlu Ünal (2016), and the Cronbach's Alpha reliability coefficient of the scale is 914. In the present study, the reliability of the Grammar Attitude Scale was determined as high (Cronbach's Alpha=0.936).

### *2.2.2. High-Level Reading Comprehension Skills Achievement Test (HLRCT)*

HLRCT includes 24 questions. Yıldız, Ünal, Bayrakcı, and Polat (2019) reported that the average item difficulty and discrimination indices of the test were 0.46 and 0.45, respectively in item analysis. They stated that the reliability of the test was calculated with KR-20 and KR-21 methods, and the Kuder Richardson-20 reliability coefficient (r) was determines as 0.84, KR-21 was determined as 0.83, and the analyzes revealed that it was a valid and reliable achievement test that measured HLRC.

### *2.2.3. Personal data form*

In the study, a "Personal Data Form" was used to determine participant demographics and study variables. The form included questions on student gender, final Turkish language course grade, and parental education levels.

## 2.3. Data analysis

The study data were evaluated analyzed with SPSS 22 statistical analysis software. Frequencies and percentages were employed to determine student demographics, and standard deviation and mean were used to analyze the scale scores. In the study, normal distribution of the variables was determined based on skewness and kurtosis.

**Table 3**

*Normal Distribution*

| | N | kurtosis | Skewness |
|---|---|---|---|
| HLRCS | 427 | -0,549 | 0,280 |
| Total Grammar Attitude Score | 427 | 0,124 | -0,155 |
| Interest in Grammar | 427 | -0,182 | -0,162 |
| Positive Attitudes Towards Grammar | 427 | 0,111 | -0,301 |

In the literature, variable kurtosis between +1.5 and -1.5 (Tabachnick & Fidell, 2013) and skewness between +2.0 and -2.0 (George, & Mallery, 2010) are considered to demonstrate normal distribution. It was determined that the variables exhibited normal distribution. Parametric methods were employed in data analysis.

The correlations between the dimensions that determined the scale scores of the students were analyzed with Pearson correlation and linear regression analysis. Correlation coefficients (r) between 0.00 and 0.25 are considered very weak, between 0.26 and 0.49 are considered weak, between 0.50 and 0.69 are considered moderate, between 0.70 and 0.89 are considered high, and between 0.90 and 1.00 are considered very high (Kalaycı, 2006, p.116). Independent groups t-test, one-way analysis of variance (ANOVA) and post hoc (Tukey, LSD) analyses were conducted to investigate the differences between scale scores based on descriptive variables. Cohen(d) and Eta square ($\eta^2$) coefficients were calculated to determine the effect size. The effect size indicates whether the intra-group difference is significant. Cohen's coefficient is considered small when 0.2, moderate when 0.5, and high when0.8, and eta square is considered small when 0.01, moderate when 0.06, and high when0.14 (Büyüköztürk et al., 2018).

## 2.4. Ethical principles

The ethics committee approval for this study was granted by Aydın Adnan Menderes University Rectorate Education Research Ethics Committee with decision number 2022/09 on 26.05.2022.

## 3. Findings

The present study aimed to determine whether grammar attitude has an effect on HLRC. Thus, the findings associated with the main and sub- research problems are presented below:

**Table 4**

*Mean Grammar Attitude, HLRCT scores and Final Turkish Language Course Grade*

| | N | Center | Ss | Min. | Max. |
|---|---|---|---|---|---|
| Total Grammar Attitude | 427 | 99,422 | 20,537 | 31,000 | 153,000 |
| Interest in Grammar | 427 | 48,426 | 12,297 | 16,000 | 79,000 |
| Positive Attitudes towards Grammar | 427 | 50,995 | 10,565 | 15,000 | 75,000 |
| HLRCT Score | 427 | 8,500 | 4,034 | 0,000 | 20,000 |
| Final Turkish Language Course Grade | 427 | 79,070 | 17,369 | 20,000 | 100,000 |

The mean "total attitude towards grammar" score was 99,422±20,537 (min=31, max=153), the mean "interest in grammar" score was 48,426±12,297 (min=16, max=79), the mean "positive attitudes towards grammar" score was 50,995±10,565 (min=15, max=75), the mean "HLRCT" score was 8,500±4,034 (min=0, max=20), and the mean "final Turkish language course grade" was 79,070±17,369 (min=20, max=100).

The variations in grammar attitude and HLRCT scores of the students based on gender and parental education level are presented in Table 5.

**Table 5**

*Variations in HLRCT and Grammar Attitude Scores Based on Student Demographics*

| Demographic | | HLRCT | Total Grammar Attitude | Interest in Grammar | Positive Attitudes towards Grammar |
|---|---|---|---|---|---|
| Gender | | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| Female | 204 | 8,760±4,035 | 101,804±21,821 | 49,760±12,741 | 52,044±11,031 |
| Male | 223 | 8,260±4,027 | 97,242±19,077 | 47,206±11,773 | 50,036±10,048 |
| t= | | 1,268 | 2,304 | 2,152 | 1,969 |
| p= | | 0,206 | 0,023 | 0,032 | 0,050 |
| Maternal Education Level | | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| Primary School | 99 | 8,480±3,656 | 102,939±19,816 | 51,424±11,446 | 51,515±10,444 |
| Middle School | 111 | 7,100±3,779 | 99,469±19,755 | 48,261±12,512 | 51,207±9,849 |
| High School | 125 | 8,670±3,832 | 99,472±19,395 | 48,504±11,301 | 50,968±10,969 |
| College | 92 | 9,970±4,460 | 95,511±23,202 | 45,294±13,560 | 50,217±11,084 |
| F= | | 9,052 | 2,097 | 4,045 | 0,260 |
| p= | | 0,000 | 0,100 | 0,007 | 0,854 |
| PostHoc= | | 4>1, 1>2, 3>2, 4>2, 4>3 (p<0.05) | | 1>4 (p<0.05) | |
| Paternal Education Level | | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| Primary School | 87 | 8,250±3,847 | 104,046±23,950 | 52,425±12,868 | 51,621±12,854 |
| Middle School | 107 | 7,380±3,294 | 97,654±17,910 | 47,897±11,494 | 49,757±9,172 |
| High School | 129 | 8,590±4,138 | 100,442±18,096 | 48,535±11,200 | 51,907±9,692 |
| College | 104 | 9,740±4,425 | 96,106±22,242 | 45,490±13,147 | 50,615±10,827 |
| F= | | 6,375 | 2,779 | 5,266 | 0,956 |
| p= | | 0,000 | 0,041 | 0,001 | 0,413 |
| PostHoc= | | 4>1, 3>2, 4>2, 4>3 (p<0.05) | 1>2, 1>4 (p<0.05) | 1>2, 1>3, 1>4 (p<0.05) | |

The findings presented in Table 5 are discussed below based on study variables.

### 3.1. Grammar attitudes based on gender

Student attitudes towards grammar were analyzed based on total score, interest in grammar, and positive attitude towards grammar scores and the gender variable.

The grammar attitude scores of the female students (x=101,804) were higher when compared to the male students (x=97,242) (t=2,304; p=0.023<0.05; d=0.223; $\eta^2$ =0.012).

The "interest in grammar" scores of the female students (x=49,760) were higher when compared to the male students (x=47,206) (t=2,152; p=0.032<0.05; d=0.209; $\eta^2$ =0.011).

The "positive attitude towards grammar" scores of female students (x=52,044) were higher when compared to the male students (x=50,036) (t=1,969; p=0.05<0.05; d=0,191; $\eta^2$ =0,009).

### 3.2. High-Level reading comprehension skills based on gender

It was determined that there was no difference between the HLRCT scores of the students based on gender (p>0.05).

### 3.3. Grammar attitudes based on maternal education level

It was determined that there was no significant difference between the total grammar attitude and "positive attitudes towards grammar" scores of the students based on maternal education level ($p>0.05$).

A significant difference was determined between the "interest in grammar" scores of the students based on maternal education level ($F=4,045$; $p=0.007<0.05$; $\eta^2=0.028$). This was due to the fact that the scores of the students whose maternal education level was primary school were higher than the scores of the students whose maternal education level was college ($p<0.05$).

### 3.4. High-Level reading comprehension skills based on maternal education level

The difference between the students' HLRCT scores was significant based on maternal education level ($F=9,052$; $p=0<0.05$; $\eta^2=0.060$).

The HLRCT scores of the students whose mothers were college graduates were higher when compared to those whose mothers were primary, middle and high school graduates ($p<0.05$).

The HLRCT scores of the students whose mothers were primary school graduates were higher when compared to those whose mothers were middle school graduates ($p<0.05$).

The HLRCT scores of the students whose mothers were high school graduates were higher when compared to those whose mothers were middle school graduates ($p<0.05$).

### 3.5. Grammar attitudes based on paternal education level

The study findings demonstrated that the grammar attitude (GA) scores of the students significantly varied based on paternal education level ($F=2,779$; $p=0.041<0.05$; $\eta^2=0.019$).

The GA scores of the students whose paternal education was primary school were higher when compared to those whose paternal education level was secondary school ($p<0.05$).

The GA scores of the students whose paternal education was primary school were higher when compared to those whose fathers were college graduates ($p<0.05$).

It was determined that there were significant differences between the students' interest in grammar (IIG) scores and paternal education level ($F=5,266$; $p=0.001<0.05$; $\eta^2=0.036$). Certain differences between students' interest in grammar and paternal education level were as follows:

The IIG scores of the students whose fathers were primary school graduates were higher when compared to those whose fathers were middle school, high school and college graduates ($p<0.05$).

It was determined that there was no significant difference between the "positive attitudes towards grammar" scores based on paternal education level ($p>0.05$).

### 3.6. High-Level reading comprehension skills based on paternal education level

It was determined that there was a significant difference between the HLRCT scores of the students based on paternal education level ($F=6,375$; $p=0<0.05$; $\eta^2=0.043$).

The HLRCT scores of the students whose fathers were college graduates were higher when compared to the HLRCT scores of the students whose fathers were primary, middle and high school graduates ($p<0.05$).

The HLRCT scores of the students whose fathers were high school graduates were higher when compared to the HLRCT scores of the students whose fathers were middle school graduates ($p<0.05$).

The findings on the differences between the HLRC scores based on the final Turkish language course grade and the correlation between high-level reading skills and grammar attitudes:

**Table 6**

*Correlation Analysis*

| | | Final Turkish Language Course Grade | HLRCT |
|---|---|---|---|
| HLRCT | r | 0,441** | |
| | p | 0,000 | |
| Total Grammar Attitude Score | r | 0,145** | 0,205** |
| | p | 0,003 | 0,000 |
| Interest in Grammar | r | 0,082 | 0,144** |
| | p | 0,091 | 0,003 |
| Positive Attitudes Towards Grammar | r | 0,187** | 0,231** |
| | p | 0,000 | 0,000 |

The correlation analysis conducted between the final Turkish language course grade, HLRCT, total grammar attitude, "interest in grammar", "positive attitudes towards grammar" scores revealed a very weak positive correlation between total grammar attitude score and final Turkish language course grade (r=0.145, p=0,003<0.05). There was a very weak positive correlation between total grammar attitude and HLRCT scores (r=0.205, p=0,000<0.05). There was a very weak positive correlation between "interest in grammar" and HLRCT scores (r=0.144, p=0,003<0.05). There was a very weak positive correlation between "positive attitudes towards grammar" score and final Turkish language course grade (r=0.187, p=0,000<0.05). There was a very weak positive correlation between "positive attitudes towards grammar" and HLRCT scores (r=0.231, p=0,000<0.05). The correlations between the other variables were not statistically significant (p>0.05).

**Table 7**

*The Impact of Grammar Attitude on High-Level Reading Comprehension Skills*

| Independent Variable | Non-standard Coefficients | | Standard Coefficients | t | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | B | SE | ß | | | Alt | Top |
| Fixed | 4,493 | 0,947 | | 4,746 | 0,000 | 2,632 | 6,353 |
| Grammar Attitude | 0,040 | 0,009 | 0,205 | 4,321 | 0,000 | 0,022 | 0,059 |
| *Dependent Variable= HLRCT, R=0.205; R2 =0.040; F=18.674; p=0.000; Durbin Watson = 1.439 | | | | | | | |

The regression analysis conducted to determine the causality between grammar attitudes and HLRCT revealed significant findings (F=18,674; p=0,000<0.05). Grammar attitude explained 4% of the total variation in HLRCT ($R^2$ =0.040). Increase in grammar attitudes improved high-level reading comprehension skills (ß=0.205).

**Table 8**

*The Impact of the Grammar Attitude Scale Sub-dimensions on HLRCT*

| Independent Variable | Non-standard Coefficients | | Standard Coefficients | t | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | B | SE | ß | | | Alt | Top |
| Fixed | 3,987 | 0,969 | | 4,114 | 0,000 | 2,082 | 5,892 |
| Interest in Grammar | 0,002 | 0,020 | 0,005 | 0,092 | 0,927 | -0,037 | 0,040 |
| Positive Attitudes towards Grammar | 0,087 | 0,023 | 0,227 | 3,805 | 0,000 | 0,042 | 0,132 |

*Dependent Variable= HLRCT, R=0.231; R2 =0.049; F=11.914; p=0.000; Durbin Watson = 1.459

The regression analysis conducted to determine the causality between "interest in grammar", "positive attitudes towards grammar" and HLRCT revealed significant findings (F=11,914; p=0,000<0.05). The interest in grammar" and "positive attitudes towards grammar" dimensions explained 4.9% of the total variation in HLRCT scores ($R^2$ =0.049). "Interest in grammar" had an effect on the HLRCT score (p=0.927>0.05). "Positive attitudes towards grammar" increased the HLRCT score (ß=0.227).

## 4. Conclusion and Discussion

The mean "total attitude towards grammar" score was 99,422±20,537 (Min=31; Max=153), the mean "interest in grammar" score was 48,426±12,297 (Min=16; Max=79), and the mean "positive attitudes towards grammar" score was 50,995±10,565 (Min=15; Max=75). It was observed that the students exhibited above-average grammar attitudes. Toptal (2020) conducted a study to determine the grammar attitudes of the 5th, 6th, 7th and 8th grade middle school students and reported that the mean total attitude towards grammar scale score was $\bar{X}$=58.59±9.02 (Min=30; Max=80). Balcı and Melanlıoğlu (2020) reported that middle school students were quite interested in grammar; however, they were also alienated from grammar due to certain classroom practices.

The mean final Turkish language course grade was 79,070±17,369 (Min=20; Max=100). The analysis of the correlations between the mean final Turkish language course grade, HLRCT score, total grammar attitude, "interest in grammar", and "positive attitudes towards grammar" scores revealed very weak positive correlations between total grammar attitude score and final Turkish language course grade, between total grammar attitude and HLRCT scores, between "interest in grammar" and HLRCT scores, between "positive attitudes towards grammar" score and final Turkish language course grade, and between "positive attitudes towards grammar" and HLRCT scores. The correlations between the other variables were not statistically significant.

The total grammar attitude, "interest in grammar" and "positive attitude towards grammar" scores of the female students were higher compared to those of the male students. Similarly, Toptal (2020) reported that the mean course achievement and classroom interaction scores of the female students were higher when compared to the male students, the mean difficulties experienced in the course score of the male students was higher when compared to the female students, and the mean grammar attitude score of the female students was higher when compared to the male students. Thus, it could be suggested that female students had higher interest in and positive attitudes towards grammar when compared to the male students.

There was no significant difference between the total grammar attitude and "positive attitudes towards grammar" scores of the students based on maternal education level. However, there was a significant

difference between the "interest in grammar" scores of the students based on maternal education level. Thus, the "interest in grammar" scores of the students whose mothers were primary school graduates were higher than those whose mothers were college graduates. Although elucidation of the reason behind this difference requires future studies, college graduate mothers could have assisted the homework of their children based on grammar rules instead of employing intuition.

It was determined that there was a significant difference between the total grammar attitude scores of the students based on paternal education level. Thus, the total scores of the students whose fathers were primary school graduates were higher than those whose fathers were middle school or college graduates. There was a significant difference between the "interest in grammar" scores of the students based on paternal education level. The "interest in grammar" scores of the students whose fathers were primary school graduates were higher when compared to those whose fathers were middle, high school, and college graduates. "Positive attitudes towards grammar" scores of the students did not differ significantly based on paternal education. The high total grammar attitude and "interest in grammar" scores of the students whose fathers were primary school graduates could be explained by the possibility that the college graduate fathers could have instructed their children based on rules instead of intuition, similar to college graduate mothers. Further research is required to clarify this assumption. The empirical study conducted by Kodallı (2022) revealed a significant difference between all scale scores that favored the experimental group, including the attitude towards the Turkish language course, grammar attitudes, and student achievements in intuitive grammar instruction. Review of the literature on grammar attitude revealed no other findings based on parental education level.

In the study, it was determined that the mean HLRCT score of the 8th grade middle school students was 8,500±4,034 (Min=0; Max=20). It was observed that the highest score was 20 in the test, where the maximum score was 24 points, and the mean score was below the half of the highest possible score. In a study conducted with 10th graders, Yıldız, Divrik, Özçelik, and Aktaş (2022) reported that the mean HLRCT score of the female students was 41/100 and it was 39/100 for the male students. These findings were consistent with the present study and the mean reading comprehension scores were below average in both studies. Bayat and Çetinkaya (2020) reported that the reading comprehension scores of the 5th and 6th grade students were moderate.

The correlation between the final Turkish language course grade and HLRCT score was not statistically significant. Although the mean Turkish language course grade was above 50%, their mean HLRCT score was not consistent with their Turkish grade. Similar to the findings reported by Yıldız et al. (2022), there was a weak positive correlation between the course grades of the tenth grade students and their HLRCT scores, and no significant difference was determined between the HLRCT scores of the students and literature course grades.

Certain studies (Yılmaz; 2015, Sallabaş; 2008-Erden and Koçyiğit; 2023) indicated that students with high reading comprehension were successful in the Turkish language course.

There was no significant difference between the HLRCT scores of the students based on gender. Various studies (Erden & Koçyiğit, 2023; Yıldız, Divrik, Özçelik, & Aktaş, 2022; Yüksel, Küçükseymen, Tunç, Yılmaz, Deniz, Güser, 2022; Akbalık, 2019; Kaya & Yıldırım, 2018; Kuşdemir Kayıran & Katırcı Ağaçkıran, 2018; Ulutaş & Aksoy, 2016; Durukan, 2013; Sabak Kaldan, 2007) reported similar findings. However, certain studies (Kızıltaş, 2023; Yılmaz, 2023; Bıyık, 2022; Kızgın & Baştuğ, 2020; Wu, Valcke, & Keer, 2019; Altunkaya, 2018; Sülükçü & Altunkaya, 2018; Kuyumcu Vardar & Sarıoğlu, 2017) indicated that female students were more advanced in reading comprehension when compared to the male students. Bayat and Çetinkaya (2020) reported that female students were more successful when compared to male students in reading comprehension deep structure dimension, reading and inference skills, as well as knowledge and other related skills.

It was determined that there was a significant difference between the HLRCT scores of the students based on maternal education level. The HLRCT scores of the students whose mothers were college graduates were higher when compared to those whose mothers were primary, middle, and high school graduates, the scores of those whose mothers were primary school graduates were higher than those whose mothers were middle school graduates, and the scores of those whose mothers were high school graduates were higher when compared to those whose mothers were middle school graduates. The finding that the HLRCT scores of the students whose mothers were college graduates were higher than those whose mothers were primary, middle, and high school graduates was an expected result. It could be suggested that college graduate mothers set an example for their children and guided them by reading books. However, the fact that the high scores achieved by the students whose mothers were primary school graduates when compared to those whose mothers were middle school graduates merits further research.

Saraçlı Çelik and Karasakaloğlu (2021) reported that the difference between the skills of the students to read silent words correctly and fluently was significant based on maternal education level, and students with higher maternal education were more successful in reading silent words correctly and fluently. Altunkaya (2018) reported contrasting findings. Altunkaya (2018) reported that there was no significant difference between mean group scores in the test conducted to determine a possible significant difference between the mean reading comprehension scores based on maternal education variable.

There was a significant difference between the student scores based on the paternal education level. The HLRCT scores of the students whose fathers were college graduates were higher when compared to those whose fathers were primary, middle, and high school graduates. The scores of the students whose fathers were high school graduates were higher when compared to those whose fathers were middle school graduates. Saraçlı Çelik and Karasakaloğlu (2021) reported that there was a difference between accurate, fluent, and silent reading scores of the students and paternal education level, and the students with higher paternal education level were more successful in reading. Altunkaya (2018) also reported similar results on reading comprehension scores based on paternal education level. In the study, the reading comprehension scores of the students whose fathers were college graduates were higher when compared to those whose fathers were primary, secondary and high school graduates.

The regression analysis conducted to determine the causality between grammar attitude and HLRCT scores revealed significant findings. Grammar attitude explained 4% of the total variation in HLRCT score. Grammar attitude increased high-level reading comprehension achievements.

The regression analysis conducted to determine the causalities between "interest in grammar", "positive attitudes towards grammar" and HLRCT score revealed significant findings. The "interest in grammar" and "positive attitudes towards grammar" variables explained 4.9% of the total variation in HLRCT score. "Interest in grammar" affected the HLRC level. "Positive attitudes towards grammar" improved the HLRCT score. These findings emphasized the affective dimension of grammar instruction in the acquisition of HLRCS and the significance of grammar instruction. In the literature, there is no study where the impact of grammar attitude on HLRCS was investigated. Several studies investigated the correlations between reading comprehension and various affective factors in reading. A study conducted by Kızgın and Baştuğ (2020) reported a weak positive correlation between the reading comprehension scores of 4th grade students and their reading motivation. Kızıltaş (2023) reported no significant correlation between reading attitude and reading comprehension scores. Yusnitasari and Novita (2022) investigated the correlation between language learning attitudes and reading comprehension achievements, and reported that a good attitude led to better learning, while a negative attitude led to failure. Riyanto et al. (2015) investigated the correlation between student attitudes

towards language learning and reading comprehension, and argued that attitude towards language learning contributed most to vocabulary.

### 4.1. Recommendations

The study findings demonstrated that grammar attitude increased achievements in high-level reading comprehension. "Interest in grammar" and "positive attitudes towards grammar" variables increased HLRCT scores, and grammar attitude was a significant factor in HLRCS instruction. Teachers, textbook authors, and curriculum developers should plan the education to ensure the development of positive attitudes towards grammar among the students.

The mean HLRCT score of the 8th grade middle school students was 8,500±4,034 (Min=0; Max=20). The maximum possible test score was 24, the highest score was 20, the mean score was 8.5, and the mean was below the median score. Since the study was during the final months of the 2nd 8th grade semester, it should be noted that the achievement level was quite low. Thus, the Turkish language course curriculum, textbooks, and instructional methods and techniques associated with reading skills should be revised, solutions should be identified, and the HLRCS training should be reorganized accordingly.

Female students had more positive attitudes towards grammar when compared to male students. Further studies should be conducted to identify the solutions to improve the attitudes of the male students towards grammar.

Further studies should be conducted to elucidate the finding that the grammar attitude scores of the students whose parents were primary school graduates were higher when compared to those whose parents were graduated from higher education institutions.

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Research Article

# Attachment Styles and Loneliness as Predictors of Phubbing amongst University Students

Serap Büyükşakar[1]
Eyüp Çelik[1]*

[1] Sakarya University, Sakarya, Türkiye
serap.buyuksakar1@ogr.sakarya.edu.tr,
eyupcelik@sakarya.edu.tr

*Corresponding Author

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**Abstract:** Due to the increase in the use of technology, more loneliness and phubbing have been observed in individuals. In this concept, the relationship between attachment styles, loneliness, and phubbing was examined in this study. The research data was collected from 288 students, 224 of whom were women (77.8%) and 64 of whom were men (22.2%). The data was collected using the Relationship Scales Questionnaire, the UCLA Loneliness Scale Short Form (ULS-8), and the General Phubbing Scale. The data was analyzed using Pearson correlation coefficient and regression methods in accordance with the aim of the research. The Pearson correlation analysis revealed that there is a relationship a positive and significant relationship between phubbing and loneliness, fearful attachment, dismissive-avoidant attachment, and preoccupied attachment. However, the relationship between phubbing and secure attachment was found to be insignificant. According to the regression analysis, phubbing was predicted by loneliness, fearful attachment, and preoccupied attachment, but not by secure attachment and dismissive- avoidant attachment styles.

**Keywords:** Phubbing, Attachment Styles, Loneliness, University Students

## 1. Introduction

Thanks to the technological developed in the last century, people have become able to easily do things that were once considered impossible. With the advancement of technology, phones have become a part of our daily lives (Nazir & Pişkin, 2016). Individuals use technology to overcome their problems with pleasure (Yanık & Özçiçek, 2021). Nowadays, people can do many multitasking activities with their smartphones, such as checking flight tickets while exercising or writing comments about a football match while waiting for a car in a limited amount of time (Al-Saggaf & O'Donnell, 2019). However, smartphones have a negative impact on people's interpersonal relationships, personal development, and personalities (Karadağ et al., 2016). Moreover, the increasing worldwide use of social media, which is accessible everywhere, can make some users addicted to it (Okkay & Bal, 2021). Even close friends can become estranged from each other (Büyükgebiz Koca, 2019). In other words, the excessive use of social media and technology can cause problems in communication and human relationships, which can have negative effects on people's work, friends, and even family life. This situation where communication problems affect human relationships through cell phones is called as "phubbing."

Phubbing, considered a new addiction (Davey et al., 2018; Robert et al., 2014; Parmaksız, 2021), was first included in the Macquarie Dictionary and formed by the words phone and snubbing. According to Karadağ et al. (2015), phubbing is defined as the situation in which a person looks at and is interested in their phone and avoids communication with others while talking with them. While expressions such as problematic internet use (Okur & Özekes, 2020; Shapira et al., 2000; Uzun & Ünal, 2018) and pathological internet use (Morahan-Martin & Schumacher, 2000) have been used before, they cannot fully explain the concept of phubbing. Phubbing behavior consists of a multidimensional structure, including smartphone addiction, internet addiction, social media addiction, and gaming addiction (Karadağ et al., 2015; Karadağ et al., 2016). According to Çaka (2021), "Phubber individuals" who exhibit

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phubbing behavior may increase their use of social media in order to overcome a feeling of social exclusion."Phubbee" can be defined as a person who is ignored by the phubber (Chotpitayasunondh & Douglas, 2016). Phubbing can harm close relationships, such as partners, friends, and family members, by negatively affecting communication (Ballı, 2020). Phubbing, which has a multidimensional structure, can lead to many negative effects on individuals' lives, such as health problems and negative impacts on social relationships.

Research in the literature has shown that phubbing is associated with depression (Ivonova et al., 2020; Parmaksız, 2021), boredom (Al-Saggaf et al., 2018; Al-Saggaf & O'Donnell, 2019b), negative emotions (Ting et al., 2018), attachment styles (Shams et al., 2019), and loneliness (Aydoğdu & Çevik, 2020; Blachnio & Przepiorka, 2019; David & Roberts, 2017; Ivonova et al., 2020). There is not a single effect of phubbing, as excessive phone use, not paying attention to those around them, and choosing the phone over social interactions may also lead individuals to feel lonely, just as phubbing.

Loneliness can be defined as the state of perceiving oneself as alone, even if one is in a psychological, emotional, cognitive, or social environment. Loneliness is often described as social isolation (Holt-Lunstad et al., 2015) or a cognitive and emotional state of being alone (van Roekel et al., 2016). According to Weiss (1973), loneliness is divided into emotional and social loneliness. Emotional loneliness is defined as the inability of the individual to relate to those around him/her, while social loneliness is defined as the situation where the needed relationship cannot be found in the environment (cited in Aslan Cevheroğlu & Say, 2021). In addition, there are three important points in loneliness; First, loneliness arises from the lack of social relationships in individuals. Second, there is a subjective experience in loneliness. The last one is that although the experience of loneliness can be an encouraging situation for an individual's personal development, it is a sad and unpleasant experience to exposure to loneliness (Perlman et al., 1984). Loneliness now affects individuals not only socially and emotionally, but also through the effects of technology. The effect of technology on loneliness is explained by Mert and Özdemir (2018) as follows: the factor that is more effective in causing people to feel lonelier is the replacement of communication established by individuals with devices such as phones and computers. Therefore, loneliness can be challenging for individuals emotionally, cognitively and socially, and even if lonely individuals want to establish social connections, they may try to tolerate loneliness by focusing on devices such as phones and computers, leading to interpersonal problems and socially maladaptive behaviors.

When the literature is reviewed, many factors affect loneliness such as; depression (Tüfekçi & Karaca, 2021; Yaşar Can & Kavak Budak, 2021), parents' divorce (Akyol, 2013), smartphone addiction (Mert & Özdemir, 2018), parental phubbing (Dong, 2022), and many others. A research conducted on attachment styles, a relationship was found between loneliness, anxious, and avoidant attachment (Aslan Cevheroğlu & Say, 2021), loneliness predicted secure, preoccupied, and fearful attachment, but not dismissive-avoidant attachment (Bingül & Çelik, 2021), a negative relationship was found between anxious and avoidant attachment styles and loneliness (Ünlü, 2015), and anxious attachment significantly predicted loneliness (Yıldız, 2021). Although there are many factors that affect individuals' loneliness, the attachment styles that individuals have also affect their loneliness.

Attachment can be defined as a temporary or permanent emotional connection that individuals develop towards a person or an object, and it is one of the human needs. According to Bowlby (1973), attachment is defined as the bond individuals establish with those who are close to them. Attachment can be described as the bond between a mother and her child that starts from the prenatal period and can show various effects at different times throughout life, and also becomes resistant to change throughout life (Yıldız, 2021). Individuals' attachment styles were established by Ainsworth et al. (1978) through the "Strange Situation Experiment" in infancy, and by Hazan and Shaver (1987) in romantic relationships in adulthood through the Adult Attachment Model, while Main et al. (1985) developed a scale called the

"Adult Attachment Interview". Consistent with Ainsworth's work, four adult attachment styles were established. In addition, "The Four Attachment Model" was developed by Bartholomew and Horowitz (1991), which includes four categories and two dimensions (self-model and other model). According to this model, four different attachment styles were identified as secure, preoccupied, dismissive- avoidant, and fearful. The secure attachment style is characterized by a positive self-model and positive perception of others (Bartholomew & Shaver, 1998; Sümer & Güngör, 1999), while preoccupied attachment style is characterized by a high sense of worthlessness and an inclination towards obsessive and fixated relationships due to unrealistic expectations for initiating a relationship (Sümer & Güngör, 1999). Individuals with a fearful attachment style do not perceive themselves as valuable, perceive others as rejecting and untrustworthy, and avoid close relationships (Bartholomew & Shaver, 1998). The dismissive-avoidant attachment style has a positive self-model but a negative other-model (Sümer & Güngör, 1999). It is observed that different names are used for different relationships in different periods when examining individuals' attachment styles.

When the literature is reviewed, there are studies related to phubbing and attachment styles (Shams et al., 2019), but due to the complex structure of phubbing, which can be considered within different dimensions, in smartphone addiction, a negative relationship was found between secure attachment and phubbing, and a positive significant relationship was found between fearful and preoccupied attachment styles (Canatar, 2020). There is a positive relationship between anxious attachment and smartphone addiction (Tok & Güzel, 2020). In terms of internet addiction, there is more pathological internet use in individuals with preoccupied and fearful attachment styles (Ceyhan, 2016), there is a relationship between anxious attachment and online gaming addiction (Çiftçi, 2021), and internet addiction negatively predicts secure attachment and positively predicts dismissive-avoidant and preoccupied attachment styles (Morsünbül, 2014). In terms of social media addiction, individuals with high levels of anxiety and avoidance are more likely to have social media addiction (Bakar Benli, 2019). Physical appearance and contingent self-esteem play a mediating role in the relationship between social media addiction and anxious/ambivalent attachment styles (Bayraktar, 2020), and an increase in social media addiction leads to an increase in secure, preoccupied, and fearful attachment styles (Kaplan, 2019). In terms of gaming addiction, individuals with high levels of avoidance and anxiety are more likely to have gaming addiction (Öziç, 2019). Furthermore, according to Yılmaz (2020), there is a positive relationship between dismissive and fearful attachment styles and game addiction.

### 1.1. Present study

Currently, everyone, young or old, regardless of where they are, uses a phone. Phubbing, which can cause mental health and other health problems in individuals, also has a negative effect on social relationships. Being belittled or ignored by others can lead to social exclusion (David & Roberts, 2017), which can also increase feelings of loneliness. It is stated that with increasing loneliness and anxiety, individuals become more dependent on their phones (Çaka, 2021). Excessive phone use is said to increase loneliness by hindering communication with other individuals in social settings (Yam & İlhan, 2020). Therefore, this study will examine the relationship between phubbing and loneliness. Loneliness can be observed in individuals of all ages and genders (Badcock et al., 2020). In addition to that, individuals who experience intense attachment anxiety need other people to feel worthy of being loved (Yıldız, 2021), but this need for closeness may not always be met, resulting in feelings of loneliness.

