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From the Editor

Dear IEJES reader,

We are sorry for those who lost their lives due to the earthquake on February 6th in 2023. This issue is dedicated to those who were damaged in the earthquake.

We would like to inform you again. International e-journal of Educational Studies indexed in **EBSCO Education Source H.W. Wilson Index** since January 7th, 2020.
https://www.ebsco.com/m/ee/Marketing/titleLists/eft-coverage.htm

I would like to welcome the new members of our editorial board in 2023 to Prof. Dr. Bülent Gürbüz, Prof.Dr. José María Fernández Batanero and Prof. Dr. José Luis Ubago-Jiménez.

In the present issue, there are thirteen articles. All of these articles are research articles. Our authors present in this issue are composed of researchers working in different universities and institutions.

We look forward to seeing you in 2023 July Volume 7 Issue 14 of the International e-Journal of Educational Studies (IEJES). We are inviting you submission of manuscripts for the forthcoming issue.

Yours Sincerely

Prof.Dr. Tamer KUTLUCA
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Abstract

This research aims to examine the correlations between different early childhood education programs (Montessori, Waldorf, and Ministry of National Education (MNE)) with preschool children's social competence and types of competition. Beside this, the social competence, and types of competition of children in early childhood examined in terms of demographic variables. Also, the relation between the social competence and types of competition of children investigated. The sample of the study consists of 287 children, 48-72 months of age, who attend pre-primary education institutions. In the study, correlational survey models used. The data collection tools for the research were Personal Information Form, Social Competency and Behaviour Assessment-30 Scale-Teacher Form, and Preschool Competition Questionnaire. At the end of the research, it was seen that there is a significant correlation between different early childhood education programs (Montessori, Waldorf, and MNE) and the social competence and types of competition of preschool children. In the study, it was also determined that the social competence and types of competition of children differ depending on some demographic features of the children.

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Research Article

Examination of the Social Competence and Types of Competition of Preschool Children in terms of Different Early Childhood Education Programs*

Merve ÖZÇELİK [1] **Özkan SAPSAĞLAM** [2]

Abstract

This research aims to examine the correlations between different early childhood education programs (Montessori, Waldorf, and Ministry of National Education (MNE)) with preschool children's social competence and types of competition. Beside this, the social competence, and types of competition of children in early childhood examined in terms of demographic variables. Also, the relation between the social competence and types of competition of children investigated. The sample of the study consists of 287 children, 48-72 months of age, who attend pre-primary education institutions. In the study, correlational survey models used. The data collection tools for the research were Personal Information Form, Social Competency and Behaviour Assessment-30 Scale-Teacher Form, and Preschool Competition Questionnaire. At the end of the research, it was seen that there is a significant correlation between different early childhood education programs (Montessori, Waldorf, and MNE) and the social competence and types of competition of preschool children. In the study, it was also determined that the social competence and types of competition of children differ depending on some demographic features of the children.

Keywords: Competition, Ministry of National Education Program, Montessori, social competence, Waldorf

1. INTRODUCTION

In the preschool period, the intellect, linguistic, physical, psychomotor, and socio-emotional development that will play an essential role in the child's later life are mainly completed during the preschool years, and the child's personality is shaped (Gerber, Wilks & Erdie-Lalena, 2010). Interactions, especially in early life, have a profound impact on a child's development. Children learn a lot between 0-72 months and during this period, the child's skills and abilities develop rapidly (Sevinç, 2005). Socio-emotional development shows a great progress, between the ages of 3-6. In this period, they show great improvement in terms of understanding their surroundings and establishing social relationships. Children are open to all kinds of learning and begin to explore their environment thanks to their curiosity (Kandır, Aral & Can, 2002).

The concept of socialization is the first step of social development. It includes a tendency to regulate one's behaviour to maintain relationships and get along with people (Damon, 2006). The socialization process of child starts in the family, and it continues to develop during preschool period (Moore et al., 2015). The preschool period is a process, in which the child interacts with those around him/her and begins to acquire social skills such as taking responsibility, sharing and self-control (Claessens, 2012). During this period, the child also develops his/her social competence through

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communication with his teachers and peers. Competencies such as initiating and maintaining communication, being popular among friends, considering others while getting something for themselves and empathy are evaluated within the concept of social competence (Rubin, Bukowski & Parker, 2006). Studies show that many factors are effective on children's social competence. These factors are individual's personality and temperament, family relations and social environment (school), cognitive skills, gender, peers, teacher attitude, and preschool education affecting children's social competence (Bakkaloğlu, Eryılmaz & Sapsağlam, 2019).

The socialization process includes processes such as the acquisition and development of social skills, adapting to society and making friends, as well as problem situations and conflicts between individuals (Uyanık-Balat, Akman & Arslan-Çiftçi, 2017). In addition to positive experiences such as friendship, sympathy, sharing and helping each other; rivalries, fights, and conflicts become inevitable for the child with starting school (Beyazkürk, Anlıak & Dinçer, 2007). When the competitive situations children experience in the socialization process were examined, it was seen that the child was exposed conflict situations, first at home and then in other social environments like school (Özensel, 2004). Tsiakara and Digelidis (2014) defined competitive behaviours as behaviours aimed at outperforming others and doing something better than others.

Although competition and competitive behaviours are thought to be seen mostly in older ages, it is determined that they are also common in preschool children (Tsiakara & Digelidis, 2014). While some researchers (Sheridan & Williams, 2011) see competition as a detrimental factor to the learning environment, some researchers, on the contrary, have revealed that competition is an important factor that increases learning motivation and motivates learning (Bulut, 2020; Sheridan & Williams, 2011). When the studies conducted in the following years are examined, it has been determined that competition seen in early childhood can be seen in three forms; "other-referenced competition", "task-oriented competition" and "maintenance of dominance hierarchy" (Paquette et al., 2013; Tsiakara & Digelis, 2014). The impact of competition on children is determined by the style and scope of competition in early life. While constructive and adequate competition is important to a child's development and is required for him to focus on and complete a task, destructive and overly competitive behaviour can harm a child's social relationships (Sönmez, 2016). It seems that there is relation between social relations and competitiveness. Considering the studies and research on the competitive behaviour of children in the preschool period, it can be said that the child's age, gender, relationship with peers, and education is effective on the child's competitive behaviour (Watanabe & Yuzawa, 2013).

It is obvious that early childhood education (ECE) is crucial for both social competence and competitive behaviours of children (Fettig et al., 2022). However, early childhood education is not provided within a single program or curriculum. There are different perspectives on early childhood education and different philosophical foundations in this field (Saracho & Evans, 2021). Different ideas and approaches put forward by the needs, development and priorities of the child have brought along different early childhood education programs (Tepeli & Yılmaz, 2012). When all of these are considered, it is thought that there is an effect of different early childhood education programs on children's social competence and competitive behaviours.

In this study, the social competence, and types of competition of children attending pre-school education institutions where the Montessori Program, the Waldorf Program and the MNE Preschool Education Programs are applied are compared. The Montessori Program is based on academic knowledge and is a program in which the academic progress of children is important (Lillard & Else-Quest, 2006). Waldorf Program does not include any activities based on academic knowledge (Astley & Jacson, 2000). In the Montessori Program, it is thought that academic progress of children encourages children's competitiveness. MNE Program is the official program of Turkey, and this program is applied in all state preschools, for this reason it took place in our study. Beside this, there

are some studies about children' social skills and social competence who take education at the Montessori Program (Aral et al., 2015) and the Waldorf Program (Oberman, 2007). Considering all these, these three programs were selected for the study.

Montessori education is a type of education in which mixed-age children interact with the Montessori materials individually or in groups (Kayılı & Arı, 2011). This program is based on real-life experiences as well as age-related traits. Individual children's interests play a significant role in its ideology (Sarıkaya, 2018). Individual interests of children occupy an important place in its philosophy. In Montessori classrooms, there is only one material from each, and in this way the child learns to wait and be patient. By doing some work with one or more friends, he develops the skills of communication, helping, and working in cooperation with his friends (Cosgrove & Ballou, 2006).

Waldorf education is a method in which children understand themselves and the world and recognize different cultures instead of being a member of a certain culture or nation and grow up as "citizens of the world". Children play games by establishing social relationships with their friends and they receive education with mixed age groups in an atmosphere like the family environment without being exposed to any competitive pressure (Astley & Jacson, 2000; Darga, 2021). Tales and plays belonging to different cultures used in the activities also contribute to the growth of children as world citizens (Schmitt-Stegman, 1997).

The Ministry of National Education early childhood program (2013) was developed to improve the social, emotional, motor, language, and cognitive skills of preschool children, to enable them to speak Turkish correctly and beautifully, to give children self-care skills and to prepare the child for primary school. There are learning centers such as science, book, block, art, and music centers MNE classrooms. During free play times, children turn to the learning center they are interested in and play games with the materials there, helping in small groups and interacting with each other. At these classes, children take education with children of the same age group (MNE, 2013).

The world in which children exist tells them to be more competitive than in past decades. However, it is very important what type of competition it is. It may affect them positively or there may be a competition that negatively affects their social relations. On the other hand, problems such as the ever-increasing screen use, urbanization and security concerns cause children to be more isolated from society and social areas. Schools are important institutions that can provide children with social skills development and positive competitive environments. The limited number of studies comparing different preschool education programs and the fact that the social competence and type of competition of children of different age groups who were educated in these three pre-school education programs (Montessori, Waldorf, MNE) in our country and abroad were not investigated before. Considering all these factors together, it is thought that this research is important and provides important data on children's competitiveness styles-levels and social competencies in the context of early childhood education programs.

1.1. Purpose of the Research

The purpose of the research was to examine the social competence and types of competition of children in terms of early childhood education programs. It is important to examine these issues in the context of different early childhood education programs in a world where competition is increasing, and children are becoming increasingly lonely. In this age when children are lonely, determining their social skills and competitiveness is very valuable in terms of producing solutions. Because early childhood education provides children with the opportunity to develop their social skills. At the same time, children can compete with their friends in different ways in classroom. In this sense, this research attempts to examines children's social competencies and types of competition in different early childhood programs. It also reveals the relationship between children's social competencies and types of competition.

According to the objective of the research the following research questions were tested:

1. Is there a correlation between different early childhood education programs (Montessori, Waldorf, MNE) with social competence of 48-72 months old preschool children?
2. Is there a correlation between different early childhood education programs (Montessori, Waldorf, MNE) with type of competition of 48-72 months old preschool children?
3. Is there a correlation between social competence with demographic characteristics (gender and age) of preschool children?
4. Is there a correlation between the types of competition with demographic characteristics (gender and age) of preschool children?
5. Is there a correlation between the types of competition with social competence of 48-72 months old preschool children?

2. METHOD

2.1. Research Design

The research was carried out with a correlational survey model, one of the quantitative research methods. The correlational survey model used in research that aims to determine the relationship between two or more variables or the existence and degree of change (Creswell & Garret, 2008). The relationship between the children's social competence and types of competition and the early childhood education program they received education was examined. Quantitative data collected with scales filled by preschool teachers.

2.2. Participants

The population of this research consists of 48-72-month-old preschool children attending different preschool education institutions in İstanbul. In this study, the sample of the research was determined by the criteria sampling method, which is one of the purposeful sampling methods (Creswell & Garret, 2008; Tanrıöğen, 2012). The sample group was formed by taking the criterion that the children to be included in the sample group had received education in one of the Montessori, MNE and Waldorf early childhood education programs during at least one education period. There were also other criteria while choosing schools. Schools that implement the Montessori Program, whose data was collected within the scope of the research, are needed to be accredited by AMS (American Montessori Society) and the teachers in these schools are required to have AMS Montessori education. The schools that implement the Waldorf Program are accredited by the Friends of the Art of Education Association, implementing the International Waldorf early childhood education program. The schools where the MNE pre-school education program is applied are the schools that operate under the Ministry of National Education and where the official pre-school education program is applied.

In study, 300 data collection tools were distributed to collect research data, but 13 of them were not included in the study because they were filled in incorrectly or incompletely. Therefore, the research was conducted with 287 children aged 48-72 months who were educated in early childhood education classes in 8 different preschools during the 2018-2019 academic year.

In the study, the number of children receiving education in the Montessori Program, Waldorf Program and Ministry of National Education is shown in Table 1. Table 2 shows the gender distribution of children.

Table 1. Distribution of preschool education programs of children participating in the study

	Frequency	Percentage	Valid Percentage	Total Percentage
Montessori	115	40,1	40,1	40,1
Waldorf	81	28,2	28,2	68,3
MNE	91	31,7	31,7	100,0
Toplam	287	100,0	100,0	

Table 2. The demographic characteristics of the children

	Gender			Age		
	Girls	Boys	Total	48-60 months old	60-72 months old	Total
N	145	142	287	144	143	287
%	50,5	49,5	100	50,2	49,8	100

2.3. Instruments

2.3.1. Personal Information Form

This form developed by researchers to determine the personal characteristics of children (age, gender, and preschool education period).

2.3.2. The Preschool Competition Questionnaire

The scale was developed by Paquette Gagnon, Bouchard, Bigras and Schneider (2013) to evaluate the competitive styles of 3-6 years old preschool children. On the scale, there are 17 items expressing the observable competitive behaviours of preschool children. The scale consists of three sub-dimensions which are other-referenced competition, task-oriented competition, and maintenance of dominance hierarchy. Cronbach Alpha reliability coefficients of the original scale for each dimension are .89, .75 and .74, respectively. The test-retest reliability coefficient was found as .92, .80 and 69 ($p<.001$) (Paquette Gagnon, Bouchard, Bigras & Schneider, 2013). The Turkish adaptation of the Preschool Competition Questionnaire (PCQ) was made by Uyanık-Balat, Akman and Arslan Çiftçi in 2017. Also in this study, same sub-dimensions were found. The Cronbach's alpha coefficients of the sub-dimensions vary between 0.91 and 0.96, test-retest reliability coefficients vary between 0.85 and 0.95 (Uyanık Balat, Akman & Arslan Çiftçi, 2017). The scale is filled in by the teacher separately for each child, according to the grading method (1 = never, 2 = almost never, 3 = sometimes, 4 = generally, 5 = most of the time, 6 = always) by observing the child's behaviours.

2.3.3. Social Competence and Behaviour Evaluation Teacher Form Scale

Social Competence and Behaviour Evaluation-30 (SCBE-30) Scale was developed by La Freniere and Dumas in 1996. The scale evaluates THE social competence and behaviour of 3–6-years-old children. This scale has two forms which are the parent form and the teacher form. In this study researchers used to teacher form and teachers filled in scales based on their observations. Cronbach alpha coefficient of the scale is between .79 and .91 and the inter-rater reliability coefficient is between .72 and .89. The correlation coefficient for test–retest reliability assessment applied two weeks apart is between .78 and .86 and correlation coefficient for test–retest reliability assessment applied six months apart is between .59 and .70 (LaFreniere, 1996). The Turkish adaptation of the SCBE-30 Scale was conducted by Çorapçı, Aksan, Arslan Yalçın and Yağmurlu in 2010. The scale has three sub-dimensions which are social competence, anger-aggression, and anxiety-withdrawal. Cronbach's alpha internal consistency coefficients for social competence, anger-aggression, and anxiety-withdrawal subscales were found as .88, .87, and .84, respectively. Item-total correlation coefficients for each subscale were found to be .41 and above (Çorapcı et al., 2010).

2.4. Procedure

Firstly, ethical approval was sought both from the university that the researchers are associated and İstanbul provincial directorate of national education. The schools that fit the criteria were contacted and their permission was obtained for the research. Teachers volunteered and were given instructions on how to fill out the scales. Teachers filled Personal Information Form, The Preschool Competition Questionnaire, and Social Competence and Behaviour Evaluation Teacher Form Scale for each child based on their observations and children's personal development files.

While research data was collected, families were informed about the study and their permission was taken. The scales were kept anonymous for ethical reasons and given numbers for each student. Teachers also informed that they could not respond and opt out of the data collection process when they wanted to. Ethical approval was sought both from the university that the researchers are associated with and the İstanbul provincial directorate of national education.

2.5. Data Analysis

Data acquired from the study were analysed using SPSS 22.0 (The Statistical Package for the Social Sciences) software. When the sample size is larger than 50, Kolmogorov-Smirnov (KS) Test is applied (Büyüköztürk, 2013: 41). In this study, Kolmogorov-Smirnov Z-test was used as the sample group was larger than 50, and it was seen that the data did not normally distribute. Kruskal Wallis Variance-test was conducted to compare the types of competition and social competence of children who were trained in different early childhood education programs. Spearman Correlation-test was used to examine the relationship between the sub-dimensions of the Preschool Competition Questionnaire and the Social Competence and Behaviour Evaluation-30 (SCBE-30) Scale. In addition, the Mann Witney-*U*-test was applied to examine the social competence and types of competition of children in terms of demographic variables.

3. FINDINGS

Firstly, Kruskal Wallis Variance-test was performed to understand whether the scores of the children from the subdimensions of study differ according to the type of preschool education program they received. Then, Mann Whitney-*U* test, which was preferred in paired comparisons, was used to determine which groups had a significant difference.

Table 3 shows that depending on the preschool education program the children receive, it has been observed that the scores differed significantly in the subscales of social competence ($\chi2$ = 23,017; sd = 2; p < .05), and anxiety-withdrawal ($\chi2$= 8,426; sd = 2; p < .05). Also, it was found that the anxiety-introversion scores of the children who were educated according to the MNE Preschool Education Program were significantly higher than the children who were educated according to the Waldorf Program (*U*=2758,000; z=-2,849; p = ,004).

Table 3. Kruskal Wallis test results regarding the examination of children's scores from social competency and behaviour evaluation-30 (SCBE) sub-dimensions according to the variable of preschool education program

Sub-dimensions	Programmes	n	Mean	sd	$\chi2$	*p*	Difference between groups
Social competence	Montessori	115	167,11	2	23,017	,000	1-3
	Waldorf	81	147,65				
	MNE	91	111,54				
Anger-aggression	Montessori	115	140,63	2	5,020	,081	
	Waldorf	81	160,78				
	MNE	91	133,31				
Anxiety-withdrawal	Montessori	115	142,26	2	8,426	,015	2-3
	Waldorf	81	125,81				
	MNE	91	162,38				

1-Montessori Program 2-Waldorf Program 3- MNE Program

Among the children participating in the study, the level of other-referenced competition of the children who received education according to the Montessori Education Program is significantly higher than the children who received education according to the Waldorf Education Program (*U* = 3596.500; z = -2.716; p =, 007). In the maintenance of dominance hierarchy sub-dimension scores, the

children who received education according to the Montessori Education Program (*U* = 3756,000; z = -2.316; p =, 021), was found to be significantly higher than the children who received education according to Waldorf and MNE Preschool Program (*U* = 4116,500; z = -2,643; p =, 008) (Table 4).

Table 4. Kruskal Wallis test results regarding the examination of children's scores from preschool competitiveness scale (PCQ) sub-dimensions according to the variable of preschool education program

Sub-dimensions	Programmes	n	Mean	sd	χ2	*p*	Difference between groups
Other-referenced competition	Montessori	115	158,04	2	7,104	,029	1-2
	Waldorf	81	126,14				
	MNE	91	142,15				
Task-oriented competition	Montessori	115	146,92	2	1,200	,549	
	Waldorf	81	148,62				
	MNE	91	136,20				
Maintenance of dominance Hierarchy	Montessori	115	161,54	2	8,657	,013	1-2
	Waldorf	81	132,02				1-3
	MNE	91	132,49				

1-Montessori Program 2-Waldorf Program 3- MNE Program

As can be seen Table 5, it was determined that the scores obtained by children in the sub-dimensions of other-referenced competition (U = 8618,000; p <.05), maintenance of dominance hierarchy (U = 7540,500; p <. 05) and anger-aggression (U = 8825,000; p <. 05) differ significantly in favour of boys.

Table 5. Mann Witney-U test results on examination of children scores from preschool competitiveness scale and social competency and behaviour evaluation-30 depending on gender variable.

Sub-dimensions	Gender	n	Mean ranks	Sum of ranks	U	*p*
Other-referenced	Girl	145	132,43	19203,00	8618,000	,017
Competition	Boy	142	155,81	22125,00		
Task-oriented Competition	Girl	145	137,13	19884,50	9299,500	,156
	Boy	142	151,01	21443,50		
Maintenance of dominance	Girl	145	125,00	18125,50	7540,500	,000
Hierarchy	Boy	142	163,40	23202,50		
Social Competence	Girl	145	141,69	20545,50	9960,500	,634
	Boy	142	146,36	20782,50		
Anger-aggression	Girl	145	133,86	19410,00	8825,000	,036
	Boy	142	154,35	21918,00		
Anxiety-withdrawal	Girl	145	150,82	21869,00	9306,000	,159
	Boy	142	137,04	19459,00		

According to Table 6, there are significant differences between the subscale scores of 60-72 months old children and 48-60 months old children. 60-72 months old children have higher score on competition focused on others (U = 8440,000; p < .05) task-oriented competition (U = 7168,000; p <.05), maintenance of dominance hierarchy (U = 6773, 000; p <.05) and social competence (U = 6279,500; p <.05) sub-dimensions than 48-60 months old children. In the anxiety- withdrawal sub-dimension, it was observed that 48-60-month-old children have higher scores than 60-72-month-old children.

Table 6. Mann Witney-U test results on examination of children scores from preschool Competitiveness Scale and Social Competency and Behaviour Evaluation-30 depending on age variable.

Sub-dimensions	Age	n	Mean ranks	Sum of ranks	U	*p*
Other-referenced Competition	48-60 months	144	131,11	18880,00	8440,000	,008
	60-72 months	143	156,98	22448,00		
Task-oriented Competition	48-60 months	144	122,28	17608,00	7168,000	,000
	60-72 months	143	165,87	23720,00		
Maintenance of Dominance Hierarchy	48-60 months	144	119,53	17213,00	6773,000	,000
	60-72 months	143	168,64	24115,00		
Social Competence	48-60 months	144	141,69	20545,50	6279,500	,000
	60-72 months	143	146,36	20782,50		
Anger-aggression	48-60 months	144	133,86	19410,00	10001,500	,675
	60-72 months	143	154,35	21918,00		
Anxiety-withdrawal	48-60 months	144	150,82	21869,00	7995,500	,001
	60-72 months	143	137,04	19459,00		

As can be seen in Table 7, there was no significant relationship between other-referenced competition and task-oriented competition. A positive and significant relationship was found between other-referenced competition and maintenance of dominance hierarchy (r= 0,495; p<0.01). No significant relationship was found between other-referenced competition and social competence. A positive and significant relationship was found between other-referenced competition and anger-aggression. (r= 0,582; p<0.01). A positive and significant relationship was found between task-oriented competition and maintenance of dominance hierarchy (r= 0,495; p<0.01). There was positive and significant relationship between task-oriented competition and social competence (r= 0,719; p<0.01). A negative and significant relationship was found between task-oriented competition and anger-aggression (r=-0,372; p<0.01). A negative and significant relationship was found between task-oriented competition and anxiety-withdrawal (r=-0,359; p<0.01). A positive and meaningful relationship was found between the maintenance of dominance hierarchy and social competence (r= 0,359; p<0.01). A positive and meaningful relationship was found between the maintenance of dominance hierarchy and anger-aggression (r=0,145; p<0.05). A negative and meaningful relationship was found between the maintenance of dominance hierarchy and anxiety-withdrawal (r=-0,319; p<0.01). A negative and meaningful relationship was found between social competence and anger-aggression (r=-0,372; p<0.01). A negative and meaningful relationship was found between social competence and "anxiety-withdrawal and (r=-0,348; p<0.01). A positive and meaningful relationship was found between anger-aggression and anxiety-withdrawal (r=-0,297; p<0.01).