In this context, it can be emphasized that loneliness and attachment are related, and individuals may engage in phubbing behavior to cope with loneliness. Furthermore, there are various studies that show the relationship between addiction to smartphones, internet, social media, and gaming and attachment styles that are included in the content of phubbing, but there are very few studies on phubbing and attachment styles, so this study is thought that it will contribute to the literature. As a result of the literature review, models that examine the relationships between phubbing, loneliness, and attachment

styles together have not been found. Therefore, this research may be an important study in terms of providing a foundation for future research on the models that can be created. In this context, the aim of this study is to examine the relationships between phubbing, loneliness, and attachment styles.

## 2. Method

This study was conducted using a descriptive-correlational survey design. Descriptive analysis is a method that allows the evaluation of trends and outcomes in any subject or discipline in a descriptive manner (Akyürek, 2022; Çalık & Sözbilir, 2014). The correlational method, on the other hand, is a method used to identify relationships between two or more variables and to gain knowledge in the cause-and-effect context (Büyüköztürk et al., 2021, p.16). In this context, the study examined the relationships between phubbing, loneliness, and attachment styles, and attempted to determine whether phubbing can be predicted by loneliness and attachment styles.

### 2.1. Study group

The data of the study was collected from Sakarya University students. The study group consists of 224 women (77.8%) and 64 men (22.2%).

### 2.2. Data collection tools

#### *2.2.1. Relationship Scales Questionnaire (RSQ)*

The scale developed by Griffin and Bartholomew in 1994 was adapted into Turkish by Sümer & Güngör (1999). The scale consists of 30 items and is a 7-point Likert scale (1=does not describe me at all; 7=completely describes me). Secure and dismissive-avoidant attachment styles can be measured by 5 items, while preoccupied and fearful attachment styles can be measured by 4 items. The internal consistency coefficients of the sub-scales range from .27 to .61. The test-retest reliability ranges from .54 to .78. The Cronbach's alpha internal consistency coefficients range from 0.27 to 0.61. The scale was found to be two-factorial, with the first factor explaining 42% of the variance and the second factor explaining 27% of the variance. and both factors explained 69% of the total variance. The fearful style had a factor loading of .87 and the secure style had a factor loading of -.76 in the first factor, while the preoccupied attachment style had a factor loading of .89 and the dismissive-avoidant attachment style had a factor loading of -.56 in the second factor. Additionally, a high score on a particular attachment style indicates that the individual possesses that attachment style.

#### *2.2.2. UCLA Loneliness Scale short form (ULS-8)*

The original version of the form, developed by Russel et al. (1978), consisted of 20 items and 4 subscales, while Hays and DiMatteo (1987) reduced the scale to 8 items to create the short form. The UCLA Loneliness Scale Short Form was translated into Turkish by Doğan et al. (2011). The scale consists of 8 items and is a 4-point Likert type (1 = not appropriate at all; 4 = completely appropriate). There are reverse-scored items (item 3 and 6). The scale can range from a minimum of 8 to a maximum of 32 points. Confirmatory Factor Analysis (CFA) revealed that the model had acceptable fit indices (GFI = 0.97, NFI = 0.92, CFI = 0.94, IFI = 0.94, AGFI = 0.94, RMSEA = 0.066). Cronbach's Alpha internal consistency coefficient was measured as .72. The scale is positively correlated with social-emotional loneliness and negatively correlated with perceived social support.

#### *2.2.3. General phubbing scale*

The General Phubbing Scale was originally developed by Chotpitayasunondh and Douglas (2018) and translated into Turkish by Ergün et al. (2020). The scale consists of 15 items and is rated on a 7-point Likert scale (1 = never; 7 = always). It has four subscales (nomophobia, interpersonal conflict, self-isolation, problem acknowledgement). Scores on the scale range from 15 to 105. Confirmatory factor

analysis (CFA) showed that the model has acceptable fit indices (CFI = 0.95, GFI = 0.92, NFI = 0.92, SRMR = 0.051, RMSEA = 0.072). The Cronbach's alpha coefficient for the General Phubbing Scale was .90, indicating high internal consistency. The internal consistency coefficient of the subscales ranged from .75 to .86 (NP; α= 0.86, IC; α= 0.82, SI; α= 0.85, PA; α= 0.75).

### 2.3. Ethical principles

The ethical permission required for the study to be carried out was obtained with the decision numbered "19" at the meeting dated 13.04.2022 and numbered 06 of Sakarya University Social and Human Sciences Ethics Committee.

## 3. Findings

The regression assumptions and normality were examined prior to data analysis. In this context, extreme values were determined by considering the normal distribution graph and the skewness and kurtosis range (±3.29) specified by Mayers (2013). The result of analysis, 7 outliers were removed from the analysis. The findings related to regression assumptions and normal distribution have been presented in Table 1 and Figure 1.

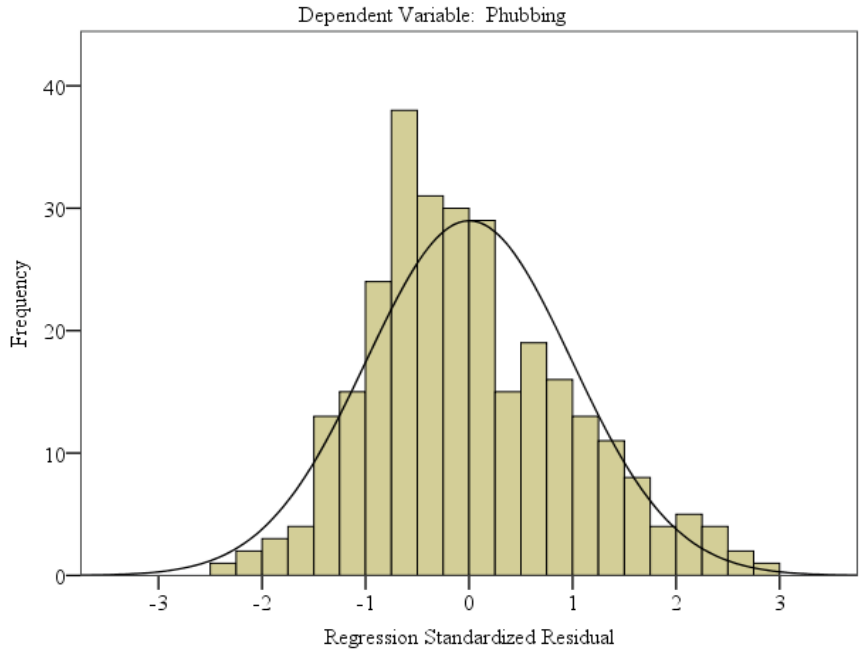
**Table 1**

*Information on Descriptive Statistics and Regression Assumptions*

| Variables | $\bar{x}$ | SD | Skewness | Kurtosis | VIF |
|---|---|---|---|---|---|
| Phubbing | 44.48 | 18.13 | .722 | -.195 | |
| Loneliness | 13.13 | 4.23 | .883 | -.055 | 1.291 |
| Secure Attachment | 15.41 | 4.38 | -.149 | -.308 | 1.506 |
| Fearful Attachment | 17.13 | 4.73 | -.020 | -.153 | 1.742 |
| Dismissive Attachment | 22.72 | 3.95 | -.267 | -.182 | 1.421 |
| Preoccupied Attachment | 14.28 | 4.16 | -.022 | -.265 | 1.510 |

**Figure 1**

*Normal distribution curve*



When Table 1 and Figure 1 were examined, it is seen that the data of the research are in accordance with the assumptions of the regression analysis. The relationships between phubbing and loneliness and attachment styles are shown in Table 2.

**Table 2**

*The Relationship Between Phubbing and Loneliness and Attachment Styles*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1: Phubbing | 1 | | | | | |
| 2: Loneliness | .28** | 1 | | | | |
| 3: Secure Attachment | .07 | -.06 | 1 | | | |
| 4: Fearful Attachment | .27** | .38** | -.32** | 1 | | |
| 5: Dismissive Attachment | .13* | .16** | -.31** | .52** | 1 | |
| 6: Preoccupied Attachment | .28** | .35** | .38** | .21** | .03 | 1 |
| $\bar{x}$ | 44.48 | 13.13 | 15.41 | 17.13 | 22.72 | 14.28 |
| SD | 18.13 | 4.23 | 4.38 | 4.73 | 3.95 | 4.16 |

**: $p$<.01. *: $p$ < .05

When Table 2 is examined, it can be seen that there is a statistically significant positive relationship between phubbing and loneliness ($r$ = .28; $p$<.01), fearful attachment ($r$ = .27; $p$<.01), dismissive-avoidant attachment ($r$ = .13; $p$<.05), and preoccupied attachment ($r$ = .28; $p$<.01) in individuals, but there is no significant relationship between secure attachment ($r$ = .07; $p$>.05) and phubbing. There was no significant relationship between loneliness and secure attachment ($r$ = -.06; $p$>.05), but there was a significant relationship between loneliness and fearful attachment ($r$ = .38; $p$<.01), dismissive-avoidant attachment ($r$ = .16; $p$<.01), and preoccupied attachment ($r$ = .35; $p$<.05). In light of the results of the correlation analysis, a regression analysis was conducted to examine whether phubbing is predicted by loneliness and attachment styles and presented in Table 3.

**Table 3**

*Regression Analysis Results*

| Predictor Variables | *B* | *SH* | *β* | *t* | *p* | $R^2$ |
|---|---|---|---|---|---|---|
| (Constant) | 4.502 | 8.400 | | .536 | .592 | |
| Loneliness | .670 | .267 | .157 | 2.509 | .013 | |
| Secure Attachment | .391 | .279 | .094 | 1.401 | .162 | .15 |
| Fearful Attachment | .762 | .278 | .199 | 2.743 | .006 | |
| Dismissive Attachment | .134 | .300 | .029 | .445 | .657 | |
| Preoccupied Attachment | .635 | .294 | .146 | 2.160 | .032 | |

When Table 3 is examined, it is observed that 15% of phubbing is explained by attachment styles and loneliness variables. Phubbing is statistically significantly predicted by loneliness ($\beta$ = .157), fearful attachment ($\beta$ = .199), and preoccupied attachment ($\beta$ = .146), while secure attachment ($\beta$ = .094) and dismissive-avoidant attachment ($\beta$ = .029) are not statistically significant predictors. In addition,

although there was a statistically significant relationship between phubbing and dismissive-avoidant attachment according to the correlation analysis, the result of the regression analysis showed that dismissive attachment did not predict phubbing.

## 4. Discussion

This study examines the relationship between phubbing, loneliness, and attachment styles. The analysis reveals a statistically significant positive relationship between phubbing and loneliness, fearful attachment, dismissive-avoidant attachment, and preoccupied attachment, while a significant relationship was not found between phubbing and secure attachment. However, while there is a statistically significant correlation between phubbing and dismissive-avoidant attachment, the regression analysis did not find that dismissive-avoidant attachment predict phubbing. The study also found that there is no significant relationship between phubbing and secure attachment. Shams et al. (2019) found that phubbing behavior is related to adult attachment styles. According to a study by Shams et al. (2019) that is similar to this research, individuals with secure attachment show less phubbing behavior because they are less prone to using their phones. Bartholomew (1991) suggests that individuals with secure attachment can control themselves and maintain internal regulation because they have confidence in themselves and others. A negative relationship has been found between smartphone addiction, one of the multidimensional structures of phubbing, and secure attachment (Canatar, 2020), and internet addiction has been found to negatively predict secure attachment (Morsünbül, 2014). The lack of a relationship between phubbing and secure attachment may be due to reasons such as the ability to maintain self-control and to be less interested in phones and the internet. In addition, individuals with a secure attachment style may not be able to predict phubbing since the high level of self-confidence facilitates their interaction with people.

Phubbing behavior did not predict dismissive-avoidant attachment. Individuals with dismissive-avoidant attachment do not want to risk their own values and prefer to establish relationships without directly connecting with others (Morsünbül, 2014). They reject relationships with other individuals and prioritize their autonomy (Sümer & Güngör, 1999), which is why there may be no relationship between phubbing and dismissive-avoidant attachment.

A positive relationship was found between phubbing and fearful attachment. High anxiety and depression have been found in individuals with fearful attachment (Ceyhan, 2016). In social media addiction, which is one of the comprehensive dimensions of phubbing, individuals experience an increase in their addiction due to their secure, preoccupied, and fearful attachment to social media relationships and the trust they have developed towards them (Kaplan, 2019). Additionally, individuals with fearful attachment tend to experience more communication-related anxiety and, as a result, prefer using the internet over face-to-face communication (Ceyhan, 2016). Furthermore, a positive relationship has been found between dismissive-avoidant and fearful attachment and gaming addiction (Yılmaz, 2020). Given individuals' communication-related anxieties, the increased trust in social media, and the preference for using the internet instead of face-to-face communication, a relationship may exist between phubbing and fearful attachment in this study. A positive relationship has been found between phubbing and preoccupied attachment. Preoccupied attachment style, which corresponds to Hazan and Shaver's anxious/ambivalent attachment style (Sümer & Güngör, 1999), causes individuals with this style to seek acceptance and approval from others, potentially becoming obsessive in their close relationships and having unrealistic expectations (Sümer & Güngör, 1999; Bartholomew, 1998). Individuals with preoccupied and fearful attachment tend to use the internet pathologically and experience difficulties in emotion regulation (Ceyhan, 2016), and may engage in more gaming behavior to fulfill their need for socialization and to increase their happiness (Çiftçi, 2021). According to Morsünbül (2014), games and the internet may be preferred by individuals with preoccupied attachment style because they can easily hide their identities, make various changes, and leave the

virtual environment easily in case of problems. In addition, individuals use social media to escape from problems in their lives (Bakar Benli, 2019).

A positive relationship has been found between anxious attachment and smartphone addiction (Tok & Güzel, 2020), and anxious and avoidant attachment are related to gaming addiction (Öziç, 2019). Thus, the positive relationship found between phubbing and preoccupied attachment in this study may be due to factors such as increased phone usage, increased gaming, increased internet usage, and difficulties in emotion regulation.

A positive relationship has been found between phubbing and loneliness. Similar findings have also been reported in other literature studies (Aydoğdu & Çevik 2020; Błachnio & Przepiorka 2019; David & Roberts. 2017; Ivanova et al., 2020). Due to the increase in individuals' phone use, they may be more susceptible to loneliness (Ivanova et al., 2020), which could explain the relationship between phubbing and loneliness. Al-Saggaf and O'Donnell (2019b) and Ergün et al. (2020) did not find a relationship between phubbing and loneliness. Different findings exist in the literature. The different findings may be due to individuals not recognizing their behavior as phubbing and instead perceiving it as normal behavior, or not being aware that their behavior constitutes phubbing.

There has been no significant relationship found between secure attachment and loneliness, but there is a significant relationship between loneliness and fearful, dismissive-avoidant, and preoccupied attachment styles. People with secure attachment can easily establish close relationships, have no difficulty initiating and maintaining relationships because they love and trust themselves and those around them, and have an internalized sense of self-worth (Bartholomew & Shaver, 1998; Sümer & Güngör, 1999). Therefore, there may be no relationship between secure attachment and loneliness. Studies have also found a relationship between loneliness and attachment styles. Birgül and Çelik (2021) found that secure attachment negatively predicted loneliness, and there was no difference in loneliness levels between genders, but singles had higher levels of loneliness.

In this study, it may be that people with secure attachment develop a more positive self-structure and therefore can tolerate loneliness more easily, which is why no relationship was found between secure attachment and loneliness. According to Yıldız (2021), loneliness is associated with anxious and avoidant attachment styles. Ünlü (2015) also found a negative relationship between loneliness and anxiety and avoidance dimensions. Birgül and Çelik (2021) found a positive relationship between loneliness and preoccupied and fearful attachment, and a negative relationship between loneliness and dismissive-avoidant and secure attachment. Despite, different findings in the literature, it can be said that there is a relationship between loneliness and attachment styles. Individuals with insecure attachment may have negative perceptions of others based on their early life experiences, which may result in dependency or avoidance of others (Ainsworth et al., 1978). Avoidance of closeness to others may lead individuals to be lonelier. Fearful attached individuals may avoid communicating with others and develop unsatisfying relationships (Birgül & Çelik, 2021), which may explain the relationship between loneliness and fearful attachment. The importance placed on autonomy and rejection of the need for others in individuals with a dismissive-avoidant attachment style (Sümer & Güngör, 1999) may explain the relationship between loneliness and dismissive-avoidant attachment. The unrealistic expectations of individuals with preoccupied attachment style (Sümer & Güngör, 1999) may lead to avoiding problems, which may explain the relationship between loneliness and preoccupied attachment. For all these reasons, the attachment styles can be an important factor in whether they are alone or not.

Among the limitations of the study, it is mentioned that the research focused on adult individuals and did not include adolescents and elderly individuals. The limitation also includes the small sample size of 288 people. It is believed that different results could be obtained with a larger sample. The research data

is limited to the year 2022. Although different results may be obtained in the future, significant results have been obtained. In addition, different results can be obtained from data collected from different age groups, such as adolescence and adulthood. To prevent phubbing, individuals' conscious awareness should be increased, and therefore, education should be given to raise awareness. In addition, individuals should give more importance to social and family relationships instead of their phones. In summary, in the age of technology, if individuals become more active in social life, they can stay away from tools such as telephone, internet and games.

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Research Article

# The Impact of Socio-Scientific Activities on Middle School Students' Attitudes and Views towards STEM

İbrahim Benek[1]
Behiye Akçay[2*]

[1] Turkish Ministry of National Education, Van, Türkiye, ibrahimbenek11@gmail.com

[2] İstanbul University Cerrahpaşa Hasan Ali Yücel Faculty of Education, İstanbul, Türkiye, bbezir@gmail.com

*Corresponding Author

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**Abstract:** In this study, middle school students were encouraged to develop STEM based socio-scientific activities, and as a result, their attitudes and opinions towards STEM were investigated. Mixed nested method was used in this research. Sample of the study consists of 16 seventh grade students, who got educated during the 2017-18 academic year in an eastern province of Türkiye. The study lasted 24 weeks during an academic year. Data was collected by using STEM Attitude Scale, STEM Interview Form, Field Notes and Informal Meetings. The research findings indicated that engagement in STEM-based socio-scientific activities significantly enhanced participants' attitudes towards STEM disciplines. Moreover, this active involvement positively impacted their skills and aspirations, fostering a greater inclination toward selecting professions and careers geared towards creating innovations to enhance human life. Additionally, it was concluded that the activities positively affected their knowledge and motivation about STEM and socialization features such as communication, interaction and sharing.

**Keywords:** STEM, Middle School, Science, Attitudes, Socio-Scientific Activities

## 1. Introduction

Today, information is changing rapidly. In order to exist in a globally competitive environment, individuals need to acquire new knowledge by following up the developments in science and technology. It is important that individuals, who will ensure the development of countries in the industry and workforce, have the required skills for the 21st century. Therefore, countries also compete for raising qualified individuals (Tas & Yenilmez, 2008). A qualified education is needed to raise a qualified workforce (Aykac, 2018). Qualified individuals are required to have skills in science, mathematics, technology, and engineering. Therefore, countries have started to attach importance to STEM (Science, Technology, Engineering, and Mathematics) education, which aims to teach these four areas by integrating them into education systems (Ulutan, 2018).

### 1.1. What is STEM?

STEM is not a new concept. The National Science Foundation (NSF) designed the concept of STEM in the 90s (Blackley & Howell, 2015). This organization initially created the abbreviation SMET, however, they reconsidered it due to negative feedback and suggested the concept of STEM. STEM has become widespread since its emergence to this day. In particular, significant changes have occurred in STEM education over the past two decades (Ozcan & Kostur, 2018; Williams, 2011).

In STEM education, the education process is organized by combining science, mathematics, engineering, and technology. In this way, the qualities of individuals improve as a result of gaining knowledge and skills related to these fields. Thanks to qualified individuals, the production in the labor market can increase significantly, and as a result, countries can succeed in the global competitive environment. STEM is considered vital since it enables students to develop the skills necessary in the 21st century (Bybee, 2013; Gull et al., 2022). Most of the developed or underdeveloped countries, organizations, and

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global companies are aware of the importance of STEM. For this purpose, countries have revised their science curricula and included STEM. This is because STEM education is important for being financially powerful (Lacey & Wright, 2009).

According to Next Generation Science Standards (NGSS, 2013), STEM professions have already become prominent all around the world. Many countries in the world have allocated a certain amount of their budget for STEM in their education systems to carry out various projects and programs for students to acquire skills related to STEM fields at each education level, from kindergarten to university. The purpose of STEM instruction is to generate STEM literate individuals (Fitzpatrick, 2007). In STEM literacy, students can understand what STEM is, follow up scientific developments related to STEM, solve problems, create products using STEM fields, search STEM-related resources, and conduct research.

### 1.2. Teaching STEM

In STEM education, it is beneficial for students to follow engineering design processes to understand the related procedure (Gencer, 2015). An engineering design process includes (1) defining the problem, (2) doing research, (3) creating solutions, (4) selecting the best explanation, (5) preparing the prototype, (6) testing and evaluating, (7) presenting, (8) revising, and (9) finalizing (Hynes et al., 2011).

### 1.3. Socio-Scientific issues

Scientific problems that concern society but do not have a clear solution are called socio-scientific issues. Controversial scientific issues such as vaccination, pregnancy sugar loading test, biodiversity, organ transplantation or cloning can change based on different cultures, societies and regions (Klop & Severiens, 2007; Walker & Zeidler, 2007). Every subject we encounter in daily life may not be a socio-scientific issue. There are several criteria for an issue to be a socio-scientific issue. Socio-scientific issues have two main features: (1) They should be related to science, and (2) they should be significant in public (Eastwood et al., 2012). Additionally, a scientific issue that contains contradictions, that does not have a single definitive solution, and that can change depending on people's beliefs, political and ethical values may also be accepted as socio-scientific issues. In this study, socio-scientific issues with a scientific and social content indicate features varying from society to society.

In the Science Curriculum renewed by the Ministry of National Education in 2018, socio-scientific issues are explained as ways which are used "to develop reasoning ability, scientific thinking habits and decision-making skills" (MoNE, 2018, p.9). When the 2019-2020 academic year science textbooks prepared by the Ministry of National Education are examined, it is seen that they include various socio-scientific topics in all 5th, 6th, 7th and 8th grades. The seventh grade program is examined within the scope of the study and it is found out that social issues such as "space pollution/space technology", "domestic waste", "recycling", "solar energy" and "in vitro fertilization" are included (MoNE, 2018).

According to the 2018-2019 MoNE curriculum, the skills related to socio-scientific topics to be acquired in the seventh grade are as follows: explaining space technologies, expressing possible causes of space pollution and predicting the possible consequences of this pollution, explaining the relationship between technology and space research, distinguishing between recyclable and non-recyclable materials in a household waste, designing projects for the recycling of domestic solid and liquid waste, questioning recycling in terms of efficient use of resources, taking care of waste control in their immediate surroundings, developing a project to deliver reusable items to those in need, giving examples of innovative applications of solar energy in daily life and technology, and discussing the ideas they produce on how to benefit from solar energy in the future. In the scope of this study, six separate socio-scientific subject matters have been used: household waste/recycling, wind/kinetic energy, solar energy, technology, global warming, and space.

### 1.4. Significance of the research

STEM education aims to provide students with 21st-century skills (Ministry of National Education [MoNE], 2016). Students who receive STEM education can develop 21st-century-skills such as critical thinking, creativity, and problem solving. Since the 1990s, there have been several studies related to STEM education and socio-scientific issues in Türkiye as well as in different parts of the world. In literature review, it is determined that studies on STEM education mainly focuses on scale adaptation, teachers'/prospective teachers'/students' views towards STEM, attitude towards science and STEM, academic achievement, STEM integration, mathematical achievement, and STEM career (Khishfe, 2017; Sadler et al., 2017). It is also determined that studies discussing socio-scientific issues along with STEM education are very limited in Türkiye as well as the world. As a result of the review, it is found out that there is a study carried out on prospective teachers by Bozkurt Altan et al. (2018). The researchers concluded that prospective teachers found it appropriate to create STEM problem situations based on socio-scientific issues because socio-scientific topics can offer features such as relevance to real life, multiple criteria and compatibility with other disciplines (Bozkurt Altan et al., 2018). In addition, Benek and Akcay (2022) concluded that STEM activities integrated with socio-scientific issues had a positive effect on students' 21st-century-skills and permanently improved these skills. Most countries recognize the importance of science, technology, engineering and mathematics education (collectively known as STEM education) in preparing citizens for the future (Treagust & Won, 2023) and to create a scientifically literate society (Cheng & Leung, 2022). In conclusion, because our study aims to develop, and make students' attitudes and opinions towards STEM permanent with socio-scientific STEM application, we believe that our study will be unique and significant.

### 1.5. Purpose of the study and Sub-Problems

The goal of this study is to find out how students' attitudes and views on STEM have changed by researching a problem in socio-scientific issues and producing solutions for the problem. In this context, we seek an answer to the question “How do STEM-based socio-scientific activities affect students’ views and attitudes toward STEM?”

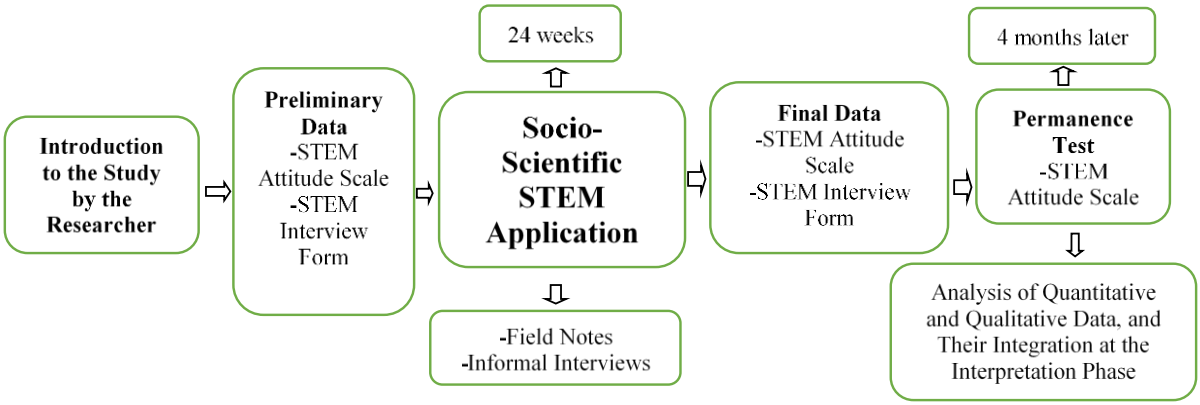
## 2. Method

### 2.1. Research model

This research was designed according to Mixed Nested Design. In a mixed nested design, a qualitative process is added to an experimental study (Creswell & Plano-Clark, 2011). The symbolic representation of the study is provided in Figure 1.

**Figure 1**

*Flow chart of the study*



### 2.2. Study group

The sample of the study consists of 16 seventh grade students (11 female and 5 male) from public middle school. The study was carried out in the region of Van, located in the east of Türkiye. Participants were selected using a simple random sampling method. The school is located in a socially and culturally disadvantaged district of the Van province according to the data of the Ministry of Industry and Technology (Acar et al., 2019). The school was damaged due to the 2011 Van earthquake, and as a result, it was demolished, rebuilt, and reopened in November 2013 with 10 classrooms. Therefore, the school does not have the necessary study areas for educational technologies, science laboratories, art activities, physical activities and eating and dining areas.

None of the students' fathers have a university degree, and there is no illiterate father. All of the students' mothers and fathers are alive and live together (Table 1). Participants' families monthly salaries were found to be between 138$-972$ (1$ was 3,6TL when the study was conducted in September 2017). According to the results of the subsistence minimum index for Türkiye in September 2017, it is observed that the monthly salaries of families of all participants are below the "poverty threshold". The minimum wage was 1,404 TL (about $ 390) in 2017 in Türkiye when this study was conducted. Therefore, it was determined that participants' socio-economic levels were low.

**Table 1**

*Demographic Information About Parents*

| | Graduation | f | % | Job | f | % |
|---|---|---|---|---|---|---|
| Father | Illiterate | - | - | Unemployment | 3 | 18,7 |
| | No education | 1 | 1 | Building attendant | 4 | 25 |
| | Elementary school | 7 | 43,7 | Tradesman | 4 | 25 |
| | Middle school | 3 | 18,7 | Barber | 1 | 1 |
| | High school | 5 | 31,2 | Worker | 2 | 12,5 |
| | University | - | | Accountant | 1 | 1 |
| | | | | Officer | 1 | 1 |
| Mother | Illiterate | 3 | 18,7 | Housewife | 16 | 100 |
| | No education | 5 | 31,2 | | | |
| | Elementary school | 3 | 18,7 | | | |
| | Middle school | 1 | 1 | | | |
| | High school | 1 | 1 | | | |
| | University | 1 | 1 | | | |

The data gathered also indicates that 18.7% of students live in a rented house, 68.7% do not have their own rooms, 37.5% have their home heated with a stove, 87.4% come to school on foot, 68.7% have no computer at home, 56.2% of them do not have the internet connection, and more than half of them do not get any kind of educational support. The participating students have 2 to 14 siblings. Five of the students have siblings studying at a university, while 11 students do not.

### 2.3. Data collection tools

*STEM Attitude Scale for Middle School Students:* It was developed by Benek and Akcay (2019). It is a five-point Likert scale consisting of 33 items and 6 sub-factors. The reliability coefficient (α) value of the scale was .887. The scale has six sub-dimensions including (1) Science, (2) Mathematics, (3) Engineering, (4) Technology, (5) Science-Mathematics-Engineering-Technology and (6) Career.

*STEM Interview Form*: Aim of this form is to find out participants' views about STEM and how the application has affected these views. The STEM Interview Form developed by the researchers has four open-ended questions (Appendix 1). Ten students were randomly selected for the interviews and the interviews lasted around 12 minutes on average. The interviews took place in the counseling service, which was relatively quieter than other parts of the school. All interviews were recorded and transcribed.

*Field Notes:* In this process, the researcher, as a "participant-observer", tried to note the interesting events in a notebook. Throughout the study, the researcher kept detailed "field notes" for the application process immediately after the application. While the researcher was keeping the notes, he tried to determine the feelings and the levels of satisfaction felt by the students during the application process.

*Informal Meetings*: In this study, the researcher also served as a teacher. He spent a lot of time with students in practice during the breaks in hallways and the garden five days a week, holding various informal discussions with them, and cordially chatting with them. The students discussed their experiences during the application process, their opinions and suggestions regarding the process, the questions they wondered about the socio-scientific issues addressed in the applications, and their opinions and thoughts about the applications, and as a result, any situation considered important was noted by the researcher.

### 2.4. Data analysis

The quantitative data was analyzed statistically, whereas the qualitative data including STEM Interview Form, Field Notes and Informal Meetings was analyzed using content analysis and descriptive analysis methods. Each student was given a code (S1, S2…). In the analysis of qualitative data, two different researchers evaluated the data. The consistency between the evaluators was assessed according to Miles and Huberman' formula (1994) and determined as 89%.

### 2.5. Information about the researcher and his role in application

Since the coordinator of the application is also the science teacher of the study group, he acted as a researcher and a teacher during the research period. The researcher is a male science teacher with ten years of experience. He has worked in the same school for nine years and completed his doctorate degree in Science Education in 2018.

### 2.6. Research process

Main application of the study was performed in the 2017-2018 academic year. Before the study, the required permissions were obtained from the Ministry of National Education. The classroom did not receive sunlight, but adequate lighting was provided with several lamps. There was no smart board application in the classroom, instead, there was a whiteboard with a board marker.

The research started in September 2017 and continued until the last week of May 2018 (Table 2). However, the activities of the study were completed in 24 weeks. The study was applied in the Science Applications course, which was given as an elective course for two hours a week. The studies were carried out in light of the guided inquiry method. In this context, the teacher told the groups about which subject to be studied, but the students decided what kind of design would be made on the given subject.

**Table 2**

*Research Process*

| Period | Week | Implementation | Time (hour) | Data collection tool |
|---|---|---|---|---|
| | 1-week | Description of the research to participants | | |
| Fall | 1-week | Application of pre-tests | 2 | -STEM Attitude Scale<br>-STEM Interview Form |
| | 4-weeks | Recycling -Domestic Wastes | 8 | -STEM Application Form<br>-Field Notes<br>-Informal Interviews |
| | 4-weeks | Motion Energy-Wind Energy | 8 | |
| | 4-weeks | Solar Energy | 8 | |
| Spring | 4-weeks | Technology | 8 | |
| | 4-weeks | Global Warming | 8 | |
| | 4-weeks | Space | 8 | |
| | 1-week | Application of post-tests | 2 | -STEM Attitude Scale<br>-STEM Interview Form |
| First Week of Fall | 4 months later | Persistence test | 1 | -STEM Attitude Scale |

In the study, no work was carried out in the first week of schools, due to the orientation of the students. In the second week, the participants were informed about the research and the groups were formed. The groups were formed by the students, and their groups were named as “4X4” (S4, S9, S11, and S14), “Ladybug” (S1, S10, and S16), “Crazy” (S5, S12, and S13), “Fantastic” (S2, S7, and S8) and “The Talented Ones” (S3, S6, S15). In the third week of the official calendar, the implementation started by applying pre-tests.

Students followed the Engineering Design Process proposed by Hynes et al. (2011) while creating their designs (Table 3). The details of one of the works (Technology: Remote Control with a ring) designed by the groups following the engineering design process during the application are as follows:

**Table 3**

*Stages of Engineering Design Process*

| Engineering Design Steps | Week | Hour |
|---|---|---|
| 1. Defining the need or problem<br>2. Researching the need or problem | Fist week | 2 |
| 3. Developing possible solutions<br>4. Choosing the best solution | Second week | 2 |
| 5. Prototyping<br>6. Testing and assessing the solution<br>7. Presenting the solution | Third week | 2 |
| 8. Redesign/revision<br>9. Decision to Finalize | Fourth week | 2 |

### *2.6.1. Studies conducted in the first week*

The groups defined the problem and specified the requirements to solve the problem. For this purpose, the students tried to get an idea about the design to be made by using a tablet, mobile phone, and a computer for an hour. The groups exchanged ideas both within the group and between the groups, as well as with the teacher-researcher, and discussed how they would make a design on the "technology" determined by the teacher. In this regard, they discussed what kind of design people would need, what they would do in their daily lives, and whether the design would be functional, useful, and beneficial. Firstly, each group made a decision within the group, and they wrote down their decisions on a piece of paper and gave it to the teacher. The teacher took ideas from all groups and assessed these ideas with all the students. With the teachers and students meeting on common ground, it was discussed how to develop a solution to find the lost remote control at home and what kind of design could be made for this purpose. As a result, each group developed various alternative solutions to make lost remote controls easier to find.

### *2.6.2. Studies conducted in the second week*

The groups developed their possible solutions and selected the best solution. In this process, the groups reconsidered the design they intended to make. In the end, the teacher and students found a common idea: they agreed that the best solution would be the "remote control with a ring" project.

STEM Compatibility Form (Appendix 2) was established by the researchers to conclude whether the activities are suitable for STEM. Before the study, students' remote control plans were evaluated according to the STEM Compatibility Form to decide whether it was compatible with STEM, and the "remote control with a ring" project was found to be compatible. After examining the forms, it was observed that the students would benefit from the topics/concepts related to the four fields in STEM for the designs they would make, and these designs would be suitable for STEM education.

In all groups, each group member first drew drafts on how to make their design. Then, all drawings were discussed and evaluated within the group and it was decided which drawing would be used in the project. The groups decided which materials they would use for their prospective design. It was agreed that the researcher would provide the materials which the students could not provide themselves.

**Table 4**

*Materials Required for the "Remote Control with a Ring" Design*

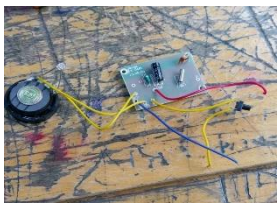
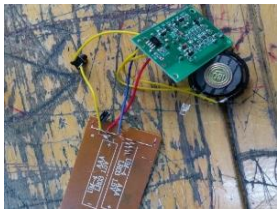
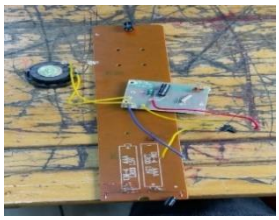
| TV remote control unit | Wireless doorbell | Conducting wire | Soldering device | Heat Silicon Gun | Scissors & Utility knife | Adhesive, tape, ruler | Screwdriver, Pliers |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |

### *2.6.3. Studies in the third week*

All groups prepared the materials necessary for making the prototype. For the missing materials, they consulted the teacher and completed the missing parts(Table 4). Then, the groups developed their first prototypes (Table 5). After creating their designs, students tested and presented it to the teacher and the other groups.

**Table 5**

*Phases of Making the "Remote Control with a Ring" Design*

| | | |
|---|---|---|
| 1- Firstly, the students separated and opened the cases of the remote controller and wireless doorbell using a screwdriver, pliers, etcetera. |  |  |
| 2-Then, they separated the electrical mechanism inside the wireless doorbell from the bell device. |  |  |
| 3-After removing the mechanism of the wireless doorbell, they connected the two cables of the mechanism to the positive and negative poles of the remote control, which was already opened, using a soldering device. |  |  |
| 4- After making the electrical connections of the wireless doorbell mechanism and the remote control, they attached the mechanism of the bell inside the remote control with the on-off button remaining outside, and then closed the case of the remote and restored it to its original state. |   | |

### *2.6.4. Studies in the fourth week*

The groups revised and finalized their designs. In the last week of their work, all groups reconsidered their designs and further developed the design. Those, who had completed the missing parts, and those, who wanted a revision, revised and finalized their designs. After making the necessary corrections, they finalized the design of the remote control with a ring (Figure 2).

**Figure 2**

*The Final Version of the Students' Designs*

The button of the doorbell was affixed to any wall of the house. This button was pressed when the remote disappeared, then a ringing sound was heard from the remote control. In this way, it would be ensured that the lost remote controls were found. After all the groups had completed their designs, the created designs were tested in the classroom by acting as if there was a search for a remote control lost inside the house. It was determined that the "remote control with a ring" designs created by all groups were working in the desired quality, and all groups were able to easily find the lost remote controls.

All groups benefited from the STEM fields which was developed by the groups, and what they did as a group are given detailed below:

**Table 6**

*The Work of the Groups in STEM Fields*

| Design | STEM Fields | Studies Conducted |
|---|---|---|
| *Remote Control with a Ring* | Science | - Electrical connections (connecting the electrical mechanism of the wireless doorbell with the electrical mechanism of the remote controller, installing conducting wire, on-off button/switch). |
| | Mathematics | -Calculate/measure the effective distance between the button and the lost remote control. |
| | Engineering | -Preparing drawings related to the design to be made.<br>-Doing works on cutting, attaching, integrating, and gathering the materials such as bell, remote control, pliers, screwdriver, etc. |
| | Technology | -Using a wireless doorbell with a tune. |

### 2.7. Validity, reliability and ethics of the study

Participants of the study were randomly selected from the two separate seventh grade classes in the school to increase internal validity. All studies were carried out on the same day, same hour, and in the same classroom environment every week. All scales were applied in the classroom by the researcher (course instructor). Also multiple qualitative data tools were used to support each other. Two independent researchers were involved in the process of analyzing qualitative data. The data obtained from the interviews were shared with the participants and confirmation about their accuracy was obtained.

#### 2.7.1. Ethical principles

The ethics committee approval for this study was granted by İstanbul University Rectorate Research Ethics Committee with decision file and number 2017/89-126531 on 26.10.2017.

## 3. Results

### 3.1. The impact of Stem-Based Socio-Scientific activities on the students' attitudes towards stem

The STEM Attitude Scale and all sub-dimensions of the scale were tested to see if the pre-test, post-test, and permanence test scores showed normal distribution. For this purpose, (1) Skewness-Kurtosis test, (2) Kolmogorov-Smirnov Test, (3) Shapiro-Wilk test, and (4) Histogram graphics methods were used. When the data showed a normal distribution, whether there was a significant difference between the test scores of the students was determined by the t-test from the parametric tests, and by the Wilcoxon signed-rank test from the non-parametric tests when it did not show a normal distribution. In the methods used, it was observed that the pre-test, post-test, and permanence test scores of the attitude scale showed a normal distribution, while the sub-dimensions of the scale did not show a normal distribution. Therefore, the t-test from parametric tests was used to test whether there was a significant difference between the STEM attitude scale pre-test and post-test scores as well as post-test and permanence test scores. The Wilcoxon signed-rank test from non-parametric tests was used for related measurements among pre-test and post-test scores of the scale sub-dimensions as well as post-test and permanence test scores.

As a result of the normality analysis conducted for the pre-test and post-test of the STEM attitude scale, it was seen that the skewness and kurtosis scores were within the normal distribution limits. The Kolmogorov-Smirnov and Shapiro-Wilk test results also provided a normal distribution (p>.05). The t-test results for the relevant samples conducted to determine whether the pre and post-test scores of students significantly differed is given in Table 7.

**Table 7**

*The Results of the T-Test on the STEM Attitude Scale*

| | Test | N | Mean | SS | df | t | p |
|---|---|---|---|---|---|---|---|
| STEM Attitude Scale | Pre-test | 16 | 101.13 | 8.24 | 15 | -31.964 | .000 |
| | Post-test | 16 | 154.69 | 5.38 | | | |

Analyzing the STEM Attitude Scale of the students, the pre-test mean is 101.13, and the post-test mean is 154.69. According to these results, a statistically significant difference was determined in favor of the post-test (p <.05) (Table 7).

Skewness-Kurtosis Test, Kolmogorov-Smirnov Test, Shapiro Wilk test and Histogram graphics methods were used to decide which statistical method to use before examining whether there was a significant

difference between the students' pre-test and post-test scores regarding the sub-dimensions of the STEM attitude scale. When all methods were evaluated together, the data obtained from the pre-test and post-test scores of the STEM attitude scale sub-dimensions did not show a normal distribution. It was decided that it would be appropriate to use nonparametric tests to analyze the data. Therefore, the Wilcoxon signed-rank test was performed for the repeated measurements to determine whether the sub-dimensions of the STEM Attitude Scale's pre and post test scores differed significantly. The results showed that there was a statistically significant difference in favor of the post-test scores ($p < .05$) (Table 8).

**Table 8**

*The Results of the Wilcoxon Signed-Rank Test for Sub-Dimensions of STEM Attitude Scale*

| Sub Dimensions | Pre-Post test | N | Mean of Rank | Sum of Rank | z | p |
|---|---|---|---|---|---|---|
| Science | *NR* | 0 | .00 | .00 | -3.536 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |
| Mathematics | *NR* | 0 | .00 | .00 | -3.526 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |
| Engineering | *NR* | 0 | .00 | .00 | -3.535 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |
| Technology | *NR* | 0 | .00 | .00 | -3.527 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |
| Science-Mathematics-Engineering-Technology | *NR* | 0 | .00 | .00 | -3.540 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |
| Career | *NR* | 0 | .00 | .00 | -3.526 | .000 |
| | *PR* | 16 | 8.50 | 136.00 | | |
| | *Equal* | 0 | | | | |

*NR: Negative Rank PR: Positive Rank

It is seen in Table 8 that there is a positive change in the students' attitudes towards the STEM fields. To determine whether this change was temporary or not, the scale was applied four months after the study to the same students as a permanence test. The t-test results for the relevant samples conducted to determine whether the pre and post-test scores of students differed significantly for the STEM attitude scale are provided in Table 9.

**Table 9**

*The Results of Permanence Test Scores of STEM Attitude Scale*

| | Test | N | Mean | SS | df | t | p |
|---|---|---|---|---|---|---|---|
| STEM Attitude | Post-test | 16 | 154.69 | 8.38 | 15 | 2.099 | .053 |
| | Permanence test | 16 | 150.12 | 5.28 | | | |

Table 9 shows that the STEM Attitude Scale post-test mean score of the students in the study group is 154.69, and the permanence test mean score is 150.12. According to the analysis, there was no statistically significant difference between the scores obtained from the post and permanence test (p>.05). In order to determine whether there was a significant difference between the pre-test and post-test scores of the STEM Attitude Scale sub-dimensions, the Wilcoxon signed-rank test was used in repeated measurements, and the results are given in Table 10.

**Table 10**

*Wilcoxon Signed-Rank Test'S Results for the Comparison of Post-Test and Permanence Test Scores of the STEM Attitude Scale Sub-Dimensions of the Study Group*

| Sub Dimensions | Post-test -Permanence test | N | Mean | Sum | z | p |
|---|---|---|---|---|---|---|
| Science | *NR* | 11 | 7.36 | 81.00 | -1.824 | .068 |
| | *PR* | 3 | 8.00 | 24.00 | | |
| | *Equal* | 2 | | | | |
| Mathematics | *NR* | 10 | 6.10 | 61.00 | -1.088 | .276 |
| | *PR* | 3 | 10.00 | 30.00 | | |
| | *Equal* | 3 | | | | |
| Engineering | *NR* | 8 | 5.25 | 42.00 | -.812 | .417 |
| | *PR* | 3 | 8.00 | 24.00 | | |
| | *Equal* | 5 | | | | |
| Technology | *NR* | 8 | 6.56 | 52.50 | -1.811 | .070 |
| | *PR* | 3 | 4.50 | 13.50 | | |
| | *Equal* | 5 | | | | |
| Science-Mathematics-Engineering-Technology | *NR* | 7 | 6.29 | 44.00 | -.399 | .690 |
| | *PR* | 5 | 6.80 | 34.00 | | |
| | *Equal* | 4 | | | | |
| Career | *NR* | 6 | 7.08 | 42.50 | -.854 | .393 |
| | *PR* | 5 | 4.70 | 23.50 | | |
| | *Equal* | 5 | | | | |

*NR: Negative Rank PR: Positive Rank

Table 10 shows that there is no statistically significant difference between the post-test and permanence test scores of all sub-dimensions of the STEM Attitude Scale (p >.05).

### 3.2. Comparison of students' opinions about before and after STEM applications

A five-question on STEM Interview Form was used to examine the opinions of students in the study group before and after STEM application. Although there are different opinions about how many participants will be interviewed, it is generally stated that this number can be between a minimum of 5 and a maximum of 50 people (Baker & Edwards, 2012; Cobern & Adams, 2020). Factors such as the content of the study, access to the sample, and research questions are important in determining this number of participants (Creswell & Creswell, 2018). In this context, interviews were held with 10 students who stated that they would voluntarily participate in the interview before and after the study. The interview was conducted with ten (10) students with the codes of S2, S3, S6, S8, S9, S12, S13, S14, S15, and S16 selected from the study group. Students' opinions were analyzed by content analysis, themes, sub-themes, and codes. The frequency and data analysis are given in Table 11.

**Table 11**

*Analysis of Pre and Post Interviews*

| | | | Pre-Application Interview | | Post-Application Interview | |
|---|---|---|---|---|---|---|
| Theme | Sub-theme | Code | f | Quotation | f | Quotation |
| STEM Profession | Engineer | *Automotive engineer* | 1 | "Dear Teacher, I can be a designer or an architect. Automotive engineers..."(S8) | - | |
| | | *Aerospace engineering* | 1 | "..For airplanes. Aerospace engineering." (S8) | - | |
| | | *Computer engineering* | 1 | "Dear Teacher, I can be an engineer. For example, computer engineering." (S9) | 2 | "Engineers, civil engineers, computer engineers,..." (S9) |
| | | *Civil engineer* | 1 | "Civil Engineer. Nothing else comes to my mind. I want to be a civil engineer." (S13) | 3 | "Computer engineer, civil engineer." (S13) |
| | | *Engineer* | 1 | "Engineering. For example, Mimar Sinan was an engineer." (S2) | 10 | "Engineers, architects." (S12) |
| | Architect | | 5 | "Architect. I do not know what an architect does." (S3) | 6 | "Architect, mathematics teacher, engineers,..." (S8) |
| | Scientist | | 2 | "Well, Scientist, doctor. I think they use science, mathematics, engineering, and technology." (S15) | - | |
| | Doctor | | 2 | "Engineer, doctor." (S16) | 3 | "Doctor, teacher, for example, science teachers, engineering." (S2) |
| | Teacher | *Teacher* | 1 | "..for example, teachers, architects. The architect prepares and draws the design of a building." (S6) | - | "Architecture, engineering, doctors, some specialized teachers (science and mathematics teachers)." (S6) |
| | | *Science* | - | | 2 | "Engineers, architects, doctors, teachers. Mathematics, science, informatics, technology design teachers." (S15) |
| | | *Mathematics* | - | | 2 | "… Math and science teachers." (S9) |
| | | *Technology design/IT* | - | | 2 | ".., informatics, technology design teachers." (S15) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Astronaut | - | | 1 | "... astronauts, for example" (S6) |
| | | Operator | - | | 1 | "… engineers, operators." (S8) |
| STEM Related Tool/Product | Tools / Products | *I do not know.* | 7 | "No, I've never seen any around me." (S15)<br>"I do not know. I do not remember." (S3) | - | |
| | | *Computer* | 2 | "Teacher, we use mathematics, science, and technology to make ships out of a tin can. It can be a phone and a computer." (S12) | 7 | "There are space rockets, cars, technological products, there are a lot of things in hospitals." (S12) |
| | | *Car* | 1 | "Yes. For example, cars, computers, fans, planes, phones." (S5) | 3 | "Cars, computers,..." (S8) |
| | | *Aircraft* | 1 | "Car, plane." (S8) | 1 | ".. the plane, phone." (S13) |
| | | *Construction Machines* | 1 | "Construction Machines" (S8) | - | |
| | | *Armored/Radar vehicles* | 2 | ".. armored vehicles, vehicles using radar." (S8) | - | |
| | | *Phone* | 1 | "No, sir. I do not know. For example, the phone." (S2) | 66 | "Computer, phone, projection, camera, dishwasher, refrigerator, all of the white appliances." (S2) |
| | | *White Appliances* | - | | 5 | "Things that provide benefits to us are useful. Refrigerator, washing machine, phone, tablet, television." (S10) |
| | | *Television* | - | | 1 | "Car, television,..." (S13) |
| | | *Tablet* | - | | 3 | "Computer, tablet, phone." (S3) |
| | | *Educational technologies* | - | | 5 | "Smartboard, computer, tablet, all technological tools, phone, refrigerator, food processor." (S14) |
| | | *Bicycle* | - | | 1 | "...for example, it can be a bike." (S8) |
| | | *Space Rocket* | - | | 1 | "There are space rockets, cars, technological products, there are a lot of things in hospitals." (S12) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | *Construction* | - | | 1 | "Houses, constructions. There is mathematics. Engineering is used. Washing machine, dishwasher." (S15) |
| | | *Hospital devices* | - | | 1 | "There are space rockets, cars, technological products, there are a lot of things in hospitals." (S12) |
| | Benefit | *Beneficial* | 3 | "Think about we invented the new car, it could go both in the air and in the sea as well as on the railways. When an accident occurs on land, it goes in the air immediately, and if there is a problem in the air, it goes on the sea. It is important for quick transportation from one place to another." (S8) | 8 | "Yes, it is useful. Fast transportation is done by car, communication is established by phone, and exercise is done by bicycle." (S8) |
| | | *Both beneficial and harmful* | 2 | "On the one hand, yes, on the other, no. It can be used for communication, but it is harmful. Because it prevents conversations and communication among humans." (S2) | 2 | "On the one hand, it's useful, but not on the other. For example, television gives us information, but when we watch too much, it hurts our eyes and is addictive." (S10) |
| | It meets people's needs/makes their job easier | | 5 | "Yes, Professor. Let's say we are going to watch a video for research on our computers, or for example, we can watch an educational video from there or using our mobile phones." (S9) | 10 | "It makes our jobs easier. For example, our mother cannot put the food everywhere, but only put it in the refrigerator. She washes clothes using a machine, not by hand. While making a cake, she puts the walnuts in the machine and making them smaller." (S9) |
| Engaging in a STEM Related Activity | Desire | | 10 | "I would love to. So I like doing those things. I like it if we do. It improves our brain. It improves our creativity." (S12) | 15 | "I would love to. Because I'm curious. It is beneficial to people." (S6) |
| | Affective features | *Loving* | 5 | "Yes, Professor. I love because." (S2) | 2 | "Yes. Because I like it. Developing tools is fun. It helps me." (S9) |
| | | *Enjoyment* | 3 | "Yes, Teacher. I enjoy it. I want to design something; I enjoy designing something." (S8) | 2 | "Yes. I like it and it will improve me a lot." (S3) |
| | | *Interest* | 1 | "Yes. Because teacher, I am interested in mathematics and science..." (S14) | 3 | "Yes. I am very interested..." (S8) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | *Fun* | - | | 2 | "Yes. Fun. I am very interested. Professor! It is useful. For example, imagine I will make an electronic product, we will do something useful, we will learn something and it is fun." (S13) |
| | Individual features | *Contribution/Benefit to the Individual* | 6 | "Yes, Teacher. I love because. It has contributions to me. For example, I can be more successful in my classes..." (S2) | 6 | "Yes. Teacher, these are very nice activities, I love them. It helps me tremendously." (S15) |
| | | *Individual development* | - | "Yes. Because both my handcraft improves and I learn more. It has contributions to me." (S16) | 2 | "Yes. I love it, it's fun. Thanks to these lessons, I have been improving myself. These fields are good for me." (S2) |
| | | *Influencing the next educational life* | 2 | "I would love to. Yes. I think it will be useful to me. So, it positively affects our future education." (S6) | 1 | "..These lessons are important for a better future." (S8) |
| | | *Creativity* | 1 | "Yes. It's a good thing. I gain information about them. It improves me. It improves our brain. It improves our creativity." (S12) | 21 | "Yes. Because my handcraft improves..." (S16) |
| | | *Academic achievement* | 1 | "It is beneficial for me, for example, makes our mathematics lessons easier. These lessons are important for a better future." (S8) | 1 | "..It is beneficial for me, for example, makes our mathematics lessons easier..." (S8) |
| | | *Career choice* | 1 | "..For example, when I have a good job, I can do that job better because I know about them." (S2) | 1 | "Yes. It's funny. It would be a lot of fun when they come together. It can positively change my career thoughts." (S14) |
| | | *Learning* | - | | 2 | "...I learn more. It has contributions to me." (S16) |
| Feeling the STEM Fields Close to You | Science | | 6 | "Science, mathematics, and technology. I like them. Science tells us about the human body, cells, or other topics, and I love mathematics since we will always use it, and I love technology, for it has both fun and research." (S9) | 8 | "Science and mathematics. Math is fun, I also love science." (S2) |
| | Mathematics | | 6 | "Science and mathematics. I am very good at math calculations. I love science as well because there is mathematics in science." (S8) | 8 | "Mathematics. Because I love it and I find it easy." (S6) |

| | | | | | |
|---|---|---|---|---|---|
| | Technology | 4 | “I love technology very much. I like surfing on YouTube. I say let me do it. I take videos, make changes, and edit them.” (S12) | 1 | “I'm already doing things related to technology.” (S12) |
| | Engineering | 1 | “Engineering field” (S2) | 1 | “Science, engineering. These things are interesting to me.” (S13) |

Table 11 shows that there is no change in the main themes stated by the students in the semi-structured interviews. However, the sub-themes of “Astronaut”, “Operator”, “Engineer”, “Architect”, “Scientist”, “Doctor” and “Teacher" emerged in the post-application interviews. The field note of the participant researcher on 05.03.2018 states “It is seen that students love the space theme. They enjoy doing an activity or a design on this subject. It is observed that they are more enthusiastic, have more motivation with an increased feeling of curiosity and excitement towards space compared to other studies.” , which supports the finding of the formation of the code “astronaut”. In both the pre and post-application interview, students thought that “Teaching” is a STEM profession. But only in the post-application interview, students stated in detail that specialized teachers (i.e. science, mathematics, technological design, informatics) could perform STEM professions.

It can be seen that there is no change in the theme of “STEM Related Tools/Products” and its sub-themes, but there is a notable change in the codes that constitute the sub-theme "Tools/Products". While students could give seven tools/product examples applicable for STEM fields in the pre-application interview, this number increased to 16 in the post-application interview. The biggest change is observed in computer and telephone products. Again, in the pre-application interview, no student gave the example of household appliances (washing machine, refrigerator, oven, etc.), while in the post-application interview, five students stated that these products were also STEM products. The informal interview field note of the participant researcher on 01.04.2018, states that *“Students could heat domestic water and could cool the warm house by using solar energy, which is an environmentally-friendly energy. In my conversations with some students during the day, they made me think that the solar panels that students use in their home designs are very useful for people, that they do not spend money on electricity thanks to this design, and that it is very beneficial to make such products.”*, which supports these findings.

No observable change is seen in the codes obtained in the pre-application and post-application interviews under the theme of “Engaging in a STEM Related Activity” and the sub-themes of “Desire”, “Affective Features”, and “Individual Features”. In the post interview, the students stated that it was fun to do activities related to STEM.

In terms of the theme “Feeling STEM Fields Close to You”, it was observed that students' perceptions of science and mathematics increased positively, their views on engineering remained unchanged, and their perspectives on technology decreased

## 4. Discussion and Conclusion

As a result of the STEM Attitude Scale, a positive change was detected in the attitudes of the students towards STEM fields. In addition, a positive change was also found between the pre-test and post-test scores related to all sub-dimensions of the STEM Attitude Scale including Science, Mathematics, Engineering, Technology, Science-Mathematics-Engineering-Technology and Career.

The results obtained in the research are similar to the studies in the literature that examine students' attitudes towards STEM with different ages and practices. Yavuz (2019) and Yasak (2017) stated that STEM-related practices had a positive impact on middle school students' STEM attitudes. Similarly, Akin (2019) argued that according to the results of a quasi-experimental study, STEM activities had a significant positive effect on seventh-grade students’ attitudes towards STEM in favor of the experimental group in Science, Mathematics, Technology and Engineering sub-dimensions. Akin (2019) concluded that students expressed positive thoughts about the engineering profession, stating that it was enjoyable and that it could be among the professions they could choose in the future.

Dogan (2019) discussed that seventh-grade students’ attitudes towards the “Mathematics” dimension of the STEM Attitude Scale did not change. In his study with seventh-grade students, Ercan (2014) concluded that some students, who did not think of engineering in terms of career planning before the applications, started to consider engineering as an alternative after the applications. In terms of the

"Science-Mathematics-Engineering-Technology" sub-dimension, no results were found in the literature for middle school students.

Four months after the original study, the STEM Attitude Scale was re-applied as a permanence test to determine whether the change in students' attitudes was temporary. The results indicated that no statistically significant difference was observed between the students' scores on the posttest and the permanence test for the scale. Based on these findings, it was concluded that STEM practice significantly and permanently improved students' attitudes towards STEM. In the literature, there is no study investigating the effect of STEM applications on the permanence of students' STEM attitudes.

The analysis of qualitative data showed that STEM activities had a positive effect on students' attitudes toward STEM related fields. The pre and post applications of STEM Interview Form showed that students acquired new information about the STEM professions, for example, they thought that the teaching profession was a STEM profession, but unlike the pre-application interview, they explained in detail which branches of teaching professions should be considered STEM professions in the post-application interview. Also, the number of students, who considered engineering and architecture as STEM professions, increased in favor of the post-application interview. From this point of view, it was concluded that STEM application positively affected students' level of knowledge about the STEM professions. Bozkurt Altan, Ucuncuoglu, and Zileli (2019) found that over half of the eighth-grade students in regional boarding middle schools provided examples of professions suitable for STEM fields. Most of the examples cited were related to engineering professions, such as computer science, electronics, civil engineering, environmental engineering, and more. Gencer (2015) conducted a STEM activity with seventh-grade students in his study and stated that the activity would contribute to students developing career awareness in the field of science.

In the context of the theme of "STEM Related Tools/Products", in the post-application interview, most of the students thought that tools and products such as cars, planes, phones, computers, tablets, televisions, telescopes, space rockets, calculators, smart boards, cameras, bikes, white appliances, etc. were produced thanks to STEM fields. From this point of view, it can be said that this application increases the knowledge levels of the students about the areas of use of the STEM fields.

It was observed that there was no noteworthy change in the codes obtained in the pre and post-application interviews in the theme of "Engaging in a Stem-Related Activity" and its sub-themes. The "entertainment/fun" code was added in the post-application interview in addition to the codes in the sub-theme of affective features in the pre-application interview. Having such a thought in the post-application interview leads us to the conclusion that the students enjoy the STEM application throughout the process. Additionally, the "learning" code was included in the post-application interview. This indicated that students acquired new knowledge and learned different things during the STEM-related activities conducted before the application. As a result, it was concluded that the program had a positive impact on students' acquisition of new and diverse information.

In their study on fifth-grade students, Gulhan and Sahin (2016) stated that STEM activities increased students' conceptual learning in science and their professional interests in STEM fields. In addition, it was concluded that within the scope of the theme of "Feeling the STEM Fields Close to You" and the sub-themes of "Science", "Mathematics", "Technology" and "Engineering", students' views on science and mathematics fields increased positively, but their views on engineering were not changed, whereas there was a decrease in their opinions regarding technology.

It was seen that in the post-application interview, the students gave the example of an astronaut as a profession and also, rocket and telescope products as tools/products, and a rocket was among the products that they would consider to make. Contrary to the pre-application interview, it is thought that

the reason for using the expressions related to space in the post-application interview was the effect of designing “space shuttle” and “rocket” on this subject as well as addressing the subject of “space” in the STEM application study. Therefore, it is concluded that the application positively affects students' thoughts on space. Ozsevgec et al. (2018) concluded from their study on middle school students that male students at all grade levels were more interested in astronomy than female students. The findings of this study overlap with the findings we have obtained in our research, that is, “The students have positive thoughts on space”.

Considering the opinions expressed by the students in the pre and post-interviews, it is seen that their thoughts of making a tool/product using STEM fields were more positive in the post-interview than in the pre-interview. Consequently, it was concluded that the application positively influenced students' ideas of designing useful products used in daily life by utilizing STEM fields. Bottia et al. (2017) concluded that students, who took STEM education, were more successful in their relationship with STEM. Upon completing his study involving seventh-grade students, Higde (2018) concluded that students experienced a sense of being an engineer, which enhanced their skills in design and measurement. Additionally, they exhibited qualities akin to a scientist, demonstrating idea generation, possessing scientific knowledge, and engaging in experiments while participating in STEM activities. Also, in a study with seventh-grade students at a middle school, Dogan (2019) concluded that the students wanted and loved STEM, their interest in STEM professions increased, and they found STEM practices fun. These findings in the literature overlap with the findings we obtained in our research. In general, this research is considered to affect students' perceptions of STEM professions positively, and it is effective in realizing that most of the products that they see in their environment are created by using STEM fields.

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**Appendices 1: STEM Interview Form**

1-Can you tell a profession that uses STEM knowledge or skills together?

2-Can you name a tool/product made using a combination of STEM skills that you see or know around you?

a) Do you think this tool/product is beneficial for society?

b) Do you think this tool/product has features that will meet the needs of people and make their job easier?

3-Would you like to participate in activities where STEM skills are used together, if so, why?

4-Which area(s) of STEM do you feel close to? Why?