Table 7. Spearman correlation analysis results on the relationship between children's scores from the sub-dimensions of the Preschool Competitiveness Scale and Social Competency and Behaviour Evaluation-30s.

Sub-dimensions	1	2	3	4	5	6
Other-referenced Competition	1					
Task-oriented Competition	-,035	1				
Maintenance of Dominance Hierarchy	,495**	,430**	1			
Social Competence	-,084	,719**	,359**	1		
Anger-aggression	,582**	-,372**	,145*	-,372**	1	
Anxiety-withdrawal	,000	-,359**	-,319**	-,348**	,297**	1

1.Other-referenced Competition 2. Task-oriented Competition 3. Maintenance of Dominance Hierarchy
4. Social Competence 5. Anger-aggression 6. Anxiety-withdrawal

4. DISCUSSION and CONCLUSION

The aim of this study was to examine the correlations between different early childhood education programs with preschool children's social competence and types of competition. It has been observed that the type of preschool education that children receive influences their social competence and competitiveness. Study findings showed that the Montessori Program supports social competence more than other programs. In Montessori preschool classes, children between the ages of 3-6 get education together and older age group children teach what they know by guiding their young friends. This situation provides the opportunity to strengthen communication between children and to develop their social skills for both children in the older age group and younger age group (Edwards, Blaise & Hammer, 2009). The existence of a circle time in the Montessori Program, supports children in terms of social competence in expressing their own feelings and thoughts. They try to solve their problems by going to the "Peace Table" and being a guide by the teacher. The Montessori Program allows children to share their ideas and explore social roles and skills and it improves children's social competence and behaviour (Aral et al., 2015).

According to the research findings, it can be said that the children who are educated in the MNE Program experience more anxiety withdrawal than the children educated in other programs. The reason for this may be that children do not engage in activities in mixed age groups and with their peers in small groups, or that activities that encourage them to express themselves and develop their social skills through practices such as circle time are not carried out sufficiently.

The Montessori Program has a philosophy that takes care of children individually and is based on the progress of children at an individual pace without entering the race and competition environment (Durakoğlu, 2010). However, according to the results of the research, it was seen that the competition style focused on others, which the child showed with the desire to be better, was higher in children who received the Montessori education. Otherwise, it seems that the Waldorf Program do not support competition between children. When the literature is examined, it is thought that the Montessori Program having more academic activities than the Waldorf Program. In Montessori classes, new materials are introduced in a certain order. Children may be competing to be able to do the work of their friends. There is some research that shows academical process and desire to excel support competitiveness of children (Malkoç & Erginsoy, 2008). Also, the variables not included in the study, such as the parental attitudes, may be effective in the emergence of this situation. Even though this study does not include parents, parental attitude may have also been effective in this result (Özensel, 2004).

In this study, while there was no gender-related change in terms of social competence, it was observed that boys have been found to be more competitive than girls. Boys displayed more aggressive behaviour than girls. Gender roles and cultural parenting styles have been influential on this (Tsiakara & Digelidis, 2014). In the competition sub-dimensions, it was discovered that children aged 60-72 months have a higher average than children aged 48-60 months. It is reasonable to conclude that older children are more competitive than younger children based on this knowledge. This may stem from the reason that very young children have difficulty understanding and focusing on multiple things. Children in the younger age group may not only focus on playing the game, but also cannot develop strategies to compete with them by thinking about their opponents. Students in the age group of 5 can focus on playing and defeating their opponents at the same time (Priewasser, Roessler & Perner, 2013).

It has been determined that older children have higher social competence and less introverted behaviours than younger children. As children get older in the preschool period, their language skills develop, and they can communicate better with the people around them. Children's communication

with other people and establishing good relationships also positively affects their social competence. The fact that family members communicate and share more with the child as the child grows also positively affects the social competence of the child (Rispoli et al, 2013).

Study shows that children with high social competence are also high task-oriented competition and maintenance of dominance hierarchy. When children who have developed social skills and have good relationships with others can be leader and maintain his/her dominance in a group (Stichter et al., 2007). Also, children who have improved social competence are responsible and they complete their task and jobs carefully (Denham et al., 2011). Therefore, it is an expected result that there is a significant relationship between social competence and these types of competitions. In particular, it is desirable that children have the task-oriented competition style. This competition will move the child forward both socially and academically.

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Abstract

Carried out by education inspectors and administrative superiors in Türkiye, school supervisions are done in line with national guidelines. How supervision processes are conducted in schools is necessary to be specified so as to ensure continuity and evaluation of improvement in education and training processes. Both teacher supervision and administrative supervision of school administrators were examined in this study. Designed as a descriptive survey, a questionnaire was created and multiple-choice questions were used to collect data for the present study. Teachers and school administrators working in secondary and high schools at Urla district of Izmir, Türkiye in the 2019/20 academic year were investigated in this study under the headings of the purpose of supervision; results of supervision; frequency of supervision; data sources used for supervision; the teachers and school administrators' perceptions of the current supervision processes; their views on what kind of supervision was to be demanded; along with the comparisons made on the existing situation of supervision practices and demands concerning such practices. The results indicated that teacher supervision aimed to identify teachers' weaknesses and strengths; resulted in making verbal reminding and guidance; had no routine, and was carried out in the form of a document review. Some other results regarding the supervision of school administrations pointed to either administrative sanctions or improvement through guidance, as well as to the fact that supervision practices are to be carried out every few years, taking place in the form of a document review. Some of the demands identified through this study are that the supervision of both groups should be carried out to identify both weaknesses and strengths, to result in improvement through guidance, to be continued throughout the education and training processes, to be practiced in such a way as to monitor the process and detect satisfactions of those who benefit from the service.

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Research Article

Experiences and Demands about Supervision Practices of Teachers and School Administrators*

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Abstract

Carried out by education inspectors and administrative superiors in Türkiye, school supervisions are done in line with national guidelines. How supervision processes are conducted in schools is necessary to be specified so as to ensure continuity and evaluation of improvement in education and training processes. Both teacher supervision and administrative supervision of school administrators were examined in this study. Designed as a descriptive survey, a questionnaire was created and multiple-choice questions were used to collect data for the present study. Teachers and school administrators working in secondary and high schools at Urla district of Izmir, Türkiye in the 2019/20 academic year were investigated in this study under the headings of the purpose of supervision; results of supervision; frequency of supervision; data sources used for supervision; the teachers and school administrators' perceptions of the current supervision processes; their views on what kind of supervision was to be demanded; along with the comparisons made on the existing situation of supervision practices and demands concerning such practices. The results indicated that teacher supervision aimed to identify teachers' weaknesses and strengths; resulted in making verbal reminding and guidance; had no routine, and was carried out in the form of a document review. Some other results regarding the supervision of school administrations pointed to either administrative sanctions or improvement through guidance, as well as to the fact that supervision practices are to be carried out every few years, taking place in the form of a document review. Some of the demands identified through this study are that the supervision of both groups should be carried out to identify both weaknesses and strengths, to result in improvement through guidance, to be continued throughout the education and training processes, to be practiced in such a way as to monitor the process and detect satisfactions of those who benefit from the service.

Keywords: Supervision of teachers, supervision of school administrators, purpose and results of supervision, frequency of supervision, data sources used in the supervision

1. INTRODUCTION

Teachers are often subject to supervision related to their activities in the classroom, whereas school administrators are subject to them concerning the effectiveness and efficiency of their administrative actions so that the education and training processes can be fulfilled properly. Carried out by inspectors and administrative superiors in Türkiye, school supervision is practiced in line with national guidelines (Ministry of National Education [MoNE], 2021a). According to the Regulation on Education Inspectors of the Ministry of National Education published in 2022, education inspectors are responsible for the inspection of teachers and school administrations to fulfill the duties of Guidance and Supervision, Monitoring and Evaluation, Examination, Investigation Activities and Reporting. This regulation states that it is essential to contribute to schools through supervision activities prevent corruption and irregularities, determine the level of achievement in the curriculum, as well as enabling them to improve themselves (MoNE, 2022). In this regard, it is necessary to describe how supervision processes are applied in schools to ensure continuity and evaluation of improvement in education and training processes.

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It appears that some systems assuming that managerial processes based on classical views continue with clear control and direction have been replaced by chaos management based on the uncertainty that takes place under the influence of many unpredictable variables (Dikmen, 2017). However, many administrations are still under the influence of classical thought and ignore the influence of many factors that have an impact on the organization to keep their organizations in orderly, linear and predictable systems. This might cause the organization to be alienated from its internal and external environment, hinder the creativity of its stakeholders and weaken the functions of the organization. It should, therefore, be known that their tendency towards linearity is not a redemptive solution and carries with it the risks of destroying organizations.

Supervision, which is the main focus of this study, is regarded as an evaluation step in management processes; and is practiced to determine the effectiveness and efficiency of an organization (Ozcan, 2018). An observation of the intellectual progress of control along with the theories of leadership and the way it is handled in organizations in practice reveals that the gap between theory and practice is great. Theories covered in the relevant literature often emphasize that the classical understanding is left behind, and instead, that participatory, flexible and instructional leadership prevails, without sacrificing quality and efficiency, in addition to caring about human values (Aydin, 2020; Glickman, Gordon & Ross-Gordon, 2017), whereas administrative practices in the field show that the efficiency of organizations in supervision processes is mostly determined by the generalizable results of standard assessment tools for internal stakeholders (MoNE, 2021b).

According to many studies in the literature, even though supervision finds affirmative responses such as leadership, motivation, being an opportunity for professional advancement, etc. (Sullivan & Glanz, 2013) it is observed that supervision operates in schools both for the students, who are the focal beneficiaries of the process, and for the teachers and the administrative staff who are their supervisors, in a controlling manner rather than personal-professional development provider, where errors are highlighted, oriented to the continuity of order and based on paperwork (Altınok, Tezel & Gungor, 2020; Can, 2004; Şeren & Özcan, 2022). Research on the supervision of education and school institutions in primary education in Türkiye reveals that the supervision subsystem cannot fulfill its duties in the modern sense, cannot respond to the needs, and that there are many weaknesses in this field accompanied by the presence of numerous problems (MONE, 2010).

The phenomenon of performance evaluation according to predetermined general indicators is the main practice of today's supervision practices, yet filling out of standard forms and transmission of standard forms to superiors are practices inherited from the bureaucratic management approach. Naturally, the basis of these practices is the legal regulations established by the Ministry of National Education. The most current legislation on the subject is the regulation on supervision activities and responsible training inspectors in 2022. With this regulation, duties of providing supervision and guidance services to inspectors have been defined. It is stated that preventive and corrective and improving guidance services will be provided and reported to educational institutions. In this framework, supervision of educational institutions are to be conducted according to processes, results, performance, systems, finance, appropriateness, themes, personnel, appropriateness, and course supervision types. According to this regulation, inspectors are also responsible for the supervision of the annual self-evaluations that educational institutions are obliged to carry out.

1.1. Context of the Study

Besides its function within school administration processes, supervision has been defined in the given statement as follows: "*Because the elements incorporated in it are initiating action, taking leadership, ordering, guiding and motivating the personnel, it is not a function of evaluation or correcting deviations*" (UNESCO, 1984). Nevertheless, supervision is also defined as a function of a control stage of the administration process, and as inspection activities required to make evaluation-

related decisions (Agih, 2015). Understanding the purpose of supervision depends on knowing its elements. The purpose of the supervision consists of a relationship of 3 elements, which are assessment, evaluation and correction-development. The assessment phase of the supervision is the situation description stage, which includes data collection, examination, and comparison of the purpose-result appropriateness. The evaluation phase is a stage where decisions are made about what to do with the collected data to control or improve those supervised. Correction and improvement activities are the implementations of those that turn into decisions from the options that will arise as a result of the evaluation (Basar, 2000).

Supervision can be carried out in the public sector with a focus on control and investigation, in order to take the necessary legal actions against the personnel by detecting their negligence, abuse or carelessness, or it can be carried out for the purpose of vocational guidance and assistance, which can be applied at all levels of the training provided at the desired and needed place and time with a focus on guidance and professional assistance activities (Taymaz, 2005). In general, supervision is carried out to ensure the survival and development of organizations by using their resources in the most efficient and beneficial way. In educational institutions, supervision can be carried out to determine the weaknesses of the supervised staff in a control-oriented manner, or it can be carried out to determine the strengths of the supervised with a developmental focus. The supervision may have the purpose of both controlling and improving the supervised, in which the option of 'identifying the weaknesses' and 'identifying the strengths' as well as 'identifying both the weaknesses and strengths' were directed to the participants in the questions addressing the purpose of the supervision and what it should be. A school is an organization of complex activities which are carried out by people (Agih, 2015) to ensure that educational processes evolve towards development with the contribution of supervision factors, and the purpose of the supervision should also be aimed at development. According to complexity management theory, precise dependence on the foundation point for organizational processes and characteristics of variables that can be recognized in a system are related to the way the supervision is carried out, but how it is carried out depends on what is intended by it, and these choices determine how it will yield results. For example, supervisors may use process supervision to improve school and classroom management processes, or they may turn to the supervision of results to reveal the benefit or impact of the work being done. In this study, participants stated their opinions through the options about the results of the supervision, which are; "administrative sanctions", "both administrative sanctions and development with guidance" and "development with guidance".

How often the supervision is carried out in educational processes varies depending on the intensity of the task that the supervisors are responsible for. The intensity of the supervision program and the low inter-tour times (Taymaz, 2005) and the excess workload caused by the supervision (Basar, 2000) cause the supervision approach to rely on outcome evaluation instead of process evaluation. Process evaluation aims to improve personnel with guidance, and therefore, requires frequent monitoring of the supervised individuals in the process (Aydin, 2020). Taking into consideration the intensity of findings from the literature signifying that short-term supervision practices based on standard forms and document examination are dominant in schools (Altinok et al., 2020), it may be suggested that the outcome evaluation approach, which deems sufficient to visit schools on average once a year to check whether the people supervised fulfill their responsibilities (Glickman et al., 2017), is the preferred approach in the supervision of educational institutions in Türkiye. In this study, participants expressed their opinions on the questions about the frequency of supervision through the options of "never", "once a few years", "once a year", "once a term", and "during the process".

For the purposes of supervision, the available data obtained about those supervised are utilized so as to make decisions about them during the evaluation phase (Basar, 2000). It is possible

for supervisors to collect data from various sources as well as their own impressions in order to determine the attitudes and behaviors that the supervised persons should show in accordance with their job descriptions in the legislation. If the aim is to reveal the status of those being supervised by supervision processes and to give feedback to people in line with the results, then supervision processes should be conducted in this direction and data should be collected from sources to feed the need.

In supervision, while making decisions about those supervised during the evaluation phase, data obtained about them are utilized (Basar, 2000). When supervision is conducted in a process evaluation approach, care is taken to access all possible performance data on both weaknesses and competencies for their superiority when monitoring supervisees. According to Glickman et al. (2017), in process supervision, in-class observation data such as students' participation in class, movements in the classroom, and questioning techniques, as well as assignments, experiments, practice studies, projects, and measurement tools are also subject to review. If the supervision process is to be operated in the outcome evaluation approach, it is suggested that the stakeholders affected by the services of the person inspected should participate in the decision process and their representation in the evaluation decision, but it is also said that administrators and teachers resist such participation (Aydin, 2020). Since the currently more prevalent supervision approach is the outcome evaluation approach for evaluating the situation in a short time, it is important to reveal the judgments of school administrators and teachers. For this reason, school administrators and teachers were asked about their thoughts on the sources from which supervisors collect data and from which they should collect it when conducting their own supervision.

1.2. Problem of the Study

The problem statement is based on determining the study sample's perceptions of current supervision practices under the headings of the purpose of supervision, consequences of supervision, frequency of supervision and data sources used in supervision and on what kind of supervision is demanded; comparing the existing and demanding circumstances. This study aimed to investigate and determine the opinions of those being supervised about the current situation of the supervision practices and of the favorable supervision practices. Unlike the other current studies in this area this study focused not only on teacher supervision, but also on the supervision of principals and vice-principals. To this end, it is aimed that the questions did not remain superficial, that they could show the details of the operation of the supervision, and that the experience of the participants about the practice was obtained rather than focusing on the morale/motivation dimension of supervision practices. For this reason, the teachers and school administrators were asked multiple-choice questions in the form of questions such as what, which, how, how often and in what ways, in order to be able to obtain clear diagnostic answers about the objectives, results, frequency and data sources of classroom supervision and school administrative supervision.

Main problem: What are the perceptions of teachers and administrators about current and demanded supervision practices?

Four sub-problems were created and analysed.

Sub-problem 1: What are the participant views on what the purpose of the supervision is and how it is desired to be?

Sub-problem 2: What are the participant views on the consequences of existing and desired states of supervision?

Sub-problem 3: What are the participant views on the current state of the supervision frequency and the desired frequency?

Sub-problem 4: What are the views of the participants on the sources of data used in the supervision and which data would they like to be used as a source of data during their supervision?

In the scale prepared to examine these sub-problems in depth, participants were asked the following questions:

1.2.1. Purpose of the supervision (Sub-problem 1)

- Which status of the supervised person does the supervision aim to identify, according to school administrators and teachers?
- Which status of the supervised person should the supervision aim to identify, according to school administrators and teachers?
- Are there any differences between perceptions of teachers and school administrators about which state of the supervised person the supervision aims to identify and which state of the supervised person should the supervision aim to identify?

1.2.2. Consequences of the supervision (Sub-problem 2)

- How is the supervision concluded, according to school administrators and teachers?
- How should the supervision be concluded, according to school administrators and teachers?
- Is there a difference between the views on how the supervision ends and on how those being supervised demand it to end for their own sake?

1.2.3. Supervision frequency (Sub problem 3)

- How often are school principals supervised, according to school administrators and teachers?
- How often should school principals be supervised, according to school administrators and teachers?
- Are there any differences between the opinions of the participants about how often school principals are supervised and how often the participants want them to be supervised?
- How often are teachers supervised, according to school administrators and teachers?
- How often should teachers be supervised, according to school administrators and teachers?
- Is there a difference between opinions of the participants about how often teachers are supervised and how often the participants want them to be?

1.2.4. Data sources used in supervision (Sub-problem 4)

- From what sources was data collected during the supervision?
- From what sources should data be collected for supervision in schools?

2. METHOD

2.1. Research Design

This research was conducted using a descriptive survey model in a qualitative research design. In this study, the researcher investigated teachers' and administrators' perceptions on current supervision practices under the headings of purpose of supervision, results of supervision, frequency of supervision and methods used in supervision and on what kind of supervision is demanded; and compared current situations and demands in this direction. A semi-structured, multiple-choice questionnaire was prepared and applied to participants to determine their situational perceptions of supervision practice and their views on how to demand it. This measurement tool took into account the possibility of unpredictable responses; therefore, in addition to the options provided as possible for each question item, *"other: …"* was included as a final option for each question to be answered if required. The answers that reached the same significance for the expression "other" and that were at least as high as the frequency of choosing the other options were grouped and included in the calculations related to the question by being treated like other options.

2.2. Participants

This research was carried out with 40 teachers, 17 vice principals and 24 school principals working in secondary and high schools in Urla district of Izmir, Türkiye during the 2019/20 academic

year. Kindergartens and primary schools were not included in the study population since education and training processes were carried out with classroom teachers. In order to make reliable generalizations about the population, this study was designed in a way to be conducted in schools where only the core subjects were taught.

Sampling was not used in this study. Entire population of school administrators (N=55) were aimed to be reached, though only 14 of them could be reached (n=41). Since views of teachers and administrators were to be compared for the purposes of the present study, utmost attention was paid to reach as many teachers as the number of administrators in order to make parametric distribution calculations reliable. In this case, school administrators whose data were evaluated corresponded to 74.5% of the population, while teachers corresponded to 11% (n=40) of the whole population (N=363). Relevant tables demonstrate the distribution of the study sample according to their tasks (Table 1), school types (Table 2) and professional seniority (Table 3).

Table 1. **Participants' professional positions in schools**

Status	*f*	*%*
Teachers	40	49.4
Vice Principals	17	21.0
Principals	24	29.6
Total	81	100.0

Table 2. School types and participants by position

School Type	*Teachers*	*School Administrators*	*Total*
Secondary school	4	21	25
High school	36	20	56
Total	40	41	81

Table 3. Distribution of participants by professional seniority

Seniority	*f*	*%*
10 years and less	19	23.5
11-19 years	21	25.9
20-24 years	20	24.7
25 years and above	21	25.9
Total	81	100

2.3. Measurement tool

The measurement tool was designed with the aim of creating the simplest and clearest questions possible in order to establish clearly what teachers and school administrators, who were subject to supervision as part of their job descriptions, thought about supervision in relation to the research questions. For this purpose, volunteer school administrators and a field expert were consulted on the items and options of the questionnaire prepared by the researcher prior to the actual administration, and then the participants' opinions on content validity and suggestions for improvement were taken. It was concluded that items asked about the demanded questions and options largely met answers that could be given. Due to the well-known advantages such as quick sharing, simultaneous feedback and only volunteers taking the time to fill in, questions were prepared in an online form. The responses of volunteer participants working as teachers and school administrators in the study population were collected online.

2.3.1. Reliability and Validity of Measurement

The reliability of the measurement was determined by the Cronbach's alpha calculation for items with more than three options in the scale. The Cronbach's alpha is the correlation coefficient

between the total scores of the answers and is suitable for this analysis since the number of options of the 4 items written for the sub-problem about the frequency of supervision from the research questions is greater than 3 (with 5 options). The result of the reliability analysis was found as α= 0.707, and according to Kilic (2016), the measurement reliability for these substances is at a good level since this value is higher than 0.7.

Kaiser-Mayer-Olkin (KMO) and Bartlett's analyses were applied for the validity of the measurements, and these values were magnitudes related to the appropriateness of the correlation between the sample and the scale items. The analyses were made by considering the answers given to 4 items written to find perceptions about the frequency of the supervision, which had 5 options as in reliability measurements. The measurement value of the KMO sample size was determined to be KMO=0.589, p=0.000. According to Field (2000), the fact that the KMO value is greater than 0.50 and the value p in Bartlett's hypothesis "The correlation matrix is the unit matrix" is less than 0.05 is an indication of a correlation between substances.

2.4. Data Analysis

In the first part of the questionnaire, participants were asked about their attitudes towards current supervisory practices in schools, while in the second part they were asked about their expectations of supervisory practices. Frequency, percentage distribution, arithmetic mean and standard deviation data were used for process monitoring and analysis. The normality values of the data distribution were examined in terms of skewness and kurtosis indices. According to Demir, Saatçioğlu and Imrol (2016); if it is close to 0 within the ±2 limits of the skewness and kurtosis indices, the existence of a normal distribution is taken as evidence. As can be seen in Table 4, the skewness and kurtosis values are within acceptable ranges, so it was decided to use parametric difference tests with the exception of one item (demanded purpose of supervision).

Table 4. Normality indicators scores of items

Items	*N*	$\bar{X}$	*S*	*Skewness*	*Kurtosis*
Current purpose of supervision	81	1,32	,496	1,094	-,070
Demanded purpose of supervision	81	1,90	,339	-1,704	4,409
How supervision is currently concluded	81	2,32	,772	-,629	-1,040
How the supervision should be concluded	81	2,64	,508	-,895	-,534
Supervision frequency of school principals in the current situation	81	2,68	1,283	,737	-,560
Demanded supervision frequency of school principals	81	4,16	1,042	-,806	-,773
Supervision frequency of teachers in the current situation	81	2,95	1,413	,226	-1,213
Demanded supervision frequency of teachers	81	4,20	1,005	-,865	-,594

Independent samples t-test analyses were used for parametric distributions to identify teachers' and school administrators' views on their perceptions of school administration and teacher supervision, as well as their demanded supervision practices, and to compare them with the task independent variable. The Mann-Whitney U-test was used for the item "demanded purpose of supervision" as its kurtosis indexes the deviation. Paired samples t-test analyses were used to determine whether there was a difference between situational perceptions of the participants about supervision practices and demanded supervision practices. In this study, the data were analysed by using SPSS 20 program.

3. FINDINGS

3.1. Purpose of the Supervision

To interpret the first sub-problem, there are three questions to identify participant views on the current state of supervision, the aim of supervision and how it is demanded to be. In response to the first two questions in the measurement tool, three same options were included. While the results

were being interpreted, generalization was made according to equally spaced score intervals for the options of "Identifying weaknesses" (1.00-1.66), "Identifying both weaknesses and strengths (1.67-2.33), and "Identifying strengths" (2.34-3.00).

To determine whether there is a difference in the opinions between the teacher and administrator groups in the answers given to the question "Which status of the supervised person does the supervision aim to identify, according to school administrators and teachers?"; independent samples t-test analysis was performed.

Table 5. Independent samples t-test results with arithmetic mean and standard deviation values for the current purpose of supervision

Item	*Item's options and scores*	*Groups*	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
perceptions of teachers and administrators about purpose of current supervision practices	- identify weaknesses (1) - identify both weaknesses and strengths (2) -identify strengths (3)	School administrators	41	1.32	.471	79	.072	.943
		Teachers	40	1.33	.526			

[$t_{(79)}$=0.072, p>.05].

The opinions of school administrators ($\bar{X}$=1.32, S=0.471; n=41) and teachers ($\bar{X}$=1.33, S=0.526; n=40) regarding this research question were in conformity with the view that the supervision was done to "identify weaknesses". Difference tests for the arithmetic mean scores of the teacher and school administrator groups indicated that there was no significant difference between the groups regarding the current purpose of the supervision [$t_{(79)}$=0.072, p>.05] (Table 5). To determine whether there is a difference in the opinions between the teacher and administrator groups in the answers given to the question "Which status of the supervised person should the supervision aim to identify, according to school administrators and teachers?"; Mann Whitney U test analysis was performed.

Table 6. Mann Whitney U test results about what should be aimed with supervision

Item	*Item's options and scores*	*Groups*	*n*	*Mean rank*	*U*	*p*
Demands of teachers and administrators about the purpose of supervision practices	- identify weaknesses (1) - identify both weaknesses and strengths (2) -identify strengths (3)	School administrators	41	44,02	944	.040*
		Teachers	40	37,90		

*[U=944, p<.05].

The opinions of school administrators ($\bar{X}$=1.98, S= 0.156; n=41) and teachers ($\bar{X}$=1.83, S=0.446; n=40) for this question were found to be indicating that it should be done to "identify both the weaknesses and strengths"; however, this finding was mostly observed in the school administrators group and a statistically significant difference was also found [U=944; p<.05] (Table 6).

To answer the question "Are there any differences between perceptions of teachers and school administrators about which status of the supervised person the supervision aims to identify, according to school administrators and teachers and which status of the supervised person the supervision should aim to identify, according to school administrators and teachers?", paired samples t-test was performed.

Table 7. Comparison of the perceptions about purpose of supervision according to participants regarding the current and demanded objectives of supervision

	N	$\bar{X}$	*S*	*sd*	*t*	*p*
What is the purpose of the supervision?	81	1.32	.496	80	-9.589	.000*
What should be the purpose of the supervision?	81	1.90	.339			

* [t(80) =9.589, p<.05].

For this question, opinions of the participants regarding the purpose of the supervision and current situation ($\bar{X}$=1.32, S=496; N=81) and the purpose of the supervision and desired situation ($\bar{X}$=1,90, S=0,339; N=81), were compared with paired samples t-test. A significant difference was found between current supervision practices and participant views on what should be aimed with the supervision [$t_{(80)}$=9,589, p<,05]. Participants stated that in the current situation, it is aimed to find weaknesses of the supervised through the supervision; yet, the aim should be to identify both the weaknesses and successes of the supervised (Table 7).

3.2. Consequence of Supervision

Predicting the second sub-problem, there are three sub-problems in order to determine participant views on the consequences of existing and desired states of supervision. The same three options were included in response to the first two questions in this direction in the measurement tool. While the results were being evaluated, generalization was made according to equally spaced score intervals for the options of "Administrative sanctions" (1.00-1.66), "both administrative sanctions and improvement through guidance" (1.67-2.33), and "Improvement through guidance" (2.34-3.00).

An independent samples t-test analysis was conducted to compare the opinions of the teacher and school administrator groups on the answer data given to the question "How is the supervision concluded, according to school administrators and teachers?"

Table 8. Independent samples t-test results with arithmetic mean and standard deviation values regarding how supervision is currently concluded

Item	*Item's options and scores*	*Groups*	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
How is the supervision concluded, according to school administrators and teachers?	- Administrative sanctions (1) - Both administrative sanctions and improvement through guidance (2) - Improvement through guidance (3)	School administrators	41	2.34	.693	79	.240	.811
		Teachers	40	2.30	.853			

[t(79)=0.240, p>.05].

$\bar{X}$ points of the groups are close even though the teachers categorically expressed their opinions for this question in the direction of "both administrative sanctions and improvement through guidance" with ($\bar{X}$=2.30, S=0.853; n=40); and school administrators expressed theirs in the direction of "improvement through guidance" with ($\bar{X}$=2.34, S=0.693; n=41). When these arithmetic mean scores are compared, the tendency of the views of both groups is that supervision in schools results in "both administrative sanctions and improvement with guidance". [$t_{(79)}$=0.240, p>.05] (Table 8).

An independent samples t-test analysis was conducted to compare the opinions of the teacher and school administrator groups on the answer data given to the question "How should the supervision be concluded according to school administrators and teachers?"

Table 9. Independent samples t-test results with arithmetic mean and standard deviation values about how the supervision should be concluded

Item	*Item's options and scores*	*Groups*	*n*	$\bar{X}$	*S*	*sd*	*t*	*p*
How should the supervision be concluded, according to school administrators and teachers?	- Administrative sanctions (1) - Both administrative sanctions and improvement through guidance (2) - Improvement through guidance (3)	School administrators	41	2.59	.547	79	1.016	.313
		Teachers	40	2.70	.464			

[$t_{(79)}$=1.016, p>.05].

For this question the teachers expressed their opinions in the direction that it should be as "improvement through guidance" with ($\bar{X}$=2.70, S=0.464; n=40), along with the school administrators being in the same direction ($\bar{X}$=2.59, S=0.547; n=41). The comparison of the arithmetic mean scores has proven that there is no significant difference between the views of the teacher and administrator groups [t(79)=1.016, p>.05] (Table 9).

Paired samples t-test analysis was performed to answer the question "Is there a difference between the views on how the supervision comes to a conclusion and on how the supervised demands it to for their own sake?"

Table 10. Comparison of the supervision results in terms of current & demanded statuses (paired samples t-test results)

	N	$\bar{X}$	S	sd	t	p
Result of supervision (current)	81	2.32	.772	80	-3.096	.003*
Result of supervision (demanded)	81	2.64	.508			

* [$t_{(80)}$=3.096, p<.05].

For this question, participants' views of results of the supervision – current situation ($\bar{X}$=2.32, S=0.772; N=81) and results of the supervision – demanded situation were compared through paired samples t test. A significant difference was found between current supervision practices and participant views on how supervision should be concluded [$t_{(80)}$=3.096, p<.05]. The participants stated that supervision often ended up with "both administrative sanctions and improvement through guidance" for the supervised, but should instead be concluded with "improvement through guidance" for the supervised (Table 10).

3.3. Supervision Frequency

For the third sub-problem, there are six questions to determine the participants' views on the current state of the supervision frequency and the desired frequency. The same five options were included in response to the four questions in this direction in the measurement tool. While evaluating the results, a generalization according to equal score intervals was made for the options of "Never" (1.00-1.80), "Once a few years" (1.81-2.60), "Once a year" (2.61-3.40), "Once a term" (3.41-4.20), "During the process" (4.21-5.00).

An independent samples t-test analysis was conducted to compare the opinions of the teacher and school administrator groups on the answer data given to the question "How often are school principals supervised, according to school administrators and teachers?"

Table 11. Supervision frequency of school principals in the current situation, according to school administrators and teachers

Item	Item's options and scores	Groups	N	$\bar{X}$	S	sd	t	p
How often are school principals supervised?	- Never(1) - Once a few years (2) - Once a year (3) - Once a term (4) - During the process (5)	School administrators	41	2.63	1.318	79	.317	.752
		Teachers	40	2.73	1.261			

[$t_{(79)}$=.317, p>.05].

Teachers expressed their opinions in the direction of "Once a year" to this question ($\bar{X}$=2.73, S=1.261; n=40); and school administrators, likewise ($\bar{X}$=2.63, S=1.1318; n=41). When these arithmetic mean scores are compared, the tendency of the views of both groups is that school principals are currently supervised once a year [$t_{(79)}$=.317, p>.05] (Table 11).

An independent samples t-test analysis was conducted in order to compare the opinions of the teachers and school administrators based on the data collected from the responses given to the

following question: "How often should school principals be supervised, according to school administrators and teachers?"

Table 12. Demanded supervision frequency of school principals according to teachers and school administrators

Item	Item's options and scores	Groups	N	X̄	S	sd	t	p
How often should school principals be supervised	- Never(1) - Once a few years (2) - Once a year (3) - Once a school term (4) - During the process (5)	School administrators	3,95	1,161	3,95	79	1,857	,066
		Teachers	4,38	,868	4,38			

[$t_{(79)}$=1.857, p>.05].

To this question, teachers expressed their opinions as "during the process" with ($\bar{X}$=4.38, S=0.868; n=40); and school administrators as "once a school term" with ($\bar{X}$=3.95, S=1.161; n=41). Although they differed in terms of categorical nomenclature, when the arithmetic mean scores were compared statistically, there was no significant difference between the tendency of the views of the two groups [$t_{(79)}$=1.857, p>.05]. Accordingly, while interpreting the findings, teachers and administrators stated that school principals should be supervised "during the process" (Table 12).

Paired samples t-test analysis was conducted in order to compare the participants' views and wishes based on the data collected from the responses given to the following question: "Are there any differences between the opinions of the participants about how often school principals are supervised and how often they want them to be supervised?".

Table 13. Current/demanded comparison of school principals' supervision frequency (paired samples t-test findings)

	N	X̄	S	sd	t	p
Frequency of school principals –current	81	2.68	1.283	80	-9.363	.000*
Frequency of school principals –demanded	81	4.16	1.042			

* [t(80)=9.363, p<.05].

For this question, views of the participants on supervision frequency of school principals – current situation ($\bar{X}$=2.68, S=1.283; N=81) and supervision frequency of school principals – demanded situation ($\bar{X}$=4.16, S=1.042; N=81) were compared through paired samples t-test. A significant difference was found between the current supervision frequency practices of school principals and the participant views on the desired supervision frequency [t(80)=9.363, p<.05]. The participants stated that in the current situation, school administrators are supervised once every few years, but they should be supervised throughout the process (Table 13).

An independent samples t-test analysis was conducted in order to compare the opinions of the teachers and school administrators according to the data collected from the responses given to the following question: "How often are teachers supervised, according to school administrators and teachers?"

Table 14. Arithmetic mean and standard deviation values and independent samples t test results regarding how often the teachers are supervised

Item	Item's options and scores	Groups	n	X̄	S	sd	t	p
How often are teachers supervised?	- Never(1) - Once a few years (2) - Once a year (3) - Once a term (4) - During the process (5)	School administrators	41	2.80	1.487	79	.939	.351
		Teachers	40	3.10	1.336			

[t(79)=,939, p>,05]

To this question, both the teachers ($\bar{X}$=3.10, S=1.336; n=40) and school administrators ($\bar{X}$=2.80, S=1.487; n=41) expressed their opinions as teachers need to be supervised "once a year" in the current situation. When these arithmetic mean scores are compared, no significant difference can be found between the tendency of the views of both groups [$t_{(79)}$=.939, p>.05] (Table 14).

However, due to the fact that the standard deviation values were higher than the total item loads, it was necessary to see the frequency and percentage distributions for this item. Since the answers given to the supervision frequency of teachers seem too scattered to be considered equal to each other (Never=14, Once every few years=21, Once a year=20, Once a term=7, During the process=19, N=81), it may be suggested that there is no clear consensus among the participants in the supervision frequency of teachers, that is, there is no generalizable routine of teachers' supervision in this study population.

An independent samples t-test analysis was conducted in order to compare the opinions of the teachers and school administrators according to the data collected from the responses given to the following question: "How often teachers should be supervised, according to school administrators and teachers?"

Table 15. Arithmetic mean and standard deviation values and independent samples t test results regarding how often teachers should be supervised

Item	Item's options and scores	Groups	n	$\bar{X}$	S	sd	t	p
How often should teachers be supervised?	- Never(1) - Once a few years (2) - Once a year (3) - Once a school term (4) - During the process (5)	School administrators	41	4.22	.936	79	.198	.844
		Teachers	40	4.18	1.083			

[t(79)=.198, p>.05]

As an answer to the question given above, the teachers expressed their opinions indicating that supervision should be conducted "during the process" ($\bar{X}$=4.18, S=1.083; n=40), and school administrators considered that it should be done "once a school term" ($\bar{X}$=4.22, S=0.936; n=41). Although they differed in terms of categorical nomenclature, when the arithmetic mean scores were compared statistically, there was no significant difference between the tendency of the views of the two groups [$t_{(79)}$=.198, p>.05]. In this connection, when evaluating the findings, teachers and administrators stated that teachers should be supervised "during the process" (Table 15).

Paired samples t-test analysis was conducted in order to compare the participants' views on the current situation and their preferences about supervision based on the data collected from the responses given to the following question: "Is there a difference between opinions of the participants about how often teachers are supervised and how often they want to be supervised".

Table 16. Current-demanded comparison of teachers regarding the supervision frequency (paired samples t-test findings)

	N	$\bar{X}$	*S*	*sd*	*t*	*p*
Frequency of teachers – current	81	2,95	1,413	80	8,574	,000*
Frequency of teachers – demanded	81	4,20	1,005			

* [$t_{(80)}$=8.574, p<.05].

For this question, views of the participants on Supervision frequency of teachers – current situation ($\bar{X}$=2.95, S=1.413; N=81) and supervision frequency of teachers – demanded situation ($\bar{X}$=4.20, S=1.005; N=81) were compared through paired samples t-test. A significant difference was found between the participants' views on the current supervision frequency of teachers and their desired supervision frequency [$t_{(80)}$=8.574, p<.05]. Participants stated that teachers should be

supervised during the process, rather than the frequency of supervision determined by this research, which differs so much that it cannot be generalized (Table 16).

Additionally, a short summary table (Table 17) has been prepared so that the supervision frequency section findings can be seen simply according to the data of the six sub-questions.

Table 17. Frequency of current and desired supervision of school administrators and teachers

Supervision of whom	Supervision frequency of	Frequency according to teachers	Frequency according to school administrators	Comparison of current and demanded
School administrators	Current	Once a year	Once a year	* [t(80) =9.363, p<.05].
	Demanded	During the process	Once a school term	
Teachers	Current	Once a year	Once a year	* [t(80)=8.574, p<.05].
	Demanded	Once a term	During the process	

It is seen that the participants want more frequent supervisions for both themselves and the other group compared to the current situation.

3.4. Data sources of Supervision

According to fourth sub-problem of the research, the participants were asked what the data sources used in the supervision and which data they would like to be used as a source during their supervision. More than one option could be ticked at the same time.

The participants were asked to answer "From what sources was data collected about you during the supervision?" with separate items for school principals, vice principals and teachers. The answers of the participants are classified and presented in Table 18.

As an answer to the question about how supervisions of the school principals were practiced, most participants pointed to education inspectors and national education directorates, through document review; under the influence of political-union factors, parent-teacher association, parents and students' opinions.

For the supervisions of the vice principals, this question was answered by referring mostly to school principals, inspectors, and national education directorates; by document review, observation and correction in the process; by taking into account political and union factors, through the opinions of teachers and students.

Table 18. Opinions of participants about current supervision practices

Item	*Opinions of school principals*	*Opinions of vice principals*	*Opinions of teachers*
Who is supervising? (Which units supervised you?)	71.6% by Education inspectors 69.1% by National Education Directorates	79% by school principals, 49.4% by Education inspectors, 38.3% by National Education Directorates	95.1% by school principals, 34.6% by education inspectors, 32.1% by other school administrators, 13.6% by National Education Directorates, 12.3% by students, 8.6% by parents, 4.9% by other teachers at school
Used methods (In what ways have you been supervised?)	72.8% through document review	49.4% by document review, 9.6% by observation and correction in the process	67.8% course observation 58% document review
Other sources affecting supervision (By which sources was data collected during your supervision?)	7.4% under the influence of political-union factors, 3.7% parent-teacher association, 3.7% parents 1.2% students' opinions.	8.6% under the influence of political and union factors, 1.2%, by getting the opinions of teachers 1.2% by getting the opinions of %students.	by getting the opinions of; 58% other administrators at school, 44.4% students, 25.9% parents, 22.2% other teachers at school, 3.7% parent teacher association 2.5% political-union factors.

The supervision of teachers, on the other hand, was mostly made by school principals, education inspectors, other school administrators, National Education Directorates, by students, parents and other teachers at school. In fact, units such as students, parents and other teachers do not have the authority to supervise teachers legally. The reason why the participants also mentioned these could be that when negative relations are established with them, they may complain about the teacher and the teacher may be decided to be supervised. Answers for the data collection sources during teachers' supervision were rated mostly as course observation and document review by school principal for once a year, by getting the opinions of other administrators at school, also students, and parents, in addition to other teachers at school, parent teacher association and unions. Participant views were taken for another item that answers the question of which stakeholders and to what extent opinions should be sought. Answers to the question of "which sources data should be collected from in the evaluation of a teacher's course efficiency and effectiveness" were given as 72.8% from school administration, 32.1% from inspectors, 24.7% from academicians, 22.2% from students, 18.5% from other teachers at school, and 7.6% from parents. The participants were asked to answer the question "From which sources should data be collected for supervision in schools?" with separate items for school principals (Table 19), vice principals (Table 20) and teachers (Table 21).

Table 19. Frequency percentage distribution of units which are in demand as supervisors of school principals

School principals' supervisors – demanded	Teachers'views (n=40)		Vice principals'views (n=17)		School principals views' (n=24)	
	f	%	f	%	f	%
National Education Directorates	24	60	7	41.17	6	25
Inspectors	26	65	8	47.05	8	33.33
Other administrators at the school	8	20	3	17.64	2	8.33
Teachers	13	32.5	3	17.64	14	58.33
Students	1	2.5			2	8.33
Parents	3	7.5			1	4.16
Academicans	9	22.5	6	35.29	2	8.33
Other stakeholders	1	2.5	1	5.88		
School-parent associations			1	5.88	1	4.16

All groups involved gave a weighted opinion that school principals should be supervised by National Education Directorates and inspectors. However, although teachers do not express themselves mostly in this way, principals prefer teachers to be involved in the supervision of school principals rather than National Education Directorates and inspectors.

Table 20.Frequency percentage distribution of units which are in demand as supervisors of vice principals

Vice principals' supervisors- Demanded	*Teachers'views (n=40)*		*Vice principals'views (n=17)*		*School principals views' (n=24)*	
	f	*%*	*f*	*%*	*F*	*%*
National Education Directorates	17	42.5	7	41.17	6	25
School principals	25	62.5	14	82.35	24	100
Inspectors	22	55	3	17.64	5	20.83
Other administrators at the school	10	25	4	23.52	2	8.33
Teachers	19	47.5	3	17.64	5	20.83
Students	6	15	1	5.88	3	12.5
Parents	3	7.5	1	5.88		
Academicians	7	17.5	5	29.41		
Syndicates	1	2.5				
Other stakeholders	1	2.5				
School-parents associations	1	2.5	2	11.76	3	12.5

All groups involved gave a weighted opinion that vice principals should be supervised by the principal. It is interesting to note that teachers and inspectors, which were ranked 5th among the groups that vice principals preferred to be supervised by, were ranked 2nd among teachers and principals. In other words, vice-principals did not seem to consider inspectors or teachers as their primary supervisors. However, teachers and principals seemed to think that both teachers and inspectors should be involved in the supervision of vice principals.

Table 21. Frequency percentage distribution of the units which are demanded as supervisors of teachers

Teachers' Supervisors- demanded	*Teachers'views (n=40)*		*Vice principals'views (n=17)*		*School principals views' (n=24)*	
	f	*%*	*f*	*%*	*f*	*%*
National Education Directorates	10	25	4	23.52		
School principals	23	57.5	15	88.23	21	87.5
Inspectors	17	42.5	5	29.41	4	16.67
Other teachers	5	12.5	4	23.52	6	25
Students	12	30	2	11.76	4	16.67
Parents	3	7.5	1	5.882	2	8.33
Academicians	14	35	6	35.29		
Other stakeholders	1	2.5			1	4.17
School-parents associations	0	0	1	5.88		

All groups involved gave a weighted opinion that teachers should be supervised by the principal (Table 21). Perhaps because of current practice, teachers identified the supervision of inspectors as the second priority. Interestingly, principals indicated that other teachers should be responsible for supervising teachers as a second priority. The vice principals' second priority was for academics to supervise teachers. Another interesting finding is that although teachers almost never agree with the options of having other teachers supervise them, school principals and vice principals have chosen this option as a priority for teacher supervision.

Table 22. Supervision methods considered favourable to be used

	Teachers (n=40)		Vice principals (n=17)		School principals (n=24)	
Supervision methods – demanded	f	%	f	%	f	%
Supervision should be monitored by academicians.	19	47.5	6	35.29	4	16.66
Supervision should be carried out according to the opinions of the administrative superiors.	10	25	3	17.64	11	45.83
Supervision should be carried out by an inspector.	13	32.5	5	29.41	6	25
Supervision should be carried out by taking the opinions of other stakeholders in the school.	21	52.5	12	70.58	21	87.5
Supervision should be done through written exams.	5	12.5	1	5.88	2	8.33

In terms of the answers of all participants (N=81) to the question of with which methods data should be collected during the supervision; Table 22 demonstrates the detailed distribution of how these findings are represented in each group. As can be seen in table, the answer that "the supervision should be carried out by taking the opinions of other stakeholders in the school" was the most common response given by the participant from each duty. The following results were obtained: "By taking the opinions of other stakeholders in the school" (66.6%), "according to the opinions of administrative chiefs" (28.4%), "by education inspector supervision" (27.2%), "through process monitoring by academics" (34.6%) and "central written exams" (9.6%).