**Appendices 2: STEM Compatibility Form**

The STEM Compatibility Form is intended to be a form that tests the compatibility of an activity related to STEM education or a product designed with STEM education. This form needed to demonstrate whether the designs or activities that the students in the study group made/would make were suitable for the STEM fields. To this end, a draft form was developed by the researchers. The developed draft form was sent to seven (7) experts, including two faculty members specialized in science education, one faculty member in physics education, a science teacher with a doctorate in science education, two graduate students in science education, and one science teacher. In light of the suggestions from the experts, some of the concepts/topics in the form were removed, some were combined because they

serve the same purpose, and some missing concepts/topics were added to the form. The revised form with necessary adjustments was finalized. In this study, the researcher evaluated the creation of designs made by students by integrating at least three STEM fields. Before starting the design study, design plans of the students were evaluated according to the STEM Compatibility Form. If there were at least three topics/concepts, it was thought that the design would be compatible with STEM, hence it was allowed to be made. There is room for a check mark beside each concept/topic in the form. The teacher-researcher conducting STEM education will fill this form for the event or design. The developed form is given below:

| ***STEM Compatibility Form*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Science*** | | | | | | | |
| *Buoyancy* | *Volume* | *Speed/ Velocity* | *Strength* | *Balance* | *Friction force* | *Heat* | *Weight* |
| *Energy/Energy conversions* | *Pressure* | *Lenses/ Mirrors* | *Mass* | *Gravity* | *Electricity* | *Temperature* | *Voice* |
| *Metals/ Non-metallic element* | *Light* | *Space missions* | *Environment* | *Swimming/ Submersion* | *Experimenting* | *Mixture/ Solution* | *Observation/ Forecast / Making inferences* |
| *Magnetism* | *States of Matter (solid, liquid, etc.)* | *Process change (boiling, melting, etc.)* | *Weight/ Volume* | *Ecosystem* | *Organisms* | *Inheritance / Genetics* | *Conducting/ Dielectric materials* |
| *Sense organs* | *Reflection/ Refraction* | *Microscopic creatures* | *Internal Organs* | *Physical/ Chemical changes* | *Life cycle* | *Food pyramid* | *Transplantation (face, blood, etc.)* |
| *Medication* | *Socio-scientific issues* | *Photosynthesis/ Respiration* | *Biotechnology* | *Simple machines* | *Atom* | *Acid and alkaline* | *Climate/ Meteorological events/Seasons* |
| *Insulation materials* | *Element/ Compound* | *Periodic table* | *Extinct/ Endangered species* | *Layers of the world* | *Natural events (earthquakes, hurricanes, etc.)* | *Systems in our body* | |
| ***Technology*** | | | | | | | |
| *Car/Aircraft / Ship/Train* | *Phone/ Computer/Tablet usage* | *TV-Radio* | *Solar panel/Chargers/Battery usage, etc.* | *Virtual reality/Augmented reality applications* | *Using multimedia systems* | *Using sensory techniques (light, sound, touch, etc.)* | *Using infrared sensors and remote control systems* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Using the Internet* | *Innovation* | *Robotic systems* | *3D printer* | *Hologram* | *Applications such as e-food/e-curriculum/ e-ticket, etc.* | *Simulation-Animation studies* | *Information and Communication Technology* |
| *Making Engine/Machine* | *Using social media* | *Nano card/Arduino* | *Cardiac pacemaker* | *Microprocessor* | *Medical tools and equipment* | *Using the virtual environment* | *Developing new fuel systems* |
| *X-Ray* | *Ultraviolet* | *Taking Photograph/ Video* | *Hybrid vehicles* | *Space technology (rocket, fuel, etc.)* | *Lego-Robotic applications* | *Seismography* | *LED bulbs* |
| *Digital measuring devices* | | | | | | | |
| | | | ***Engineering*** | | | | |
| *Drawing* | *Prototyping* | *Designing* | *Using engineering design phases* | *Bridge-Building Construction* | *Mechatronics* | *Urban Planning* | *Infrastructure/ Sewage construction* |
| *Construction* | *Manufacturing* | *Revising* | *Designing/ reviewing automation systems* | *Applied engineering* | *Using technical systems* | *Building power plants* | *Developing software* |
| *Drawing City - Building - Bridge - Park projects* | *Taking precautions against natural disasters (earthquake, flood, fire, etc.)* | *Designing a toy car* | *Constructing models such as aircraft/car, etc.* | *Design thinking skills* | *Producing heat/sound insulation products* | *Building a coding system* | *Developing a setting for an event* |
| *Using integrated parts* | | | | | | | |
| | | | ***Mathematics*** | | | | |
| *Calculation* | *Problem-solving* | *Angle* | *Using geometric shapes* | *Creating Chart/ /Table* | *Counting* | *Calculating Area-Land* | *Analytical thinking* |
| *Measuring* | *Ruler / Compasses / Meter* | *Ratio* | *Using a spreadsheet* | *Calculating from the memory* | *Mental calculation* | *Factorial calculations* | *Solving Puzzle, Sudoku, etc.* |
| *Logic* | *Making inferences* | *Probability thinking* | *Algorithmic Thinking* | *Duration/Time control* | *Data analysis* | *Data collection and evaluation* | |

**Article Information Form**

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Research Article

# Returning to Education After the Earthquake in the Perspective of Teachers in Provinces Declared as Disaster Areas: Problems and Solution Suggestions

Mustafa Erol[1*]
Fatih Özdemir[1]

[1]Yıldız Technical University, İstanbul, Türkiye, merol@yildiz.edu.tr, fozdemir@yildiz.edu.tr

*Corresponding Author

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**Abstract:** This research aims to reveal the problems experienced in returning to education after the earthquake in the provinces declared disaster areas and the solutions for the problems. For this purpose, the research was carried out within the scope of phenomenology, one of the qualitative research designs. The research group consisted of nine teachers working in Kahramanmaraş, Gaziantep, Hatay, Malatya and Adıyaman provinces of Türkiye. The sample of the research was determined according to the maximum diversity of purposeful sampling types. Data in the research were collected online with a semi-structured interview protocol. Content analysis technique was used in the analysis of the obtained data. The research findings are grouped under three themes: problems experienced, solutions produced, and suggestions. While the problems experienced by the teachers were examined under the titles of not being able to meet basic needs and being anxious, the problems experienced by the students were examined under the titles of transportation and absenteeism. The solutions produced were examined under the headings of establishing one-to-one communication with students, organizing activities for harmony and bonding, and providing academic support to ensure equality of opportunity.

**Keywords:** Earthquake, Education After Earthquake, Teacher Opinions

## 1. Introduction

Natural or manufactured disasters cause deep societal wounds (Arcaya et al., 2020; Bradshaw, 2004). One of these disasters is earthquakes. Although earthquakes are of natural origin, many factors, such as unconscious construction, use of poor-quality materials in buildings, and not building on good ground, cause the earthquake to become a manufactured disaster. The earthquakes that occurred in the Pazarcık (7.8 Mw) and Elbistan (7.7 Mw) districts of Kahramanmaraş on the same day resulted in significant earthquakes in 11 provinces (Kahramanmaraş, Hatay, Gaziantep, Malatya, Şanlıurfa, Adıyaman, Diyarbakır, Adana, Osmaniye, Kilis and Elazığ) caused a disaster (Istanbul Technical University [ITU], 2023). These earthquakes constitute one of the biggest disasters in our country, not only with their size but also with their impact areas covering 11 provinces. The earthquakes that occurred one after another with these magnitudes caused many losses of life and property.

It is possible to express the damages of earthquakes as loss of life, physical destruction, displacement of people, security problems, and economic losses (Deryugina, 2022). The damage that earthquakes cause significantly impacts social processes and human health (Arcaya et al., 2020). Transportation, health, education, agriculture, and other sectors are the main factors negatively affected by earthquake disasters (Marangoz & İzci, 2023). Due to the problems experienced in these sectors, people in earthquake regions have difficulties accessing services. For this reason, rapid response programs should be created by evaluating the results that may occur after the earthquake in various scenarios (Guerin-Marthe et al., 2021; He, 2021). These programs are long-term studies that require a wide variety of disciplines to work with many institutions and organizations in line with a specific goal.

Although the exact timing of earthquakes is unknown and cannot be prevented, it is possible to eliminate their destructive effects. However, people generally do not expect to be harmed by earthquakes

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(Murphy et al., 2005) and do not gain risk perception awareness (Turner et al., 1986). Although do not have sufficient awareness of the consequences of these reasons, the reflection of earthquakes on society (economic, psychological, and sociological) affects all people living in the country (Baytiyeh, 2018; Kazan, 2021; Zhang et al., 2010). In this context, as a society, our culture and awareness of earthquake preparedness should be formed against the adverse effects of earthquakes.

Practical education activities provided by teachers in schools can be a solution for the formation of an earthquake preparedness culture and awareness in society, reducing the damages of the earthquake and returning to everyday life after the earthquake (Değirmenci et al., 2019; Lazarus et al., 2003). Because disaster awareness training given at all levels is essential in order to increase the disaster resilience of the communities, reduce the rates of adverse effects from disasters and be prepared for disasters (Aksa et al., 2020; Clerveaux et al., 2010; Cvetković et al., 2015; Kurita et al., 2006; Varol & Kırıkkaya, 2017). On the other hand, education is one of the most effective tools for countries to cope with the social trauma caused by disasters (Bensalah, 2002; Le Brocque et al., 2016). Preparing for the problems arising from earthquakes and creating social awareness about natural disasters are effective methods for minimizing the damages caused by earthquakes, especially in countries such as Türkiye that are at risk of earthquakes (Öztürk, 2013). Because ignorance about earthquakes and a lack of awareness about earthquakes increase people's risk factors for earthquakes (Akpolat et al., 2021). According to Hurnen and McClure (1997), individuals with high earthquake knowledge were likelier to participate in earthquake damage reduction studies. As individuals' level of knowledge about earthquakes increases, their ability to prepare for earthquakes and create safe living spaces also increases (Aydın & Coşkun, 2010; Özdemir et al., 2001). Because among the most important causes of loss of life and property in the face of earthquakes, the inadequacy of the measures taken and the insufficient awareness of society about earthquakes are shown (Karakuş, 2013). In this context, there is a need for cooperation between the individual, family, neighborhood, local government, regional, national, and international dimensions to reduce the damages and be prepared for the earthquake. Because the participation of the family and the stakeholders in society in forming an earthquake culture in the society is essential not only for the development of disaster education but also for its sustainability (Takeuchi et al., 2011).

Children constitute a large segment of the population most affected by disasters (Le Brocque et al., 2016; Peek, 2008). Incorporating appropriate knowledge and skills about hazards and disaster risk reduction into school curricula, starting early, will significantly contribute to a safe society and disaster risk reduction (Musacchio et al., 2016). In this respect, earthquake education and awareness should be an education starting from preschool education and continuing throughout life in primary and secondary education (Karakuş, 2013; Sharpe & Kelman, 2011). Because it is vital to provide children with the knowledge and skills about hazards and disaster risk reduction in schools in order to protect these children against disasters that will occur today and to build a safe society in terms of disasters in the future (Ünalan et al., 2020; Musacchio et al., 2016). In addition, with this training, students can raise awareness by informing their families and close circles about earthquakes (Davis et al., 2003). Students' lack of knowledge about earthquakes may cause them to continue their traditional views about earthquakes and to fall into various misconceptions (Tsai, 2001; Ross & Shuell, 1993).

### 1.1. Purpose and importance of the research

Education plays a significant role in mitigating the impact of natural disasters, particularly earthquakes. However, it is worth noting that the education sector itself is highly vulnerable and prone to substantial disruptions in the event of such disasters. The adverse effects of disasters on educational institutions encompass several aspects, including the disruption of school access, physical harm to school infrastructure, impairment of routine school services, hindered educational accessibility, and diminished student motivation to attend school. In 2010, approximately 11,000 schools in Pakistan

were destroyed or severely damaged by a significant earthquake (Chuang et al., 2018). In the earthquake in Mexico City, the capital of Mexico, in 1985, nearly 25 school buildings were destroyed, and 760 school buildings were severely damaged (Gratton et al., 1986).

Similarly, after the earthquakes that took place in our country centered in Kahramanmaraş, Pazarcık, and Elbistan on February 6, 24 out of 20,868 buildings affiliated to the Ministry of National Education in the region were destroyed, and 83 received heavy damage. This situation has brought many problems in schools. In this context, this research examines the post-earthquake education process from the teachers' perspective. In this respect, research aims to reveal the problems experienced in returning to Education after the earthquake in the provinces declared disaster areas and the solutions for the problems.

## 2. Method

The present investigation was conducted within the framework of a phenomenological design, one of the qualitative research designs. The primary objective of the phenomenological design is to elucidate diverse experiences about a specific phenomenon (Fraenkel et al., 2012). When disclosing these experiences, the researcher ensures that the participants engage in a thorough and enduring involvement (Moustakas, 1994). This research involved the implementation of long-term interviews with teachers employed in the region after the earthquake. Long-term interviews were employed to uncover a limited number of experiences.

### 2.1. Research group

The research group was determined by sampling the maximum variety of purposeful sampling types. Maximum diversity aims to identify and define the main themes that include many differences in the sample (Patton, 2015). In the maximum diversity sampling type, it aims to reflect the differences of individuals who may be a party to the problem in relatively small sample groups at the highest level (Yıldırım & Şimşek, 2013). Therefore, while forming the research group research, diversity was increased with teachers from different fields and ages working in provinces adversely affected by the earthquake. Demographic information about the participants is presented in Table 1.

**Table 1**

*Student Distribution by City, Department, Length of Occupation, and Gender*

| | City | Section | Occupation Period | Gender |
|---|---|---|---|---|
| S-1 | Malatya | Turkish Language Teacher | 13 | Male |
| S-2 | Kahramanmaraş | Social Studies Teacher | 10 | Female |
| S-3 | Malatya | Physical Education Teacher | 18 | Female |
| S-4 | Hatay | Science Teacher | 14 | Male |
| S-5 | Gaziantep | Religious Culture and Ethics Education Teachers | 13 | Female |
| S-6 | Malatya | Primary School Teacher | 26 | Female |
| S-7 | Adıyaman | Turkish Language Teacher | 11 | Male |
| S-8 | Kahramanmaraş | Primary School Teacher | 21 | Female |
| S-9 | Hatay | Guidance and Psychological Counselor | 6 | Male |

### 2.2. Data collection tool and data collection process

The data collection process involved using semi-structured interviews to gather information that would shed light on the participants' experiences, aligning with the research objectives. The researcher constructs an interview guide encompassing predetermined questions during the semi-structured interview. However, the researcher also has the flexibility to incorporate additional questions based on the specific circumstances that arise during the interview (Sönmez & Alacapınar, 2016). Additional inquiries can be organized during the semi-structured interview to elicit further information from participants, enhance understanding, or illustrate concepts (Merriam, 2009). In preparing the interview questions, 10 sample questions were determined from studies conducted in the relevant literature. For the determined question pool, opinions were received from 7 academicians who work in the field of earthquake education and have a doctorate in Turkish language education. In the context of expert opinions, the interview form included 7 basic questions. These questions were asked in additional questions at the end during the interview.

The data for this research were collected through interactive means (zoom and google teams) within an online environment. The interviews were captured utilizing the voice recording functionality of the computer. A precaution was taken to permanently delete the data after transcription to safeguard participant confidentiality and prevent unauthorized access to the interview data. The interviews were conducted by the researchers and had an average duration of 27 minutes.

### 2.3. Analysis of data

Data analysis in qualitative research encompasses several vital steps: data preparation, coding, theme development, and presenting findings through various means such as tables, figures, or discussion (Creswell, 2016). The examination of qualitative data primarily encompasses two fundamental forms of analysis: descriptive analysis and content analysis. The present research employed content analysis as a method for analyzing the data. Content analysis refers to systematically examining qualitative materials of substantial volume, aiming to identify recurring words and themes. This process involves condensing the data into smaller qualitative units, thereby enabling the extraction of meaningful insights (Patton, 2015). Specifically, a coding system was employed wherein the first participant was denoted as "S-1," and the sixth participant was denoted as "S-6". The data is organized according to thematic categories and is supported by relevant teacher opinions in direct quotations.

### 2.4. Reliability of qualitative data

To enhance the internal validity of the research, the researchers employed a series of probes and momentary questions during the individual interviews conducted with the teachers. Two distinct researchers conducted the coding process separately to ensure inter-coder reliability while analyzing the acquired data. The themes and codes identified were further validated by including expert opinions. Direct quotations from the interviews with teachers were incorporated in developing the codes and themes for the research. Furthermore, there was a 30-day interval between the data collection and subsequent data analysis phases. Efforts have been made to minimize the potential influence of researchers' personal opinions on the analysis process. To enhance the research's transferability or external validity, the research group was chosen using convenient sampling, one of the purposeful sampling methods. The interviews were conducted in real time with the teachers via an online platform. Furthermore, a comprehensive literature review was undertaken to ensure the research's confirmability (external reliability). Additionally, prior to administering the interview questions, pilot interviews were conducted with the teachers, and the questions were subsequently refined based on the feedback received from experts in the field.

### 2.5. Ethical principles

The ethics committee approval for this study was granted by Yıldız University Rectorate Social and Humanities Research Ethics Committee with decision file and number 2023.07 on 02.07.2023.

## 3. Finding and interpretation

This research's findings, which examine the problems experienced in returning to education and training in disaster areas after the earthquake and teachers' opinions about the solution to these problems, are explained within three themes. These themes are problems experienced in the context of expert opinions and data, produced solutions, and suggestions. Identified themes were explained by supporting one-to-one quotations from teacher opinions.

### 3.1. Experiencing problems

In the interview with the teachers, the theme of "Experienced Problems," which includes the problems experienced in the education process in the disaster areas after the earthquake, was examined within the framework of two sub-themes: the problems experienced by the teachers and the problems experienced by the students according to the teachers.

**Table 2**

*Experiencing Problems*

| Themes | Sub-themes | Codes |
|---|---|---|
| Experienced Problems | Problems Experienced by Teachers | The Problem of Not Meeting Basic Needs |
| | | Fear and Anxiety |
| | Problems Experienced by Students According to Teachers | The Problem of Access to School |
| | | Transportation Problem |
| | | Absenteeism |

#### *3.1.1. Problems experienced by teachers*

The earthquakes in Pazarcık and Elbistan in Kahramanmaraş on February 6, 2023, caused many problems for teachers working in 11 provinces. It is possible to express these problems as shelter and nutrition, fear and anxiety. Explanations regarding these problems are presented below, supported by verbatim quotes from teachers' opinions.

##### *3.1.1.1.The problem of not meeting basic needs*

One of the biggest problems experienced by teachers working in areas declared disaster areas after the earthquake is the inability to meet their basic needs of shelter and nutrition. Especially with the devastating effect of the earthquake in the region, there were problems in finding a rental house and food materials due to transportation. In addition, teachers needed help accessing cleaning products, communicating, finding potable water, and finding the necessary energy source for heating. According to the teachers, healthy education and training can only be realized by overcoming these problems. Because teachers have to meet their own basic needs first. For example;

> S-1 "*For many of us, the biggest problem was sheltered in the first stages, but it is still not solved for most of us. Naturally, we cannot help our students without meeting our own needs.*"

S-7 "*The most common problem is accommodation. Buildings are destroyed, everywhere is in ruins, some buildings are said to be slightly damaged, but you cannot enter that building whose wall is completely destroyed.*"

S-9*"We haven't started the task yet and these are the questions you asked, I would like to know where we will stay and what will happen, psychologically, of course, there were difficulties in adaptation.*"

S-3*"Most of our students stay in tents because their houses are burned down, and even their basic needs are a big problem, let alone education. Likewise, even if the houses are slightly damaged, no one can trust their house because the earthquakes still continue, they cannot leave their children and come to school, most of them are already trying to fill the time with reports in other provinces.*"

S-4 "*Housing is the first need. Unfortunately, the issue of Housing is left entirely to the initiative of the managers. I am not from Kırıkhan, so I do not have a house; my rented house is heavily damaged. Shared toilets and bathrooms are a big problem in container cities. Electricity and heat are involved in the same problem*."

In addition, teachers stated that they need help finding "hot water, toilet, electricity, and clean water" in tent and container cities. In this context, the inability of teachers to meet their basic needs constituted the most crucial problem affecting the education process after the earthquake. Because the teachers stated that they would only benefit the students if they met their and their family's needs. Ö-6 "*There were difficulties in housing. Our waters are dirty and continue. We could not even meet our family's needs, we did not even have time to think about education*" statements support this situation.

### *3.1.1.2.Fear and anxiety*

According to the teachers, the tremors experienced during or after the earthquake caused fear and anxiety in many teachers. In this case, the teachers were psychologically worn out. The feeling that the earthquake would never end, the fear of death, and the anxiety of losing loved ones affected the teachers negatively in many ways. These damaging processes have caused fear and anxiety in many teachers. This state of fear and anxiety negatively affected teachers' focus, motivation, quality of life, and attitudes. For example;

S-5 "*Sometimes I felt uneasiness, sometimes fear. Because I experienced 2 big earthquakes inside the house.*"

S-7*"Psychologically, life has started to return to normal, but there is work everywhere, the destruction continues. So how can it be improved. He is constantly shaking, which affects him psychologically*."

S-2*"After the earthquake, the most experienced problem was psychological problems. We are constantly shaking and these shakes cause great panic in people, especially in aftershocks over five, there was great panic in the city. But since the school is solid in our region, we continued our education in schools rather than tents.*"

In addition, it is seen that one of the most important reasons for the fear and anxiety experienced by teachers after the earthquake stems from the loss of students. Teachers were significantly affected by the death of their students and stated that they could not focus on education because of this process. S-4's "*The death of a few of my students has been keeping me awake for months even though I am far away, I am normally a person who sleeps when my head hits the pillow, but this incident hurts me indescribably" and*Ö-6's "*We were distraught that we could not see most of our students, so it is difficult for us to teach, there are more things in life than academic lessons."* statements support this situation.

#### *3.1.1.3.The problem of access to school*

The fact that many houses in the earthquake zones were heavily damaged or demolished and the lack of rental houses forced the teachers to reside in the surrounding provinces or in the villages where the destruction was less. In this case, it limited teachers' access to the schools where they work. Especially teachers who do not have a private vehicle have difficulties in transportation to school. In this case, it negatively affects the education and training processes after the earthquake. For example;

> S-7 "*Now, since there are no houses in the center, teachers have to come even from the surrounding provinces. Now, for example, the man comes from Elazığ. He cannot come, so they come in turns."*

> S-5 "*Those who come and go from the villages who do not have a private vehicle have a lot of problems. Transportation in the city is a big problem. For example, the lady works too. If she doesn't leave me in the morning, it is very difficult for me to go to school. There is no transport system, so there is no city.*"

### *3.1.2. Problems experienced by students according to teachers*

According to the teachers, many problems negatively affected the students after the earthquake. These problems are transportation problems, absenteeism, and fear and anxiety. Detailed explanations about these problems that negatively affect students are presented below.

#### *3.1.2.1.Transportation problem*

There are significant problems in transportation because the schools destroyed or severely damaged in the earthquake area are moved to different regions, there is no transportation network and service system in the cities, and teachers live in villages and other cities. These problems, on the other hand, negatively affect education and training activities. Due to the devastating effect of the earthquake in the region, the inability to provide an adequate service network for students, the destruction of students' schools, and therefore having to go to different schools by bus are among the problems experienced by students. For example;

> S-3 "*Since our school was heavily damaged, we temporarily came to another building nearby. If a few students can come this time, the new school cannot come to them because it is far away from them, because the means of transportation are running very little, and there is no shuttle anyway.*"

> S-6 "Schools *We had to go to other schools because it was damaged. We had transportation difficulties, transportation was* minimal."

#### *3.1.2.2.Absenteeism*

Due to the destruction in the region after the earthquake, students' attendance at school was adversely affected. According to the teachers, reasons such as the transition to bussed education as a result of the destruction of schools or severe damage, the moving of students to different provinces with their families, the fact that students do not have to attend school, and the students living in tents do not want to leave their families are among the biggest reasons for student absenteeism. Due to these problems, very few students attend school, and as a result, educational activities are negatively affected. Some teacher statements that support these statements are as follows;

> S-2*"We have many students who do not come because students do not have to attend. They never came, so the classes are almost half. That's how we ended this period, frankly, in half."*

> S-7"*The biggest problem after the earthquake is that students cannot attend school due to transportation. We normally have 100 students, but the number of students coming to the school is 6*."

S-3 "*After the earthquake, education became a problem in itself. Neither the students nor the teachers could come to school.*"

In addition, some students of the teachers lost their lives due to the earthquake. Due to this situation, classmates want to avoid coming to school. Because some students have lost their closest friends, teachers stated that this situation causes psychological problems and makes students feel negative emotions (anger, sadness, inability to feel next to them, fear, anxiety, etc.) toward school. S-3's "*children have lost their classmates, it is a tough situation for them. Your best friend is not with you when you come to school. These problems affect absenteeism*" statement supports this situation.

### 3.2. Solutions produced to adapt students to the process

The non-teachers were also asked what solutions they came up with to increase students' attendance at school and support students academically. These solutions, produced according to the teachers, were collected under the sub-themes of "Communicating One-to-One with Students, Organizing Activities, and Supporting Academically."

**Table 3**

*Solutions Produced to Adapt Students to the Process*

| Themes | Sub-themes | Codes |
|---|---|---|
| Solutions Produced to Adapt Students to the Process | Communicating One-on-One with Students | Communication |
| | Organizing Harmony and Bonding Events | Support |
| | Providing Academic Support for Equal Opportunity | Feel Loved |

#### *3.2.1. Communicating One-on-One with students*

Teachers stated that they communicated face to face with their students and colleagues when they returned to education after the earthquake. Teachers also stated that they provided psychological support to their students and colleagues in this way. Teachers stated that students need to talk, being cared for by each other makes them feel comfortable, psychological support should be provided, they should feel loved, and they should be able to give the message that they are with us. The teachers provide all this support by establishing one-to-one communication with the students. S-6 described this situation as "*We took care to communicate effectively by touching each child by establishing one-to-one communication.*" explained. At this point, to protect children from the destructive effects of the earthquake and support them, it is necessary to communicate with each student, and the student should be with their teachers, whom they value on their difficult days. Some of the teacher's views that support these statements are as follows;

S-2 "*I also personally guided children one-on-one. Because I received a TUBITAK project related to earthquake drill during the November break. Here, the project was made because there was a big earthquake expected. I was already trained for before, during and after. Since I received psychological support training at the time of the earthquake, we are not experts in the field of psychological support as much as we can, but at that time I also put it into practice during the earthquake, I don't know, there was a sense of duty, I don't know.*"

S-3 "*In the meantime, I reached most of my students, I call and ask, I talk, I try to be with them financially and morally. Even if I can't do anything, I say that I love them and that this situation will pass and better times will come, believing in my heart. I think it's much more important to us right now. Love heals every wound."*

S-9 "*Of course, the interview with the students who wanted to, as a requirement of my branch, about the psychological resilience and the acceptance of the normality of the events, was not very professional, of course, because it was over the wire.*"

S-5 "*We had few students, there was a fear and uneasiness among those who came and their families, we had conversations that would make them forget what they went through.*."

In addition, teachers also communicated with parents one-on-one. In this communication process, teachers provided educational support to parents on how to treat children in these difficult times, what activities to do, and how to tell students about losing their friends. Ö-1 "*I always answered the calls of the parents, I tried to relieve their conflicts about the school by talking. I tried to explain to the children what activities should be done and how to approach the children.*" supports this interpretation.

### *3.2.2. Organizing harmony and bonding events*

Teachers stated that after the earthquake, they carried out various activities to ensure children's adaptation to school, to support the bond between their friends, and to support their academic and emotional skills. With these activities, teachers aimed to ensure that students stay caught up in educational activities and to protect children from the psychological effects of the earthquake. The most preferred activities by the teachers are creative drama, cooperative learning, sports activities to establish friendship ties, nature walks, music-supported skill training, in-school activities to make people like school, visits, and fun picnics. According to the teachers, the primary purpose of these activities is to increase school adjustment and strengthen the bond between peers. Because in these difficult times, the support of friends or close friends is significant for students to get through the process. Teachers stated that with these activities, they tried to contribute to the student's return to everyday life and their academic skills. Some of the teachers' opinions that support these statements are as follows;

S-1 "O *horses, awards... More precisely, by doing what they want as a student, more than what I want as a teacher. Besides the lesson, I tried to get away from the misty air of the earthquake, to make people forget what happened."*

S-8 "A *visits to relatives and friends. Being in different environments, different activities, clown shows, meals, games. Have fun. picnics. In this way, I bring students closer together."*

S-2" *Here we organized activities and tournaments mostly like this outside, whether it be a football tournament, a volleyball tournament, dodgeball... Because there are things that children might like, here we took them for a nature walk. Communication and cooperation between them became stronger*."

Teachers primarily try to provide emotional adaptation rather than academic success to support children's education and training activities in this context. In other words, according to the teachers, academic success-oriented education will only reach its goal if it eliminates emotional problems. Within this, various group activities and friend support the emotional adaptation of children. Ö-6 "*After the earthquake, we needed to attract children to school rather than teaching. In this context, many of my friends have organized activities in their own way to support children's emotional adaptation and re-establish the bond with the school and their friends.*" statement supports this situation.

### *3.2.3. Providing academic support for equal opportunity*

Teachers have carried out various academic activities to prevent learning losses in students and provide equality of opportunity among students. In particular, the teachers provided additional training to the students to prevent the level of difference between the students and their peers and to ensure equality of opportunity. Students who do not have equal opportunities compared to their peers in educational environments show a lack of academic success. Because the presence or absence of educational environments and materials directly affects academic achievement. Teachers have implemented various academic activities so that students can have equal opportunities. These activities can be listed as giving additional homework, doing much repetition, organizing voluntary summer schools, providing distance education support, opening additional courses to students preparing for exams, and providing additional material and book support. However, teachers stated that distance education support is limited. Because teachers stated that most of the students need more technological infrastructure. The opinions of teachers supporting this interpretation are as follows;

S-1*"I tried to support the students' detachment from the lessons with plenty of repetition and award-winning assignments."*

S-4 "*I followed the progress of my students academically and made up a scholarship exam distance education plan for the summer."*

S-7 "*I gather students preparing for the exam in a Primary School. I explain what topics are missing for the exam, of course, I can do this to incoming students.*."

S-6 "*We were also in a very difficult situation. We asked for online education and book donations from other provinces. We tried to keep our psychology good. Our state must first correct this situation so that the additional lessons we provide do not have sufficient infrastructure for distance education in their children."*

In addition, teachers stated that they support students in subjects such as adaptation to school, motivation, psychology, attitude, anxiety, and interest in lessons to offer equal opportunities to students. Ö-1 "*We provided support to students to increase their interest, attitude and motivation to the lessons as well as academic activities so that they do not fall short of their peers in the country*, " supports this situation.

### *3.3. Suggestions*

When the opinions of the teachers were examined, suggestions were made on the issues of removing compulsory service, providing a safe environment, making financial improvements, designing the transportation system by the number of students, and bringing students together in different social environments without opening schools in order to solve the problems experienced in the disaster area after the earthquake. The opinions of teachers supporting these statements are as follows;

S-5 "*We demand that the necessary measures be taken to exempt our teachers and the education community working in earthquake zones from compulsory service, that safe home and education environments are prepared as soon as possible, especially for teachers and students, and that financial support is improved accordingly."*

S-9*"Uncertainties about what will happen come to my mind all the time. I want this situation to be shared with us as soon as possible and I want to live with awareness of what will happen. The uncertainties should be shared with us with solutions without causing anxiety and obsessions in many teachers I meet."*

S-4*"This perception changes and if each teacher is put in a personal container (with its own bathroom and toilet) and an air conditioner in each container, the housing problem is solved. We can see an example of this in Nurdağı district."*

S-7 "*For example, something like this could be done. Without transportation and security, there is no participation in education. We provided them, maybe they could participate in the training*."

S-2"*But in order for the students to see each other, maybe the school might not be opened, other methods could be found to bring the students together, or our classes could be in tents so that we can feel more comfortable."*

## 4. Conclusion and Discussion

This research presents the findings of an investigation that seeks to uncover the challenges encountered during the reintegration into education following an earthquake in provinces designated as disaster areas. The research also proposes potential solutions to address these challenges. The results are organized into three overarching themes: the problems encountered, suggestions for solutions, and recommendations. This part presents the findings and analysis of the themes, sub-themes, and codes.

Upon analysis of the teachers' perspectives, it was discovered that they encountered numerous challenges inside the provinces designated as disaster regions after the earthquake. The foremost challenge among these issues is the inability to fulfill fundamental necessities. One of the primary challenges teachers face is the inability to secure suitable Housing, particularly in the aftermath of an earthquake. Additionally, the disruption of transportation lines hinders their access to an adequate food supply. Furthermore, teachers need help accessing necessities such as sanitary facilities, hot water, and clean drinking water. These issues have adverse effects on the professional life of educators but also impose constraints on their educational and instructional endeavors. In the context of large-scale disasters, the expansive geographical scope of the event leads to a substantial influx of individuals seeking to aid their loved ones from various regions across the nation. This surge in vehicular traffic poses significant challenges, resulting in congestion and subsequent disruptions to domestic and international transportation routes. Moreover, local authorities may relocate from their respective provinces and cities in response to the disaster. These problems make it difficult to help from the center (Yalçın, 1999).

One additional challenge educators encounter is the fear and anxiety experienced as a result of the profound impact of the earthquake. The teachers were adversely affected in various ways by the unpleasant emotions stemming from the persistent aftershocks of the earthquake, including a sense of perpetual uncertainty, fear of mortality, and fear of the potential loss of their loved ones. These adverse processes have resulted in the experience of fear and worry among a significant number of teachers. Fear and worry adversely affected teachers' focus, motivation, quality of life, and attitudes. The impact of traumatic occurrences, such as the loss of loved ones after an earthquake, individuals directly affected by the destruction, and survivors who endured being trapped under debris, can be experienced with heightened intensity. In conjunction with the initial anxiety experienced after an earthquake, this anxiety can induce heightened levels of dread and anxiety in persons after aftershocks or other natural calamities (Pane et al., 2008). Anxiety and fear are among the variables that impact the psychological well-being of persons. Following the seismic event, students were confronted with various concerns, including the devastation of their residences, the bereavement of their dear ones, personal injuries, and analogous circumstances (Turhan, 2022).