4. CONCLUSION and RECOMMENDATION

This study primarily focused on the publications and announcements of the Ministry of National Education (MoNE) the education-related national policy-making and implementing institution in Turkey, in order to examine the overlap between the theory and practices regarding supervision; in other words, between "what is demanded" and "what is present" about processes. The Ministry of National Education 2023 Vision Document (2018), Ministry of Education Inspectors' Duty Standards (2019), and Guidance and Supervision Guidelines and General Principles (2021) emphasize that the primary purpose of supervision is to help the supervised people improve themselves with guidance. However, the "Guidance and Supervision Guidelines", which were updated and announced in 2021 for the supervision of all kinds of schools and institutions such as primary schools, high schools and equivalent schools, are standard forms that aim to provide bureaucratic convenience to supervisors. Since guidance prevails in theory, whereas compliance with bureaucratic processes in practice due to various limitations encountered in supervision processes (Memduhoglu, et al, 2007); the mission of professional development through guidance seems to be overshadowed by the priority given to the reporting of the process. In other words, when it comes to executing the process and result-oriented supervision together, outcome control seems to become predominant (Aydin, 2020).

This study aimed to investigate and determine the opinions of those being supervised about the current situation of the supervision practices and of the favorable supervision practices. Previous research in this area has looked at who supervises teachers and how this is done (Mette, et al.2015; Minnear-Peplinski, 2009). For this reason, the scope of the study was kept wide so as not to be limited to the supervision of teachers, but also to find out how administrative supervision of school administrators is and should be. The teachers and school administrators were asked multiple-choice questions in the form of questions such as what, which, how, how often and in what ways, in order to be able to obtain clear diagnostic answers about the objectives, results, frequency and data sources of classroom supervision and school administrative supervision. The results indicated that the teacher supervision aimed to identify not only the teachers' weaknesses but also their strengths; that it resulted in giving them verbal reminding and guidance; that they did not have a routine, and that they were carried out in the form of document review. Some other results included the following aspects: Supervision aimed to identify weaknesses in administrative supervision of school administrations; they may result in either administrative sanctions or improvement through guidance; supervision is carried out every few years; and it takes place in the form of document review. This is similar to the conclusions of Minnear-Peplinski's (2009) study that bureaucratic requirements come to the fore rather than improving the performance of the supervisee, and can be done on average once or twice a year. Some of the demands identified through this study are that the supervision of both groups should be carried out to identify both weaknesses and strengths, to result in improvement through guidance, to be continued throughout the education and training processes, to be practiced in such a way as to monitor the process and detect satisfactions of those who benefit from the service. This finding is consistent with other studies that report the importance of guiding teachers through a process of self-reflection, rather than simply seeking to identify areas of deficiency (Mette, et al., 2015).

With this study, it seems clear that the current state of supervision for school staff is far from professional development. It could be asserted that the current supervision in schools does not serve the purpose of the managerial processes, as they are expressed as discontinuous, based on document examination and exploring weaknesses. Based on the results, it could be finally concluded that school staff are faced with the outcome-oriented side of the current supervision, but they accept that the supervision is beneficial for the process and should continue uninterruptedly throughout the process.

Student success, which is the primary goal of schools, can be increased by ensuring professional development through professional supervision of employees (Memduhoğlu, 2012). With regard to the findings of this study, the views of teachers, vice-principals and principals on their own supervision; extending the time and type of data collected about their work was found to be more positive in terms of their professional development. So it is proposed to change the bureaucratic infrastructure of supervision and to spread supervision throughout the education and training process, that is, continuously. This removes the 'current priority of meeting legal requirements' which obscures the purpose of supervision to develop the supervisee, as demonstrated by this and previous research. Another important finding of this research for policy makers is that the majority of research participants approved of those directly affected by their services carrying out their own supervision. In this regard, it was demanded that especially the assistant principals be supervised by the other administrators and teachers in the school, and the principals by the teachers. In addition, there have been prominent demands for academics to be involved as external examiners or monitors for teachers and vice principals.

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Abstract

This study is a qualitative case study conducted to examine the deficiencies and needs for the implementation of the investigative inquiry program in physics classes. The study was carried out at Science High School (SHS), Anatolian High School (AHS), and Technical Vocational High School within the scope of purposeful sampling determined according to school type. In the study, observations were made in physics classes. Interviews were conducted with the teachers of the observed classes. The obtained data were subjected to descriptive analysis. Observation and interview data were interpreted together. It was observed that the teachers had classroom discussions over the daily life examples and models in the lesson. It can be said that teachers try to create an inquiry-based teaching environment in this way. It can be said that teachers are willing to teach based on inquiry, but they see some situations as obstacles in practice. Some suggestions are presented in the context of the research results. It is thought that the results of this study and the suggestions made will help teachers and administrators plan and set up activities for in-service training.

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Research Article

Deficiencies and Needs for the Application of Inquiry-Based Learning in Physics Classes *

Fatma Nur BÜYÜKBAYRAKTAR [1]

Abstract

This study is a qualitative case study conducted to examine the deficiencies and needs for the implementation of the investigative inquiry program in physics classes. The study was carried out at Science High School (SHS), Anatolian High School (AHS), and Technical Vocational High School within the scope of purposeful sampling determined according to school type. In the study, observations were made in physics classes. Interviews were conducted with the teachers of the observed classes. The obtained data were subjected to descriptive analysis. Observation and interview data were interpreted together. It was observed that the teachers had classroom discussions over the daily life examples and models in the lesson. It can be said that teachers try to create an inquiry-based teaching environment in this way. It can be said that teachers are willing to teach based on inquiry, but they see some situations as obstacles in practice. Some suggestions are presented in the context of the research results. It is thought that the results of this study and the suggestions made will help teachers and administrators plan and set up activities for in-service training.

Keywords: Inquiry-based learning, physics classes, needs for application, deficiencies for application

1. INTRODUCTION

Inquiry in science education has been discussed for years. There are different opinions about the definition of questioning and how it looks like in the classroom (Anderson, 2002). Ernst, Hodge, and Yoshinobu (2017) "What is inquiry-based learning today?" they asked. Researchers have defined inquiry-based learning as a form of active learning in which students are given a carefully scaffolded sequence of tasks and are asked to solve and make sense of them, working individually or in groups. A new inquiry-based learning framework has come out of a study that looked at the most important parts of inquiry cycles in terms of how people learn. In this framework, five general inquiry phases are defined as: orientation, conceptualization, investigation, conclusion, and discussion (Pedaste et al., 2015).

Capps and Crawford (2013) stated factors related to the nature of a teacher's inquiry and science, on which the nature of actual classroom practice depends. These are factors: knowledge, views on the nature of scientific inquiry and science, pedagogical knowledge, and students' knowledge. Khalaf and Mohammed Zin (2018) conducted a systematic and critical analysis of two dominant learning models, traditional and inquiry-based learning. As a result of the study, they summarized the pedagogical criteria in the table "Pedagogical criteria of key learning models".

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Table 1. Pedagogical criteria of key learning models*

No	Description	Traditional Learning	Inquiry Learning
1	Theoretical Perspective	Cognitive behaviourism	Cognitive constructivism
2	Teacher Role	Dominant role	Guidance & facilitator
3	Knowledge	Level Limited knowledge	Developed knowledge
4	Skills	Limited skills	Develop skills
5	Confidence	Level Low confidence	High confidence
6	Motivation	High motivation	Low motivation
7	Performance	Low performance	High Performance
8	Learner's Outcomes	Low outcomes	Low outcomes

**Source: (Khalaf & Mohammed Zin, 2018)*

Looking at Table 1, pedagogical criteria are defined as the following: theoretical perspective, teacher role, knowledge, skills, confidence, motivation, performance, and learner outcomes. Literature reveals that an inquiry cycle is usually presented as an ordered sequence of stages. However, researchers stated that inquiry-based learning is not a uniformly linear process. Connections between stages can vary depending on the context (Pedaste et al., 2015). It can be said that the situation in terms of education is complex. Inquiry-based instruction forms the scaffold for the formative assessment of inquiry skills. It also provides the opportunity to assess students' skill development in real time (Chen, Pan, Hong, Weng, & Lin, 2020). It is possible to see evaluation as taking in three forms in the inquiry learning context: the evaluation of thought/conclusion on the basis of data; the evaluation of data validity and the degree of student understanding of the concepts and so on being learned and utilised in the conduct of the inquiry (Kidman & Casinader, 2017). Discussions in an inquiry-based learning setting provide the instructor with information about the student's level of comprehension and facilitate class consensus on issues. In such an environment, both the cognitive and social development of pupils are fostered. It is asserted that the culture of inquiry fostered by the study done in high school physics classes affords pupils the ability to both collaborate and engage in scientific research procedures (Kock, Taconis, Bolhuis, & Gravemeijer, 2015). Aybek, Yalçın, and Öztürk (2019) discovered a strong correlation between critical thinking attitudes and physics success scores. Another study on this topic demonstrates that scientific inquiry supports students' learning interests and engagement. It is stated that the majority of students participating in scientific inquiry activities experience interest and enjoyment (Chen et al., 2020). Meaning-making activities that entail knowledge generation in social interaction facilitate the conceptual development of the individual (Kock et al., 2015). In science education reforms, the framework of inquiry learning that supports the nature of science is a topic of interest. Organizations such as the European Commission (EC), the National Research Council (NRC), the National Science Foundation (NSF) carry out important studies to improve science education. The Organization for Economic Co-Operation Development (OECD) has conducted a large-scale assessment of science, reading, mathematics, financial literacy and collaborative problem solving. This assessment emphasized the importance of inquiry-based teaching and curriculum development (OECD, 2017). Many countries are reforming K–12 curricula to develop systems that support science instruction. The purpose of these reforms is to create an environment that will enable students to understand scientific concepts and procedures. For this, teachers are encouraged to use scientific research in their instruction environments (Minner, Levy & Century, 2010).

Türkiye is one of the nations that has revised its curriculum in order to create an inquiry-based learning environment that will facilitate scientific research. In 2013 and 2018, modifications were made to the physics curriculum in Turkish. According to an assessment of these programs' curricula, scientific process abilities are at the forefront of both (Bezen, Aykutlu, & Bayrak, 2020). Both programs aim to raise awareness of the nature of science and comprehension of the nature of scientific

inquiry. Inquiry is geared towards integrating the nature of the scientific enterprise, its practices, and the knowledge production in which science students take part. In this process, students take an active role in the knowledge production of scientific inquiry and logical discourse, similar to scientists in science studies (Aslan-Efe & Özmen, 2018; Dias, Eick, & Brantley-Dias, 2011; Kahyaoğlu & Saraçoğlu, 2018). In this context, it makes sense to include phrases like "producing scientific knowledge using scientific process skills", "solving problems", "justifying assertions with evidence and proof", "evaluating", "interpreting" and "sharing scientific knowledge" in these curricula. The Science Learning Committee's 2007 report laid out the framework for classroom practice and student outcomes on inquiry. In this context, science proficiency as defined, "knows, uses and interprets scientific explanations of the natural world", "generating and evaluating scientific evidence and explanations", "to understand the nature and development of scientific knowledge", "participate productively in scientific practice and discourse" (NRC, 2007). According to these definitions, it can be asserted that the 2013 and 2018 physics curriculum in Turkey were designed to provide students with scientific proficiency.

In an inquiry-based learning environment, however, it is not sufficient to build a curriculum that allows students to comprehend the nature of scientific knowledge. Curriculums that have been created must be implemented in schools. Inquiry practice arises from the interaction between the teacher's teaching experiences and their beliefs about inquiry and classroom practices. Inquiry-based personal practical knowledge developed by teachers affects their teaching skills (Dias et al., 2011). It has always been believed that it is crucial for teachers to present their pupils with engaging learning opportunities and positive motivation in physics class (Bayrak, Bezen, & Aykutlu, 2015). It is thought that teachers should engage students in the educational process by directing them toward investigation and inquiry (Ayvacı & Bebek, 2018). Unfortunately, inquiry-based instruction has not been widely implemented in science classrooms (Capps & Crawford, 2013). According to research in Türkiye, the majority of teachers do not go beyond teacher-centered methods in which the teacher teaches and the student listens (Bayrak et al., 2015; Ergin & Sarı, 2013). There is a requirement for professional development opportunities for teachers in inquiry-based teaching and complementary teaching materials in this field (Chen et al., 2020). There is a need for information about transferring inquiry-based learning to the classroom environment. It is necessary to support teachers in understanding and applying reform-based teaching approaches. It is important to consider what needs to be done in this regard.

Examining the literature, it is evident that there is few research on the difficulties encountered in teaching and learning physics, their causes, and proposed solutions (Ayvacı & Bebek, 2018). The relationship between the physics teachers' teaching philosophies and their teaching practices was investigated in a thesis study. Çardak (2019) concluded that some teachers had a teacher-centered framework and others had a student-centered one. Based on some studies, the problems encountered in the implementation of the program, according to physics teachers, are the weakness of the students' processing abilities, the lack of time to teach the subjects (Bayrak et al., 2015), the lack of classrooms suitable for contemporary teaching methods, and the students' lack of curiosity and unwillingness to learn (Ersoy, Karamustafaoğlu, & Özdoğan, 2018). İnaç and Tuksal (2019) incorporated students' perspectives on physics courses into their research. The findings of this study indicate that students view physics instruction with prejudice. According to the students, the physics course was tough to comprehend. In the study, it was stated that the students' interest in the lesson decreased due to the complexity of the subjects, the laboratories were not used enough and very few experiments were conducted. There are few studies in the academic literature that describe the classroom setting for the implementation of inquiry-based teaching in physics classes. In physics classes, it is essential to highlight the efforts of teachers to create an exploratory and inquiry-based learning environment. Nonetheless, it is vital to identify the circumstances that impede students' ability to comprehend and

challenge the nature of science. In this light, the study has addressed the issue "What are the deficiencies and requirements for the implementation of inquiry-based learning in physics classes?"

2. METHOD

2.1. Research Design

The aim of this study is to identify the deficiencies and needs for the application of inquiry-based learning in physics classes. A case study is a qualitative research approach in which the researcher inquiries about the situation through observations, interviews, audio-visuals, documents, and reports and allows the situation to be defined in an intense and holistic way (Creswell, 2007). In the study, observations were made in physics classes within the scope of the case study, and teachers' opinions were taken. In this way, results were obtained for the physics teachers to implement the inquiry-based curriculum in the most effective way.

2.2. Participants

Purposeful sampling enables in-depth research by choosing information-rich circumstances that are relevant to the study's goal. Maximum variation sampling is a kind of purposeful sampling that enables the investigation of research issues in a broader context under various circumstances (McMillan & Schumacher, 2006). According to Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, and Demirel (2012) this sampling technique may provide significant hints regarding the universe's values due to the presence of diverse circumstances in the research. In this study, the type of school chosen for purposeful sampling was used to conduct maximum variation sampling. Observations of physics lessons were conducted in three distinct school types: Science High School (SHS), Anatolian High School (AHS), Technical Vocational High School (TVHS). SHS, AHS, and TVHS are high schools affiliated with the Ministry of National Education in Türkiye.

In all schools, observations were conducted during the eleventh-grade lessons on momentum and the twelfth-grade lessons on wave mechanics. The observations focused on the fact that the three physics teachers chosen on a voluntary basis represented a range of circumstances in terms of gender, tenure, and the institution or program where they got their teacher education. Two of the teachers in the classes where the observations were taken are male, while one is female. Two of the teachers are education graduates. The other teacher is a graduate of the Faculty of Arts and Sciences who completed a certificate program in teacher education. Teachers are appointed for thirteen, sixteen, or twenty-two years. Teachers attend eleven, thirteen, and sixteen in-service training sessions. In the selection of the observation sample grade level, the lesson by these teachers were questioned. It was determined that all three teachers attended the classes in the 11^{th} and 12^{th} grades. The 11^{th} and 12^{th} grades was chosen for the physics lesson observation sample. After the observations, interviews were conducted with three teachers.

2.3. Data Collection and Analysis

The case study's data were gathered through interviews and observations. At SHS, AHS, and TVHS, observations of physics lessons were made. Observations were made by the researcher as a participant observer. The procedure of observation began with obtaining permissions from the Directorate of National Education. The principals and physics teachers at the schools were subsequently interviewed. Observations were conducted in the classrooms of three physics teachers who were chosen voluntarily to reflect a variety of scenarios, including gender, duration of service, and the institution or program where they acquired their teaching education. Observations were made in the physics lessons given by each teacher in the eleventh and twelfth grades. Twenty to twenty-five students are present in each classroom being observed. Together with the instructor of the observed class, the observer reviewed the notes taken during the observations. Regarding the observation notes, verification was received.

The course observations were conducted using the observation form created by the researchers during the research procedure. The form consists of eighteen elements that were developed in accordance with the physics curriculum goals and objectives. Eighteen items are based on fundamental situations, such as "attracting attention at the course's entry, informing students of the course's objectives and accomplishments, and teaching physics courses using the approaches-methods indicated in the program." The participant observer who made the observations jotted down specific details about these fundamental conditions. Specifically, the researcher took notes for each situation within the context of inquiry-based instruction. Following an assessment by two Professor Doctor lecturers who are physics education specialists, it was somewhat modified and given its final form.

Interviews were conducted with three physics teachers teaching in the classroom where the observations were made. The semi-structured interview form used in the interviews has seven open-ended questions that allow for in-depth examination of the teachers' responses. The interview form was reviewed and completed with the assistance of professional lecturers in the area of education.

Interviews were done voluntarily and with participant involvement. Teachers were briefed about the research prior to the interviews. The teachers were asked for permission to videotape the interview. However, many teachers expressed discomfort with this subject. Others said that "it would be better if you did not register." As a result, the researcher documented several interviews only in writing. Throughout the interview process, time was set out for written documentation. Wherever it was considered essential, the phrases were presented or repeated to the teacher, and the teacher's permission was sought. The interviews lasted between 20 and 30 minutes.

A description is used to describe a case's history or present status. The description provides the context for the analysis that leads to interpretation (McMillan & Schumacher, 2006). In this case, the data from classroom observations and the data from teacher interviews were combined and submitted to descriptive analysis. The results were defined and evaluated within the analytical framework.

3. FINDINGS

3.1. Data of Lesson Observations

The data from the lesson observations made in the eleventh and twelfth grades are presented in this section.

3.1.1. Data of eleventh grade lesson observations

Eleventh-grade observations were made in classrooms where momentum was taught. Lesson observations were made in the eleventh grade utilizing the observation form. Table 2 summarizes the data gathered during the observations.

Table 2. Observation data of eleventh grades

Behaviors	Schools*	O*	PO*	NO*
Attracting attention at the entrance to the lesson, motivating the students to the lesson	SHS	X		
	AHS		X	
	TVHS	X		
Making lesson plans, informing students about the aims and achievements of the lesson	SHS	X		
	AHS	X		
	TVHS	X		
Conducting the teaching of physics subjects with the approaches-methods specified in the program	SHS		X	
	AHS		X	
	TVHS		X	
	SHS		X	

Applying the teaching activities in current physics textbooks	AHS		X	
	TVHS		X	
Explaining abstract concepts using concrete materials	SHS	X		
	AHS		X	
	TVHS	X		
Utilizing instructional technology in topic presentation	SHS			X
	AHS	X		
	TVHS			X
Giving examples from daily life on the subject	SHS	X		
	AHS	X		
	TVHS	X		
Experimenting in the lab or conducting a demonstration experiment in the classroom	SHS			X
	AHS			X
	TVHS			X
Leveraging simulations, models and games	SHS	X		
	AHS		X	
	TVHS	X		
Organizing learning activities suitable for students' individual differences	SHS		X	
	AHS			X
	TVHS		X	
Organizing group learning activities	SHS			X
	AHS			X
	TVHS			X
Creating an environment in which students construct their own learning	SHS		X	
	AHS			X
	TVHS	X		
Creating an environment where students support each other's learning	SHS		X	
	AHS			X
	TVHS		X	
Guidance in using science process skills	SHS		X	
	AHS			X
	TVHS		X	
Enabling students to pose and solve problems using physics concepts	SHS		X	
	AHS		X	
	TVHS		X	
Carrying out activities to eliminate the misconceptions about the subject and prevent the occurrence of misconceptions.	SHS			X
	AHS			X
	TVHS			X
Organizing activities that relate to other subjects of the physics course and sub-disciplines	SHS	X		
	AHS		X	
	TVHS	X		
Measuring and evaluating in accordance with physics subjects and concepts	SHS		X	
	AHS	X		
	TVHS	X		

* SHS: Science High School; AHS: Anatolian High School; TVHS: Technical Vocational High School; O: observed; PO: Partially Observed; NO: Non-observed

The lecture approach, class discussion, case study methodology, and modeling were all utilized to teach momentum in the eleventh grade at SHS. Students are situated according to the traditional seating arrangement in the classroom. The classical seating arrangement is described as a row of parallel seats immediately across from the board. The classroom is equipped with a smart board. The majority of students who attended the session expressed an interest in the subject. It was noted that

many students were willing to engage in class discussions and provide observations on the topic. It was noticed that the majority of students worked diligently to solve the teacher's example issue.

In the eleventh grade at AHS, the direct expression technique and modeling were utilized to teach momentum. Students are situated according to the traditional seating arrangement in the classroom. The classroom is equipped with a smart board. It was noted that many of the students who attended the course shown an interest in the subject matter. Certain students have been seen scribbling on the papers in front of them or conversing among themselves while the lesson is being given. It was noticed that just a few students were willing to respond to the teacher's queries and engage in the class. Despite the teacher's cautions, it was noticed that the majority of students chose to talk with their friends rather than solve problems within the allowed time to complete the teacher's exam.

TVHS class discussion, case study method, and modeling were utilized to educate eleventh-grade students about momentum. Students are situated according to the traditional seating arrangement in the classroom. The classroom is equipped with a smart board. At the start of this session, it was noted that the majority of students were uninterested in the subject. It was noted that many students lacked a notepad and pen at their desks. The students' interest in the lecture progressively grew as the teacher inquired about the subject's illustration. Many students began to attend the class when the teacher requested students to provide examples regarding the topic. With the establishment of a chat atmosphere in the classroom, all students started to pay attention to their teacher and classmates. However, it is worth noting that the majority of students offered comments unrelated to the topic. While solving the problems, it was noticed that the students showed a lack of enthusiasm in participating in the class discussion. When the teacher requested them to answer subject-related instances, it was noted that relatively few students were eager to do so. However, relatively few students took notes throughout the course.

3.1.2. Data of twelfth grade lesson observations

The topic of the course, according on observations made in the twelfth grades, is wave mechanics. Since the twelfth grades are preparing for the Higher Education Institutions Exam (YKS), there was no instructional activity in the courses at AHS and SHS other than test solution. As a result, the observation form developed to identify teacher and student actions during instructional activities could not be utilized in the twelfth grades of AHS and SHS. The researcher collected notes while observing these courses.

According to an observation conducted in the twelfth grade of SHS, the teacher said that before entering the classroom, he distributed three wave mechanics exams to the students, which they would complete throughout the lecture. Students were given photocopied exam sheets. Each exam paper has fifteen questions. The teacher allotted students ten to fifteen minutes to complete each exam, as witnessed. Throughout this time period, the teacher went around the classroom, answering questions from students. The teacher resolved some of the questions, while others were resolved by a student selected from among the willing students. While students were completing the problems, the teacher highlighted key points and provided suggestions. All students passed the exams given throughout the session. Additionally, it was noticed that all students attentively followed the teacher's on-board answers to the problems.

At AHS, the teacher handed exam papers to all students that he had photocopied at the start of the session. The teacher allotted the students about fifteen minutes to complete the fifteen-question exam. When the time allotted for the test solution elapsed, the teacher began answering the questions on the board, beginning with the first. The teacher responded to each question and then inquired as to how many students properly answered the question. Then, on the board, she drew the answer to the issue. In several instances, the teacher addressed the question, "Does anybody wish to solve this?" to

the students. The teacher assisted students who approached the board in resolving the questions. During this session, it was noted that many students completed the exam. The teacher cautioned students who failed to complete the exam. Despite this, the students did not seem to pay any heed to the warning. However, it was found that students were reluctant to approach the chalkboard to answer problems.

A wave mechanics teaching activity was conducted in the twelfth grade of TVHS. The form was utilized in this class's observation. Table 2 summarizes the data gathered during the observation.

Table 3. Observation data of TVHS twelfth grade

Behaviors	Observed	Partially Observed	Non-observed
Attracting attention at the entrance to the lesson, motivating the students to the lesson	X		
Making lesson plans, informing students about the aims and achievements of the lesson		X	
Conducting the teaching of physics subjects with the approaches-methods specified in the program		X	
Applying the teaching activities in current physics textbooks		X	
Explaining abstract concepts using concrete materials		X	
Utilizing instructional technology in topic presentation			X
Giving examples from daily life on the subject	X		
Experimenting in the lab or conducting a demonstration experiment in the classroom			X
Leveraging simulations, models and games		X	
Organizing learning activities suitable for students' individual differences		X	
Organizing group learning activities			X
Creating an environment in which students construct their own learning		X	
Creating an environment where students support each other's learning		X	
Guidance in using science process skills		X	
Enabling students to pose and solve problems using physics concepts		X	
Carrying out activities to eliminate the misconceptions about the subject and prevent the occurrence of misconceptions.			X
Organizing activities that relate to other subjects of the physics course and sub-disciplines		X	
Measuring and evaluating in accordance with physics subjects and concepts		X	

Students are situated according to the traditional seating arrangement in the classroom. The classroom does not have a smart board. At the start of the class, the teacher sketched a wave model on the board. The teacher attempted to elicit a class debate on this paradigm by providing examples from everyday life. The teacher then defined the subject's concepts. The teacher questioned the students on these topics. The teacher seemed to be attempting to expose a difficulty scenario pertaining to the topic by the responses he got to these queries. The teacher called a student to the board and instructed the student on how to solve the issue. However, it was determined that the student was unable to provide the proper response. By posing certain questions to the whole class, the teacher attempted to offer students a chance to address the issue. It was noticed that students provided partly accurate responses to the teacher's queries. On the board, the teacher has solved the issue. The teacher then instructed the students to solve the issue by posing a question that was remarkably similar to the one he had solved. The teacher allowed students some time to work on the problem. At the conclusion of the period, the teacher called one of the students to the board and assisted him in resolving the problem.

It was noticed that the majority of students who attended the class in the start were very apathetic to it. The majority of students' desks lacked notebooks, papers, and pencils. It has been noticed that some students' interest in the class has risen as a consequence of the teacher using current events as examples and allowing students to talk throughout the session. However, several students remained apathetic to the lecture until the conclusion.

3.2. Data from Interviews with Teachers

After the lesson observations, the researcher interviewed the teachers. In these interviews, the opinions of the teachers regarding the deficiencies and needs for the implementation of the inquiry-based program in physics classes were taken.

Teachers in all three schools stated that students were less interested in physics lessons. SHS teacher PT1 stated that students are focused on the university exam. PT1 “As the university entrance exam questions were reduced, the interest in physics, chemistry, and biology courses decreased.” The TVHS teacher associated the PT3 students' disinterest in the lesson with their lack of goals and objectives.

The first question on the interview form is, “Do you see the necessity for in-service training in order to adapt to the advances in physics education (curriculum, techniques, etc.)?” Justify your position.” is included in the form. PT2 and PT3 teachers said, "There is a need," whereas PT1 responded, “There is no need.” Our teachers provided the following justifications for their responses:

PT1: *Not required. Only if new subjects are introduced, should they be seminar.*
PT2: *The approach includes targeted, purposeful actions, but how much will we give? It is beneficial to have constraints.*
PT3: *It would be good to be informed about what to tell and what not to tell. considered.*

The second section of the form asks, "Do you need in-service training in lesson preparation and delivery?" Kindly explain." is included in the form. PT3 said, “There is a need.” PT1 and PT2 teachers said, “There is no need.” Our teachers provided the following justifications for their responses:

PT3: *Everything would be OK but hard to use even the EBA (Educational Information Network). Because TVHS (students) are different from AHS and SHS students. I'm going to AHS for the course, the courses there are very different, I can go into more detail, but the subject here remains suspended.*

The third section of the interview form asks, "Do you need in-service training in teaching physics lesson topics and concepts?” Kindly explain.” is included in the form. PT3 said, “There is a need,” while PT1 and PT2 teachers responded, “There is no need.” Our teachers provided the following justifications for their responses:

PT3: *Maybe, at least it can provide a different perspective. Like atomic physics, that would be nice. Because there is different information in the lecture about quantum physics. It would be nice if they told us what they want us to tell.*
PT2: *I do not need. Our education is sufficient.*
Researcher: *What do you mean by the education we received? Undergraduate education?*
PT2: *Yes. In undergraduate, the education in the faculty of education is sufficient.*

The fourth option on the form is "Do you need in-service training on scientific knowledge pertaining to the physics curriculum's content?" Indicate which subjects are included in the form. PT1 responded, "There is a need," while PT2 and PT3 teachers said, "There is no need." Our teachers articulated their response and the topics for which they need in-service training sessions within the context of the physics curriculum as follows:

PT1: *This varies according on the topic's substance. There may be new physics courses introduced to the curriculum. As an example, consider particle physics. Dynamism is not comparable to electricity. In other words, contemporary topics such as lasers, advances in atomic physics, and astronomy.*

PT3: *I am not in need of it. However, we do have a physics group. There are 11-12. We have teachers who have never instructed students. This may work for them.*

The fifth question on the interview form is, "Do you need in-service training in innovative methods to learning and teaching (inquiry-based teaching, constructivist teaching, etc.)?". All teachers said, "There is a need," Our teachers shared the following perspectives on learning-teaching methods and instructional activities:

PT2: *I just attended a session on the approaches and strategies of teaching physics. It would be preferable if it were provided. Group work in particular proved beneficial. I attended a lecture on project-based educational approaches. It's very beneficial.*

Researcher: *How were the programs you participated in?*

PT2: *It was conducted in the manner of a seminar.*

Researcher: *Did you take part in any practices?*

PT2: *No, you have not completed the task.*

Researcher: *Have you had the chance to put the information and abilities you acquired throughout these trainings into practice in the classroom?*

PT2: *I am making an attempt to implement it, despite the fact that I am unable of doing it completely. Naturally, this is not always feasible, and some problems must be addressed. Applications are not accepted at this time.*

PT3: *Nothing to worry about. If there are other ways, it is preferable that I express it in this manner. That I am aware of. I got on-the-job training in innovative teaching approaches and strategies. In my classes, I attempted to incorporate many of the strategies we saw there. It had a significant impact. Students' interest in the class grew to the point that they really attended. I was taken aback as well. That is, it is possible.*

The sixth question on the form asks, "Do you need in-service training on teaching technologies, tools, and materials that may be utilized in physics instruction, as well as their use?". PT2 and PT3 teachers said "There is a need," while PT1 responded, "There is no need.". Our teachers shared the following perspectives on the use of instructional technology, tools, and resources in physics instruction:

PT1: *Students do not want to experiment. They see the experiment as a waste of time. Instead, they say they will solve so many questions. In fact, they are not so unfair; the conditions push the children to this.*

PT3: *This method is very effective. However, we must first get a substrate. Our school (TVHS) has many deficiencies in this area.*

Researcher: *Let's assume that equipment is provided.*

PT3: *It would be advantageous to have a guide in which I may do current tests.*

The form's seventh section asks, "Do you need in-service training on evaluating physics gains?". Our teachers offered the following sentiments on this subject:

PT2: *I attended a lecture on measuring and assessment. We included open-ended questions to the exams we created for students after this lecture. We included questions of the true-false, fill-in-the-blank, and branching tree kind. Returning to the standard questions.*

Researcher: *Do you evaluate your students?*

PT2: *Process assessment adds to the teacher's workload.*

Researcher: *If the required documentation for process assessment was provided in advance..*

PT2: *Because we do not know the student's level, this does not accurately represent the student's condition.*

PT3: *Perhaps, but not in high school initially. Children must use their creativity and self-expression. Our youngsters (TVHS students) are not used to comprehending texts.*

4. DISCUSSION and CONCLUSION

In the observations of AHS, SHS, and TVHS the data were interpreted together with the interview data. It has been observed that teachers in all classes have the following behaviors;

- Attracting attention at the entrance to the lesson, motivating the students to the lesson,
- Making a lesson plan, informing the students about the aims and achievements of the lesson,
- Explaining abstract concepts using concrete materials,
- Giving examples from daily life on the subject; using models,
- Organizing activities that relate to other subjects of the physics course and sub-disciplines,
- To make measurements and evaluations in accordance with the subjects and concepts of physics,

Since these points have been observed, it can be said that all teachers have mastered the lesson from the beginning to the end of the lesson. It can be said that teachers try to create an inquiry-based teaching environment by having classroom discussions. It is understood that classroom discussions are generally conducted over daily life examples and models.

All the teachers stated that the students were less interested in the physics lesson. The SHS teacher attributes this situation to the fact that students are focused on the university exam. It is understood from the SHS 11th grade observation data that the students are willing to participate in the lesson. It is thought that this situation is due to the fact that the subject of the course is related to the university exam. On the other hand, the TVHS teacher stated that her students did not even have the goal of entering university. It is understood from the observation data that TVHS students are reluctant to attend the lesson. The teacher attributed the TVSH students' indifference to the lesson to their lack of goals. The teacher associated the students' reluctance to participate in the lesson with this situation. Inquiry-based learning emphasizes active participation and responsibility for discovering knowledge that is new to the learner (De Jong & Van Joolingen, 1998).

Research indicates that teachers have difficulty motivating their students' learning interests (Chen et al., 2020). It was stated that demonstrations and hands-on activities could be used to increase students' situational interest (Lin, Hong, & Chen, 2013). It is emphasized that situational interest-inducing techniques such as demonstrations, models, analogies, discussion, and science games also cause a positive increase in students' individual interest in science (Palmer, Dixon & Archer, 2017). However, research indicates that teachers favor traditional techniques such as narrative and question-and-answer to create classroom settings (Ersoy & Dilber, 2015; Karal Eyüboğlu, 2011; Oğuz, 2005). It has been observed that teachers in all classes partially engage in the following behaviors;

- Conducting the teaching of physics subjects with the approaches-methods specified in the program,
- Implementing the teaching activities in current physics textbooks,
- Enabling students to pose and solve problems using physics concepts.

Capps and Crawford (2013) say that a teacher should have beliefs that are in line with reform-based ways of teaching and learning that go beyond their knowledge. All of the teachers said that they need new ways to learn and teach, like inquiry-based teaching and constructivist teaching. In light of the findings of the interviews with teachers, it can be concluded that teachers are willing to adhere to the aforementioned principles, but they only do so partly because of concern of spending too much time.

Technology can be useful in supporting inquiry-based learning, transforming classroom practices (Rubin, 1996), and solving real-world problems (Friesen & Scott, 2013). The use of instructional technology in topic presentation has been observed in the AHS classroom but not in the SHS or TVHS classes. However, an inspection conducted in a classroom at an AHS revealed that the smart board was being utilized only to show subject-related definitions and formulae. It can be

concluded that the AHS teacher may improve the effectiveness of his presentations by using various apps to leverage instructional technology. It is assumed that teachers lack resources that include a variety of instructional technology tools.

Considering students' individual differences is vital to a good science education (Schlatter, Molenaar & Lazonder, 2020). SHS and TVHS teachers exhibited some of the behaviors associated with organizing learning activities that accommodated students' individual differences, fostering an environment in which students support one another's learning, and engaging in scientific process skills, but not AHS teachers. TVHS teacher demonstrated the conduct of establishing an atmosphere in which students organized their own learning, the SHS teacher demonstrated this behavior partly, and the AHS teacher demonstrated this behavior entirely. When we examine our teachers' involvement in in-service training, we find that AHS teachers participate at the greatest rate. In this context, it is thought that the AHS teacher's in-service trainings didn't help him enough.

It has been observed that teachers in all classes do not exhibit the following behaviors;

- Experimenting in the laboratory or conducting a demonstration experiment in the classroom,
- Organizing group learning activities,
- Carrying out activities to eliminate the misconceptions about the subject and prevent the occurrence of misconceptions.

Based on the teachers of the teacher interviews, it can be inferred that teachers at AHS and TVHS were unable to perform experiments due to a lack of supplies in the school's physics labs. In SHS, it may be inferred that students were unable to do experiments because they wanted to solve the exam rather than conduct the experiment and the teacher was unable to find time for laboratory preparation. This finding is consistent with the findings of Ersoy et al. (2018) study of eighteen physics teachers' interviews.

One of our teachers, who stated that she took an assessment-evaluation seminar in the interviews, stated that she applied what she learned in this seminar in her lessons. Observations in the twelfth grades of AHS and SHS revealed that teachings were transmitted via the creation of exam answers. On the other hand, inspections at TVHS' twelfth grade revealed that classes were conducted identically to those in the eleventh. When this scenario is assessed via interviews with teachers, it is believed that the student profile in schools and the students' future aspirations have a significant role in the development of the situation.

4.1. Suggestions

The learning process through scientific inquiry that actively engages students is more effective in increasing conceptual understanding than passive techniques used in standardized assessment (Minner et al., 2010). The assessment can vary, depending on the style of inquiry. One study says that science teachers should know what will happen if they choose more traditional ways of doing scientific research. It is stated that science educators should focus on making teaching environments relevant to the world their students live in (Kidman & Casinader, 2017). It is understood that the reasons behind pupils' lack of interest in physics lessons vary by school type. Based on these factors, it was established that vocational high school pupils do not have a university aspiration. It may be advantageous for these students to connect the concepts covered in physics classes to contemporary examples from the field of vocational education. In this setting, inquiry-based learning environments that cater to the interests of vocational high school, science high school, and Anatolian high school students can be created. In inquiry-based settings, it is felt that it would be good for high school science students to have content linked with college entrance exams.

It is believed that it will be beneficial to incorporate what needs to be done into the content of in-service training in order to avoid wasting time on using the approach-methods specified in the curriculum, implementing the teaching activities in physics textbooks, and enabling students to pose and solve problems.

It was noteworthy that the teachers gave almost the same examples on the subject and drew similar models. At this point, it can be said that teachers benefit from similar sources. It is thought that directing teachers in in-service training on how to use instructional technology tools would be helpful. It is believed that including experiments conducted using readily accessible materials into the curriculum of in-service training would be helpful. Preparing in-service training material for arranging group learning activities is considered to be helpful in this situation.

The findings of this research and the recommendations made will assist educators and administrators in planning and organizing in-service training activities, and it is hoped that they will shed light on the studies they will conduct in the context of eliminating deficiencies and improving in-service training activities for academicians working in the field of education.

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Abstract

The aim of the study was to test the effect of using the flipped learning model in social studies course on students' academic achievement and higher-order thinking skills, and to determine student views on this model. Explanatory sequential design, one of the mixed research methods, was used in the research. The study group of the research consisted of 30 students studying at the 7th grade in two secondary schools affiliated to the Ministry of National Education in the Bor District of Niğde Province in Turkey. As a result of the research, it was concluded that the academic achievement and higher-order thinking skill total scores of the students in the experimental group, in which the social studies course was conducted with the flipped learning model, were statistically significant and at a higher level compared to the students in the control group. The analysis of the data obtained from the semi-structured interviews also revealed the students learned the subjects better with this model and had positive thoughts about the model in the social studies course conducted with the flipped learning model.

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Research Article

The Effect of the Use of the Flipped Learning Model in the Social Studies Course on the Students' Academic Success and Higher-Order Thinking Skills *

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Abstract

The aim of the study was to test the effect of using the flipped learning model in social studies course on students' academic achievement and higher-order thinking skills, and to determine student views on this model. Explanatory sequential design, one of the mixed research methods, was used in the research. The study group of the research consisted of 30 students studying at the 7th grade in two secondary schools affiliated to the Ministry of National Education in the Bor District of Niğde Province in Turkey. As a result of the research, it was concluded that the academic achievement and higher-order thinking skill total scores of the students in the experimental group, in which the social studies course was conducted with the flipped learning model, were statistically significant and at a higher level compared to the students in the control group. The analysis of the data obtained from the semi-structured interviews also revealed the students learned the subjects better with this model and had positive thoughts about the model in the social studies course conducted with the flipped learning model.

Keywords: Social studies, flipped learning, academic achievement, higher-order thinking, skill

1. INTRODUCTION

Today, digital technologies have become an indispensable part of teaching-learning processes and are considered to be a necessity rather than a matter choice. They are used both to prepare learners for the information society and to provide learning environments suitable for today's conditions of the generation whose learning preferences have changed. The point that draws attention at this point is that student-centered learning approaches based on digital technologies are becoming more and more usable in the education process day by day. Especially in recent years, the state of technology has been effective in the emergence of new teaching approaches and models such as "Flipped Learning" (Geçer, 2013; Gençer, 2015; Umar & Ko, 2022). As for what Flipped Learning literally means, the words "Flip" and "Learning" refer to 'Inverted' and 'learning' respectively (Cambridge Dictionary, 2021). Flipped learning is expressed as a teaching model in which direct instruction takes place outside the classroom mostly through videos, and then, discussion activities based on peer teaching and collaboration are carried out under the in-class guidance of the teacher (Francl, 2014). The main purpose of this learning model is to realize meaningful learning. Because the environments where in-class and out-of-class activities are conducted are swapped in the flipped learning model; the course content is given prior to the course while homework and other activities are carried out in the classroom (Arslanhan, Bakırcı & Altunova, 2022).

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In the related literature, flipped learning is claimed to have many advantages. It is stated that this learning model will contribute to students' repeating the lessons they missed by individualizing their learning outside the classroom, learning at their own pace, conducting their own learning processes, improving their attitudes towards the lesson in a positive way (Iyitoğlu, 2018) and increasing their academic success (Bergmann & Sams, 2012). In addition, with the educational videos watched in the home environment and the collaborative practices made in the classroom about these videos, this teaching model provides the opportunity for students to communicate with both their teachers and their peers (Baytiyeh & Naja, 2017). One of the biggest advantages of flipped learning is that it contributes to the development of various skills, including higher-order thinking skills, by enabling students to reinforce their learning (Chen, Hwang, & Chang, 2019; Lo, Cheung, Chan & Chau, 2021; Yiğitoğlu & Erişen, 2020). Another remarkable point in the flipped learning model is that students are active in the learning-teaching process. Because the problem-solving activities that the students have done enable them to take an active role in the classroom. This role that students take in the process will help them come to the classroom ready, understand how to access and share information, and include their higher-order thinking skills into the learning process (Bergmann & Sams, 2012).

The rapidly developing science and technology has also been influential in the emergence of educational approaches that focus on higher-order thinking skills and include mental skills in the field of education. Because modern education approaches put the student at the center of all educational activities and aim to develop their language and mental skills at a high level (Güneş, 2012). For this reason, practices for the development of thinking skills in schools also gain importance (Kurnaz-Adıbatmaz & Kutlu, 2020). Great importance should be given to higher-order thinking and deep learning skills while designing education systems so that individuals who can meet the needs of the modern age can be raised (Kutlu, Doğan & Karakaya, 2010; Senemoğlu, 2011). In fact, developing students' higher-order thinking skills, including problem solving and critical thinking, has been recognized as a very important educational goal in the 21st century (Lin, Hwang, Chang & Hsu, 2021).

One of the courses that aim to provide students with higher-order thinking skills in the education process is “Social Studies”. Social Studies Course has a separate and important role in the process of making students gain higher-order thinking skills in the education-teaching process. Because it tries to structure the students in harmony with the various life skills and citizenship competencies that the individuals will need in order to adapt to the society, they live in. In this sense, students' use of higher-order mental skills such as research, reflective thinking, problem solving, critical thinking and decision-making in the learning process plays an important role in reaching the determined goals of Social Studies Course.

1.1. Literature Review

1.1.1. Flipped Learning Model

The flipped learning model, which is a sub-branch of blended learning in which technological tools are used, is regarded as one of the new generation teaching models (Toytok & Ramazanoğlu, 2021). This learning model emerged in the United States when chemistry teachers named Jonathan Bergmann and Aoran Sams noticed that students from rural areas were behind in the subjects as they could not come to the classes due to various reasons. Flipped learning is a learning model in which students listen to the lesson at home through videos and do activities related to the subject at school. This model, which includes the use of all kinds of internet technology so that the teacher can spend more time interacting and communicating with the students instead of teaching the subject in the classroom, is generally based on the principle of watching the videos created by the

teacher outside of class hours. In the simplest terms, classroom work is done at home through the videos created by the teacher while homework is done in the classroom (Ahmed, 2016).

The flipped learning model provides students with multimedia-supported materials online outside of school and enables students' cognitive skills to develop through problem-solving activities in the classroom. The model aims that students come to the lesson ready and spend more time for active learning activities in the classroom. Stating that a flipped classroom is active and student-centered and includes the course content, Herreid and Schiller (2013) claim that this type of education enables students to learn by associating the course content with the real world. Flipped learning, which has emerged as an innovation in the education process in recent years, is used both to increase the motivation of students and to help them gain technological skills (Jamaludin & Osman, 2014). In the flipped learning model, the videos prepared by the teacher beforehand can be watched, rewinded or forwarded and repeated by the students whenever they want. Social interaction environment can be created by doing cooperative learning activities in the classroom. Teamwork among students can make it easier for them to help each other and acquire different skills (O'Flaherty & Phillips, 2015). One-on-one, small group or large group activities conducted through this model enable learners to better understand the subject (Eryilmaz & Çiğdemoğlu; 2018; Gülbahar, Kalelioğlu & Afacan-Adanır, 2020: 64) and help students' motivation, creativity and course success increase (Al-Zahrani, 2015). This model increases the interaction between students and teachers, allows students to prepare as much as necessary at the appropriate place and time, supports collaborative work, and enables students to move from passive listening to active learning by ensuring their participation in the lesson.