Furthermore, it is essential to consider that the psychological well-being of pupils may be adversely impacted by their fear of experiencing another earthquake (Kurt & Gülbahçe, 2019). Conversely, persons who transition from their stable and comfortable residences to temporary dwellings such as

tents or container cities, which may present security challenges, may experience heightened fear due to the potential exposure to issues related to security, protection, and shelter (Long & Wong, 2012). The findings of this research provide empirical support for the dread and anxiety reported by the teachers included in our research.

Based on the teachers' observations, the attendance of pupils at school was negatively impacted due to the devastation that transpired in the area following the earthquake. Students do not attend school primarily due to transportation-related issues. Furthermore, a significant contributing factor to student absenteeism is the relocation of families, which often entails pupils leaving their familiar surroundings and friends behind. Consequently, students may be reluctant to attend school due to losing these social connections. Certainly, transitioning to a new school environment can present challenges for students, which might contribute to increased absenteeism. Following the seismic event, a significant proportion of the student population was compelled to evacuate their residences alongside their respective families.

Consequently, pupils need access to an appropriate environment conducive to studying and engaging in remote educational activities. According to Ki (2020), the occurrence of this issue has the potential to impede earthquake victims' access to education. In their research, Cuaresma (2010) investigated the correlation between disaster exposure and educational outcomes, particularly regarding human capital. The research's findings indicate a robust and adverse association between catastrophe exposure and educational participation. In their research, Paudel and Ryu (2018) investigated the correlation between the seismic event of magnitude 6.9 on the moment magnitude scale (Mw) that transpired in Nepal in 1988 and its impact on educational achievements. Upon examination of the collected results, it was discovered that the continuing Education and educational completion rate was low.

Similarly, the research conducted by Caruso and Miller (2005) investigated the correlation between the seismic event of magnitude 7.9 on the Richter scale, which took place in Peru in 1970, and its impact on educational achievements. Upon examination of the acquired statistics, a discernible decline in educational involvement was seen, exhibiting variations based on gender. To clarify, the seismic event has been found to hurt the educational duration of male individuals, resulting in a reduction of around 0.5 years compared to their unaffected counterparts.

Similarly, females have a more pronounced decrease in educational duration, with a reduction of approximately 0.8 years. In addition, The research conducted by Segarra-Alméstica et al. (2022) investigated the impacts of Hurricane María and the earthquake in 2020. Following the natural catastrophe, it was determined that the kids residing in the affected region encountered difficulties attending school. In a research conducted by Pane et al. (2008), the researchers examined the collective effects of Hurricanes Katrina and Rita in 2005, drawing parallels to seismic events such as earthquakes. The research revealed that a quarter of public-school children in Louisiana experienced displacement because of hurricanes, leading to a portion of pupils not enrolling in school.

Additionally, absenteeism emerged as a significant concern. The findings of this investigation are consistent with the findings of our research. In the present context, it can be argued that the occurrence of natural calamities such as earthquakes poses challenges to the accessibility of education.

Teachers have also devised multiple strategies to facilitate students' acclimation to the educational environment and mitigate issues related to student absence. One of the most crucial aspects is the establishment of direct communication channels between educators and pupils, as well as between educators and parents. Educators assert the need to maintain ongoing communication to offer pupils psychological assistance and foster a sense of connectedness. Another proposed option involves implementing activities to foster harmony and strengthen interpersonal bonds. Educators deem it

crucial to cultivate interpersonal connections with peers and the educational institution, to foster student retention within the academic setting.

Furthermore, educators have asserted that pupils need to be afforded equitable opportunities relative to their peers, resulting in a decline in their scholastic performance. In response to this particular circumstance, educators have used various strategies, including developing supplementary instructional materials, providing virtual training opportunities, and facilitating online courses. The extant scholarly literature underscores a notable decline in student attendance and a concomitant rise in absence rates in the aftermath of the seismic events. According to Silwalvd's (2018) research conducted in the aftermath of the earthquake in Nepal, it was observed that students refrained from attending schools due to the unavailability of suitable accommodations, resulting in their temporary residence in tents. Additionally, the research findings indicated a significant decline in the overall student population inside educational institutions. The present circumstance hurts the development of kids' academic and fundamental literacy abilities (Gomez & Yoshikawa, 2017; Pane et al., 2008; Segarra-Alméstica et al., 2022).

Similarly, students experience adverse academic consequences because of challenges such as disrupted school attendance and difficulties with attention following an earthquake disaster. The presence of significant adult figures is crucial for adolescents to get instruction on effectively managing their emotional responses following the cessation of an unforeseen threat. Parents, educators, and other individuals responsible for the well-being of children and adolescents can assist them in managing the aftermath of a natural calamity by maintaining composure and providing reassurance over their safety and security. According to Lazarus et al. (2003), it is imperative for emergency response efforts to prioritize the instruction of efficacious coping mechanisms, the cultivation of supportive interpersonal connections, and the facilitation of children's comprehension of their emotional responses. In this context, notwithstanding the prevailing low standard of living, educators have undertaken numerous initiatives to enhance student attendance rates, facilitate their integration into the school environment, foster academic achievement, promote equitable opportunities vis-à-vis their peers nationwide, and develop students' social connections.

According to educators, online education has yet to fulfill its intended objectives effectively. In order to ensure the successful implementation of remote Education, it is necessary to undertake a range of technological, institutional, and political actions and policies (Pregowska et al., 2021). The presence of tent cities, where most students reside, has a detrimental impact on the efficacy of online education. In their research conducted in 2007, Wang, Yang, and Li examined the impact of the 7.8 Mw earthquake that occurred in Tangshan, China, in 1976. Their findings revealed a notable decrease in educational accessibility because of the disaster. The research results indicated that the cohorts impacted by the earthquake exhibited a decrease in their performance ranging from 14% to 21% compared to their unaffected counterparts. In this instance, the evidence substantiates the notion that it is imperative to offer pupils equitable opportunities in comparison to their counterparts.

### 4.1. Suggestion

Some suggestions were made within the framework of the findings obtained in the research. These recommendations, supported by the literature, are presented below.

1) After the earthquake, there was an increase in the fear and anxiety of many teachers working in the region due to the aftershocks. This situation may cause fear and anxiety in the individuals who experienced the earthquake and society. Because the reflection of the earthquake on society is adequate for all people (Baytiyeh, 2018; Zhang et al., 2010). At this point, psychological support can be provided to all teachers working in the country so that they can overcome the negative process that our country

experienced in the earthquake (experiencing anxiety and fear, feeling sad, thinking that they will experience the same situation, etc.) in a positive way.

2) According to the teachers, one of the most critical problems in returning to education after the earthquake is the problem of students needing to attend school. In solving this problem, significant responsibilities fall on the state, families, and institutions. Takasaki (2017) stated that disaster relief can reduce dropout among victims. In this context, transportation, accommodation, nutrition, and similar basic needs should be met to ensure the students' attendance affected by the earthquake.

3) Earthquake students were psychologically affected negatively. Students' psychological state after the earthquake is significant, and educators should take this situation seriously (Doğan et al., 2021). In this context, teachers can do bonding activities in their Primary Schools with games that support bonding and increase school adjustment.

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Research Article

# The Effect of Disaster Training on Teachers Candidates' Perception of Disaster Awareness

Celalettin Çelebi[1*]
Serap Yılmaz Özelçi[1]

[1] Necmettin Erbakan University, Konya, Türkiye, celalcelebi75@gmail.com, syozelci@erbakan.edu.tr

*Corresponding Author

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**Abstract:** Türkiye frequently experiences disasters that negatively affect human life in terms of various aspects. Therefore, teacher candidates who will teach future generations should be educated about raising disaster awareness. In this study, the effect of the disaster awareness training given by AFAD on the disaster perceptions, and awareness levels of teacher candidates were studied. In the research convenience sampling method was adopted. 58 teacher candidates, 44 females and 14 males, participated in the study which was designed in the "Single Group Pre-Test - Post-Test" model. Teacher candidates took disaster training for 12 hours in two courses. After the training, there was a partial increase in disaster awareness levels. However, the results showed that having received disaster training before or having experienced a disaster did not make a significant difference in disaster awareness. A disaster education course, including practice, can be integrated into undergraduate programs of education faculties.

**Keywords:** Disaster Training, Disaster Awareness, Teacher Candidates

## 1. Introduction

Disasters occurring under the influence of natural forces (Sena & Michael, 2006) can be defined as events that have local and global effects, require international measures, have devastating effects, and cause fatal damages (Disaster and Emergency Management Presidency [AFAD], 2014; Dikmenli & Yakar, 2019). These events are called disasters because of the great damage they can cause, rather than their magnitude (Varol & Gültekin, 2016). Disasters, handled in two groups, natural and man-made, according to the way they occur, are destructions that are uncontrollable and can cause deaths, severe injuries, food shortages, infectious diseases, and psychological disorders that affect human life in many ways (financial, social, economic, environmental health, etc.) (Özey, 2006; cited in Yazıcı & Ulu Kalın, 2018; Sena & Michael, 2006).

In the history of the Republic of Türkiye, there were significant mortality rates and loss of property owing to the earthquakes that occurred in Varto, Erzincan, Gölcük, Düzce, Elâzığ, İzmir, Van, and in the earthquake occurring on the 6th of February 2023, referred to in the literature as the "Disaster of the Century" that destroyed 11 provinces (Akbaş & Çalışkan, 2023; Aktürk & Albeni, 2002). What's more, due to global warming, natural disasters have become increasingly common (Şahin, 2019). Türkiye is one of the countries with a high probability of various disasters due to its geographical location. Since it will not be possible to prevent the events that occur naturally (floods, earthquakes, volcanic eruptions, etc.), ways to minimize the damages such events could cause should be sought, because natural disasters are potential threats even in the twenty-first century (Clarke, 2013). People consider natural disasters as unfortunate but inevitable (Sena & Michael, 2006). Therefore, the researchers think that raising individuals' awareness about disasters is important (İnal et al., 2012).

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Studies show that societies with disaster awareness are more successful in minimizing the damages that may arise from disasters and managing post-disaster effects. Education is the primary factor in this success (Cvetković & Stanišić, 2015). That's why knowledge and awareness of the society about disasters is crucial. Disaster education enables individuals to understand how to prepare for a disaster, what to do, and how to act during a disaster (Çelik, 2020). As for closing the gap between theory and practice, disaster education should be done practically and should be available at all levels of education (Gerdan, 2019). According to the common wisdom, surviving disasters with the least damage and recovering quickly are related to using knowledge about disasters (Varol, 2007). Thus, disaster education provides individuals with access to material and resources, that can help reduce vulnerability to disasters (Hoffmann & Blecha, 2020). Recently, it has been widespread in many countries to offer courses on disasters at different levels of education (Öcal, 2007).

Starting from pre-school education, students should be provided with information and awareness about disasters (Yılmaz, 2015). Torani et al. (2019) conducted a conceptual analysis of how and to whom disaster education should be provided. Because all types of education require time and cost, it is important to determine in advance to whom (children, women, elderly or disabled people/volunteers, people who can carry out post-disaster activities) disaster training will be given and to prepare the content accordingly.

The study done by Ronan and Johnston (2001) indicates that disaster education related to risk perceptions of children increases their knowledge of hazard reduction. In disaster education, the aim should be to gain the ability to read and recognize disaster information and reduce risks (Kesumaningtyas, Hafida, & Musiyam, 2022). Studies show that injuries and damages caused by natural disasters can be avoided by or reduced with various solutions such as training and proper equipment (Aldrich & Benson, 2008; Başıbüyük, 2004; Öcal, 2005; Tuladhar et all, 2015).

Moreover, disaster education is a key to disaster awareness. It can either directly or indirectly affect disaster vulnerability as the capacity to anticipate, cope with, resist, and recover from natural disasters. Through education and learning, individuals acquire knowledge, abilities, skills, and perceptions that enable them to effectively prepare for and cope with the consequences of disaster shocks. This is the direct impact. On the other side education indirectly provides individuals with access to materials, information, and social resources that can help reduce disaster vulnerability. It is therefore important that all individuals are involved in disaster education processes (Hoffman and Blecha, 2020).

Teachers have a critical role in raising individuals' awareness about disasters. Thus, teachers should know about disasters and have disaster awareness. First of all, studies need to be done to increase the knowledge and awareness levels of teacher candidates who will teach future generations (İnal et al., 2012). In the research done to determine the Natural Disaster Literacy levels of pre-service geography teachers, it came out that the general natural disaster literacy levels of teacher candidates were high, but in the behavior dimension, it was at a medium level. Knowledge levels of teacher candidates should also be increased by training on natural disasters (Sözcü & Türker, 2021). Literature review showed that there are few studies on disaster awareness of teacher candidates (Özgen et al., 2011; Özkazanç & Yüksel, 2015; Sözcü & Aydınözü, 2019; Yazıcı & Ulu Kalın, 2018). Sözcü (2020), who revised the studies done between 2003 and 2020 on disaster education in Türkiye, concluded that the number of studies increased gradually, but there were not enough experimental studies.

Accordingly, this paper deals with the effect of a disaster education program aiming to increase the disaster awareness of teacher candidates and their perceptions of disaster awareness. It is hoped that disaster awareness of teacher candidates turns into a transferable behavior. The primary purpose of the study is to test the effect of the disaster education program given by AFAD on the disaster awareness of teacher candidates. Accordingly, it seeks answers to the following questions:

1. What are the disaster awareness levels of teacher candidates?
2. Is there a statistically significant difference between teacher candidates' disaster awareness pre-test and post-test scores?
3. Do the disaster awareness post-test scores of teacher candidates differ according to variables such as getting disaster training before and having experienced a disaster before?

## 2. Method

### 2.1. The research approach

This paper studies the effects of disaster awareness training on teacher candidates. Accordingly, the research was designed using a "Single Group Pre-test - Post-test" model. This model, considered relatively weaker among experimental designs, lacks a control group, and data collection tools are administered solely to the experimental group both before and after the experimental process (Büyüköztürk et al., 2016). The experimental group in this study comprised 58 teacher candidates who willingly participated in the program.

### 2.2. Population and sample

The study population consisted of teacher candidates studying at a faculty of education in Central Anatolia during the spring semester of the 2021-2022 academic year. The research sample was determined through the convenience sampling method. The sample consisted of 65 teacher candidates who voluntarily participated in the 12-hour Disaster Awareness Training program offered by AFAD at the faculty. The training's content and duration were explained, and volunteers were requested to attend the seminar hall at the specified time. These pre-service teachers constituted the experimental group, which was the only group in the study.

The experimental group consisted of 58 teacher candidates (7 forms were invalid and data from 58 forms were used for analysis) who willingly participated in the 10-hour training. Of the participants, 44 (75.9%) were females, and 14 (24.1%) were males. Out of the teacher candidates, 26 (44.8%) reported experiencing at least one disaster, while 31 (53.4%) reported no prior disaster experience. Furthermore, 41 teacher candidates (70.7%) had previously received disaster training, while 16 teacher candidates (27.6%) had not received any disaster-related training.

### 2.3. Data collection tool

The study used the "Disaster Awareness Perception Scale," developed by Dikmenli, Yakar, and Konca, (2018). This scale is comprised of 36 items and four factors: "disaster education awareness," "pre-disaster awareness," "false disaster awareness," and "post-disaster awareness." Respondents used a 5-point Likert-type scale with response options including "never," "rarely," "sometimes," "frequently," and "always." Nine of the items in the scale were reverse coded. The overall Cronbach alpha coefficient for the scale was found to be 0.772, with Cronbach alpha coefficients for the individual factors ranging between 0.672 and 0.769 (Dikmenli, Yakar, & Konca, 2018). The researchers conducted a confirmatory factor analysis for the scale, and by dividing the obtained chi-squared value by the degrees of freedom, a ratio of 2.88 was calculated. Since this value is less than 3, it was concluded that there was a high degree of compliance (Sümer, 2000). Additionally, the analysis of the scale's factors yielded a root mean square error of approximation (RMSEA) index of 0.069. The Cronbach alpha coefficients for both the overall scale and its factors ranged between 0.85 and 0.88.

### 2.4. Data collection & experimentation

Prospective teachers got disaster training in two courses from Konya AFAD trainers. In the first course, basic information and concepts, the necessary preparations to be made before any disasters, the correct behavior during disasters, post-disaster actions, fire prevention and evacuation, and information about what to do before and after earthquakes were taught. The course consists of 6 hours of training in total. In the second course, basic CBRN (Chemical, Biological, Radiological, and Nuclear) training was given to the participants. This course also had a total of 6 hours of training.

### 2.5. Ethical principles

The ethics committee approval for this study was granted by Selçuk University Ethics Committee of Literature Faculty with decision file and number 2022/03 on 28.01.2022.

## 3. Finding

Findings related to the level of prospective teachers' disaster awareness perceptions are given in Table 1.

**Table 1**

*Mean and standard deviations of prospective teachers' disaster awareness perceptions*

| Scale | N | Min | Max | X | Sd |
|---|---|---|---|---|---|
| Disaster Awareness Perception Scale (Total) | 56 | 1,47 | 3,56 | 2,75 | ,330 |
| Pre-disaster awareness factor (8 items) | 57 | ,63 | 4,00 | 3,32 | ,532 |
| Disaster education awareness factor (13 items) | 57 | ,54 | 3,38 | 2,87 | ,427 |
| Post-disaster awareness factor (7 items) | 57 | ,57 | 3,86 | 2,61 | ,600 |
| False disaster awareness factor (8 items) | 58 | ,00 | 4,38 | 1,78 | 1,086 |

Considering that the highest mean to be obtained from the scale is "5", it can be thought that the teacher candidates' perception of disaster awareness is at an "average" level. The participants have the highest mean in the "pre-disaster awareness" factor. The lowest mean belongs to the false disaster awareness factor. This result can be considered as an indicator of the necessity of disaster training.

In the research, the effect of disaster training on the participants' disaster awareness perception was studied. The results of the paired samples t-test are given in Table 2.

**Table 2**

*Paired Samples t Test results to test the effects of disaster awareness training on prospective teachers' disaster awareness perceptions*

| Variable | Category | X | N | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Disaster Awareness Perception Scale (Total) | Pretest | 2,75 | 56 | ,330 | 55 | 1.138 | .260 |
| | Posttest | 2,81 | 56 | ,256 | | | |
| Pre-disaster awareness factor (8 items) | Pretest | 3,32 | 57 | ,532 | 56 | -,831 | .406 |
| | Posttest | 3,38 | 57 | ,394 | | | |
| Disaster education awareness factor (13 items) | Pretest | 2,88 | 57 | ,427 | 56 | -2,702 | .009* |
| | Posttest | 3,07 | 57 | ,335 | | | |
| Post-disaster awareness factor (7 items) | Pretest | 2,61 | 57 | ,600 | 56 | -5,431 | .000* |
| | Posttest | 3,06 | 57 | ,509 | | | |
| False disaster awareness factor (8 items) | Pretest | 1,78 | 58 | 1,086 | 57 | ,876 | .385 |
| | Posttest | 1,63 | 58 | 1,174 | | | |

* p<.05

Considering the results in Table 1, it is clear that there is no significant difference between the mean pretest and posttest scores from the overall scale (t55=1.138, p>.05), the mean pretest and posttest scores from the pre-disaster awareness factor (t56=0.831, p>.05), and the mean pretest and posttest scores from the false disaster awareness factor (t57= .876, p>.05). It came out that the posttest mean scores from the post-disaster awareness factor differed significantly from the pretest mean scores (t56=-5,431, p<.05). Accordingly, the mean score for post-disaster awareness factor, which was X=2,61 at the beginning, increased to X=3,06 after the training. The difference in the mean scores for the disaster education awareness factor was statistically significant (t56=--2,701, p<.05). The mean score which was X=2,88 before the training, increased to X=3,07 after the training.

On the other hand, the researchers also tested whether the posttest mean scores for the teacher candidates' disaster awareness education differed significantly according to whether they had experienced a disaster or whether they had received disaster education before (non-parametric test was done because the data related to the variable of whether they had received disaster training before or not did not show normal distribution). No statistically significant difference was found between the mean scores obtained from the scale's total and its factors in terms of both variables. The results are given in Table 3 and 4.

**Table 3**

*Mann-Whitney U Test results for the posttest scores of the disaster awareness scale of teacher candidates according to whether they had received disaster training before or not*

| Variable | Category | N | Mean Rank | Sum of Ranks | U | p |
|---|---|---|---|---|---|---|
| Disaster Awareness Perception Scale (Total) | Got Training | 16 | 34,41 | 1102,50 | 241,500 | ,124 |
| | No Training | 41 | 26,89 | 550,50 | | |
| Pre-disaster awareness factor (8 items) | Got Training | 16 | 30,13 | 482,00 | 310,00 | ,748 |
| | No Training | 41 | 28,56 | 1171,00 | | |
| Disaster education awareness factor (13 items) | Got Training | 16 | 31,03 | 496,50 | 295,500 | ,563 |
| | No Training | 41 | 28,21 | 1156,50 | | |
| Post-disaster awareness factor (7 items) | Got Training | 16 | 32,44 | 519,00 | 273,00 | ,326 |
| | No Training | 41 | 27,66 | 1134,00 | | |
| False disaster awareness factor (8 items) | Got Training | 16 | 32,88 | 1127,00 | 266,66 | ,270 |
| | No Training | 41 | 27,49 | 496,50 | | |

**Table 4**

*The results of the Independent Groups t Test considering whether the participants had experienced a disaster before or not*

| Variable | Category | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Disaster Awareness Perception Scale (Total) | Experienced a disaster | 31 | 2,85 | ,214 | 55 | -1,080 | ,285 |
| | No disaster experience | 26 | 2,78 | ,299 | 55 | | |
| Pre-disaster awareness factor (8 items) | Experienced a disaster | 31 | 3,45 | ,375 | 55 | -1,382 | ,173 |
| | No disaster experience | 26 | 3,30 | ,409 | 55 | | |
| Disaster education awareness factor (13 items) | Experienced a disaster | 31 | 3,09 | ,343 | 55 | -,936 | ,354 |
| | No disaster experience | 26 | 3,01 | ,339 | 55 | | |
| Post-disaster awareness factor (7 items) | Experienced a disaster | 31 | 3,11 | ,517 | 55 | -,790 | ,433 |
| | No disaster experience | 26 | 3,01 | ,518 | 55 | | |
| False disaster awareness factor (8 items) | Experienced a disaster | 31 | 1,63 | ,959 | 55 | ,145 | ,885 |
| | No disaster experience | 26 | 1,68 | 1,400 | 55 | | |

Table 3 and 4 show that the teacher candidates who have experienced a disaster before or participated in disaster training before do not have a significant difference in their disaster awareness perception. This situation is thought to be remarkable and worthy of discussion.

## 4. Results and Discussion

In this research, the effect of disaster awareness training conducted by AFAD on the disaster awareness perceptions of teacher candidates was studied. It was found that there was no significant difference between the pre-test and post-test mean scores of pre-disaster and false disaster awareness perceptions of teacher candidates who attended the disaster awareness training in two sessions. However, it can be concluded that there was a partial increase in the mean pre-disaster awareness perception scores of the teacher candidates after the disaster training. In their study, Dikmenli and Yakar (2019) found that the pre-disaster perceptions of the participants were high, and the false disaster consciousness perceptions were at a medium level. In another study, it was found that the level of disaster awareness among high school students in Türkiye was low (Özkazanç & Yüksel, 2015). In another research in Türkiye, contrary to our findings, it was determined that the level of basic disaster awareness and preparedness among higher education students was low (İnal, Kocagöz, & Turan, 2012). A study done in Taiwan found that school administrators and teachers had a high level of disaster preparedness skills (Chung & Yen, 2016). In a study done in Greece, it was found that despite the increasing occurrence of biological and technological hazards, teachers' awareness of disasters is low, which negatively affects teaching, and consequently the preparedness of students and their families (Christina, Asimina, Anastasios, & Luca, 2022). These differences in findings may be due to differences in the education levels of the participants and the disaster education policies of the countries. Doğan et al. (2023) studied the attitudes of pre-service social studies teachers towards disasters and found that pre-service teachers' attitudes towards disasters were “agree” in cognitive and affective dimensions and “moderately agree” in behavioral dimensions. Sari and Ridhwan (2022) conducted a study in Indonesia with prospective geography teachers and found that their level of disaster preparedness was low. However, the most interesting finding of the study was that there was a significant relationship between academic competence and disaster preparedness. Disaster preparedness levels of those with high academic competence were also found to be high. The researchers explained this relationship with the appropriateness of the content in the curriculum and the availability of teaching materials such as simulations and models. In this context, the quality of the education provided also stands out (Coppola, 2015). Modern disaster management includes pre-disaster risk management (prevention and preparation) and post-disaster crisis management (response and recovery) stages (Mileti, 1999). In the provision of such management, it is a priority for individuals to gain practical knowledge. In this context, the practical effectiveness of the content of training offered both in pre-service programs and at different times by governmental or non-governmental organizations should be discussed.

AFAD defines disaster as a natural, technological, or human-induced event that causes physical, economic, and social losses for the whole or certain segments of the society, stops or interrupts daily life and human activities, and the coping capacity of the affected society is not sufficient. Disaster is not the event itself, but the consequence. In this context, we consider our negative experiences that occur after the event as “disasters” (AFAD, 2023). One way of improving disaster awareness is the disaster experience and the other one is training**.** Coping with disasters depends on being able to correctly identify where and how the danger will come from. Knowing the risks related to possible disasters improves perception, awareness, and combating skills (Kundak, 2018). Several empirical studies indicate that higher education levels are positively associated with several outcomes like levels of preparedness, responses to forewarnings, evacuations and relocation decisions, adaptation to environmental conditions, and the ability to deal with the results of disasters (Hoffmann and Blecha, 2020). In Türkiye, the Disaster and Emergency Management Presidency is trying to improve disaster

awareness through brochures prepared for children, youth, and families and practical training given at different educational levels. In addition, citizens can participate in "basic disaster awareness training" by applying through e-government (application link: https://www.turkiye.gov.tr/afad-temel-afet-bilinci-farkindalik-egitimi-basvurusu).

The results of the research show that the difference between the mean scores before and after disaster awareness training is statistically significant. The mean score, which was X=2.88 before the training, increased to X=3.07 after the training. This indicates that the training had a positive effect on the perception of the teacher candidates but to a limited extent. Research shows that even limited disaster training contributes to increasing disaster awareness (Karanci, Akşit & Dirik, 2005). However, training should be determined according to needs and priorities, and for disaster training to be effective, training should be provided by experts using appropriate techniques, and the continuity of this training should be ensured (Mızrak, 2018). For example, natural disasters such as earthquakes, floods, and landslides are frequent in Türkiye. Precautions should be taken for these disasters, the consequences of which are extremely destructive, and everyone in society should be trained against such disasters (Ataman-Bor, 2023).

In the study of Gezer and Aksu (2022), it was observed that the disaster awareness levels of teacher candidates who were exposed to a disaster and experienced a disaster differed statistically from those of teacher candidates who were not exposed to a disaster or did not experience a disaster before. Karadeniz (2020) similarly found that the disaster preparedness scores of those who experienced a disaster were higher than those who did not experience a disaster. The fact that prospective teachers have experienced the negative conditions of a disaster may have led them to be more conscious about disasters and to develop awareness about disasters. However, the findings obtained in the current study are different. A striking finding of the research is that disaster awareness perceptions of the teacher candidates do not differ according to whether they have experienced a disaster before. The experienced disaster, and the amount of destruction, damage, or loss may affect this situation. Boran and Ulutaşdemir (2023), found that the number of people exposed to disaster in the family, the number of people who lost their relatives in the disaster, the death toll, and material loss in the disaster did not affect the mean scores of the students of the Department of Emergency Relief and Disaster Management. The research done with teachers after the disaster in Indonesia, one of the disaster-prone countries, in 2018 showed that a recent disaster experience improved teachers' knowledge, attitudes, and disaster risk reduction knowledge. According to the research findings, teachers reflected their knowledge in classroom activities. Another reason for the improvement was disaster risk reduction activities in the school and increased participation in lessons emphasizing these issues (Astuti, Werdhiana, & Wahyono, 2021). Becker et al. (2017), on the contrary, emphasize that experience has seven different effects on disaster preparedness after their research on earthquakes. These are: encouraging thinking and talking; increasing awareness and knowledge; telling individuals the results of a disaster; improving preparedness; influencing emotions, and encouraging community interaction on disaster. Any kind of contribution to preparedness or awareness is very important considering the possibility of saving lives or minimizing damage. All segments of society need to be educated on this issue. The awareness of teachers, who are role models for their students and are responsible for educating them, gains even more importance.

## 5. Recommendations

Disaster awareness training, also known as disaster preparedness or emergency preparedness training is an educational program designed to increase the awareness and preparedness of individuals and communities for various types of disasters and emergencies. The primary goal of disaster awareness training is to provide people with the knowledge, skills, and resources needed to understand, respond to, and reduce the effects of disasters. Considering that it is unpredictable and likely to occur at any time,

everyone needs disaster awareness training. It is considered important to carry out detailed studies on this subject to create public opinion. Considering the limited findings, the following suggestions were made.

To increase disaster awareness of teacher candidates in Türkiye, which often faces disasters, a disaster education course, including practice, can be incorporated into the undergraduate program of education faculties.

By cooperating with NGOs and public institutions, the physical, social, and psychological development of disaster consciousness and awareness of teacher candidates can be supported through training provided in out-of-school learning environments.

Teacher candidates can be included in drills organized jointly by the relevant units of local governments, NGOs, and universities.

Comprehensive disaster education programs can be developed by designing and piloting disaster education programs at different educational levels.

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Research Article

# Examination of Pre-Service Teachers' Experiences on Student-Centered Instruction

Fehmi Demir

Siirt University, Siirt, Türkiye
demirfehmi72@gmail.com

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**Abstract:** The teaching approach, in which the student is at the center of learning, is becoming more and more common. The teacher is an important factor in the implementation of this approach. Pre-service education plays an important role in the qualified training of teachers. If teacher candidates learn student-centered teaching through experience at the university, they are expected to apply it more easily when they start working. In this direction, it was aimed to examine the student-centered teaching experiences of pre-service teachers. It is supposed that pre-service teachers' views on this process will contribute to the development of pre-service teacher education. The research was carried out with the phenomenology design, and 67 pre-service teachers were included in the research with the criterion sampling method. The research data collected with an open-ended questionnaire form were analyzed by content analysis. According to the results of the research, pre-service teachers think that student-centered teaching encourages them, makes them effective, and provides them with skills. Because of these features, they consider the approach as an effective learning approach and think that the experiences give them emotional awareness and improve their professional competencies. However, pre-service teachers experience educational problems such as indecision, anxiety, lack of self-confidence and knowledge, and inexperience while performing student-centered teaching.

**Keywords:** Pre-Service Teacher, Student-Centered Instruction, Undergraduate Education

## 1. Introduction

Student-centered teaching is a teaching-learning approach that has been researched, applied, and tried to be disseminated in developed countries for the last fifty years (Özer, 2008). In Türkiye, a constructivist approach has been adopted in education since 2004 (Ünsal, Ağcam & Korkmaz. 2019). In this direction, student-centered teaching has begun to show its effect in all processes, from curriculum to textbooks, from teacher training to designing the teaching process (Özpolat, 2013). Constructivist learning theory focuses on the use of student-centered methods and techniques that will enable the active involvement of students in the teaching-learning process (Karasu Avcı & Ketenoğlu Kayabaşı, 2018; Ünsal, Ağçam & Korkmaz, 2019). This approach, in which students are active and interacting, is based on the constructivist ideas of John Dewey and Lev Vygotsky (Bada & Olusegun, 2015).

In student-centered teaching, students learn by doing and experiencing rather than watching (Brown, 2008). In the learning-teaching process, students are expected to make efforts to obtain information from different sources, to show continuous improvement, and to be at the center of learning-teaching activities rather than transferring the information in the textbooks (Temizkan, 2010). Thus, it is aimed for student to create new knowledge based on active and applied experiences in the learning process (Scheurs & Dumbraveanu, 2014). In this sense, important responsibilities fall on the teacher in guiding teaching in student-centered teaching, arranging the learning environment, and increasing the effect of learning materials (Koç, 2014; Maden, Durukan & Akbaş, 2011; Overby, 2011). Adopting well-prepared, student-centered teaching materials positively affects both teaching practices and teachers (Czajka &

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McConnell, 2019). Therefore, in student-centered teaching, it is important to design the learning-teaching process in which the student will be active (Yıldırım, 2021).