1.1.2. High Level Thinking Skill

Thinking is one of the important skills that provides the linguistic, mental and social development of individuals and directs their learning and future. It can also be defined as the process of collecting data about a subject or event, evaluating the data obtained, and making a judgment as a result (Perkins & Ritchhart, 2004: 352). The difference of this definition from other definitions is that it expresses not ordinary thinking but higher-order thinking. Because higher-order thinking includes different processes from the processes in low-level thinking. The main difference between high-order thinking and lower-order thinking skills is that high-order thinking is the use of knowledge, skills and experiences from past experiences through deduction, induction and analogy in the case of insufficient information when solving a problem or reasoning. For example, problem-solving by a student through memorizing any question formula shows low-level thinking while making relationships and predictions using the information given can be expressed as higher-order thinking (Kurnaz-Adıbatmaz & Kutlu, 2020).

Bloom's taxonomy, which is widely known by educators and researchers, is used to measure higher-order thinking skills. Generally, the last three levels of Bloom's taxonomy (analysis, synthesis, and evaluation) are accepted as higher-order thinking skills (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths & Wittrock, 2001). It is necessary to understand Bloom's reconstructed taxonomy of cognitive domains to better understand higher-order thinking skills. Bloom's updated taxonomy is a special classification approach in which categories are ordered in one dimension. The updated taxonomy consists of six steps: remembering, understanding, applying, analyzing, evaluating and creating (Kurnaz-Adıbatmaz & Kutlu, 2020). Accordingly, application, analysis and evaluation are accepted as higher-order thinking skills while remembering information is an example of low-level cognitive pattern or thinking skills. As a matter of fact, application, analysis, and evaluation-oriented learning experiences all develop problem-solving, inferencing, estimation, generalization and creative thinking skills, which are considered higher-order thinking skills (Wilks, 1995). In Bloom's taxonomy, critical thinking success in the learning process occurs when students can perform at the levels of analysis, synthesis and evaluation (Munawaroh, Sudiyanto & Riyadi,

2018). Especially in the face of changes and advances in the digital age, individuals need to be successful in choosing the appropriate information, analyzing, synthesizing and transferring it to new experiences by catching the latest developments (Akpur, 2020).

1.1.3. Flipped Learning Model and Higher-Order Thinking Skills

It is becoming more and more important to use teaching approaches and models that can be useful in developing students' higher-order thinking skills in the education process. Flipped learning, which is regarded as one of such teaching models, creates a cooperative learning, peer teaching and project-based learning environment in order to develop higher-order cognitive skills for the relevant learning area. While applying the flipped learning model in order to develop higher level thinking, teachers should observe students, give feedback on their work, and be in constant interaction with them to avoid confusion in classroom discussion activities (Hamdan, McKnight, McKnight & Arfstrom, 2013). In the flipped learning model, students' activeness in the learning-teaching process ensures that they are also active in the problem-solving activities carried out in the classroom. In addition, it is thought that the learning process that students perform both in and out of the classroom, coming to the classroom ready, asking questions about the subject, actively participating in learning activities, taking responsibility for their own learning, and knowing how to access and share information will contribute to the development of higher-order skills of students (Bergmann & Sams, 2012). For this reason, it is necessary to develop high-level thinking in educational institutions, especially in the rich technology classroom environment, and to ensure that educators adopt appropriate approaches to facilitate students' thinking development (Sun, Xie & Lavonen, 2022). It is considered important for the effectiveness of the process that teachers, who are the guides of this process, use methods and techniques that will contribute to the development of students' higher-order thinking skills.

Flipped learning is believed to provide students with higher-order thinking skills at all educational levels, grades and school subjects (Chen et al., 2019). Flipped learning model aims to realize all cognitive steps in Bloom's teaching objectives classification taxonomy and to offer a learning-teaching environment suitable for this. It is stated that lecturing takes too much of teachers' time (Bond, 2020) and students do not need help in the understanding and remembering steps of Bloom's taxonomy which was rearranged by Anderson at al. (2001) in a classroom where traditional learning is applied. The upper steps, where students need the help of their teachers more, are tried to be gained through homework outside of the classroom (Hayırsever & Orhan, 2018). However, in the flipped learning model, which is the opposite of the traditional classroom, while the goals at the remembering and understanding level as the first steps of the taxonomy are tried to be gained through online applications outside the classroom, higher-order cognitive goals of the taxonomy such as application, analysis, evaluation and creation are achieved in the classroom (Yiğitoğlu & Erişen, 2008).

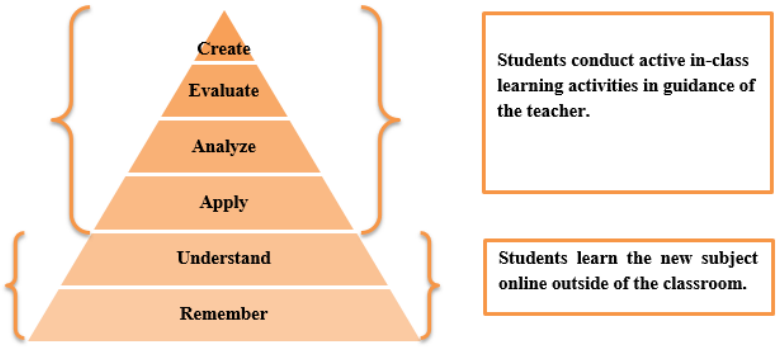

Figure 1. Revised Bloom's taxonomy pyramid (Yiğitoğlu & Erişen, 2020)

Reversing the teaching focus helps students develop lower-level thinking skills (i.e., remembering and understanding) outside of the classroom but higher-order thinking skills (i.e., analysing, evaluating and creating) in the classroom (Bergmann & Sams, 2012; Hayırsever & Orhan, 2018).

1.1.4. Higher-Level Thinking Skills in Social Studies Teaching

Higher-order thinking skills such as critical thinking, problem solving, creative thinking, reflective thinking, analytical thinking and scientific thinking have been included in instructional programs due to the greater emphasis put on higher-order thinking skills in the education and training process in the 21st century and they have improved accordingly (Shukla & Dungsungnoen, 2016). It also enabled the development of thinking skills (Yılmaz, Aşkar, Yıldız & Sönmez, 2021). Over time, higher-order thinking skills have become one of the essential subjects of the education process and developing these skills has become one of the main objectives of various teaching programs. One of the courses that aims to enable students to gain higher-order thinking skills in the education-teaching process is "Social Studies", which is created in the context of human life and its relationship with the environment. Especially the students who have not acquired higher-order thinking skills have a deficiency in verifying knowledge and making contextual analyzes of the subjects learned in the classroom in this course (Purnomo & Mulianingsih, 2021). It is essential to make students achieve higher-order thinking skills such as questioning, problem solving, and hypothesis development in social studies courses in accordance with the objectives of the curriculum and under the guidance of teachers so that this deficiency can be filled (Yusmanto, Soetjipto, & Djatmika, 2017). Because this course aims not only to transfer knowledge to the students, but also to make them achieve knowledge and scientific and systematic thinking skills while educating active citizens (Gelen, 2002). Considering that there is thinking in every step of education, it is thought that students may need higher-order thinking skills that they can acquire in social studies course throughout their lives. In addition to asking appropriate and effective questions, being active citizens who can make decisions is also directly related to their higher-order thinking skills. It can be suggested that the social studies curriculum prepared in this context aims to raise students as creative individuals who can think and ask questions freely in the education-teaching process, and who can question by thinking critically.

The purpose of this study is to examine whether the use of flipped learning model in social studies course has an effect on students' academic achievement and higher-order thinking skills. While it is stated that the flipped learning model is effective in developing students' higher-order thinking skills, no study that measures higher-order thinking skills based on questions based on Bloom's taxonomy has been found in the related literature. It is believed that this study will contribute to testing whether the use of flipped learning model in social studies course develops students' higher-order thinking skills. In this sense, answers were sought to the questions of whether the flipped learning

model in the 7th grade social studies course has an effect on the academic success of the students or on their higher-order thinking skills together with students' opinions.

2. METHOD

2.1. Research Design

This research, which examines the effects of the use of the flipped learning model in the social studies course on students' academic achievement, high-level thinking skills, and their views on the flipped learning model, was conducted with the mixed research method. Mixed research method is expressed as a research design in which data collection and data analysis are done by using the question types of both quantitative and qualitative approaches (Tashakkori & Teddie, 2003). In other words, it is defined as collecting and analyzing data using both qualitative and quantitative approaches in a single study and making inferences by integrating the findings (Tashakkori & Creswell, 2007). Creswell (2021) expressed the mixed research design as a research approach in which qualitative and quantitative data are collected, the two data sets are integrated, and then conclusions are drawn using the advantages of that integration to understand research problems. In this study, explanatory sequential design, one of the mixed research methods, was used. The explanatory sequential design is a research design that starts with the quantitative phase and uses the qualitative phase to explain the results of the quantitative phase (Creswell, 2021). In the explanatory sequential design, qualitative research is used to provide a deeper explanation of quantitative research results (Creswell & Plano Clark, 2020).

2.2. Participants

Simple random sampling was used in the quantitative part of the study. In this context, computer-assisted random selection technique, one of the simple random sampling methods, was used in the selection of the experimental and control groups. In this context, the study group of the research consisted of 30 students in total who study in the 7th grade in two separate state secondary schools affiliated to the Ministry of National Education in the Bor district of Niğde province in Turkey, and the group was divided into two groups as the experimental and control group both of which were comprised of 15 students. Criterion sampling, one of the purposive sampling methods, was used in the qualitative part of the research. Criterion sampling is defined as the preferred sampling in accordance with the criteria determined by the researcher (Yıldırım & Şimşek, 2021). As studying in the classroom in which the flipped learning model was applied was determined as the basic criterion in this research, 15 students who made up the experimental group formed the study group of the research in the qualitative part.

2.3. Instruments

Data collection tools used in this research are an academic achievement test prepared by the researcher for the "People, Places and Environments" learning field in the 7th grade social studies course, open-ended questions, a rubric for the evaluation of these questions and semi-structured interviews.

2.3.1. Academic Achievement Test

In line with the principles expressed in this research, an academic achievement test consisting of 50 multiple-choice questions about the "People, Places and Environments" learning field in the 7th grade social studies course was prepared and presented to expert opinion. Content validity was calculated using the Lawshe technique, in which CVR, NN and N refer to content validity rate,

number of experts who state that the item is necessary or the item measures the structure and the number of experts who gathered information about the substance respectively.

$$CVR = \frac{N_N}{\frac{N}{2}} - 1$$

According to this formula, the minimum value to be reached when the opinions of 20 experts are taken is calculated as 0.42 (Lawshe, 1975). The items below the calculated minimum value were removed from the data collection tool and a temporary form was created for the pilot study. In line with expert opinions, a multiple-choice test consisting of 40 items was applied to 160 students at the 8th for testing the validity and reliability of the academic achievement test to be used in the pilot study. The data collected through the pilot study were analyzed with TAP (Test Analysis Program), which also provides individual reports on total scores and item responses for test takers (Brooks & Johanson, 2003). The reliability, item difficulty and item discrimination levels of the data collection tools were examined using TAP. The reliability level of the tests was calculated with the KR21 value. It is considered appropriate to base the KR21 value for multiple-choice tests applied in the classroom environment and a coefficient value of over 0.70 obtained from KR21 is accepted as good in terms of reliability (Terzi, 2019). The item discrimination coefficient can vary between -1.00 and +1.00 (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel, 2019). As a result of the statistical analysis in the study, it was determined that no item that was negative and under 0.20 in terms of item discrimination existed in the achievement test.

15 items were excluded so that the scale could be evaluated out of 100, a balanced distribution of the number of questions for each achievement could be ensured and participants at the 7th grade could answer the questions within one lesson period. After deleting the 15 items in the achievement test, the remaining items were analyzed again. The item discrimination value was calculated according to the item analysis based on the difference between the lower and upper 27% group averages (Büyüköztürk et al., 2019). It was seen that the academic achievement test is highly reliable with an average KR21 reliability value of 0.876. A coefficient value of over 0.70 obtained from KR21 is accepted as good in terms of reliability (Terzi, 2019). As the academic achievement test had an easy level of difficulty (0.60 - 0.79) with a difficulty index of 0.60, it was determined that the average discrimination index of the test was at a very good level (≥.40 very good) with a value of 0.61. The fact that the discriminative power of the test is very good can be interpreted as that it is successful in distinguishing between students who know and those who do not.

2.3.2. Open-Ended Questions and Rubrics Designed to Measure Higher Thinking Skills

Measuring and evaluating higher-order mental skills requires the use of certain measurement tools because classical measurement methods such as multiple choice, true false, matching, completion, short answer, etc. are insufficient to measure the high-level mental skills that are desired to be observed in students, which necessitates the use of open-ended items (Aslanoğlu, 2022). In this study, 15 open-ended questions prepared in accordance with the last three steps of the revised Bloom taxonomy (analysis, evaluation, creation) and a rubric to evaluate these questions were developed in order to measure the effect of the flipped learning model on students' higher-order thinking skills.

Open-ended questions were analyzed using the SPSS 21 package program. In this study, item discrimination and item difficulty indexes were examined to prove the reliability of the measurement tool. Item discrimination and item difficulty indexes are given in Table 1.

Table 1. Item discrimination index and item difficulty index of the open-ended questions

Question	n	Discrimination Index (dj)	Difficulty Index (pj)
Question 1	30	0.45	0.51
Question 2	30	0.74	0.48
Question 3	30	0.59	0.44
Question 4	30	0.69	0.34
Question 5	30	0.52	0.45
Question 6	30	0.39	0.38
Question 7	30	0.56	0.46
Question 8	30	0.77	0.5
Question 9	30	0.77	0.5
Question 10	30	0.85	0.42

As a result of the statistical analysis, it was revealed that the item discrimination value of each question was over 40 at "very good" level and item difficulty values of all the questions ranged between 0.40 - 0.59 at "moderate" difficulty level. The measurement tool consisting of open-ended questions was coded and each participant was given a different number. The raters scored the rubrics without knowing whether the student was in the experimental or the control group. It is known that scoring reliability is excellent if the scores do not change from one scoring to another or from one rater to another (Turgut, 1977).

2.3.3. Semi-Structured Interview

For the qualitative part of the research, semi-structured interviews were conducted with the students after the application. Semi-structured interview is described as an effective technique that includes open-ended questions and provides qualitative data. The purpose of semi-structured interview is to examine the thoughts, feelings, knowledge and logic of the participants about a topic in depth (Johnson & Christensen, 2014). Draft interview questions were prepared by the researcher in order to determine the views of the students about the social studies course conducted with the flipped learning model. The draft questions were presented to 2 faculty members working in the field of assessment and evaluation, 2 faculty members working in the field of social studies education, and 1 faculty member working in the field of Turkish education for language compatibility to get expert opinion. The interview form was rearranged according to the feedback from the experts. A pilot application was made with 2 secondary school students in order to determine whether the interview form was suitable for the purpose of the research and then the interview form was given its final form.

2.4. Implementation Process

In order to minimize the influence of the researcher as an external factor in the implementation process, the application of data collection tools and the teaching of the lessons were carried out by the course teachers in both the experimental and the control group. Before the implementation process, the teachers of the classes in the experimental and control groups were informed about what to do during the implementation process through interviews. First, an academic achievement test was given to the experimental and control group teachers by informing them that the pre-test would be carried out before moving on to the topics in the 7th grade “People, Places and Environments” in the social studies course. The experimental group teachers were informed that videos would be sent according to the achievements in line with the annual plan and the students should watch the videos at home. It was also told that there should be no lectures before and after the relevant achievement in the lessons, and that the activities prepared by the researcher or the course teacher should be used through the methods and techniques determined by the researcher during the lesson.

During the implementation period, the course videos on EBA TV in accordance with the achievements were shared with the students by the teacher through EBA and digital communication tool. The teacher followed up on which students watched the videos via EBA. On the other hand, the control group teachers were informed that they should teach the lesson with their own methods. Annual plans were obtained from the teachers of the experimental and control groups in order for the subjects to progress simultaneously, and the implementation process was carried out according to the annual plan. After the achievements were completed in line with the annual plan, a measurement tool consisting of post-test and open-ended questions was applied to both groups.

Semi-structured interviews were conducted with each student separately in January 2022 in a quiet classroom environment so that the research process would not be affected. Depending on the structure of the semi-structured interview, the research was tried to be deepened through additional questions asked to the participants according to their answers. The participants were informed about the purpose of the research and that their personal information would be kept confidential. All of the semi-structured interviews conducted within the scope of the research lasted approximately 250 minutes. The interviews were recorded with a voice recorder with the permission of the participants and then they were transcribed in the computer environment.

2.5. Data Analysis

2.5.1. Analysis of the Data Collected through the Academic Achievement Test

Shapiro-Wilk, Skewness and Kurtosis tests were performed for the normality analyzes obtained from the study groups during the application process. Since both the experimental and the control group consisted of equal numbers of participants, Shapiro-Wilk was conducted as the normality test. The analyzes of the academic achievement pre-test and post-tests applied to the experimental and control groups were carried out with the JAMOVI statistical program.

Table 2. Normality distribution for the experimental and control groups

Groups	Data Collection Tools			
Experimental	Academic Achievement Pre-test	**Skewness**	.986	.580
		Kurtosis	.500	1.121
			Shapiro-Wilk	
		s	**Sd**	**p**
		.901	15	.098*
	Academic Achievement Post-test	**Skewness**	-.251	.580
		Kurtosis	.065	1.121
			Shapiro-Wilk	
		s	**Sd**	**p**
		.950	15	.519*
Control	Academic Achievement Pre-test	**Skewness**	.235	.580
		Kurtosis	-1.680	1.121
			Shapiro-Wilk	
		s	**Sd**	**p**
		.888	15	.062*
	Academic Achievement Post-test	**Skewness**	-1.066	.580
		Kurtosis	.634	1.121
			Shapiro-Wilk	
		s	**Sd**	**p**
		.896	15	.082*

**p>.05*

When Table 2 is examined, it is seen that the data show a normal distribution (George & Mallery, 2010). t-test for independent samples was used to compare the academic achievement test scores due to the normal distribution of the experimental and control groups.

2.5.2. Analysis of the Data Collected through Open-Ended Questions

After ensuring rater reliability, item discrimination and item difficulty, the scores obtained by the experimental and control groups from the open-ended questions were transferred to the SPSS statistical program. Shapiro-Wilk, Skewness and Kurtosis tests were applied for the normality analyzes obtained from the study groups during the experimental processes. Since the experimental group and the control group consisted of the same numbers of participants, Shapiro-Wilk was used as the normality test. In the study, t-Test for independent samples was conducted to determine whether the mean scores differed significantly from each other.

2.5.3. Analysis of Semi-Structured Interviews

Content analysis was used in the analysis of the data obtained through the semi-structured interview. Content analysis forms the basis of the process of conceptualizing the data and explaining patterns between concepts through themes (Yıldırım & Şimşek, 2021). In other words, content analysis is based on a detailed examination of the data collected during the research process and shows an inductive approach. In this context, concepts, codes, categories and themes are required to explain the data. Among the collected data, codes are extracted from the events or facts that are frequently repeated and emphasized by the participants. Categories are created from the codes and themes from the categories (Baltacı, 2019). In the content analysis, the data obtained through interviews in the study were analyzed in four stages:

- Coding of data,
- Finding codes, categories and themes,
- Editing codes, categories and themes,
- Identification and interpretation of findings (Yıldırım & Şimşek, 2021)

3. FINDINGS

3.1. Findings Related to the Academic Achievement Test

Table 3. t-test findings for independent samples regarding the academic achievement test pre-test mean scores of the experimental and control groups

Group	n	$\bar{x}$	sd	df	t	p
Experimental	15	43.20	17.32	28	1.139	.264
Control	15	36.40	15.31			

It was determined that there was no statistically significant difference ($t_{(28)}$=1.139;p>.05) between the academic achievement pre-test mean scores of the experimental and control groups. The absence of a statistically significant difference between the academic achievement pre-test scores of the experimental and control groups is interpreted as that the experimental and control groups are equivalent in the application process.

Table 4. t-test findings for dependent samples regarding the academic achievement pre-test and post-test mean scores of the experimental group

Tests	n	$\bar{x}$	sd	df	t	p
Pre-test	15	43.20	17.32	14	10.94	**.000***
Post-test	15	84.27	6.32			

p≤.05

When table 4 is examined, a statistically significant difference ($t_{(14)}$=10.94;p≤.05) was found between the academic achievement pre-test and post-test mean scores of the experimental group. The fact that the arithmetic mean ($\bar{X}$=87.27) of the post-test scores of the experimental group was higher than that of the pre-test ($\bar{X}$=43.20) indicates that the difference is in favour of the post-test.

Table 5. t-test findings for dependent samples regarding the academic achievement pre-test and post-test mean scores of the control group

Tests	n	$\bar{x}$	sd	df	t	p
Pre-test	15	36.40	15.31	14	3.95	**.001***
Post-test	15	65.60	21.53			

*$p \leq .05$

According to Table 5, a statistically significant difference exists between the academic achievement pre-test and post-test mean scores of the control group ($t_{(14)}$=3.95;p≤.05). The difference was found to be in favour of the post-test ($\bar{X}$=65.60) in the control group. Considering the results obtained from the academic achievement test applied at the end of the unit in the control group, it is seen that there is an academic improvement in the control group as well.

Table 6. t-test findings for independent samples regarding the academic achievement post-test mean scores of the experimental and control groups

Group	n	$\bar{x}$	sd	df	t	p
Experimental	15	84.27	6.32	28	3.22	**.003***
Control	15	65.60	21.53			

*$p \leq .05$

The values in Table 6 indicate that there exists a statistically significant difference ($t_{(28)}$=3.22;p≤.05) between the academic achievement post-test mean scores of the experimental and control groups. It is seen that this difference is in favour of the experimental group. The reason for the fact that the academic achievement post-test mean score of the experimental group ($\bar{X}$=84.27) was higher than that of the control group ($\bar{X}$=65.60) shows that the implementation process was successful. In this context, it can be stated that the flipped learning model is more effective than the traditional learning model in increasing the academic achievement of students.

3.2. Findings Related to the Open-Ended Questions

Table 7. t-test findings for independent samples regarding the rubric mean scores of the experimental and control groups

Group	n	$\bar{x}$	sd	df	t	p
Experimental	15	53.53	14.88	14	4.549	**.001***
Control	15	34.20	15.86			

*$p \leq .05$

According to Table 7, there is a statistically significant difference ($t_{(14)}$=4.549;p≤.05) between the mean scores obtained from the rubric developed to measure the higher-order thinking skills of the experimental and control groups in favour of the experimental group ($\bar{X}$=53.53). As a result of the application process, it was found that the higher-order thinking skills of the students in the experimental group were higher than those of the students in the control group. Accordingly, it can be stated that the flipped learning model applied in line with this finding is effective in improving students' higher-order thinking skills.

3.3. Findings Related to the Semi-Structured Interviews

The themes, categories and codes obtained from the analysis of the semi-structured interviews are given in Table 8.

Table 8. Themes, categories and codes obtained as a result of content analysis

Theme	Category	Code
1. Educational Process	➢ Problem ➢ Subject teaching ➢ Understandability	• Trouble-free video viewing • Clear videos • Learning the subject • Eagerness to come to class
2. Flipped Learning	➢ Learning the subject	• Better learning • Time to play in the classroom • Retention • Enjoyable • Sense of competition

As a result of the analysis of the data, 2 (two) themes were determined, namely "Education Process" and "Flipped Learning".

3.3.1. Education Process

In the interviews conducted for the participants to evaluate their own learning, the participants were asked whether they encountered any problems while watching the videos, and all the participants stated that they did not encounter any problems. For example; S2 said, "No, I did not encounter a problem. Since I have an internet connection at home, I watched all the videos."

The students were asked whether there were places they did not understand while watching the videos, and most of the participants (n=11) found the videos understandable and stated that there were no parts they did not understand. For example; S6 asserted that he understood the topics in the videos by saying "No, there weren't. Our teacher in the videos explained the subject well. In some places he asked questions. He gave lots of examples." On the other hand, the participants S7, S9, S11 and S14 stated that they had difficulty in understanding some parts. In response, they were asked what they did when they had difficulty in understanding those parts. The participants P7 and T14 replied that they took notes and asked their teacher questions in the classroom about the parts they did not understand, while the participants P9 and T11 stated that they rewinded the video and watched it again.

When the participants were asked whether the videos they watched had an effect on their learning of the subjects, only T14 said that there were times when he couldn't learn while watching the videos. However, the other participants stated that the videos they watched at home were effective in their learning the subjects and achievements. For example, S1 answered "Yes, it helped me learn. Although I knew some subjects, I learned more after watching the videos." S7 said, "I think I learned the whole unit. All the information is in my mind. After all, we already answered all the questions correctly in the quiz." He mentioned the effect of the videos he watched on his participation in the activities held in the classroom.

3.3.2. Views on the Flipped Learning Model

In this section, in order to obtain a holistic view about flipped learning, the views of the participants on the flipped learning model used in the research were tried to be determined by focusing on the model.

The answers given by the participants showed that all participants had a positive opinion about the flipped learning model. When the data obtained from the interviews with the participants are examined, it is seen that they describe flipped learning as very good, fun, nice, effective, educational and instructive. For example, participant S1 said, "I learned very well. I wish we always taught classes like this. It is both enjoyable and instructive." S6 and S7 expressed that they wanted other lessons to be taught with this model as well. The participant S9 pointed out the positive effect of the activities carried out in the classroom on the whole class by saying, "When we had a competition in the class, the whole class got ambitious. We listened to the videos more carefully the next week. I think it was good."

Afterwards, the participants were asked the question "Do you think you learned better in this model?" in order to examine the effect of the flipped learning model on the learning process. Considering the answers given, it is seen that all participants stated that they learned the subject better with the flipped learning model. For example; the participant S2 said, "Yes, I learned very well. Normally, we did not have time to play games in class. Now we both played a lot of games in the class and learned the subjects. These events kept the topics in my mind." The participant S9 claimed that they forgot the subjects faster because they could not do activities at home in traditional learning by saying "Yes, we do not do activities at home when we learn about the subject at school. And then we

forget about it." The participant S6 emphasized that the activities based on flipped learning model reinforced the course subjects with the statement; "I think I have learned the subjects very well. When I came to school, I did not forget the videos I watched. I could remember them when I was doing the activity."

4. DISCUSSION and CONCLUSION

In this study, it was concluded that there was no statistically significant difference between the pre-test scores of the experimental and control groups which shows that the experimental and control groups had equal achievement levels before the application process. In experimental studies, it is an expected situation that there is no statistically significant difference between the pre-test results in terms of the fact that the effect of the application process is the preliminary step of the change situation. Cognitive equivalence of the experimental and control groups during the application process is considered important in terms of revealing the change experienced on the two groups as a result of the process.

In the study, it was determined that there was a statistically significant difference between the academic achievement pre-test and post-test mean scores applied to the experimental group. In line with this result, it can be stated that an academic progress has occurred from the beginning to the last stage of the application process. In addition, the statistical increase in the academic achievement levels of the experimental group in the post-test can be interpreted as that the flipped learning model has a positive effect on the learning of the students. In the related literature, there are experimental studies examining the academic achievements of students using the flipped learning model in social studies course. In the studies conducted by Erdoğan (2019), and Şerefli (2020), it was concluded that the use of flipped learning in social studies course increased the academic achievement of students, which supports the findings of this research.

It is also determined that there is a statistically significant difference in favor of the post-test between the academic achievement test pre-test and post-test mean scores applied to the control group. This is thought to indicate an academic progress from the beginning to the last stage of the implementation process. Considering the results obtained from the academic achievement test applied at the end of the unit in the control group, it is seen that there is an academic progress in the control group as well. Although a program-based teaching was carried out in the control group as opposed to the experimental group, an improvement in the academic achievement levels of the control-group students is considered to be an expected result (Özen, 2020).

It was concluded that the academic achievement post-test mean scores of the experimental group were statistically more significant and higher than those of the control group, in which the lesson was conducted with traditional learning methods. This result reveals that the flipped learning model is more effective than the traditional learning model. In the related literature, there are various experimental studies in which the social studies course is conducted with the flipped learning model.

Bursa (2019) concluded that flipped classroom practices significantly increased the academic achievement and responsibility levels of the students in the experimental group. Similarly, Söğüt (2019) and Dursunlar (2018) found in their studies that the social studies course structured according to the flipped classroom model contributed positively to the academic achievement of students. In their study, Aidinopoulou and Sampson (2017) concluded that the flipped classroom model in social studies course increased students' participation in student-centered activities, improved their historical thinking skills and increased their academic achievement. Erbil and Kocabaş (2020) concluded that the use of cooperative learning method in the flipped classroom environment has a positive and significant effect on students' academic achievement levels. Contrary to the results obtained both in this study and in the abovementioned studies, Pozolinski (2015) conducting social studies course with the flipped

learning model did not lead to a statistically significant difference in academic achievement. In the related literature, there also exist ssome studies investigating the effect of conducting the flipped learning model in different courses other than social studies on academic achievement. In some studies, it was concluded that the academic achievement of the experimental group classes in which the flipped learning model was applied was statistically significant compared to that of the control group class in which the traditional learning model was applied (Akgün & Atıcı, 2017; AlJaser, 2017; Boyraz & January, 2017; Bursa, 2019; Deslauriers, Schelew & Wieman, 2011; Elian & Hamaidi, 2018). These results can be expressed as that flipped learning model has a positive effect on increasing the academic achievement of students in other courses as well as social studies courses.

Another result obtained is that there is a statistically significant difference in favor of the experimental group in the mean scores obtained from the rubric prepared to measure the higher-order thinking skills of the experimental and control groups. In line with this result, it can be stated that flipped learning has an important effect on developing students' higher-order thinking skills. Higher-order thinking skills, which are expected to be possessed by individuals at secondary school, serve as a touchstone for students' further academic achievements. It is also revealed in the study that the flipped learning model has an important effect on the development of higher-order thinking skills of individuals in addition to their academic achievements. Similarly, studies by Bergmann and Sams (2012), Hamdan et al. (2013), Herreid and Schiller (2013), Gough, DeJong, Grundmeyer and Baron (2017), Lee and Lai (2017), Mas'ud and Surjono (2018), Suprapti, Nugroho and Pembangunan (2021) also revealed that flipped learning is an effective method for developing higher-order thinking skills.

The learning processes of the students of the flipped learning model are mentioned. It was concluded that most of the participants who stated that they did not encounter any problems while watching the videos also described the videos as understandable. Some participants stated that they did not understand the subject in some places, but this problem disappeared when they watched the videos again. It was concluded that only one participant had difficulty in learning the subject from the videos watched at home in the out-of-class dimension of the flipped learning model, and the other participants stated that it was effective in learning the subject and achievements. It is thought that this result shows the flipped learning model has a positive effect on students' learning. In a study with a similar result (Bursa, 2019), participants stated that their academic achievement levels increased in the social studies course conducted with the flipped learning model. According to the results of the study by Akgün and Atıcı (2017), participant students in the experimental group stated that their academic achievement increased with the flipped classroom method, they remembered the topic they had learned better, they were more active during the lesson, and found watching the videos before the lesson more motivating. Similarly, İnciman-Çelik and Soft (2021) concluded that the flipped learning model was effective in students' learning of the subject, students were able to practice more in the classroom and they were motivated.

The views of the students about the flipped learning model were tried to be handled with a holistic approach. From the findings obtained from the analysis of the data, it was concluded that all participants thought that they learned better with the flipped learning model than with the traditional learning model. In addition, it was determined that all participants had a positive view of flipped learning and described this model with adjectives such as very good, fun, nice, effective, educational and instructive. Some participants stated that it would be beneficial to teach other lessons with this method as well. In their qualitative studies with similar results, Boyraz and Ocak (2017) also concluded that students had a positive view of flipped learning.

4.1. Conclusion for the Explanation of Quantitative Findings with Qualitative Findings

In studies designed with an explanatory sequential design in the mixed research method, it is necessary to explain in more detail how the quantitative findings are supported by the qualitative

findings after the quantitative and qualitative results are presented and discussed separately (Creswell, 2021). For this reason, in this section of the research, the results and discussions of the quantitative and qualitative findings are presented without comparing them.

In the second sub-problem of the quantitative part of the research, it was determined that there was a statistically significant difference between the academic achievement pre-test and post-test mean scores of the experimental group in which the lessons were conducted with the flipped learning model. The difference was in favor of the post-test. This result was supported by the results obtained from the analysis of the interviews with the participants. Participants of the study stated that they learned better in the lessons conducted with the flipped learning model, which supports the quantitative findings of the study.

Another result obtained from the quantitative data is that there is a statistically significant difference in favor of the experimental group in the mean scores obtained by the students from the rubric prepared to measure the higher-order thinking skills of the experimental and control groups. According to the interviews with the participants, it is thought that carrying out their own learning processes is an important indicator of their higher-order thinking in the process. Participants mostly expressed that they understood the subject while watching the lectures, and using their own methods to solve the problem had a positive effect on the higher-order thinking skills of the participants who had difficulty in understanding the subjects. In addition, the fact that participants like and enjoy the activities used in classroom practices is thought to have an important effect on the development of both their academic achievements and higher-order thinking skills.

In summary, it has been concluded from the quantitative and qualitative findings of the research that the use of the flipped learning model in social studies lessons is effective on the improvement of students' academic achievements and higher-order thinking skills.

Based on the results of the research, the following suggestions can be expressed:

- Research can be conducted using the flipped learning model at different grade levels and learning areas in social studies courses.
- Research can be conducted to test the effects of the flipped learning model on different skills other than high-level thinking skills.
- Various researches can be conducted on the effectiveness of the flipped learning model by using different data collection tools.

Based on the conclusion that the model used improves the academic achievement and high-level thinking skills of the students, the use of this model in the social studies course can be encouraged.

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This research was carried out with the permission of Niğde Ömer HalisDemir University Social and Human Scientific Research and Publication Ethics Committee with the decision numbered 140905 dated 03/12/2021.

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Abstract

This research examined the relationship between university students' perceptions of the chemistry laboratory environment and their chemistry laboratory anxieties. The method of the study is correlational research. The study was conducted on 281 university students who enrolled in biology, physics, chemistry, and science teaching programs and took the chemistry laboratory course. The chemistry laboratory classroom environment scale and the chemistry laboratory anxiety scale were used to collect research data. The obtained data were analyzed via the structural equation model. The research results revealed that students' perceptions of the chemistry laboratory environment were a significant predictor for their chemistry laboratory anxiety. Furthermore, it was determined that 13% of the variance in laboratory anxiety was explained by the perceptions of the laboratory environment.

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Research Article

Examination of the Relationship between University Students' Perceptions Regarding the Chemistry Laboratory Environment and their Chemistry Laboratory Anxiety*

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Abstract

This research examined the relationship between university students' perceptions of the chemistry laboratory environment and their chemistry laboratory anxieties. The method of the study is correlational research. The study was conducted on 281 university students who enrolled in biology, physics, chemistry, and science teaching programs and took the chemistry laboratory course. The chemistry laboratory classroom environment scale and the chemistry laboratory anxiety scale were used to collect research data. The obtained data were analyzed via the structural equation model. The research results revealed that students' perceptions of the chemistry laboratory environment were a significant predictor for their chemistry laboratory anxiety. Furthermore, it was determined that 13% of the variance in laboratory anxiety was explained by the perceptions of the laboratory environment.

Keywords: Chemistry laboratory, chemistry laboratory environment, chemistry laboratory anxiety

1. INTRODUCTION

When science teaching is examined in terms of its content and pedagogy, it is seen that new standards for science education have been developed and adopted (National Research Council, 1996; 2000). The educational science laboratory is the most striking one among these standards. In science laboratories, students can understand and explore nature in a more tangible way through experimentation and observation by using authentic, concrete materials (Hofstein & Mamlok-Naaman, 2007). To achieve this, of course, there are some certain principles need to be considered during laboratory activities. Firstly, students should actively participate to the process. They should be aware of the problem handled, understand the rationale of the experiment, develop alternative hypotheses to solve the problem, and test these hypotheses by collecting and interpreting data (Aladejana, 2006; Hung & Chin, 1988; Mayer, 2003). Besides, the practices carried out in the laboratory should be qualified enough to arouse students' interest, and the creativity of the students should be rewarded, their questioning skills should be encouraged, and they should be given a certain duration to develop thought-provoking answers and dialogues (Instructional Philosophy, 2004). Following these principles in a laboratory teaching is important to provide the students with meaningful learning.

As a complementary to science education, with laboratory practices, students develop their skills of creative and scientific thinking, problem solving, and observing and interpreting the events, collecting, and analyzing data, thus they can improve their scientific knowledge (Taitelbaum, Mamlok-Naaman, Carmeli, & Hofstein, 2008). That is, through laboratory practices, students can raise questions, plan, and perform experiments, collect data using appropriate tools and techniques, make

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critical and logical connections between the gathered data and predictions/presuppositions about the results of a scientific experiment, and they develop their ability of structuring, analyzing, discussing and sharing scientific arguments (Adadan, 2015). According to Hodson (1996), there are three types of skills acquired during laboratory activities. The first one is to ensure the application of science as a main source of learning intellectual and theoretical knowledge. The second one is to learn science directly from nature and through using scientific methods. The third one, on the other hand, is to concentrate on performance, in other words, to specialize in scientific research. Hofstein and Mamlok-Naaman (2007) stated that laboratory practices increase students' problem-solving and scientific processing skills, and help them to develop positive attitudes towards science education. Singer, Hilton and Schweinger (2005) examined the impact of laboratory experiences on students' affective skills and revealed that laboratory experiences increase students' interest in science and improve their ability to make scientific interpretations from the research.

1.1. Laboratory Environment

There are certain factors that play important roles on the effectiveness of laboratory practices and of all the factors, laboratory environment has a special place. The absence of proper laboratory environment is one of the most serious problems that restrict the efficiency of science teaching. A laboratory environment has two aspects: (i) physical environment, and (ii) non-physical environment. Physical environment of a laboratory includes the features such as location of the laboratory, lightning, furniture design, infrastructure, ventilation, accessibility of the devices, etc. The laboratuaries that are not furnished in accordance with today's update technologies, that don't meet the students' potential needs, or that don't have adequate devices (i.e., those with old, broken/or inadequate materials) are the primary obstacles to the practical teaching of science lessons in the laboratory environment. Such kinds of situation causes that laboratory practices are often neglected and that most of the science lessons are conducted in classroom environment (Güzel, 2002).

The non-physical aspect of the laboratory environment, on the other hand, includes the personality of the teacher, the student-teacher relationship, classroom management ability of the teacher, the rules to be followed in the laboratory, the clarity of the said rules and how these rules are determined (Silberman, 1973; Wilson, 1996). Quek, Wong and Fraser (1998) investigated 'learning environments', in general, and 'laboratory environment', in particular, in following five dimensions:

Student solidarity	Each student helps the others based on their level of knowledge
Open-mindedness	Experiencing laboratory activities with a variety of open-ended approaches
Integration	In the lack of laboratories, supporting the classes with laboratory activities
Rule transparency	Formally-rule surrounded behaviors in laboratories
Materials	Sufficiency of the devices and equipment

Figure 1. The dimensions of laboratory environment

In some studies that focus on the nonphysical environment in the laboratuaries found that poorly planned laboratory activities (Erdem, 2011; Güneş, 2007) are not efficient, and they can lead to confusion (Hodson, 1990) as well as disrupting classroom discipline (cited in Feyzioğlu, Demirdağ, Akyıldız, & Eralp, 2012). Undoubtedly, in addition to the physical and non-physical laboratory environment, the emotional characteristics of the students also play a decisive role on the practices in the laboratory environment. One of the students' emotional characteristics that affect the quality of

teaching services in the laboratory environment is the "laboratory anxiety". As a matter of fact, the previous studies (e.g., Uşaklı & Akpınar, 2015; Ünal & Kılıç, 2016) have shown that students have anxieties while performing an experiment in a laboratory environment.

1.2. Laboratory Anxiety

Freud (1969) defines anxiety as "an undesirable, unpleasant feeling that can be experienced anytime and anywhere". Wynstra (1990), on the other hand, defines science anxiety as a diffuse, vague fear of learning science. Eddy (1996) coined the term of chemophobia and ascertained that students were anxious while carrying or mixing unfamiliar chemicals. Bowen (1999) was the first to use the term of chemistry laboratory anxiety and developed the chemistry laboratory anxiety scale. This scale emerged from the idea that it would not be enough to focus only on the anxiety of science and chemistry but that laboratory anxiety should be handled separately (Azizoğlu & Uzuntiryaki, 2006). The scale investigates students' anxieties about the chemistry laboratory from a cognitive perspective and deals with students' use of their causal and experimental skills to comprehend chemical concepts. Uşaklı and Akpınar (2015) developed an "anxiety scale for science laboratory" with the purpose of determining students' anxiety about laboratory and to develop suggestions for better and more efficient laboratory classes. Sert-Çıbık and İnce–Aka (2021), on the other hand, examined the relationship between students' anxiety of chemistry laboratory and their attitudes towards laboratory skills from various variables.

1.3. The Objective of the Study

The unique atmosphere of the laboratory environment (e.g., students and the instructors need to wear uniforms, the dangerous properties of the materials to be exploited in the experiment are not known exactly, and the necessity of preparing the experimental setup with peers in front of the instructor) may cause performance anxiety among the students. That is, quite different from the classroom environment, with its unique atmosphere, the laboratory environment can trigger negative feelings as uneasiness, reluctance, and failure in students. Hence, it is thought that students' perceptions of the science laboratory environment play an effective role on their laboratory anxiety. However, considering both the laboratory environment and laboratory anxiety are multidimensional, it may only be possible to fully grasp the level and direction of the relationship between these two variables through empirical studies on the subject. From this point of view, this study aimed to examine the relationship between students' perceptions of the laboratory environment and laboratory anxiety. Although the studies in the literature show that the learning environment is effective on anxiety and other affective characteristics (e.g., Karslı & Ayas, 2013; Lee & Fraser, 2006; Wong, Young & Fraser, 2006), no study has been found in the literature that directly examines the relationship between perceptions of the chemistry laboratory environment and chemistry laboratory anxiety. In this regard, it is believe that the study will contribute to the literature.

2. METHOD

2.1. Research Design

Since, the relationship between university students' perceptions of the chemistry laboratory course and their laboratory concerns is examined this study is a correlational research one. In correlational research studies, it is aimed to determine whether two or more variables are related to each other and to determine the level of the relationship (İlhan & Gezer, 2021).

2.2. Study Group

The selection of individuals or circumstances that satisfy predefined criteria is known as criterion sampling. That is to say, in this sampling technique data is gathered from the participants who have the specified criterions (Gezer, 2021). The variable taken as a criterion in the current study was to have taken the chemistry laboratory course. So, the sampling strategy used in the study was criteria sampling. Consequently, the study was conducted on 281 university students who took the chemistry laboratory course during the Fall Term of the 2018–2019 academic year and were attending the biology, physics, chemistry, and science teaching programs at Dicle University's Ziya Gökalp Education Faculty in Turkey.

2.3. Data Collection Procedures

The research data were collected using the general chemistry laboratory classroom environmental scale and the chemistry laboratory anxiety scale.

2.3.1. General Chemistry Laboratory Classroom Environmental Scale

This scale was developed by Moos and Trickett, and adapted into Turkish by Doğan, Atılgan and Demirci (2003). The scale has a five-point Likert-type scale ranging from Always (5) to Never (1). In the adaptation study; the reliability coefficient of the scale, consisted of 35 items classified into five dimensions, calculated as .85, and the reliability coefficients of the subscales were reported to vary between .61 and .87. The sub-dimensions of the scale, the reliability coefficients for each dimension for the measurements of the current research, and sample items are presented in Table 1.

Table 1. **Sample items and reliability coefficients of the sub-dimensions of the general chemistry laboratory classroom environment scale**

Scale Dimensions	*Number of Items*	*Sample Item*	*Reliability Coefficient*
Proximity	7	I get along well with the students in my class in the lab	.73
Open- mindedness	7	I have the opportunity to do research on chemistry subjects I am interested in laboratory classes.	.59
Integration	7	The studies I do in my General Chemistry classes are compatible with the laboratory activities.	.85
Clarity in rules	7	There are clear rules that guide the activities I carry out in my lab classes.	.71
Physical Environment	7	I find the lab crowded while doing the experiment	.70

As can be seen in in Table 1, the Cronbach alpha coefficients vary between .59 and .85. In general, coefficients of 70 and above are considered sufficient for the reliability of the measures (Erkuş, 2003). However, the number of items in a scale significantly affects the internal consistency coefficient and it is difficult to reach high reliability values in scales with few items (Urbina, 2004). For this reason, values of .50 and above in scales with a small number of items can be considered as the lower limit for reliability (Raines-Eudy, 2000). In this respect, the data obtained in this study by means of the general chemistry laboratory classroom environment scale can be considered reliable.

2.3.2. Chemistry Laboratory Anxiety Scale

This scale was created by Bowen (1999) and adapted into Turkish by Azizoğlu and Uzuntiryaki (2006). The scale was designed in five-point rating from Strongly Agree (5) to Strongly Disagree (1), contains 20 items and consists of four dimensions. The reliability coefficients calculated for the sub-dimensions were found to vary from 0.86 to 0.88. Table 2 shows the sub-dimensions of the scale, the calculated reliability coefficients in the present study for each dimension, and sample items.

Table 2. Sample items and reliability coefficients of the sub-dimensions of the chemistry laboratory anxiety scale

Scale Dimensions	*Number of Items*	*Sample Items*	*Reliability coefficient*
Working with lab equipment and chemicals	6	I feel at ease using the chemicals and the equipment in the chemistry laboratory.	.81
Working with other students	4	It makes me feel nervous to work with other students in the chemistry lab	.72
Data collection	6	While working in the chemistry lab, recording the data I need creates tension for me.	.81
Having adequate time	4	I feel worried if there is enough time to finish the lab	.77

Table 2 demonstrates that the reliability coefficients range between .72 and .81. When the estimated reliability coefficients are considered, it can be stated that the data acquired using the chemistry laboratory anxiety scale are reliable.

2.4. Data Analysis

Before starting to analyze the data, data was scrutinized to see whether there was missing values in the data set and no missing data was found. Then, the distribution of the research data was examined. To this end, the skewness and kurtosis coefficients were analyzed. Table 3 provides the obtained skewness and kurtosis coefficients.