Although student-centered teaching is considered important at all teaching levels, teachers lack a comprehensive framework to design, develop, and implement it (Lee & Hannafin, 2016). Even though they adopt the approach as an idea, for some reasons they do not apply it to the learning-teaching process (Akpınar & Gezer, 2010; Erdem, Karademir & Tezel, 2022). Research also emphasizes that teachers should be informed about student-centered teaching in the pre-service and in-service periods (Dönmez, 2008; Güven & Sözer, 2007; Kızılca, 2007). On the other hand, teacher productivity increases with experience. The gains obtained through experience turn into practice when starting the profession (Harris & Sass, 2011). In this sense, teachers need to receive qualified pre-service training for student-centered teaching (Yalçın İncik & Tanrıseven, 2012). In undergraduate education, it is necessary to implement and expand the student-centered education approach (Scheurs & Dumbraveanu, 2014). Changes in teachers' field knowledge and teacher practices affect student success (Bada & Olusegun, 2015; Polly, McGee, Wang, Martin, Lambert & Pugalee, 2015). However, since the classrooms in undergraduate education are generally teacher-centered, this prevents pre-service teachers from being successful.

Many educators are trying to make changes in their undergraduate education toward student-centeredness. Despite this, it cannot be said that the education process is generally student-centered (Wright, 2011). Studies show that the courses taken by pre-service teachers are not student-centered, and they are not sufficient in preparing student-centered activities. Although experienced educators claim that they value student-centered learning, they act teacher-centered in practice (Estes, 2004). On the other hand, although the instructors consider themselves competent in applying student-centered instruction, students state that student-centered instruction is not implemented and the instructors are inadequate (Ünver, 2010). Yalçın İncik and Tanrıseven (2012) also determined that the instructors used student-centered teaching in the lessons, but the students emphasized that this teaching was not applied. Therefore, the current situation shows that traditional methods and techniques still dominate the teaching-learning process (Aliusta, Özer, & Kan, 2015). Okumuş (2021) examined the student-centered activity development skills of pre-service science teachers. In the study, teacher candidates were at a low level in terms of both their activity development and the suitability of the activities they developed for the approach. Şahin (2023), in his research with classroom and preschool teacher candidates, found that instructors rarely use student-centered teaching. Therefore, in the last 20 years, it seems that the reflection of student-centered education on the learning-teaching process has not been sufficient.

Pre-service teachers' perspectives on learning are strongly influenced by the way a particular subject is taught to them at school (Clark, 1994). While doing the teaching profession, they generally apply the knowledge they have learned about student-centered teaching in pre-service education and develop course materials suitable for this approach (Zulkardi 2002). In this context, teacher educators must train prospective teachers to use the student-centered approach (Thanh, Dekker & Goedhart, 2007). Also, it is to gain the knowledge, skills, and attitudes necessary for their profession (Görgen, Çokçalışkan & Korkut, 2012). In this process, pre-service teachers' experiences based on methods and techniques in which they will be active prepare them for the profession in a more qualified way (Yalçın İncik & Tanrıseven, 2012). Therefore, higher education should include student-centered practices and serve to raise the human type required by age (Karakaş Özür, 2019).

In Türkiye, with the implementation of the new primary education program, there has been a transformation in the role of teachers in the classroom environment. Because of this role, the responsibility of teachers who take the role of guide in the classroom has increased even more in performing the teaching profession. Curriculums have also made it compulsory for the majority of

classroom activities to be processed with student-centered activities (İzci, Duran & Taşar, 2010). The 2018 life studies curriculum focuses on developing student-centered activities while expressing the issues that the teacher will pay attention to during the implementation process of the curriculum. It is stated that the activities should be prepared and planned in line with the interests, wishes, and needs of the students. In addition, the activities should be carried out in line with the achievements, and activities are requested to establish a connection between school and life (Ministry of National Education (MoNE), 2018). Therefore, pre-service teachers need to gain the ability to prepare student-centered activities before starting the profession. Education faculties have important responsibilities in helping them gain this skill. Learning this teaching practically in pre-service education and seeing many examples of activities will prepare them for the profession better. In this context, third-year pre-service teachers studying in the classroom teaching undergraduate program were provided to prepare student-centered teaching activities within the scope of life studies teaching and apply these activities in the classroom. After this experience, it was found worth examining how the pre-service teachers evaluated the approach, how they were affected by the implementation process, and what kind of problems they encountered in this process.

In the literature, many studies have been conducted on student-centered teaching, especially after the program change in 2005. In the research, opinions of pre-service teachers, teachers and lecturers regarding student-centered teaching (Açıkgöz, 2008; Bulut, 2008; Akpınar & Gezer, 2010; İncik & Tanrıseven, 2012; Zeki & Sonyel, 2014; Okumuş, 2021; Şahin, 2023), the effectiveness of student-centered teaching practices (Yaşar, Çengelci Köse, Göz & Gürdoğan Bayır, 2015), the effect of the approach on student attitudes (Temizkan, 2010; Özbayraktar, 2016) and the effects of student-centered environments and course designs on success (Deniz, 2005; Dönmez, 2008; Daşdemir & Doymuş, 2012; Topan, 2013; Teker, 2014; Kansızoğlu & Sulak, 2019; Yeşilpınar Uyar & Doğanay, 2018; Borazan, 2019; Asmaz, 2019) are examined. Okumuş (2021) also investigated the skills of science teacher candidates in designing student-centered activities. In this study, the experiences of primary school pre-service teachers in preparing and implementing activities with a student-centered approach are discussed. The results of the research are expected to contribute to pre-service teacher education. In addition, it is expected to guide the instructors in student-centered training to be organized for teacher candidates in pre-service education. In this direction, it is aimed to examine the student-centered teaching experiences of teacher candidates in the research. Within the scope of the research, answers were sought to the following three questions:

- How do pre-service teachers evaluate student-centered teaching?
- How are pre-service teachers affected by student-centered teaching?
- What problems do pre-service teachers face in student-centered teaching?

## 2. Method

Phenomenology design was used in the study. The phenomenology design focuses on phenomena that we are aware of but do not have a detailed understanding of (Yıldırım & Şimşek, 2013). It is expected that student-centered teaching activities will have an impact on teacher candidates. To determine how and in what way this effect occurs, the phenomenological design was chosen. The aim of the phenomenology design is to uncover the meanings of experiences related to a phenomenon and to define the underlying meanings of the phenomenon (Kocabıyık, 2015). The phenomenology design was preferred to determine the student-centered teaching experiences of pre-service teachers and to reveal their perceptions of student-centered teaching.

### 2.1. Data collection tool

An open-ended questionnaire form was used as a data collection tool. The form was developed by the researcher. For the questions, firstly the literature mentioned in the introduction was examined. Then, research questions were developed according to the relevant literature. Since the research examined teacher candidates' experiences regarding student-centered education, the data collection tool focused on how the candidates evaluated the approach, what problems they encountered and how they were affected. On the other hand, in qualitative research, it is essential not to ask too many questions to participants (Weiss, 1994). In this respect, six questions were included in the form. Three field experts were consulted regarding the research questions. One of the experts is an associate professor in educational sciences, one in the field of social studies, and one is a doctor lecturer in the field of classroom teaching. In line with expert opinions, two questions were removed from the form and two questions that were similar in meaning were combined. In its final version, the form included the following three questions:

1. How do you evaluate student-centered teaching?
2. How were you influenced by student-centered teaching?
3. What problems does the student face in centered teaching?

### 2.2. Working group

The study group consists of 67 third-grade pre-service teachers in the classroom teaching department. In the phenomenology design, it is generally studied with a limited sample. However, since more limited data could be collected with the open-ended form, the study group was kept large. Thus, it was ensured that the study included possible diversity, richness, difference and contradiction. The pre-service teachers in the study group were determined according to the criterion sampling method. The criteria for participating in the sampling were determined as having prepared a student-centered activity in the life sciences teaching course in the fall semester of 2022 and having attended the course at a rate of 70 percent. The reason why the life sciences teaching course was chosen is that the activities were designed according to the achievements, skills and values of this course and the prepared activities were applied in this course. The purpose of the study was explained to 87 pre-service teachers who met the criteria in the last week of the application and they were offered to participate in the study. In addition, it was stated to the candidates that participation in the study was voluntary. Then, the data collection tool was distributed to the teacher candidates. They were given two days to answer the form. At the end of the period, the completed forms were delivered to the researcher. As a result, a total of 67 teacher candidates, 30 males, and 37 females, participated in the study.

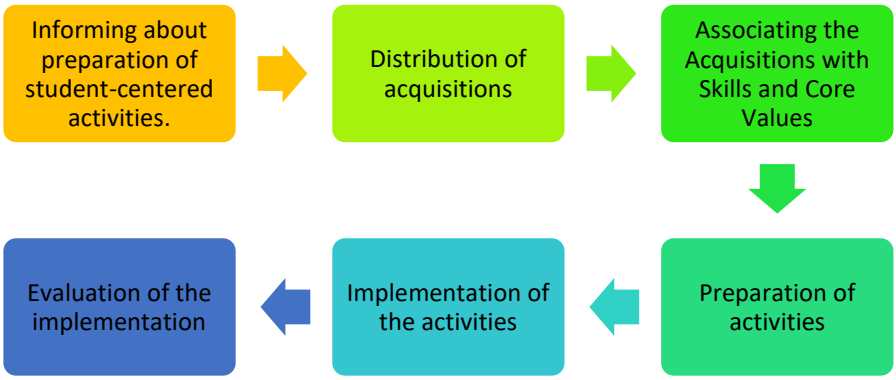
### 2.3. Implementation process

A semester in higher education lasts 14 weeks. During the semester, pre-service teachers taught student-centered lessons by preparing activities for at least one week and participating in the activities prepared for 13 weeks. The activities were applied in the life studies teaching course, which lasted three hours a week. In the first week, student-centered teaching approach was introduced to pre-service teachers with examples of activities. Then, life studies lesson acquisitions were randomly distributed to prospective teachers. They were asked to associate the acquisitions with at least one of the core values and basic life skills in the curriculum of the course. Afterward, they were asked to prepare activities in which all students in the class would be active in accordance with this association and to apply these activities in the classroom. In association, specific skills and values are not associated with certain achievements. Pre-service teachers were left free to associate achievements, skills and values. Therefore, sometimes different teacher candidates were able to associate the same outcome with

different skills and values. Each week, two pre-service teachers taught the activities they prepared in the classroom. The implementation process was carried out as indicated in Figure 1.

**Figure 1**

*Student-Centered Activity Preparation-Implementation Process*




### 2.4. Data analysis

Research data were analyzed by content analysis. The main purpose of content analysis is to reach concepts and relationships that can explain the collected data (Yıldırım & Şimşek, 2013). In this context, first of all, the collected data were coded according to the concepts extracted from the data. Some of the data was also coded by another field expert. The generated codes were brought together and examined. According to the resulting codes, the data is divided into meaningful parts that are related to each other. These sections were conceptualized, and themes were obtained. Then, the data were defined and organized according to codes and themes. The identified codes and themes were examined by another field expert. Finally, the findings were defined and interpreted by tabulating. While presenting the findings, the information about the pre-service teachers was coded and shortened. For example, the second pre-service teacher was coded as "PT2". These abbreviations are used in the presentation of the findings and direct quotations.

### 2.5. Validity and reliability of the research

Guba and Lincoln (1982) focus on the concepts of credibility, transferability, consistency, and confirmability, rather than validity and reliability in qualitative research. Guba and Lincoln's method was followed in the study to ensure its validity and reliability. To ensure credibility, the research was reviewed by an expert whose area of study is curriculum and instruction. After the research report was completed, the results were shared with the participants individually at the confirmation meeting held in the researcher's office, and the participants' evaluations were taken. Within the scope of transferability, the purposive sampling method was chosen, and the data were presented by describing them in detail and supporting them with direct quotations. For consistency, the data obtained and the results reached were reviewed by another expert with peer confirmation. In addition, the stages of developing the data collection tool, collecting the data, and analyzing the data are presented in detail. For confirmability, the data collection tool of the research, the raw data, and the coding in the analysis phase were kept.

### 2.6. Ethical Principles

Ethics committee permission was received from Siirt University Ethics Committee with the decision dated 05.04.2022 and numbered 361.

## 3. Findings

According to the sub-objectives of the research, the findings that were reached and supported by sample opinions are presented below.

### 3.1. How do pre-service teachers evaluate student-centered instruction?

The findings regarding how pre-service teachers evaluate student-centered teaching are presented in Table 1.

**Table 1**

*Opinions of Pre-service Teachers on Student-Centered Instruction*

| Theme | Sub-Theme | Codes |
|---|---|---|
| Effective Learning Approach | Encouraging (f=38) | More entertaining lessons (4, 9, 12, 15, 19, 20, 24, 26, 30, 34, 36, 37, 40, 45, 50, 52, 53, 57)<br>Increasing interest in the lesson (4, 9, 23, 26, 40, 59)<br>Attracting better attention to the lesson (50, 60, 65)<br>Keeping morale-motivation at a high level (29, 31, 59)<br>Lessons are not boring (5, 11, 47)<br>Keeping the student in the lesson (11, 12)<br>Encouraging research and discovery (30)<br>Providing a suitable environment for learning (2)<br>Providing the opportunities to associate what has been learned with daily life (46) |
| | Active participation (f=35) | Ensuring active participation of students in the lesson. (2, 3, 5, 8, 9, 11, 12, 15, 20, 23, 25, 27, 28, 31, 32, 36, 37, 47, 49, 50, 52, 55, 56, 58, 64, 65)<br>Ensuring learning by doing and experiencing (15, 24, 25, 27, 32, 41, 48, 50, 55) |
| | Skill building (f=32) | Increasing self-confidence (8, 15, 30, 35, 40, 55, 61, 62)<br>Strengthening communication (12, 22, 25, 28, 31, 49, 64)<br>Developing cooperation (12, 13, 22, 40)<br>Gaining responsibility (28, 40, 49)<br>Providing an opportunity for self-expression (20, 61, 64)<br>Strengthening social ties (61, 62, 64)<br>Providing an atmosphere and culture for discussion (13)<br>Developing empathy (13)<br>Enabling to discover talents (3)<br>Strengthening self-control (12) |
| | Increasing academic success (f=31) | Permanent learning takes place (9, 11, 23, 24, 28, 34, 36, 41, 50, 51, 52, 53, 55, 57, 58, 65)<br>Providing better learning (1, 12, 29, 32, 43, 44, 47, 52)<br>More efficient lesson (2, 5, 12, 25, 58)<br>Addressing more sense organ (23)<br>Easier understanding of the subject (8) |
| | Inclusive (f=11) | Being appropriate for the age and imagination of the students (17, 43, 51, 60)<br>Considering the interests and needs of all students (3, 4, 66)<br>Addressing every student (18, 29)<br>Involving even inactive students (47, 64) |

As seen in Table 1, pre-service teachers evaluated student-centered teaching as an effective learning approach. Under this theme, five sub-themes emerged. The sub-themes were determined as encouraging, skill-building, inclusive, increasing academic success, and active participation. In the

encouraging sub-theme, pre-service teachers stated that a suitable learning environment was created in the classroom and that student-centered teaching prompted students to explore, kept their morale and motivation at a high level, increased students' interest in the lesson, and offered the opportunity to associate the information they learned with their daily lives. In addition, they emphasized that student-centered lessons are not boring; on the contrary, it is more fun, increase interest, and attract students' attention more. Some of the sample opinions are presented below:

*"...The teaching process is more fun, and this process attracts the attention of the students. Thus, an environment where more permanent learning takes place is created..." (PT9). "Student-centered activities increase the student's interest in the lesson, develop self-confidence, enable them to be collaborative, and make them aware of their responsibilities. The student enjoys the lesson because the interest and curiosity of the student are activated." (PT40).*

In the sub-theme of skill-building, pre-service teachers stated that student-centered activities allow students to discover their talents and express themselves, strengthen their social ties, and provide a discussion environment and culture to the classroom. They also stated that activities enable students to take responsibility, develop cooperation among them, strengthen their communication, and increase their self-confidence. In addition, they emphasized that with student-centered teaching, students learned to control themselves and developed empathic behavior. Some of the sample opinions of the pre-service teachers are presented below:

*"As the student is at the center, it makes the lesson more fun and productive... Student-centered activities enable the development of skills such as cooperation, communication, and self-control among students." (PT12). "I think that student-centered activities will increase students' self-confidence and enable students to get together and become friends more easily." (PT62).*

In the third sub-theme, pre-service teachers evaluated student-centered teaching as inclusive. In this context, they stated that student-centered education appeals to all students and meets their interests and needs. It was also emphasized that student-centered activities were suitable for the development and perception level of the students. Some of the sample opinions of the pre-service teachers are presented below:

*"In student-centered activities, the student is active and discovers their talents. It is very convenient as the needs and wishes of all students are taken into account." (PT3). "Student-centered activities are important in terms of being suitable for all student types..." (PT18).*

In the fourth sub-theme, pre-service teachers stated that student-centered teaching increased the academic success of the student. They expressed that student-centered activities appeal to more sense organs, and this situation enables students to learn the lesson better. In addition, they emphasized that permanent learning took place thanks to student-centered activities, students did not forget the information they learned, and the lessons were more productive. Some of the sample comments are presented below:

*"As someone who has experienced teacher-centered teaching, I find student-centered teaching extremely useful and necessary. In student-centered lessons, teachers and students enjoy, and I think that permanent learning takes place in the student..." (PT34). "With student-centered activities, the student is both having fun and learning because he is active. This makes the lesson more fun. Since the student is in the center, the lessons are more instructive and permanent." (PT52)*

In the last sub-theme, pre-service teachers stated that student-centered teaching makes students active in the lesson, increases their participation in the lesson, and provides them with the opportunity to learn by doing and experiencing. Two of the sample opinions are presented below:

*"I find it very necessary to do student-centered activities for students to enjoy my lesson, to be active in the teaching-learning process, and to express themselves adequately…." (PT20). "Traditional teaching leads the student to memorization. However, student-centered activities enable the student to participate actively in the lesson by enabling the student to learn by living and doing." (PT32)*

### 3.2. How does student-centered instruction affect pre-service teachers?

Findings on how student-centered teaching affects pre-service teachers are presented in Table 2.

**Table 2**

*The Effects of Student-Centered Instruction on Pre-service Teachers*

| Theme | Sub-Theme | Codes |
|---|---|---|
| Raising emotional awareness | Encouraging so(f=43) | Influencing motivation positively (2, 3, 6, 7, 8, 9, 10, 11, 13, 16, 20, 21, 24, 26, 27, 28, 30, 31, 32, 34, 37, 41, 43, 45, 46, 47, 48, 50, 51, 52, 53, 57, 61, 63, 64, 65) |
| | | Increase excitement (25, 36, 54, 61, 66) |
| | | Inspiring the activities (47,51) |
| | | Encouraging them to complete their deficiencies (45) |
| | | Increasing willingness to take care of the student (60) |
| | Raising awareness (f=25) | Changing the perspective on teaching (2, 17, 29, 42, 55) |
| | | Understanding that teaching is not difficult (7, 12, 18, 24, 27) |
| | | Understanding that teaching is a fun profession (4, 12, 32, 42) |
| | | Realizing the responsibilities of the teacher (21, 26, 39) |
| | | Understanding that he/she can teach (4, 19, 35) |
| | | Understanding how important activities are (2) |
| | | Understanding that he/she is responsible for all students' learning (49) |
| | | Understanding that it is a fun and effective method (11) |
| | | Understanding that the student should be in the center of teaching (17) |
| | Worrying (f=3) | Being a tiring process that requires preparation (33) |
| | | Understand that teaching is more difficult than you think (66) |
| | | Worrying about being able to do creative activities (58) |
| Developing professional competence | Gaining a sense of achievement (f=28) | Enjoying the lessons (15, 23, 31, 33, 38, 44, 47, 57, 65) |
| | | Ensuring self-confidence (1, 5, 7, 15, 27, 35, 40) |
| | | The feeling of being a teacher (1, 19, 22, 26, 41, 57, 67) |
| | | Feeling successful (10, 25, 28, 31) |
| | | Being more effective (64) |
| | | Overcoming the fear of teaching (6) |
| | Gaining experience (f=24) | Seeing many examples of activities (2, 13, 39, 47, 55, 58) |
| | | Developing horizon (1, 24, 55, 64, 65) |
| | | Gaining teaching experience (15, 22, 61, 62, 66) |
| | | Learning how to follow a path in teaching (15, 58) |
| | | Learning to prepare better activities (12, 65) |
| | | Understanding how to manage the classroom (59, 67) |
| | | Increasing creativity (36) |
| | | Learning how to gain an acquisition (51) |

As seen in Table 2, pre-service teachers evaluated the effect of student-centered teaching on themselves in two themes. The first theme was named raising emotional awareness. In this theme, they emphasized the sub-themes of worrying, raising awareness, and encouraging. In the sub-theme of worrying, pre-service teachers stated that although they are positively affected by student-centered teaching, the teaching profession is not easy, it is difficult to find creative activities, and the student-centered approach is a tiring process that requires preparation. Two of the sample opinions are presented below:

*"…I would also like to point out that it is a tiring process that requires preparation." (PT33). "…I was negatively affected because I was worried if I would be able to prepare creative activities suitable for the developmental levels of the students." (PT58).*

In the raising awareness sub-theme, pre-service teachers emphasized that they understood the importance of the student-centered approach and stated that they realized that the activities were very useful. Thanks to the activities, they understood that teaching is not difficult; on the contrary, it is a fun and doable profession. They also realized being a teacher and emphasized that their perspective on teaching had changed and that they understood that they were responsible for student learning. In addition, they understood that the student-centered approach is fun and effective and that the learning process should be organized according to the student. Two of the sample opinions are presented below:

*"…For the first time, I felt myself as a teacher candidate. I realized the responsibilities of the teacher." (PT26). "Student-centered activities opened my horizons and showed that I could be more beneficial to the student. My perspective on teaching has been positively affected." (PT29).*

In the encouraging sub-theme, pre-service teachers stated that student-centered activities affect them positively, increasing their motivation and willingness to engage with students more. In addition, they stated that student-centered activities excite them, inspire them for their professional life, and encourage them to develop more. Two of the sample opinions are presented below:

*"It helped me gain self-confidence by showing that the teaching profession is not difficult. It contributed to the relations and motivation of the students. I can say that it motivated me professionally." (TA7). "It made me discover how much I was lacking. I thought to myself that I must make up for my deficiency. My efforts to become more competent also increased my motivation." (PT45)*

Developing professional competence was the second theme that emerged regarding the effects of student-centered teaching on teacher candidates. In this theme, pre-service teachers emphasized the sub-themes of *gaining a sense of achievement and experience*. In gaining a sense of achievement, they stated that student-centered teaching makes students active in the lesson, makes them feel successful, and enables them to enjoy the lessons. Thanks to the activities, they overcame their fear of studying and became more confident in themselves. They also stated that student-centered teaching made them feel like teachers. Two of the sample opinions are presented below:

*"I had fears about teaching. But now I am confident in myself. The activities helped increase my self-confidence. Instead of the fear of how I would do when I became a teacher, I gained the courage to become a teacher as soon as possible (PT27). "It affected me positively. I learned various activity examples according to my achievements, and I had a lot of fun in these activities…" (PT47).*

In the sub-theme of gaining experience, pre-service teachers emphasized that they learned how to follow a course and prepare more effective activities in the classroom with student-centered teaching. They also saw many examples of activities throughout the term; these activities improved them and increased their creativity in preparing better activities. In addition, they understood how to manage the classroom effectively, thanks to the activities. Additionally, they learned how to gain acquisitions to students through student-centered activities, and they gained professional experience. Two of the sample opinions are presented below:

*"It was my first experience... It made me very happy. It made me feel like I was a teacher and I was observing my students." (PT22). "Preparing and presenting a student-centered activity impressed me well. Although the activity was short-lived, it showed that I have a serious responsibility in the future*

*and that teaching is important. Organizing activities made it easier for me to get ideas for doing many activities in the future and to understand my work." (PT39).*

### 3.3. What are the problems pre-service teachers face in student-centered instruction?

The findings regarding the problems faced by pre-service teachers in student-centered teaching are presented in Table 3.

**Table 3**

*The Problems Pre-service Teachers Encounter in Student-Centered Instruction*

| Theme | Sub-Theme | Codes |
|---|---|---|
| Problems related to self-efficacy | Anxiety (f=16) | Excitement and fear of making mistakes (31, 37, 38, 40, 51, 61)<br>Worrying that the activity will not appeal to all students (3, 9, 18, 32)<br>Fear of whether the activity will be useful (16, 36, 48)<br>Anxiety about not completing successfully. (27, 39)<br>Worry about students wanting to participate in the activity (23) |
| | Indecision (f=13) | Not sure that the activity is appropriate for the learning acquisition and grade level (24, 35, 46, 47)<br>It takes time to decide on the activity (2, 22, 62)<br>Not sure that the activity is suitable for all students (7, 30, 47)<br>Inability to decide on the right activity (10, 18)<br>Not being able to decide how to do it (27) |
| Problems related to education | Inexperience (f=29) | Difficulty in finding and preparing materials (6, 7, 13, 15, 29, 33, 46, 53, 64)<br>Difficult and challenging preparing an activity (24, 34, 57, 60, 65)<br>It takes time to prepare an original activity (1, 14, 53, 58)<br>Not preparing an activity before (4, 5, 8, 61)<br>Teaching a lesson for the first time (28, 40, 51)<br>Not being educated with a student-centered approach. (17, 24)<br>Planning takes a lot of time. (46, 57) |
| | Lack of knowledge (f=28) | Difficulty in finding ideas (13, 16, 19, 27, 28, 33, 43, 54, 59, 61, 64, 65)<br>Difficulty in estimating the student's level (39, 43, 54, 60, 63)<br>Not knowing how to prepare the activity (12, 31, 45)<br>The course acquisition is not suitable for doing activities (9, 33, 51)<br>Inability to associate the acquisitions with daily life (19, 42)<br>Insufficient prior knowledge (21)<br>Lack of sample activities on the Internet (13)<br>Not knowing what to do with first-grade and illiterate students (25) |
| | Lack of planning (f=21) | Inability to manage time (9, 11, 15, 18, 20, 29, 34, 50, 53, 66)<br>Difficulty in managing the classroom (18, 49, 50, 53)<br>Inability to make all students active (10, 52, 56, 64)<br>Difficulty in organizing the activity (5, 8, 15) |

As seen in Table 3, the problems faced by pre-service teachers in student-centered teaching are grouped under two themes. The first theme was identified as problems related to self-efficacy. In this theme, indecision and anxiety sub-themes were emphasized. In the sub-theme of indecision, pre-service teachers stated that it is difficult to decide on student-centered activities and stated that it takes a lot of time to prepare the activity, and they are not sure about the suitability of the activities for the student. They also emphasized that they were hesitant to identify the activities in which the students were in the center and that they doubted whether the activities they found were student-centered. Some of the sample opinions are presented below:

*"I can say that it is very thought-provoking to try to give the best to the student in the most efficient way in line with the acquisition while preparing a student-centered activity." (TA2). "Preparing a student-centered activity is difficult, challenging…. In the first weeks, while developing ideas about the activity, I had difficulty matching these ideas to the learning acquisition and grade level. As the weeks progressed, I saw that I had more ideas and developed. (PT24)*

In the anxiety sub-theme, pre-service teachers stated that they were worried about preparing an effective student-centered activity, and they experienced both excitement and fear of making mistakes in this process. Also, they were afraid that the activities they prepared were not suitable for all students. In addition, they were afraid of students not participating in the activities they prepared. Two of the exemplary opinions regarding this issue are presented below:

*"I was a little worried about whether my activity would appeal to the whole class. I couldn't get the attention of the whole class until the end of the event." (PT32). "To be honest, I was very excited. I also had a little fear of making mistakes. But in the end, I finished the activity well." (PT37)*

The second theme that emerged regarding the problems that pre-service teachers faced in student-centered teaching was determined as *problems related to education*. In this theme, lack of knowledge, *inexperience,* and *lack of planning* sub-themes emerged. In the lack of knowledge sub-theme, they stated that their previous knowledge was not sufficient, they did not know how to prepare student-centered activities, and they had difficulty finding ideas. They also stated that they could not find exemplary student-centered activities in their internet searches to get an idea. In addition, they emphasized that they did not know how to prepare the activities if the students were first graders or illiterate. They also expressed that they faced similar problems when they did not know the learning level of the students. However, they stated that some of the lesson acquisitions were not suitable to be processed with a student-centered approach, and they had difficulty in associating the lesson acquisition with the student's life. Some of the sample opinions of the pre-service teachers regarding this issue are presented below:

*"I didn't have a specific idea about the topic I would be doing the event. I couldn't find any specific data on the internet for the activity I was going to do. I had difficulties in creating the activity." (PT13). "It is very difficult to produce. It's really hard to get down to the students' level. I think it's a problem that will be settled with time and experience." (PT43).*

In the sub-theme of inexperience, pre-service teachers stated that they taught student-centered lessons for the first time, and they had not prepared student-centered activities before. They found it challenging to prepare student-centered activities since they did not receive training on the approach. According to them, preparing an original activity, finding or preparing materials, and planning the lesson takes a lot of time. Some of the exemplary opinions regarding this are presented below:

*"As much as I enjoyed doing these activities, I also had difficulties. It takes a lot of effort to design materials, find ideas, and then present them in the classroom. Along with these, time management can sometimes be too much of a problem." (PT15). "I realized that it is not that easy to consider every detail... The planning process took time while preparing the activity for the acquisition." (PT57).*

In the lack of planning for the sub-theme, pre-service teachers stated that they did not use time effectively in the classroom and that they had difficulty managing the classroom. They also had problems organizing the activity and activating all students in the lesson. Two of the exemplary opinions regarding this issue are presented below:

*"I just had trouble with the duration. Since we are doing an activity in the classroom and there are no strict rules in the lesson, the direction and time of the activity cannot be predicted precisely."*

*(PT11). "When you do student-centered activities, there is confusion in the classroom. When we do not manage it well, the activity is prolonged. This causes a waste of time." (PT50).*

## 4. Results and Discussion

This research was carried out to examine the experiences of pre-service teachers regarding student-centered teaching. According to the results of the research, pre-service teachers consider student-centered teaching as an effective learning approach. The approach provides a suitable learning environment and positively affects student motivation. The teaching activities are also fun and remarkable, and the teaching process offers the students the opportunity to associate what they have learned with their daily life. Similarly, research reveals student success and motivation of student-centered approaches, methods, techniques and materials (Uzun, 2020; Yaşar, Çengelci Köse, Göz, & Gürdoğnan Bayır, 2015; Yeşilpınar Uyar & Doğanay, 2018). Topan (2013) also determined that student-centered methods are more effective on academic success than the traditional method. Two of the main reasons for the adoption of student-centered teaching are that it provides enjoyable learning and enables students to learn better (Froyd & Simpson, 2008). Enabling students to learn while having fun makes learning and teaching more comfortable. This also builds trust (Moye, 2010). Students value and appreciate the subject taught with student-centered learning (Brown, 2008). In student-centered learning, students do not always depend on teachers and do not expect teachers' instruction, approval, correction, advice, and praise. In this aspect, teaching is more participatory, effective, motivating, and entertaining (Demirkan & Saraçoğlu, 2016; Jones, 2007; Ünsal, 2017). The role of constructivist teachers is to organize constructivist learning activities by providing content and resources, thereby creating a context in which the student is motivated to learn (Schreurs & Dumbraveanu, 2014). Student-centered learning provides students with higher critical thinking, problem-solving, developing attitudes toward learning, and an increase in general participation (Overby, 2011).

According to another result of the research, student-centered teaching enables students to take responsibility, cooperate, and communicate with their friends and teachers. Thus, students' social bonds are strengthened, their self-confidence increases, and they become more sensitive to their environment. On the other hand, student-centered education is inclusive because it is suitable for the development and perception level of all students and appeals to them. Since more sense organs are active in the activities of the approach, students learn better, and learning is more permanent. Therefore, student interest and participation in the lesson increases in student-centered teaching. Uzun (2020) and Topan (2013) also determined in their research that student-centered teaching has a positive effect on attitudes towards lessons compared to traditional teaching. Talbert, Hofkens, and Wang (2019) state that there is a positive relationship between student-centered teaching and student participation in the course. Student-centered strategies, methods, and techniques have a wider impact on increasing academic achievement than teacher-centered approaches (Semerci & Batdi, 2015; Ural & Bümen, 2016; Yeşilpınar Uyar & Doğanay, 2018). Student-centered methods and techniques better meet the needs of students and enable them to grow up as citizens with global consciousness (İlter, 2014). Activities organized in accordance with this approach provide higher student success (Granger, Bevis, Saka, Southerland, Sampson & Late, 2012). These results show that pre-service teachers recognize student-centered teaching as versatile and evaluate it as an effective learning approach. Therefore, when appropriate activities are carried out in pre-service education, pre-service teachers both recognize the student-centered teaching approach and learn how to apply the approach. In this respect, the preparation and implementation of student-centered teaching activities by pre-service teachers in undergraduate education serve to raise them more qualified.

In the second sub-objective of the study, it was questioned how pre-service teachers were affected by student-centered teaching. According to the findings, student-centered teaching raises awareness of teacher candidates. Their perspectives on teaching were affected positively, and they understood that

teaching is not a difficult profession; on the contrary, it is a fun and doable profession. The approach has been encouraging by positively affecting their motivation and willingness to deal with the student. According to the results of a research, teachers who consider themselves competent develop teaching methods and measurement and evaluation tools suitable for new approaches (Akpınar & Gezer, 2010). It is stated in the literature that practice-oriented courses have a positive impact on the development of teacher candidates' teaching skills (Kılıç & Acat, 2007; Güney & Semerci, 2009; Kablan, 2012). When the teacher believes that a student-centered classroom provides a more effective learning environment, they strive for this purpose (Wright, 2011). Teachers' focus on student-centered teaching affects student success (Papanastasiou, 2008). Students' performance improves more when the classroom is well organized, and students actively participate in learning through student-centered activities (House, 2008). In such classrooms, students become expert learners by questioning themselves and their strategies (Bada & Olusegun, 2015). Thus, students and teachers have the chance to discover and succeed, and the school becomes interesting and safe for them (Overby, 2011). In this respect, for pre-service teachers to use the student-centered approach in their professional lives, they should be supported in their undergraduate education with alternative educational experiences that are encouraging, entertaining, and will increase their participation. On the other hand, student-centered teaching gives pre-service teachers a sense of achievement. The activities enable them to adopt the role of teaching, have fun in the lessons, overcome their fear of teaching, and be self-confident. Student-centered teaching also gives them experience. Candidates both experience how student-centered teaching is implemented and learn to activate students by participating in many activities. According to Ünsal (2017), active learning enables students to break their prejudices towards the lesson, gain valence awareness, and increase their self-confidence. However, student-centered teaching has worried some teacher candidates. Although these pre-service teachers approach student-centered teaching positively, they consider this teaching as a tiring and preparatory process. According to them, it is difficult to find creative activity, and teaching is a troublesome profession. When the results related to the second sub-goal are evaluated, it can be said that student-centered teaching gives pre-service teachers emotional awareness and develops them professionally. This process not only introduced them to student-centered teaching but also convinced them of the benefits of the approach. In addition to realizing that student-centered teaching provides a better learning environment, they also understand the role of the teacher in this teaching. In this respect, it is seen that teacher candidates' experience of student-centered teaching in undergraduate education contributes positively to their professional development.

In the study's third sub-objective, the problems pre-service teachers faced in student-centered teaching were examined. According to the findings, pre-service teachers are worried that students do not attend the lesson. They are unsure of the suitability of the activities they have prepared for the student and experience indecision. Since they have not received training on the student-centered approach before and their current knowledge is insufficient, they have difficulty in student-centered teaching, and they see their experience as insufficient. Because they do not plan the activities in detail, they do not use time effectively during the lesson and have problems managing the class. Akpınar and Gezer (2010) found that although teachers adopted a learner-centered approach, they did not reflect this on the learning-teaching process and mainly taught with the traditional narrative method. Okumuş (2021) also stated that pre-service teachers are at an intermediate level in terms of designing student-centered activities and emphasized that teacher candidates' lesson plan and activity design skills should be improved. In another study, crowded classes, insufficient time, and pre-service and in-service training were problems for student-centered education (Erdem, Karademir & Tezel, 2022). On the other hand, Taşkıran (2015) determined that there were no problems that prevented the activities that the teacher should do in the lesson. The learning opportunities provided to teachers in professional development programs are an important factor leading to quality education and high self-efficacy (Son, Han, Kang, & Kwon, 2016). When students are asked to behave differently in the classroom, they can create some resistance (Froyd

& Simpson, 2008). In addition, physical impossibilities and crowded classrooms can also create problems in the implementation of student-centered teaching (Özdaş, 2018; Yalçın İncik & Tanrıseven, 2012). However, if the classroom environment is well-planned, students learn how to learn (Bada & Olusegun, 2015). Therefore, the teacher's field education and pedagogical knowledge of the field, beliefs, and interpretation of the curriculum affect and determine how student-centered activities will be implemented (Remillard, 2005). Therefore, when the results are evaluated, it is seen that pre-service teachers have problems related to self-efficacy and education. However, considering the results related to the other sub-objectives of the research, it is thought that providing a more student-centered teaching experience to teacher candidates in undergraduate education can solve the problems. In addition, instructional planning needs to be made an integral part of this education.

When the results of the research are considered as a whole, teacher candidates see student-centered teaching as a learning approach that provides effective learning. According to the pre-service teachers, the approach is inclusive, increases student participation, and brings academic success to the student. From this point of view, it can be said that student-centered activities provide pre-service teachers with a sense of achievement, experience, and professional competence. This encourages them, creates awareness in them, and gives them self-confidence. On the other hand, the practice causes pre-service teachers to experience problems related to self-confidence (such as indecision and anxiety) and education (such as lack of knowledge, inexperience, and planlessness).

### 4.1. Suggestion

In the research, it has been revealed that student-centered teaching motivates pre-service teachers and gives them professional competence. In this direction, all courses in undergraduate education, especially field courses, can be organized in a student-centered manner so that pre-service teachers can gain their teaching skills. In undergraduate education, effective participation of pre-service teachers in the teaching-learning process can be ensured, and teacher candidates can be provided to prepare and present student-centered activities. For the problems faced by pre-service teachers regarding lack of self-confidence, examples should be shown by the instructors, their concerns should be relieved, and they should be motivated. For problems related to lack of education, teacher candidates should be informed about the approach, they should be made to practice, and planning should be made a part of the practice.

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Research Article

# Students' Barriers and Emotional Presence in Online Learning: A Canonical Correlation Analysis

Zeliha Demir Kaymak

Sakarya University, Sakarya, Türkiye, zelihad@sakarya.edu.tr

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**Abstract:** Addressing the barriers students face in online learning is critical to creating an inclusive, supportive, and practical educational experience that benefits many students. The aim of this study is to examine students' online learning barriers and emotional presence, which affect many variables in online learning environments, and the relationship between these variables. For this purpose, data was collected from 402 university students enrolled in the same course at a university. According to the data collected from the students, it can be said that the student's barriers to online learning are at a medium level for eight sub-factors ((a) administrative issues, (b) social interaction, (c) academic skills, (d) technical skills, (e) learner motivation, (f) time and support for studies, (g) cost and access to the Internet, and (h) technical problems). Similarly, it was found that students' emotional presence in online learning is at an average level for Receiving Emotions ($\bar{x}$=3,438) and Giving Emotions ($\bar{x}$=2,994) factors. Canonical correlation analysis was used to show the relationship between student barriers and emotional presence. As a result of this analysis, it was concluded that the canonical correlation was low. It was observed that the factor that contributed the most to the significant model among student barriers was the factor of administrative/instructor issues, and the factor of receiving emotions factor was one of the emotional presence factors.

**Keywords:** Online Learning, Student Barriers, Emotional Presence

## 1. Introduction

The use of computer-based multimedia educational technologies, which are gradually replacing traditional face-to-face learning environments, is increasing, which can cause various emotional experiences in students (Tyng et al., 2017). Emotions are known that have a significant impact on learning (Antonacopoulou & Gabriel, 2001; Pekrun, 2000; Linnenbrink-Garcia & Pekrun, 2011). Likewise, in e-learning, emotions are positioned as central and necessary in the teaching/learning process (O'Regan, 2003). This is because those engaged in online learning deal with the effects of emotions on a daily basis, whether they are designing instruction, teaching or learning online (Cleveland-Innes & Campbell, 2012). While emotions have long been a subject of interest in educational settings, the evolution of technology has not only transformed the nature of learning environments but also reshaped our understanding of emotions within these contexts (Sarsar & Kışla, 2016). Emotions are also stated to have an important role in students' adaptation to the online learner role (Cleveland-Innes et al., 2007). When a person feels emotionally intelligent during e-learning, it means that he/she perceives a high level of emotional presence (Kang, Kim & Park, 2007). Therefore, emotional presence is one of the issues that should be taken into consideration in e-learning environments.

Presence is one of the concepts discussed and studied in e-learning. The community of inquiry model is a well-known theory and widely used in online learning researches. The community of inquiry model comprises three key components: cognitive presence, social presence, and teaching presence (Garrison, Anderson, & Archer, 2000). In the Community of Inquiry model, emotional presence is understood in terms of emotional expression which is part of social presence (Garrison, Anderson, & Archer, 2010;

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Majeski et al., 2018). Emotional presence is the outward expression of emotion, affect, and feeling by individuals and among individuals in a community of inquiry, as they relate to and interact with the learning technology, course content, students, and the instructor (Cleveland-Innes & Campbell, 2012: p.283). Kang, Kim and Park (2007) stated that social presence is based on the perception of ad hominem and emotional presence is based on individual perception for that reason emotional presence could be separated and defined as an independent area not as sub-element of social presence. It has been pointed out that the role of emotional presence includes motivational and emotional experiential elements such as self-efficacy and openness, thus going beyond emotional expression in learning (Majeski et al., 2018). Stenbom, Hrastinski, and Cleveland-Innes (2016) provided evidence in their research that emotional presence exists in an online relationship of inquiry, and emotional presence can be measured outside of social presence. Dell (2021) stated in her doctoral thesis on emotional presence in the inquiry community that he could find only eight studies on emotional presence and that further studies on this subject are needed. Her findings support that emotional presence is important for trust and belonging and is implicated in deep and meaningful learning.

Students' perceptions of online learning are one of the important factors affecting learning outcomes (Demir Kaymak & Horzum, 2013; Horzum, 2015; Horzum et al., 2015). In this respect, outputs such as high dropout rates, low motivation, negative attitudes, etc. in online learning can be caused by negative perceptions such as wrong design and disruption of the process. One of these perceptions is perceived barriers (Muilenburg & Berge, 2005).

The barriers perceived by students in online learning affect students' success (Demir Kaymak & Horzum, 2013; Horzum, 2015; Horzum et al. 2015; Horzum et al. 2017). In addition, online learning barriers are related to academic motivation (Kongül and Toprak, 2023), perception of transactional distance (Akpınar, 2019), perception of social presence (Seferoğlu, Doğan and Duman, 2011), and attitudes towards online learning (Sipahi, 2019), readiness for online learning (Horzum, 2019), Ability and confidence in online learning technology (Muilenburg and Berge, 2005), Effectiveness in online learning, and Enjoyment of online learning (Muilenburg and Berge, 2005), Number of completed online courses (Muilenburg & Berge, 2005) and the possibility of taking online courses in the future (Muilenburg & Berge, 2005). When the literature was examined, it was seen that no study simultaneously addressed students' emotional presence in online learning and perceived barriers to online learning, affecting their success. When the literature was examined, it was seen that no study simultaneously addressed students' emotional presence in online learning and perceived barriers to online learning, affecting their success. Within the scope of this research, the following research questions were examined.

- How is the student barriers to online learning?
- How is the students' perceived emotional presence in online learning?
- What is the relationship between factors of perceived students' barriers to online learning and emotional presence?

## 2. Method

### 2.1. Research design

Since the research aims to examine the relationship between student barriers and students' emotional presence in online learning, the research was conducted as a correlational research. Correlational research is research in which the relationship between two or more variables is investigated without interfering with these variables in any way (Büyüköztürk et al., 2023). correlational research is a type of nonexperimental research that facilitates prediction and explanation of the relationship among

variables (Tan, 2014:176). There are two types of correlational research: exploratory and predictive correlational research (Fraenkel & Wallen, 2006). This study is designed as exploratory correlational research.

## 2.2. Participants

The accessible population of the study consists of students taking online courses at a state university in Türkiye. Convenient sampling method was used as the sampling method and the students who voluntarily participated in the study were included. In order to prevent the participants' views from being affected by the characteristics such as the institution, department or environment providing online learning, students enrolled in the same education were studied. For this purpose, students who received pedagogical formation education online in the 2022-2023 academic year were studied. The questionnaires were sent to the students online and 409 participants returned the questionnaire forms. When the forms were examined, 7 forms were removed because they were not filled in properly, and the data obtained from the remaining 402 participants were analyzed. Demographic information about 402 participants is given in Table 1.

**Table 1**

*Demographic Information of Participants*

| Gender | N | % |
|---|---|---|
| Male | 62 | 15,4 |
| Female | 340 | 84,6 |
| Total | 402 | 100.0 |
| Age | N | % |
| 20-24 | 199 | 49,5 |
| 25-29 | 89 | 22,1 |
| 30-34 | 39 | 9,7 |
| 35-39 | 37 | 9,2 |
| 40 and over | 28 | 7,0 |
| Total | 447 | 100 |

As seen in Table 1, the majority of the participants are female students (340) and students between the ages of 20-24 (199).

## 2.3. Data collection tool

In the study, the Student Barriers to Online Learning Scale and the Emotional Burdensomeness in Online Learning Environments Scale were used as data collection tools.

### *2.3.1. The student barriers to online learning scale*

The Student Barriers to Online Learning Scale developed by Muilenburg and Berge in 2005 is a 5-point Likert-type scale consisting of 45 items and 8 factors ((a) administrative issues, (b) social interaction, (c) academic skills, (d) technical skills, (e) learner motivation, (f) time and support for studies, (g) cost and access to the Internet, and (h) technical problems). The Turkish version of the scale adapted by

Horzum et al. (2017) was used in this study. *"Lack of timely feedback from instructor", "Lack of social context cues"* and *"Lack support from family, friends, employer"* are examples of scale items. Cronbach's alpha value for the scale was .92. Cronbach's alpha values for sub-factors are between .82 and .94.

#### *2.3.2. The emotional presence in online learning scale*

In order to examine students' emotional presence, the Emotional Presence Scale in Online Environments developed by Sarsar and Kışla (2016) was used. The scale consists of 2 factors as (a) receiving emotions and (b) giving emotions and 21 items in 5-point Likert type. *"I have difficulty expressing my feelings in virtual environments"* item is an example of the Giving Emotion factor. *"I pay attention to the emotions of the people I communicate with in virtual environments"* item is an example of the Receiving Emotion factor. The Cronbach alpha of the scale was .88. The Cronbach alpha of factors, the Giving Emotion factor was.79 and the Cronbach alpha of the Receiving Emotion factor was .86.

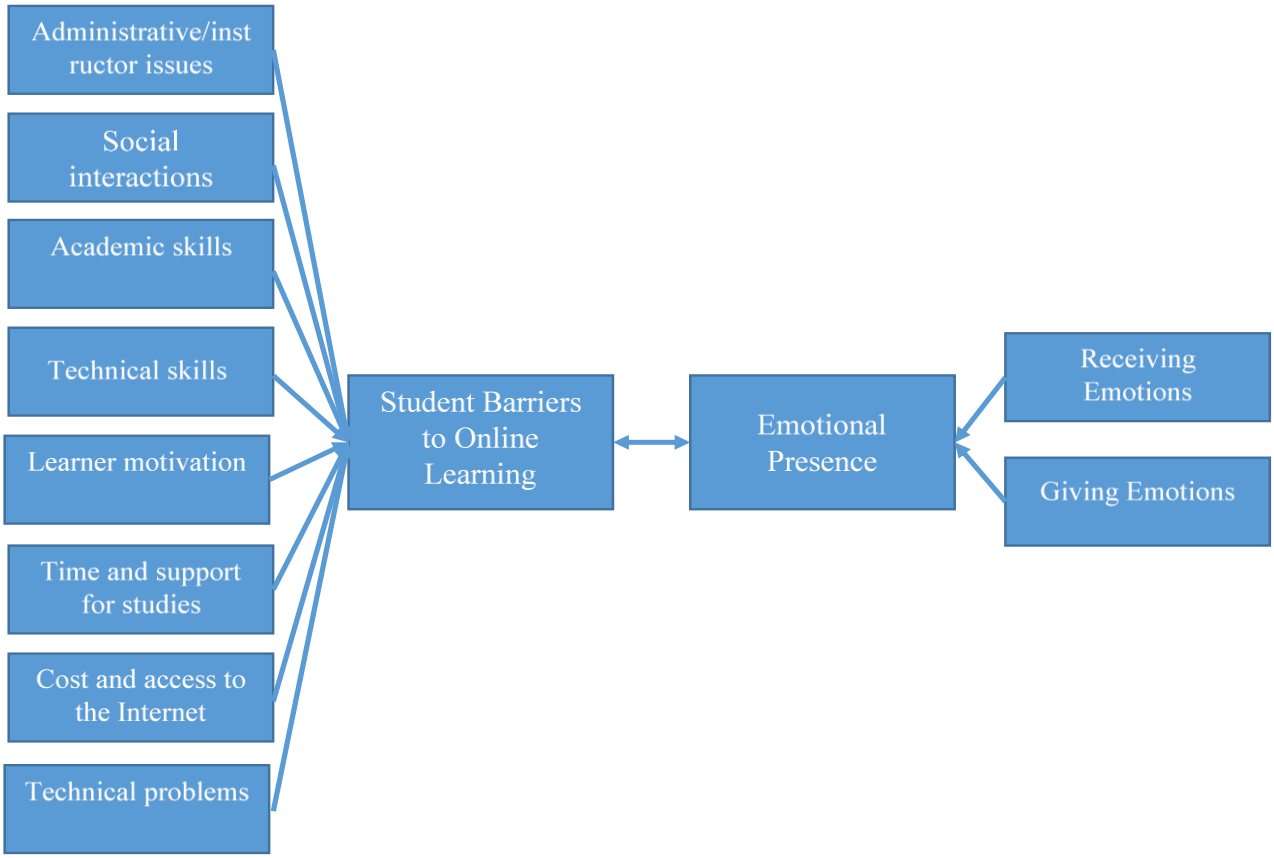
### 2.4. Data collection and analysis

The data were collected from the participants with the help of an online questionnaire. The link to the scales was sent to all students enrolled in the course. Participants who voluntarily participated in the study were included in the study. SPSS 26.0 package program was used for data analysis. Since there were two or more factors for student barriers in online learning and emotional presence in online learning environments, canonical correlation analysis was used to examine the relationship between these variables.

Canonical correlation analysis is used to find the relationships between two data sets, each consisting of at least two variables (Tabachnick, & Fidell, 2013; Weenink, 2003). Canonical correlation analysis was preferred to be used in this study since canonical correlation analysis tests whether two sets of variables obtained from the same individual or situation are independent of each other and determines the variables in both sets that contribute the most to the correlation between the sets (Çemrek, 2012). Canonical correlation analysis, a widely utilized multivariate statistical method, is favored among researchers due to its versatility in handling both metric and non-metric data, with the added benefit that neither variable set needs to be strictly dependent or independent (Menevşeoğlu, 2019). The variable groups whose relationships were analysed by canonical correlation analysis in this study are shown in Figure 1.

**Figure 1**

*Variables and general structure of the research*




For canonical correlation, firstly, the prerequisites of the analysis were examined. These conditions are linearity, multivariate normal distribution, and no multicollinearity between variables (Tabachnick, & Fidell, 2013). For multicollinearity, correlation values between variables were examined, and since these values were below 0.80 (Berry & Feldman, 1985), it was accepted that this assumption was met. Skewness and kurtosis values were examined to examine the normality of the data. Since these values are between -1 and +1 (Hair et al, 2013), it is accepted that the normality assumption is met. VIF values were analyzed for the multicollinearity assumption, and the highest value was found to be 2.86. VIF values of 5 and below indicate that this assumption is met, according to Craney and Surles (2002). In addition, the sample size should be as large as possible regarding the results' reliability. Keskin and Özsoy (2004) stated that this size should be at least 5 times the number of variables, and Stevens (2009) stated that it should be 10 or 20 times the number of variables. In this study, a total of ten variables, eight for barriers to online learning and two for emotional presence, were used, and 402 participants were studied. This shows that the sample size is quite sufficient for canonical correlation analysis.

### 2.5. Ethical principles

Ethics committee permission was received from Sakarya University Rectorate Ethics Committee with the decision dated 09.11.2022 and numbered 12/19.

## 3. Findings

### 3.1. Student barriers to online learning and emotional presence

Descriptive statistics of students' perceived barriers to online learning and emotional presence are presented in Table 1. According to the descriptive statistics based on the mean scores, students' mean

scores for (a) administrative/instructor issues in online learning ($\bar{X}$=3,18), (b) social interactions ($\bar{X}$=2,68), (c) academic skills ($\bar{X}$=2,78), (d) technical skills ($\bar{X}$=2,86), (e) learner motivation ($\bar{x}$=3,08), (f) time and support for studies ($\bar{X}$=2,75), (g) cost and access to the internet ($\bar{X}$=3,11) and (h) technical problems ($\bar{X}$=3,23) are evaluated as moderate. According to these values, it can be said that the factor with the highest perceived barrier is technical problems ($\bar{X}$=3,23) and the factor with the lowest perceived barrier is social interactions ($\bar{X}$=2,68). On the other hand, for emotional presence, the average for the Receiving Emotions factor was found to be $\bar{X}$=3,43, while it was found to be $\bar{X}$=2,99 for the Giving Emotions factor.

**Table1**

*Descriptive Statistics of Student barriers to online learning and Emotional Presence*

| | | N | Min | Max | Mean | SD |
|---|---|---|---|---|---|---|
| Student barriers to online learning | Administrative/instructor issues | 402 | 1,00 | 5,00 | 3,1827 | ,86518 |
| | Social interactions | 402 | 1,00 | 5,00 | 2,6874 | 1,08377 |
| | Academic skills | 402 | 1,00 | 5,00 | 2,7832 | 1,10437 |
| | Technical skills | 402 | 1,00 | 5,00 | 2,8672 | ,94632 |
| | Learner motivation | 402 | 1,00 | 5,00 | 3,0879 | ,85440 |
| | Time and support for studies | 402 | 1,00 | 5,00 | 2,7542 | ,91444 |
| | Cost and access to the Internet | 402 | 1,00 | 5,00 | 3,1177 | 1,07798 |
| | Technical problems | 402 | 1,00 | 5,00 | 3,2305 | 1,10689 |
| Emotional Presence | Receiving Emotions | 402 | 2,00 | 4,92 | 3,4384 | ,51045 |
| | Giving Emotions | 402 | 1,89 | 4,33 | 2,9947 | ,43109 |

### *3.1.1. Correlations between student barriers to online learning and emotional presence*

The correlation values between student barriers and emotional presence factors are given in Table 2. According to this table, the correlation values in terms of student barriers and emotional presence vary between the lowest,024, and the highest,170. These values show a low correlation.

**Table 2**

*Correlation between the sub-dimension of Student barriers to online learning and Emotional Presence (n = 402).*

| | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | Y1 | Y2 |
|---|---|---|---|---|---|---|---|---|---|---|
| Administrative /instructor issues | 1 | ,497** ,000 | ,550** ,000 | ,550** ,000 | ,567** ,000 | ,509** ,000 | ,584** ,000 | ,470** ,000 | ,170** ,001 | ,035 ,483 |
| Social interactions | | 1 | ,713** ,000 | ,553** ,000 | ,310** ,000 | ,720** ,000 | ,536** ,000 | ,559** ,000 | ,075 ,132 | ,107* ,033 |
| Academic skills | | | 1 | ,570** ,000 | ,418** ,000 | ,627** ,000 | ,523** ,000 | ,560** ,000 | ,024 ,638 | ,097 ,053 |
| Technical skills | | | | 1 | ,454** ,000 | ,626** ,000 | ,622** ,000 | ,667** ,000 | ,115* ,021 | ,111* ,026 |
| Learner motivation | | | | | 1 | ,448** ,000 | ,428** ,000 | ,304** ,000 | ,080 ,107 | ,068 ,175 |
| Time and support for studies | | | | | | 1 | ,549** ,000 | ,556** ,000 | ,051 ,307 | ,065 ,191 |
| Cost and access to the Internet | | | | | | | 1 | ,721** ,000 | ,088 ,078 | ,016 ,745 |
| Technical problems | | | | | | | | 1 | ,033 ,509 | ,069 ,168 |
| Receiving Emotions | | | | | | | | | 1 | ,392** ,000 |
| Giving Emotions | | | | | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

For canonical correlation analysis, X variable block (X1=Administrative/instructor issues, X2= Social interactions, X3 =Academic skills, X4= Technical skills, X5= Learner motivation, X6= Time and support for studies, X7= Cost and access to the Internet, X8= Technical problems) represents student barriers and Y block (Y1= Receiving Emotions, Y2= Giving Emotions) represents emotional presence factors. Only one of the two correlation values was calculated as a result of canonical correlation analysis to examine the relationship between student barriers and students' perceived emotional presence in online learning was found to be statistically significant. The Wilks Lambda coefficient for the canonical correlation between the two groups of variables was 0.918 ($F = 2.144$, $p < 0.05$), and the canonical correlation coefficient was 0.237; however, this indicates a low effect size. According to this model, the equations for student barriers and emotional presence are as follows.

Student Barriers (X)= $-1{,}052_{X1} - 0{,}145_{X2} + 0{,}715_{X3} - 0{,}266_{X4} + 0{,}237_{X5} + 0{,}119_{X6} - 0{,}440_{X7} + 0{,}556_{X8}$

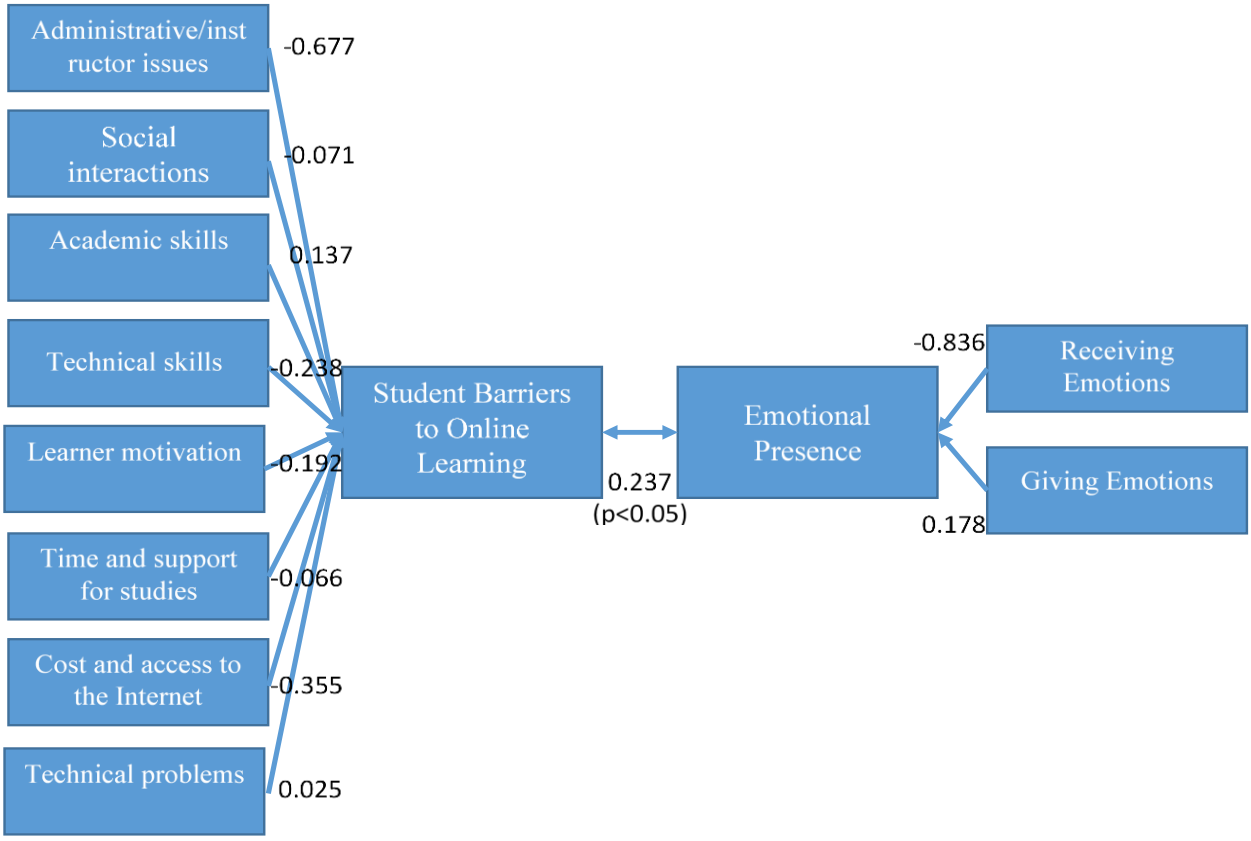
Emotional Presence (Y)= $-1{,}069_{Y1} + 0{,}597_{Y2}$

The canonical loadings of the variables are given in Figure 2. When these values are examined, it is seen that the factor with the highest canonical load value on student barriers is the factor of

administrative/instructor issues (Rs=-0.677) and the factor of receiving emotions (Rs=-0.836) on emotional presence.

**Figure 2**

*Structure coefficient of canonical factors*




In addition, when the cross-loadings showing the effect of student barriers factors on emotional presence were examined, it was found that the factor with the highest effect was administrative /instructor issues (-0.161), and the others as social interactions (-0.017), academic skills (0.032), technical skills (-0.057), learner motivation (-0.046), time and support for studies (-0.016), cost and access to the internet (-0.084), technical problems (0.006). When the effect of emotional presence factors on student barriers was analysed, the highest factor of receiving emotions (-0.198) and and then the factor of giving emotions (0.042) were found.

## 4. Results and Discussion

This study analyzed student barriers to online learning and students' emotional presence. The barrier levels perceived by the students has been examined as administrative/instructor issues, social interactions, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the internet and technical problems. The average scores calculated for student barriers can be considered moderate. This finding is similar to the studies in the literature (Akpınar, 2019; Aljaraideh, & Al Bataineh, 2019; Horzum, 2019; Srichanyachon, 2014) in which the barriers perceived by students in online learning are generally moderate. On the contrary, there are also sources indicating that students encounter significant online barriers (Sipahi, 2019) or that lower average scores are obtained for barriers (Muilenburg & Berge; 2005).

The three factors that received the highest scores for the barriers addressed in this study were factors of administrative/instructor issues, cost and access to the internet, and technical problems. On the other hand, Muilenburg and Berge (2005) found that Social interactions, Administrative/instructor issues, and Time and support for studies were the factors with high scores. In another study on online learning barriers, it was stated that Social interactions, Time and support for studies factor were perceived as a barrier, while administrative and instructor issues, academic skills, student motivation, internet access and support provider, technical skills, cost and access to the internet were not perceived as barriers (Canan-Güngören et al, 2019).

According to research results, it can be said that students' emotional presence in online learning is at an average level for receiving emotions and giving emotions factors. Similar results were found in the study conducted by İlgar et al. (2022) with university students.

Finally, when the relationship between student barriers and emotional presence in online learning was examined, a statistically significant but low-level relationship was found. In the literature, there are sources (Akpınar, 2019; Seferoğlu, Doğan, & Duman, 2011) that mention the relationship between barriers and social presence in online learning and its importance, but there are no studies on the relationship between students' barriers and emotional presence. Administrative/instructor issues factor among student barriers was found to have an effect on both student barriers and emotional presence.

### 4.1. Limitations of the study

One of the most important limitations of this study is participants. Although this study was conducted with students who received the same online education at the same university, most of the students' education before this education was face-to-face in a similar group. Although there are students from 14 different departments among the 402 participants in the research, the rate of students knowing the students from their previous classes in this education is high. Due to this, students may also be carrying the effects of face-to-face training, although they received their training completely online during the application. For example, the fact that the factor perceived as the lowest obstacle in student barriers is social interaction may be due to this. In addition, the data collection tools used in the study can also be considered as a limitation of the study. To obtain more detailed data for student barriers, a scale with more items and widely used in studies (Muilenburg & Berge; 2005) was preferred. For emotional presence, the only scale that has been studied on this subject was used.

### 4.2. Recommendations

According to the results obtained from the research, studies can be carried out to reduce perceived barriers, primarily on administrative/instructor issues, in order to contribute to students' emotional presence levels. Administrative and instructors can be trained, and support systems can be prepared in order to reduce perceived barriers of this issue. Psychological support can be provided to students who have problems with receiving emotions, which has more impact.

For future research, it can be suggested to increase the number of studies to be conducted on emotional presence. In addition, similar research hypotheses can be tested with different measurement tools and different participants. Thus, the effect of the limitations of the research can be examined. In addition, qualitative research can be organized to obtain more in-depth information on this subject.

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Research Article

# Perceptions of University Students Participating in Student Club Activities: Kültürel Miras Student Club Example

Yiğit Cebeci[1*]
Hüseyin Çalışkan[1]
Mehmet Uymaz[1]

Sakarya University, Sakarya, Türkiye,
yigitcebeci@sakarya.edu.tr,
hcaliskan@sakarya.edu.tr,
muymaz@sakarya.edu.tr

*Corresponding author

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**Abstract:** The study aims determine and examine the perceptions of students who participate in student club activities as organizers and participants regarding skills, values, and abilities/skills within the scope of these activities. The study group consisted of 14 university students who participated in the activities of a student club operating within the faculty of education of a state university in the 2022-2023 academic year. The study was carried out within the framework of phenomenology research design. "Activity Diary Interview Form" was used to collect the study data, and the data were analyzed with the descriptive analysis method. As a result of the study, it was determined that university students who participated in student club activities as organizers and participants made statements about skills 64 times and values 33 times according to the 2023 Social Studies Curriculum. In addition, it was determined that in these student club activities, university students put forward expressions regarding skills and abilities such as "world knowledge, love of learning, collaborative work, self-management, examples of altruism, language ability, initiative and volunteering activities" according to developed Paul's Transcript.

**Keywords:** Student Clubs, Student Club Activities, Skills, Values, Paul's Transcript

## 1. Introduction

Universities are not institutions that only produce and transfer knowledge through research and teaching. In addition to important roles such as the protection of local and universal cultural heritage, global collaborations, health care, community service, entrepreneurship, and innovation, universities also undertake important socialization roles such as protecting the general good in society, protecting and imparting social and universal values, identifying and solving social problems. The fact that universities can achieve their desired effects on social life only through formal education may only sometimes coincide with the expectations of the current century. When this is the case, universities also consult types of learning such as volunteering, community service practices, and service learning. One of the counterparts of volunteering, one of these types of learning at the university, stands out as a student club. Universities establish communities in order to ensure that their students are better educated in today conditions, to contribute to their free time, to motivate their energy in favorable areas, to support the social and cultural development of societies, and to seek solutions to various problems of humanity (Turan et al., 2017).

Student clubs are a framework where activities for particular purposes are carried out in line with the interests and wishes of students in higher education. Student clubs, sports clubs, artistic clubs, social responsibility clubs, clubs working in the field of engineering, clubs working in the field of health, clubs working in the field of environment and nature, cultural and academic clubs, clubs working in the field of foreign student exchange programs, clubs working in the field of religion and spirituality, it is seen that it operates in many areas, including community service clubs. The establishment and functioning of student clubs in different subjects is important for universities to serve their purposes (Eskici & Aktaş, 2014).

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Bentley University (2022) summarizes the benefits of being a member of a student club in 12 points: Knowing yourself better: providing many opportunities to learn more about yourself, your goals, and strengths. Providing a sense of community; being a voice: being a voice for others can create the chance to affect positive change, developing social skills: simply teaching you these skills not only, but it can also help you expand and develop what you already have, learning teamwork: it can enable the exchange of ideas and advice, creating networking opportunities: another great benefit is the opportunity to network, you can meet new students, make connections and gain new relationships. Can provide employment opportunities, using skills learned in the classroom: can create an environment where the skills learned can be tested, can teach you to interact with different groups of people, can provide leadership skills, can create the opportunity to take a break from classes and have fun, can enrich your CV and give you a chance to benefit society. As can be seen, being a volunteer participant of a student club means that the student is self-aware, develops a sense of belonging, defends the general good, is a social, active, participatory, team member, entrepreneur, serving, leader, responsible, open to knowledge, curious about teaching, aware and contributing. It can play a vital and versatile role in making people sought after in society and business life.

When the specific objectives of the social studies course curriculum are examined, it is seen that the students are raised as citizens of the Republic of Türkiye who love their homeland and nation, know and use their rights, fulfill their responsibilities, and have national consciousness. They should understand their place and be willing to keep democratic, secular, national, and contemporary values alive. They should understand the essential elements and processes that make up Turkish culture and history and accept that the cultural heritage that enables the formation of national consciousness should be protected and developed. They should understand the importance of being a virtuous person by adopting national, spiritual and universal values, and Goals such as knowing their ways and showing sensitivity to issues that concern their country and the world (MEB, 2023). It is thought that student clubs can assume roles such as strengthening the integration and adaptation process of students with faculties, diversifying the campus texture, understanding and contributing to the overcoming of social problems through various community service participation, contributing to the cultural and social development of societies, preserving and disseminating local and universal cultural heritage, and nurturing students' interests, desires, needs and horizons. It should not be ignored that they can directly or indirectly contribute to the objectives of the social studies curriculum and benefit from the elements of this curriculum.

The social studies course curriculum tries to provide knowledge, skills, and behaviors, values and competencies serve as the link and horizon that establishes the integrity between these knowledge, skills, and behaviors. In the Turkish Language Association (2023) dictionary, skill is defined as "the state of being able to do a job, the ability to accomplish a task and to conclude a process by the purpose." According to Piaget and Vygotsky, skill is the mental structuring of information obtained from physical and social interaction based on prior knowledge (Quiesse, 2007). Values are unifying elements that ensure social peace and bring individuals together on a common ground (Çavdarlı, 2002). Our values, which constitute our essential human characteristics, are the source of power and strength that enable us to take action in the routine flow of our lives and in dealing with the problems we encounter (MEB, 2023). Kuçuradi (1971) expresses the phenomenon of value as the same people, the same events, the same situations, the same movements, the same decisions, the same works, the same phenomena being evaluated in different ways, interpreted in different ways, and explained in different ways by different people.

The aim of the social transcript application is to provide students with social skills (communication, teamwork, critical and analytical thinking, leadership, teamwork, critical and analytical thinking), to

contribute to the upbringing of individuals with domestic and national value judgments, universal and human values, intellectual accumulation and aesthetic understanding (SUBÜ, n.d).

Unschooling society advocates following another and different transcript stance. Most unschooled families use something other than conventional transcripts with course names, credit hours, and letter grades (Griffith, 2021). This has also produced an alternative to the traditional transcript approach. Mary Griffity, the author of The Handbook of Unschooling, described this transcript approach as "Paul's transcript'' a method by which unschoolers can present their educational history for college or job applications. Accordingly, 15-year-old Paul, an unschooled student, records the skills and talents she has acquired throughout her education under various themes. This information box has become the name of a method for unschooled students that will replace the transcript we know. The student should be able to have a list of skills and abilities for herself. Teachers should also have such special observation notes to prepare for the students. They are trying a different resume (CV) and portfolio. It is thought that the following headings could be added to such a document: Citizenship impacts, advocacy activities, donation campaigns, suitable to participation training, examples of altruism, and volunteering activities (İnan, 2022).

When the relevant literature was examined within the scope of the study, various studies dealing with student clubs and their activities were encountered. The study conducted in this context includes views on student clubs, their achievements, the purposes and activities of students' participation in clubs, the fields of activity and importance of student clubs, the history of student clubs and their activities, the roles of student clubs in gaining various skills and values, the effects and contributions of participation in student club activities on students, the activities and effectiveness levels of student clubs and volunteering. (Foley at al., 2022; Al-Musa & Al-Qudah, 2021; Kuzu, 2021; Işık & Erdoğan, 2020; Turan et al., 2017; Kuhar & Sabljić, 2016; Ay, 2015; Eskici & Aktaş, 2014; Akyol & Onbaşı, 2014; Darwen & Rannard, 2011; Karimi & Matous, 2006; Foubert & Urbanski, 2006; Gray, 1952).

In the literature, only a few studies have been found in which the perceptions of university students were taken in the focus of the activities carried out by a student club. However, they were carried out using qualitative methods. It is believed that the study will contribute to this gap in the literature and may be helpful in terms of taking a closer look at student perception of student club activities, which types of student club activities may play a role in developing which values and skills, and which abilities the gains acquired in student club activities may correspond to. The study is thought to be an original study in these aspects.

The study was conducted to determine and examine the perceptions of students who participate in student club activities as organizers and participants regarding skills, values, and abilities/skills within the scope of student club activities.

In this context, in the perceptions of students who take part in student club activities as organizers and participants,

1. Which skills are included in the 2023 Social Studies Curriculum?

2. Which values are included in the 2023 Social Studies Curriculum?

3. Which abilities and skills are included in the developed Paul's Transcript?

## 2. Method

### 2.1. Research design

This study was carried out within the framework of phenomenology research design, one of the qualitative research methods. The phenomenology model focuses on aware phenomena that need a

deep and detailed understanding. Facts can appear in various forms, such as our world's perceptions, concepts, situations, events, experiences, and tendencies in our world. The phenomenology model can provide a suitable research basis for studies that investigate phenomena that are not entirely foreign. However, at the same time, we cannot reason about their exact meaning (Yıldırım & Şimşek, 2005). The phenomenology pattern was preferred to reveal the perceptions of the students who participated as organizers and participants in the student club activities in detail, based on their responses to the activity diaries, and to draw attention to the contributions of the activities based on the opinions they expressed.

### 2.2. Study group

The study group consisted of 14 students who organized and participated in the activities of a Kültürel Miras Student Club operating within the faculty of education of a state university in the 2022-2023 academic year. The "criterion sampling'' approach, one of the purposeful sampling methods, was preferred in determining the university students participating in the study. The basic understanding of the criterion sampling method is to study all situations that meet a set of criteria determined or prepared by the researcher (Yıldırım & Şimşek, 2005). In studies where the criterion sampling method is preferred, observation units can be formed from people, events, or situations with specific qualifications. In this case, units that correspond to the criteria determined for the sample are included in the sample (Büyüköztürk et al., 2014). Being a member of the student club examined was determined as the main criterion in selecting university students to participate in this study.

### 2.3. Kültürel miras student club and its activities

This study includes the activities of the Kültürel Miras Student Club, which operates under the faculty of education of a state university in Türkiye. The main objectives of this student club are; "To introduce, disseminate and protect local and universal cultural heritage elements in the light of social studies. To serve and develop the general good among the academy, faculty, school, and society, in the footsteps of the reforms of Head Teacher Mustafa Kemal Atatürk. To provide the homeland and the world by free thought, wisdom and conscience, and peace." Furthermore; "To provide teacher candidates who are constructive, can read the future, develop active and participatory citizenship skills, and enrich the social transcripts of teacher candidates.'' This student club has been operating since 2019. It carries out activities in various academic, scientific, national, local, universal, social, cultural, sportive, artistic, community service and drawing attention to world problems. In this context, 24 activities and related themes organized by a student club in the 2022-2023 academic year are given below.

**Table 1**

*Activities Organized by Kültürel Miras Student Club and the Corresponding Themes*

| Theme Corresponding to the Activity Performed | Activities |
|---|---|
| Diverse Cultural Heritage | Different Cultures Different Heritage Series: Poland<br>Different Cultures Different Heritage Series: Kosovo<br>Different Cultures Different Heritage Series: Austria |
| Nationality | 29 October Republic Day Celebrations,<br>10 November Mustafa Kemal Atatürk Commemorate Ceremony |
| Raising Awareness | Touch to the Most Precious Heritage: Shelter Visit<br>We Are Also The Reason of Climate Crisis<br>Community and Police Hand in Hand: Kades Application Training<br>Different Career Steps of a Social Studies Teacher: Teachers' Day with Memories<br>Overcoming Erasmus and Yds/Yökdil Exam Anxiety with the Experiences of an Academician |
| Socialization | Social Studies Movies: My Best Friend Anne Frank Movie Screening<br>Social Studies Movies: Türk İşi Dondurma Movie Screening<br>Social Studies Movies: Cep Herkülü Naim Süleymanoğlu Movie Screening<br>World Cup Match Screening: Croatia-Brazil<br>Social Studies Gets Social Entertainment Night |
| Social Participation | Community Assembly I: Community Vision 2029 Document<br>Community Assembly II: Spring Term Activity Plan<br>National Personalities Series I: Who is Aydın Sayılı? |
| Education Related to Social Sciences | Designing the Future: Future Education in Our Minds<br>Women in Turkish History Panel |
| Travel-Observation Studies | We Discover the Cultural Heritage of the Capital: Ankara Trip.<br>Birth of an Empire: Iznik and Bursa Trip |

## 2.4. Data collection tools

The "Activity Diary Interview Form'' was used to collect research data. While developing this form by the researchers, the current Social Studies Course Curriculum (2023) and Paul's Transcript in the book "Handbook of Unschooling'' written by Mary Griffity were used. The form included the headings

“observation’’, “acquisition’’ “comment’’, and “future’’ regarding the activities carried out by the student club. In the observation section, asking students how the activity took place and what was presented in the activity. In the acquisition section asking students what was learned from the activity. In the comment section asking student whether the activity was productive or not and what its shortcomings were. In the future section, asking student to leave a note for themselves for the future based on the activity. The developed form was first presented to three field experts (2 social studies education, 1 measurement and evaluation). Necessary corrections were made in line with the experts’ opinions, and the form was given its final form. Through these questions, the perceptions of university students who participated in student club activities as organizers and participants were examined regarding skills, values, and talents/skills according to developed Paul's Transcript and 2023 Social Studies Curriculum.

### 2.5. Data collection and analysis

After each activity carried out by a student club within an academic year, the "Activity Diary Interview Form" was distributed to the students who organized and participated in these activities. They were asked to answer the relevant questions consisting of four stages. The students' answers to the questions were analyzed descriptively according to the skills and values in the 2023 Social Studies Curriculum and the headings developed in the context of suggestions found in Paul's Transcript in the book 'Handbook of Unschooling' by Mary Griffity. Descriptive analysis, considered within the scope of qualitative data analysis, involves examining, summarizing, and interpreting the data obtained through different data collection techniques according to predetermined themes. During the descriptive analysis process, the primary purpose is to convey the findings obtained within the scope of the study to the reader in a processed, summarized, and interpreted manner (Yıldırım & Şimşek, 2005). In the first stage of descriptive analysis, a framework is created for data analysis based on the purpose and sub-goals of the study or the conceptual framework of the study. This framework is a guide on how to organize and present data. The obtained data is organized in the next stage, and the findings are defined. Regarding the final stage, the identified findings are described, interpreted, and related (Şahin, 2010). In this study, the data obtained from university students were analyzed within the scope of the study questions and purpose. In order to increase the understandability of the data obtained through the descriptive analysis method, examples from student responses are included in the findings section. The findings obtained within the framework of these examples are presented by establishing a relationship with studies conducted on similar subjects and interpreting them.

### 2.6. Validity and reliability

The research findings are based on the data in the activity diary interview form of the organizer and participating students. Enriching such a long-term study with findings based on the researcher’s objective observations and notes or the researcher's diary would have increased the reliability and credibility of the research. Likewise, participant observation is generally used in phenomenological studies. To ensure the research’s validity, methods such as long-term interaction, expert opinion, participant confirmation, researcher triangulation, and depth-oriented data collection can be used. The main characteristic of participant observation is that the observer is a member of the group. This is not only physical and It is not only the physical presence but also the ability to share the social, psychological, symbolic verbal and non-verbal expressions, traditional-social habits, behavioral patterns and internal dynamics of the members of the group (Büyüköztürk, 2013). In order to ensure validity in this study, researchers were diversified, the study period was tried to be long, and the validity of the study was tried to be ensured by taking the opinions of three experts both in the preparation phase of the data collection tool and the analysis of the data. In order to increase the external validity (transferability) of study results, detailed description and purposeful sampling are recommended (Yıldırım & Şimşek, 2005). In this regard, during the data collection phase of the study, the documents were analyzed without any changes, and academic studies related to the study topic were examined in

detail. The data obtained through the analyses carried out within the scope of the study were described comprehensively in terms of the external validity and consistency of the study.

Apart from its validity, another essential feature of study is its reliability. The consistency of the results of the study with those of other studies indicates that the study is reliable (Balcı, 2001). While carrying out this study, a detailed literature review was conducted and determined that the results of this study and the results of other studies were consistent. In collecting and analyzing the data of this study, expert opinions were used to ensure the reliability of the study.

### 2.7. Ethical principles

Ethics committee permission was received from Sakarya University Rectorate Ethics Committee with the decision dated 22.11.2023 and numbered 25/13.

## 3. Findings

The data obtained in the context of the first sub-objective of the study was analyzed in terms of the skills in the 2023 Social Studies Curriculum, and the findings related to this analysis are given below.

### The Status of the Skills in the in the Activity Diaries of University Students Who Take Part in the Student Club Activities as Organizers and Participants, According to the 2023 Social Studies Curriculum

**Table 2**

*Skills and ıts Frequency Identified in the Statements of University Students Participating in the Activities*

| Theme Corresponding to the Activity Performed | Identified Skills | Frequency |
|---|---|---|
| Diverse Cultural Heritage | Social participation, Observation, Decision making, Critical thinking, Perceiving time and chronology, Perceiving change and continuity, Perceiving space, Using evidence | 13 |
| Nationality | Collaboration, Innovative thinking, Critical thinking, Communication, Social participation | 6 |
| Raising Awareness | Entrepreneurship, Empathy, Critical thinking, Environmental literacy, Using Turkish correctly and effectively, Decision-making, Communication, Recognizing stereotypes and prejudice, Social participation, Research | 18 |
| Socialization | Perceiving change and continuity, Perceiving time and chronology, Social participation | 4 |
| Social Participation | Critical thinking, Social participation | 2 |
| Education Related to Social Sciences | Critical thinking, Perceiving change and continuity, Perceiving time and chronology, Social participation, Digital literacy, Recognizing stereotypes and prejudice | 7 |
| Travel-Observation Studies | Creative thinking, Observation, Decision making, Perceiving change and continuity, Using evidence, Perceiving space, Critical thinking, Social participation, Research | 14 |
| Total | | 64 |

According to Table 2, it was determined that the skills in the 2023 Social Studies Curriculum were included 64 times in total in the activity diary interview forms of university students who participated in student club activities as organizers and participants. It was understood that the activities carried out under the theme of raising awareness were the theme corresponding to the most skills, while the activities carried out under the theme of social participation corresponded to the most minor skill.

Below are direct quotes from the activity diary interview forms and inferences regarding the skills identified from these quotes.

> ZK4: "We participated actively as a community. We prepared the Atatürk commemoration corner with our academic. Afterward we formed a circle and expressed Atatürk's important words, the thoughts, and words expressed by important people about Atatürk. This activity, where I participated as a presenter, was very productive.''

When the statement in the activity diary of the student who organized and participated in the 10 November Commemoration of Mustafa Kemal Atatürk activity was examined, *participation*, *cooperation*, *communication* and *decision-making* skills were determined.

> ZI2: "…These two girls, raised with the utmost love and affection by their families, have no fears or concerns other than hearing the footsteps of war. However, their Jewish identity causes them trouble even in the Netherlands. All Jews in the Netherlands must wear a yellow star on their lapels. Above that yellow star, it says, 'I am a Jew'. As a result of increasing pressure, the two friends are thrown to different places: Hannah with her family to a concentration camp in Germany, and Anne hide in the attic of a building in Amsterdam, not in Switzerland as her friend thought. The murder committed by the Nazis is again in front of our eyes, as always...''

When the statement in the activity diary of the student who organized and participated in the Social Studies Movies: My Best Friend Anne Frank Film Screening activity was examined, *perceiving change and continuity*, *perceiving time and chronology*, and *empathy* skills were determined.

> TA1: "I felt this again, even though I knew they had feelings as much as we did. Their looks and movements were all signs that they were excited when they saw us. The tricks they played on us, the way they loved one while the other came and tried to make us love them, all showed that they were hungry for love and that their only concern was not food and water. At that moment, I felt at peace; but was also sad for so many animals in such a small space.''

When the statement in the activity diary of the student who organized and participated in Touch to the Most Precious Heritage: Shelter Visit activity was examined *emphaty* skill were determined.

> ZI6: "…. The previous parliaments of our country tell us a lot. They are objects that speak for us…."

> When the statement in the activity diary of the student who organized and participated in the We Discover the Cultural Heritage of the Capital: Ankara Trip activity was examined, *creative thinking* skill were determined.

> MS3: "As a social studies teacher candidate, everyone should visit a city like Ankara, where events that deeply affected the history of the Republic of Türkiye took place. The trip must be accompanied by a guide equipped with historical knowledge rather than an idle one. "I think it was beneficial for us to do this trip with such a guide."

When the statement in the activity diary of the student who organized and participated in the We Are Discovering the Cultural Heritage of the Capital: Ankara Trip activity is examined, *perceiving change and continuity*, *observation*, *critical thinking*, *recognizing stereotypes and prejudice*, *using evidence*, *perceiving the place*, and *decision-making* skills were determined.

HT11: "One of the most striking aspects of this activity was that it reminded us that humans, Homo Sapiens, will also become extinct one day."

When the statement in the activity diary of the student who organized and participated in the We Are Also The Reason of Climate Crisis activity was determined, *observation, research*, and *critical thinking* skills were determined.

HT14: "We got to know and discover Austria from various aspects. For me, the differences in the attitudes and attitudes of teachers towards students in the two countries were particularly striking.''

When the statement in the activity diary of the student who organized and participated in the Different Cultures Different Heritage Series: Austria activity was examined, *critical thinking* and *evidence-use* skills were determined.

The data obtained in the context of the second sub-objective of the study was analyzed in terms of the values in the 2023 Social Studies Course Curriculum, and the findings related to this analysis are given below.

**The Status of the Values in the in the Activity Diaries of University Students Who Take Part in the Student Club Activities as Organizers and Participants, According to the 2023 Social Studies Curriculum**

**Table 3**

*Values and its Frequency Identified in the Statements of University Students Participating in the Activities*

| Theme Corresponding to the Activity Performed | Identified Values | Frequency |
|---|---|---|
| Diverse Cultural Heritage | Sensitivity, Independence, Freedom, Respect, Responsibility | 5 |
| | Patriotism, Respect, Solidarity, Diligence | 8 |
| Nationality | Sensitivity, Love, Helpfulness, Scientificity, Responsibility, Peace, Independence | 13 |
| Raising Awareness | Freedom, Love | 2 |
| Socialization | Equality | 1 |
| Social Participation | Patriotism, Scientificity | 2 |
| Education Related to Social Sciences | Patriotism, Scientificity | 2 |
| Total | | 33 |

According to Table 3, it was determined that the values in the 2023 Social Studies Curriculum were included 33 times in total in the activity diary interview forms of university students who participated in student club activities as organizers and participants. It was understood that the activities carried out under the theme of raising awareness were the theme with the most value within the scope of values, while the activities carried out under the theme of social participation were the theme with the most minor value.

Below are direct quotes from the activity diary interview form and inferences regarding the values determined from these quotes.

BA12: “Today, many animals are extinct or endangered. It was an activity organized to prevent this situation as much as we could and to draw attention. An attempt was made to raise awareness by building a cemetery of extinct animals and a small track to show the harsh climate change experienced by animals. "I became more aware that we need to stop this extinction by acting more thoughtfully for ourselves and them."

When the statement in the activity diary of the student who organized and participated in the We Are Also the Reason of Climate Crisis activity was examined, *sensitivity*, *scientificity*, and *responsibility* values were encountered.

HT2: “I hope that in the future, people will not be oppressed and bullied because of their race, nation, or anything else.”

When the statement in the activity diary of the student who organized and participated in the Social Studies Movies: My Best Friend Anne Frank Film Screening activity was examined, *peace*, *independence*, and *freedom* values were encountered.

HT5: “I hope that future generations future generations will not forget the cultures of the countries and will be passed on to future generations.”

When the statement in the activity diary of the student who organized and participated in the Different Cultures Different Heritage Series: Poland activity was examined, *sensitivity* value was encountered.

MS2: “It was a document that increased the systematicity of our club. At the same time, a democratic environment in which we all participated on behalf of our club was created, with everyone's participation and right to vote, rather than a hierarchical order.’’

When the statement in the activity diary of the student who organized and participated in the I. Community Assembly Community's Vision 2029 Document activity was determined, *equality* value was determined.

TA1: “When I entered the shelter and met their love-hungry gaze, I was filled with sadness and happiness. We loved our paw friends, and they loved us.”

When the statement in the activity diary of the student who organized and participated in the Most Precious Heritage: Shelter Visit activity was determined, *love* value was determined.

Below, the data obtained in the context of the third sub-objective of the study was analyzed in terms of the 2023 Developed Paul's Transcript, and the findings related to this analysis are given below.

**The Status of Including Skills and Abilities in the Activity Diaries of University Students Who Take Part in the Student Club Activities as Organizers and Participants, According to the Developed Paul's Transcript**

**Table 4**

*Skills/Abilities and ıts Frequency Identified in the Statements of University Students Participating in the Activities*

| Theme Corresponding to the Activity Performed | Identified Skills/Abilities | Frequency |
|---|---|---|
| Diverse Cultural Heritage | Knowledge of the world, Love of learning, Collaborative work | 4 |
| Nationality | Knowledge of the world, Love of learning, Collaborative work | 3 |
| Raising Awareness | Cooperative work, Self-management, Examples of altruism, Love of learning, Language ability, Assertiveness, Volunteer work, Self-management | 9 |
| Socialization | Collaborative work | - |
| Social Participation | Collaborative work | 1 |
| Social Sciences Related Education | Love of learning ,Collaborative work | 1 |
| Excursion and Observation Studies | Knowledge of the world, Collaborative work | 3 |
| Total | | 21 |

According to Table 4, it was determined that the skills and abilities in the Developed Paul's Transcript were included 21 times in total, in the activity diary forms of the students who participated as organizers and participants in the student club activities. It was understood that the activities carried out under the theme of raising awareness correspond to the most skills and abilities, while the activities carried out under the theme of socialization to the most minor skills and abilities.

Below are direct quotes from the activity diary interview form and inferences regarding the skills and abilities identified from these quotes.

> BA5: "First of all, the fact that a Polish citizen made the presentation attracted my extra attention. Many factors, such as the country's food, dances, places to visit, traditional clothes, history, history, cultural structure, religious structure, and currency, were enriched with videos and photographs. "I learned many things I did not know about their country.''

When the statement in the activity diary of the student who organized and participated in the Different Cultures Different Heritage Series: Poland activity was examined, *world knowledge ability/skill* was determined.

> ZI6: "Of course, the first stop of our trip was Anıtkabir, where the grave of our Great Leader, Gazi Mustafa Kemal Atatürk, is located. After our visit to Anıtkabir, the First Parliament and the Second Parliament declared our Republic. "We also visited the Parliament and the Ziraat and İş Bankası Museums, which serve as a cornerstone in our country's economic independence.''

When the statement in the activity diary of the student who organized and participated in the We Are Discovering the Cultural Heritage of the Capital: Ankara Trip activity was examined, *world knowledge ability/skill* was determined.

TA1: "We set out to the shelter with our animal-loving friends. We had a paw friend with us who lost his eye, and he was treated.''

FY5: "T.A. organized our activity; it was held with our volunteer teacher candidates, with the contributions of the …… Municipality Shelter staff and the hospitality of the ….. Youth Center. We visited the shelter of the ….. Municipality in the middle of the day. We played with them and learned about their diet, from their diet to the vaccinations they received.''

When the statements in the activity diary of the students who organized and participated in the Most Precious Heritage: Shelter Visit activity was examined, *example of altruism* abilities/skills was determined.

BA9: "I tried to make the presentation productive by taking many small notes that would be useful to me on a topic that interested me. Most of all, I saw what steps to follow and what sites and books I should use to develop a language for Erasmus Exam. "I learned what I needed to do to get the same results by taking our teacher's experiences, actions, and progress in this regard as an example.''

When the statement in the activity diary of the student who organized and participated in the Overcoming Erasmus and Yds/Yökdil Exam Anxiety with the Experiences of an Academician activity was examined, *love of learning* and *self-management* abilities/skills were determined.

## 4. Discussion, Conclusion and Recommendations

The first result obtained as a result of the study: university students who participated in student club activities as organizers and participants used skills-related expressions 64 times in these activities, according to the 2023 Social Studies curriculum, and these were; *social participation*, *observation*, *decision making*, *critical thinking*, *perceiving time and chronology*, *perceiving change and continuity*, *perceiving space*, *using evidence*, *collaboration*, *ınnovative thinking*, *communication*, *entrepreneurship*, *empathy*, *environmental literacy*, *using Turkish correctly and effectively*, *decision making*. Supporting this result Musa and Al-Qudah (2021), who examined the role of student clubs in Arab universities in promoting cultural diversity through student opinions, found that university clubs and activities provide students with various skills. Regarding the skills of giving information, recognizing stereotypes and prejudice, research, digital literacy, using evidence and perceiving space. (Foley et al.,2022) who examined the perceptions of students who took part in university clubs (leadership) about the benefits of their participation in club activities and their post-graduation contributions, found that those who were leaders in university clubs demonstrated results in various skills such as ethics, time management and flexibility, communication and cooperation, networking, social learning, social participation and practical problem solving skills. Eskici and Aktaş (2014) found that university students think that club activities enable them to have a pleasant time, allow them to improve themselves and their social environment.

The second result obtained as a result of the study: university students who participated as organizers and participants in student club activities used values-related expressions 31 times in these activities, according to the 2023 Social Studies curriculum, and these were; *sensitivity*, *respect*, *love*, *ındependence*, *freedom*, *patriotism*, *responsibility*, *solidarity*, *hardworking*, *helpfulness*, *scientificity*, *peace*, *equality*. Al-Musa and Al-Qudah (2021) found that they expressed high levels of agreement with items containing values and related content such as "student clubs aim to instill in me good morals'', "student clubs aim to instill in me tolerance and tolerance'', "student clubs aim to instill in me my values and religious beliefs'', "student clubs aim to instill in me loyalty and belonging to my homeland'', "students enrolled in the same student club have common interests''. Dugan and Komives (2017) revealed that university clubs contribute to developing individual, social, and civic awareness.

The final result of the study is that university students who participated as organizers and participants in student club activities used abilities/skills related expressions 21 times in these activities, according to the developed Paul's Transcript and these were; and that these were; k*nowledge of the world*, *love of learning*, *collaborative work*, *self-management*, *examples of altruism*, *language ability*, *ınitiative*, *volunteer work*. Similar to the result of Foubert & Grainger (2006) who examining the effects of participation in clubs and organizations on the psychosocial development of university students participation in student organizations. It is a strong relationship with student's ability to create and clarify goals, participation in education, career planning, life management, and cultural participation. Although this relationship can be one-way or mutually reinforcing, students who participate in clubs and organizations during their university experiences also have a strong relationship with many areas Foubert & Grainger (2006).

University life stands out as a more accessible environment compared to the past educational experience, where the individual can quickly reveal his identity and have the ability to act as he wishes. This may cause the person to complete his development or completely lose his essence while determining his attitudes and behaviors. At this point, communities emerge to respond to the wishes and expectations of individuals (Akyol & Onbaşı, 2014). It becomes inevitable to consider student clubs as structures that can provide clues in developing solutions as a complement to student-centered/participatory education and training suggestions for the quality problems that arise with universities globalization and massification process (Kuzu, 2021). Because the importance of the social, cultural, and scientific contributions of student clubs to the university in which they operate through the activities they carry out should not be denied. In this regard, the example of a student club can be examined. Student clubs and activities: Being considered as a tool that can be consulted in transferring values and skills that sometimes curriculums may be blocked in conveying, developing many different skills during a vast flow of activities ranging from the structural functioning of the club to event planning, organizing and carrying out its activities, peer teaching, exchange of ideas between different departments and even faculties. It can contribute to creating opportunities for people to establish personal and social ties, providing skills that every professional candidate needs to develop in line with their career, realizing their potential, meeting new interests, developing leadership skills, and adopting the local and universal values that the society and the world expect from them. It should not be overlooked that student clubs and activities can also be used to provide professional development for prospective teachers. When social studies teacher candidates' mission to prepare their students as child citizens is evaluated, it would be beneficial for them to consider the contributions of being a participant in a student club in becoming ready to acquire, adopt, and transfer the skills and values that their students may need in order to grow up as good citizens.

In addition to reporting on the assessments of students with traditional degrees, diplomas and transcripts, it would be beneficial to report on the skills and abilities of graduates, to value them, and to pay attention to the uniqueness of everyone with their knowledge, abilities, skills and values by expanding social transcript approaches. As İnan (2022) states, the student should have a list of skills and abilities for himself and a special observation note that teachers will prepare for the student. A different curriculum vitae (CV) and portfolio essay can be considered an additional document alongside diplomas and transcripts. In this way, the university will graduate more active, valuable, and responsible individuals to the society in which it conducts science and the world. As Albert Einstein said, "In fact, everyone is a genius. But if you judge a fish by its ability to climb a tree, it will spend its whole life believing it is stupid.''

The study was carried out to determine and examine the perceptions of university students who participate in student club activities as organizers and participants regarding skills, values, abilities/skills within the scope of their activities. When all the results obtained are evaluated the

suggestions offered to researchers in terms of different dimensions and equivalent studies are as follows:

• Different dimensions can be examined by expanding the study conducted through quantitative methods.

• Scales can be developed to determine the effectiveness of student club activities.

• Similar studies can be carried out in the context of different universities, faculties, and clubs, and comparative student club activities, skills, and value perception studies can be carried out.

• A comparative research can be conducted regarding skills and values between the perceptions of club members who are solely responsible for organizing student club activities, regarding planning and carrying out these activities, and the perceptions of students who are only participants.

• Opinions of academic staff, faculty administrators, and administrative staff regarding student club activities can be examined.

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