Table 3. The skewness and kurtosis coefficients of the research data

Scale	*Dimensions*	*Skewness*	*Kurtosis*
General Chemistry Laboratory Classroom Environmental Scale	Proximity	-.22	-.09
	Open endedness	-.22	-.07
	Integration	-.55	-.03
	Clarity of Rules	-.38	.38
	Physical Environment	-.09	.04
Chemistry Lab Anxiety Scale	Working with lab materials and chemicals	-.05	-.41
	Working with other students	.37	-.36
	Data Collection	.14	-.56
	Having adequate time	.26	-.36

Table 3 shows that all of the skewness and kurtosis values are in the range of ±1. In a perfectly symmetrical normal distribution, the skewness and kurtosis coefficients are equal to 0 (Bachman, 2004). However, the skewness coefficients in the range of ±1 are interpreted as the data do not show a significant deviation from the normal distribution (Büyüköztürk, 2010). In this respect, it can be said that the research data display a normal distribution.

After it was determined that the data had a normal distribution, the data analysis process was initiated. Correlation analysis (Pearson product-moment correlation) and structural equation modeling were employed to examine the relationship between chemistry laboratory classroom environment and chemistry laboratory anxiety. Structural equation model analyzes were carried out based on the maximum likelihood method, since the data were found to be in accordance with the normal distribution. During the analysis, while determining the compatibility level between the tested model and the data, the fit indices were looked into. Table 4 illustrates the acceptable values for the fit indices checked over. While SPSS 21.0 package program was utilized for the correlation analysis, LISREL 8.54 software was operated for performing structural equation model analysis.

Table 4. Acceptable criteria for the fit indices analyzed in the study

Analyzed fit indexes	χ^2/df [a]	RMSEA [b]	SRMR [b]	CFI [c]	IFI [c]	RFI [c]	NFI [c]	NNFI [c]	GFI [c]
Criteria Values	< 5	< .10	< .08	> .95	> .95	> .95	> .95	> .95	> .95

[a] Aksu, Eser & Güzeller (2017), [b] Meyers, Gamst & Guarino (2006), [c] İlhan & Çetin (2014)

3. FINDINGS

The research findings are presented below. First, correlation analysis was applied on the total scores obtained from the general chemistry laboratory classroom environment scale and chemistry laboratory anxiety scales, and the relationship between the two variables was found to be statistically significant [r= –.31, p < .01]. Then, structural equation model analysis was applied to determine the predictive power of students' perceptions of the general chemistry laboratory classroom environment to predict their chemistry laboratory anxiety. Findings of structural equation modeling are displayed in Figure 2.

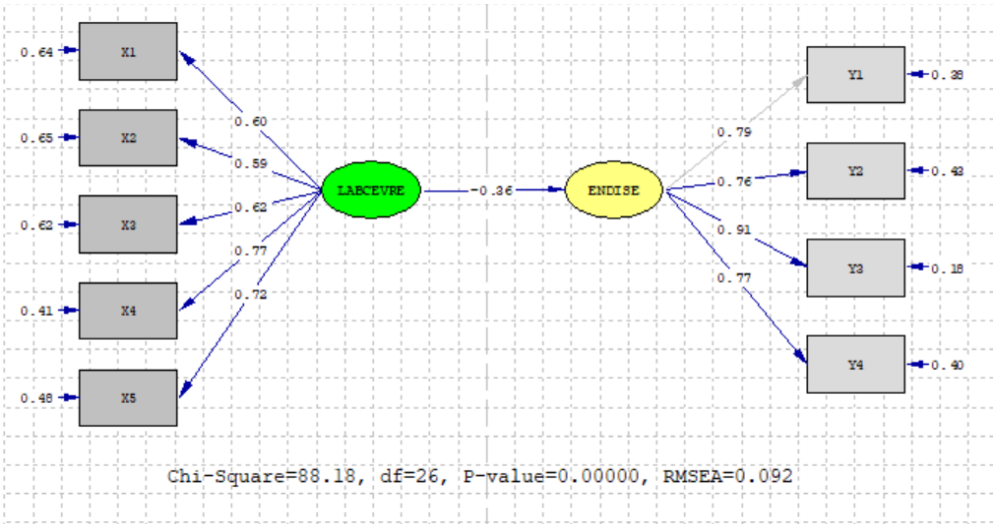

Figure 2. Structural equation model of the relationship between perceptions of the chemistry laboratory environment and laboratory anxiety

When the fit indices of the tested model, the following results were obtained: χ^2/df = 3.39, RMSEA = .092, SRMR = .076, CFI = .95, IFI = .95, RFI = .91, NFI = .94, NNFI = .93 and GFI = .93. Based on cut-off points regarding to these findings, it can be concluded that the model established between the general chemistry laboratory classroom environment and laboratory anxiety is confirmed by the research data. When the coefficients of the model were examined, the equation for predicting the chemistry laboratory anxiety of the students with their perceptions of the general chemistry laboratory classroom environment was found to be:

(Laboratory anxiety) = -0.36* (General chemistry Lab. environment), Error variance = .87, R^2 = .13
(.070) (.12)
–5.23 7.39

As seen in the equation above, 13% of the variance in students' laboratory anxiety can be explained by their perceptions of the general chemistry laboratory classroom environment.

4. DISCUSSION and CONCLUSION

In this study, the relationship between university students' perceptions of the chemistry laboratory environment and their laboratory anxiety was investigated. As a result of the study, it was found that the perception of the laboratory environment is a significant predictor of laboratory anxiety. Although there is no study in the literature that directly deals with the relationship between laboratory anxiety and perception of the laboratory environment, there are studies that can indirectly support the current research findings. Wong, Young and Fraser (2006), investigated the relationship between middle school students' perceptions of the chemistry laboratory environment and their attitudes towards the chemistry. They established that students' perceptions of the chemistry laboratory environment is an important variable that shapes students' attitudes towards the chemistry. Similarly, Lee and Fraser (2001), found a statistically significant relationship between students' perceptions of the laboratory environment and their attitudes towards science in the study they conducted on 437 high school students in Korea. The results of the studies of Wong et al., (2006) and Lee and Fraser, (2001) are compatible with the findings of this study in that they indicate that perception of the laboratory environment is related significantly with students' affective traits.

The results of studies examining the relationship between the perception of laboratory environment and academic achievement show indirect similarity with the findings of the present study. Olubu (2015) investigated how secondary school students' perceptions of the laboratory learning environment affect their academic performance and determined that students' perception of the laboratory environment had a significant effect on their chemistry performance. Aladejana and Aderibigbe (2007) investigated high school students' perceptions of the science laboratory environment and its effects on their learning outcomes. They handled students' perception of the science laboratory environment under five dimensions, and determined that all dimensions were positively and significantly related to academic achievement. As can be seen, the studies by both Olubu (2015) and Aladejana (2006) do not directly address laboratory anxiety. However, considering the fact that there is a significant relationship between the perceptions of the laboratory environment and learning outcomes in the studies cited above, it can be stated that the results of the studies just mentioned are partially analogous to the findings of the current study.

The findings obtained in this research are compatible with the results obtained in studies conducted in other disciplines. Haertel, Walberg and Haertel, (1981) investigated the correlation between social and psychological characteristics of the learning environment and cognitive and affective learning outcomes and analyzed the results of 12 studies conducted in eight different disciplines. The results of the analysis proved that there was a significant relationship between the learning environment and learning outcomes. In the studies conducted by Miller and Mitchell (1994), Tooke and Lindstrom (1998), Shields (2006), and Taylor and Fraser (2013), it was determined that the classroom environment is an effective variable on mathematics anxiety. Henderson, Fisher and Fraser, (1995) examined the relationship between students' perceptions of the learning environment and their attitudes towards the classroom and in-class discussions in the 'environmental science course', and they ascertained that there was a significant relationship between said variables. In their study on secondary school students in Australia, Dorman, Fisher and Waldrip, (2006) examined the relationships between students' perceptions of the science lesson environment, their attitudes towards the course and their academic self-efficacy. Fia et al., (2022) conducted research on the causes, effects, and management of science anxiety in 337 high school students. It was revealed that the participants experienced science homework, attitudes towards science, fear when entering science class, and anxiety about solving science problems. As a result of the study, it was determined that 49% of the variance of the attitude towards the course and 45% of the variance of the academic efficacy were related to the students' perceptions of the science course environment. These abovementioned results

indicate that the research findings are compatible with the results of the studies conducted in other disciplines.

5. SUGGESTIONS for FURTHER RESEARCH

As a result of the research, it was determined that 13% of the total variance of laboratory anxiety is related to students' perceptions of the general chemistry laboratory classroom environment. This means that the proper design of the chemistry laboratory environment will contribute to the prevention of laboratory anxiety. Therefore, in order to decrease laboratory anxiety, a suitable physical environment must be created in the laboratory, the rules to be followed must be clearly defined, a proper atmosphere where students can work collaboratively, a democratic environment should be provided to students in which they can study the subjects they are interested in. Additionally, it should be paid attention that the experiments conducted in the laboratory environment should be compatible with theoretical chemistry courses.

This research is a correlational one. Although correlational studies can reveal the direction and strength of the relationship between variables, they limit the interpretations that can be made about the causality of the results. In In this respect, it is important to carry out experimental studies to determine the effect of perceptions about the laboratory environment on laboratory anxiety for more precise inferring about causality. In addition, the data of the present study were collected using self-report instruments. Further studies on the subject should use different data collection methods such as making observations in the laboratory environment, conducting interviews with the instructors of laboratory courses and with the students taking this course, asking students to keep reflective diaries and examining these diaries.

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Abstract

Attendance is thought to be an important issue for academic success in schools. With the long school closure due to Covid-19, students were kept away from schools and when the schools were opened and face to face education began, the absenteeism rate increased a lot. A phenological study to determine the reasons for absenteeism of university students was conducted with the participation of 56 students from different faculties of a university at the Black Sea Region of Turkey during the spring term of 2022. According to the findings obtained from the study, the most important reason for absenteeism was health problems. Secondly, waking up early was another striking reason for absenteeism. Stress and depression, early class hours, family and transportation problems, academic staff were stated as important reasons for absenteeism. The long course hours, the lack of sufficient activities in the school environment, not finding the lessons meaningful and informative also found to be affective in the attendance rate of student. It was also found out that university environment and instructors were also responsible from students' absenteeism. Therefore, the courses should not be planned in the early hours and the course instructors should be able to take student attention to the courses. Moreover, the campuses should increase social, cultural and sportive activities. To attract the attention of students to school with extracurricular activities; social, cultural and sportive activities should be planned. University campus should turn into a life center where students would like to be.

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Research Article

A Study on Absenteeism of University Students*

Münir ŞAHİN[1]

Abstract

Attendance is thought to be an important issue for academic success in schools. With the long school closure due to Covid-19, students were kept away from schools and when the schools were opened and face to face education began, the absenteeism rate increased a lot. A phenological study to determine the reasons for absenteeism of university students was conducted with the participation of 56 students from different faculties of a university at the Black Sea Region of Turkey during the spring term of 2022. According to the findings obtained from the study, the most important reason for absenteeism was health problems. Secondly, waking up early was another striking reason for absenteeism. Stress and depression, early class hours, family and transportation problems, academic staff were stated as important reasons for absenteeism. The long course hours, the lack of sufficient activities in the school environment, not finding the lessons meaningful and informative also found to be affective in the attendance rate of students. It was also found out that university environment and instructors were also responsible from students' absenteeism. Therefore, the courses should not be planned in the early hours and the course instructors should be able to take students' attention to the courses. Moreover, the campuses should increase social, cultural and sportive activities. To attract the attention of students to school with extracurricular activities; social, cultural and sportive activities should be planned. University campus should turn into a life center where students would like to be.

Keywords: Absenteeism, course attendance, school attendance, compulsory attendance

1. INTRODUCTION

Education, with its most common definition, is defined as the process of making a desired behavioral change in individuals. Therefore, education and training activities occur within a certain process. Ensuring the regular attendance to these activities, which have been planned for the individual in advance, and whose place and time have been determined, will increase the rate of making changes in the individual's life. In other words, the students who attend the courses are more likely to achieve the goals related to the content and purpose of the courses compared to those who are absent. For this reason, ensuring students' attendance can only be achieved by enabling an environment they desire (Şahin, 2022). In this context, schools are environments where students change their behavior in accordance with the determined programs.

Schools are defined as a sub-system created for the regular conduct of teaching activities (Gümüş et al., 2011, p. 428). However, in order for this subsystem to become functional, many factors must work together and be in harmony. There are many variables that affect the quality of educational activities. It is very important that these variables are compatible, that they can be replanned according to the individual development of the students, that they are pedagogical and ergonomic (Şahin, 2017, 2019). There are studies showing that even the place where students sit in the classroom is associated

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with absenteeism. It has been revealed that the absenteeism and academic failure rates of students sitting. in the back rows are higher than those sitting in the front rows (Şahin, 2019). Many factors such as the physical characteristics of the school and the classroom, the acoustics in the classroom, heat, lighting, daylight, the colors chosen, the sitting arrangement of the students can affect the academic success and attendance of students (Şahin, 2019; Wasnock, 2010).

An important problem in education is absenteeism, which varies according to the type of school, school levels, and region. Kearney and Silverman (1990) defined absenteeism as refusal from school and not following classes regularly. On the other hand, Öztekin (2013) defined it as the situation where individuals are not present in places where they should be, such as school, workplace, and meeting. In another definition, it is expressed as the student's absence from school during the school term without a legitimate reason. School absenteeism is also defined as students' absences from school with or without an excuse (Conry & Richards, 2018).

In addition to the researches on the solution to the absenteeism problem (Wasnock, 2010), the Ministry of National Education (MoNE) published the "Progressive Absenteeism Management Practice Guide for Primary Schools" in 2011 and started working to prevent absenteeism. Progressive Absenteeism Management is to ensure that all students receive a diploma by ensuring that students attend to school (MoNE, 2011, p. 10). This guide for primary and other school levels points that attendance is important and the problem should be managed properly. As the Progressive Absenteeism Management of MoNE, Higher Education Institutions should also seek ways to keep students' attendance rate higher.

School absenteeism as Kim and Gentle-Genitty (2020, p. 1) cited, "has become a prevalent problem that affects student development and future societies across the world." Studies (Clifford, 2005; Crew, 2000) show that school absenteeism is an important factor that negatively affects students' futures. Students who do not attend school can negatively affect their school, family and society. School absenteeism causes lower academic success, higher school drops, lower physical and mental health, so school absenteeism affects students over all well-being outcomes (Kearney, 2008). School absenteeism also affects the future of a society as it prevents students becoming competent citizens who in some way contributes to the economy, well-being and development of the society (Ekstrand, 2015). For these reasons, all kinds of education systems encourage students to attend school. School attendance is also considered necessary for students to be able to study well in the future, have a regular job, and be a good citizen (Pehlivan, 2011). "Student's constant interaction with the school can affect the quality of school life and contribute to student success" (Uğurlu et al., 2015, p. 1013).

As the reasons for absenteeism various, some reasons are more common. Those with low self-esteem, lack of self-confidence, inadequate social skills, having problems in establishing social relations with others, those with weak academic skills, and those with health problems tend to be more absent (Morgan, 2004). The family factor is very important as one of the effective factors in students' attendance. Studies have revealed that the family factor affects students' absenteeism at a rate of 5%. Students may be absent to attract the attention of their families, due to family pressure, and insufficient care in preparing the student for school. Home environment, poor family control, indecisiveness in education, bad parenting, economic conditions, lack of respect in the society, drug addiction of family members such as alcohol and drugs, children having to work, absence of a mother or father, death, marriage and birth reasons such as rapid changes in family members, the necessity of working to make a living, and the fact that the family has to move many times in a short period are expressed as social and family-based reasons (Morgan, 2004).

Students are afraid of their teachers or school administrators when they are late to school. When there are not enough activities for students at the school for students, the lack of appropriate clothing for school, the excessive discipline, the student's feeling of inadequacy towards the lesson

(Altınkurt, 2008), the attitude of the teachers or instructors to student may result in absenteeism. Students may not like the school due to school climate, administrator attitudes, learning styles, cultural differences, relations with teachers, other classmates, school and curriculum (Kindler et al., 1996).

Especially academic failure (Aucejo & Romano, 2016), damage to social and emotional development (Gottfried, 2014), substance use (Henry & Huizinga, 2007), poverty, school failure to meet students' needs, irresponsible families (Zhang, 2003), low socio-economic status (Gottfried & Gee, 2017) can increase school dropouts and absenteeism. 10% of students choose not to go to school on a daily basis and are absent from school (Eaton, Brener, & Kann, 2008).

Altınkurt (2008), who examines students' absenteeism under six dimensions, states that students may prefer absenteeism due to administrators, family, teachers, environment, academic anxiety and individual reasons. School facilitates young people's transition to adulthood by enabling them to have a job economically (Fredricks et al., 2019), school environment provides social, mental and physical development of young people (Bonnel et al., 2019), while young people are at school get opportunities for academic, practical and emotional learning. School attendance ensures the sharing of social experiences and the transfer of the values and cultural elements of the country (Zaf et al., 2017).

Stayin far from school, health problems, psychological problems, sense of failure, group psychology, family problems, inadequacy of social activities at school, working at a work to meet the needs, not having the necessary tools for school, disliking teachers, not waking up early for school, bullying at school, teachers' failure to use methods that will increase interest to courses, illiterate family members, and insufficient communication between school and family are stated as important reasons for absenteeism (Sakıç, 2013, p. 5).

The reasons for absenteeism may also differ according to the type and level of school. In a study in Turkey, it was found that absenteeism from school and school administrators came to the fore as the primary reason, but socio-economic level did not make a significant difference on absenteeism (Uzun & Kemerli, 2019). Sanders (2022), who investigated the reasons for absenteeism of secondary school students, pointed out that absenteeism should be seen as the first sign that the student has taken a wrong path and the beginning of the problems to be experienced later. Sakınç (2013), on the other hand, stated that the reasons for student absenteeism in vocational and technical secondary educational institutions are administrators, teachers, family, environment, economic, social, individual and legislative reasons.

Pehlivan (2011) revealed that school administrators and teachers believe that the reasons for absenteeism are the students and their families, while the students pointed the educational activities at school as the main reason for absenteeism. In another study (Yılmaz et al., 2020), it is stated that school-related reasons, personal reasons, and family-related reasons play an important role in high school students' absenteeism.

School attendance is an important factor for students' academic success. Students who are absent cannot catch enough change. For this reason, schools and educational environments should be a place where students want to be (Altınkurt, 2008; Şahin, 2021; Şimşek et al., 2016). When it comes to universities, it is even more important for students to attend classes because university students gain important knowledge and do applications about their possible future professions at the courses. A medical school student, a chemist or a teacher who does not attend classes may also lack the knowledge and practical experience necessary for his profession. As Uğurlu et al. (2015) stated, absenteeism is an important problem among instructors. The arrangement and quality of the teaching environment can be only possible with the attendance of the students to the courses.

A scale to determine the absenteeism tendencies of university students developed by Şimşek et al. (2016). The scale, with a Cronbach Alpha value of .94 for reliability, consists of 28 items. When the components of the scale are examined, the most important reason for absenteeism is the attitude and behavior of the lecturer, and the second is the "course content". Other reasons emerged as "social

activities, unexpected situations, instructors' attitude to absenteeism, transportation problems and course success", respectively.

Uğurlu et al. (2015) took the views of academic staff and university students. In the study, university faculty members defined absenteeism as a reason for failure, while students described it as a choice and a situation that should be removed. Sarıdere and Arslan (2017), determined that students did not attend classes due to reasons arising from themselves, the school environment, instructors and course content. Usta et al. (2014) revealed that the secondary education students exhibited more absentee behavior, and the tendency to absenteeism changed depending on factors such as the attitudes of the instructor, the course content, and the transportation problem.

Absenteeism is an important factor that negatively affects both students' academic success and society's well-being. It is one of the natural duties of the school to take measures for students who have disciplinary problems, fail, and do school absenteeism (Ereş, 2009). Many studies (Conry & Richards, 2018; Sarıdere & Arslan, 2017; Şahin, 2021) accept that school absenteeism is a complex issue as it can be influenced by many multidimensional factors at individual, family, school, instructor, and community levels.

After the closure due to Covid-19 the rate of university students' absenteeism increased a lot. Knowing the new reasons and dimensional changes about absenteeism will make a significant contribution to developing solutions to the problem. It is expected to make an important contribution to the literature as well. The aim of the study is to determine the reasons of university students' absenteeism from students' perspective and develop solutions to ensure attendance. Therefore, answers to the following questions were sought.

- What are the reasons for absenteeism of university students?
- Should the attendance be compulsory? Why/Why not?
- What can be done to ensure attendance to classes?

2. METHOD

2.1. Research Design

Qualitative research method is used to meet the objectives of the research and phenomenological research design is used to get the opinions of participants in depth about the concept of "absenteeism". Phenomenology aims to focus on cases that are related but not understood in detail (Yıldırım & Şimşek, 2005).

2.2. Study Group

The participants of the research composed of 56 students from 8 faculties of a university situated at the Black Sea Region of Turkey. Participants were determined by the criterion sampling method based on maximum diversity, one of the purposive sampling types. With purposive sampling, it is aimed to work on a sample that is representative of a universe suitable for the purpose of the study and where the most appropriate observation can be made regarding the problem being studied (Sencer, 1989, p. 386). Students who have absenteeism over the limit of 4-week were chosen for the study. With the participant identification method, the diversity of data providers has been tried to be ensured (Silverman, 2006; Yıldırım & Şimşek, 2005). In determining the students to be selected for the study group, diversity was provided in the context of faculty, class, department and gender. It is a rule agreed upon by researchers that when the data reach the saturation point and data starts to repeat each other, researcher stops interviewing and collecting data (Yıldırım & Şimşek, 2011). Participants were coded as S1, S2…. Demographic information of the participants participating in the research is given in Table 1.

Table 1. Demographic characteristics of study group

	Departments	Class	Age	Gender	Code
				F/M	
	Nursing	2	19	F	S1
	Nursing	4	19	M	S2
	Nursing	1	18	M	S3
Faculty of Health Sciences	Nursing	3	20	M	S4
	Nursing	1	19	M	S5
	Nursing	2	23	M	S6
	Midwifery	1	19	F	S7
	Midwifery	2	21	F	S8
	Midwifery	3	22	M	S9
	Midwifery	3	21	F	S10
Faculty of Erbaa Social and Human Sciences	Communication and Design	1	20	F	S11
	Communication and Design	3	21	F	S12
	Turkish Language and Literature	3	20	M	S13
	Turkish Language and Literature	3	21	M	S14
Faculty of Education	English Language Teaching	3	22	M	S15
	Turkish Language Teaching	2	20	M	S16
	Turkish Language Teaching	4	22	F	S17
	Turkish Language Teaching	2	21	F	S18
	Primary School Teaching	4	24	M	S19
	Primary School Teaching	2	21	F	S20
	Social Studies Teaching	3	23	F	S21
	Social Studies Teaching	2	22	M	S22
	Psychological Consultation	1	19	F	S23
	Psychological Consultation	2	21	M	S24
Faculty of Islamic Sciences	Islamic Sciences	1	20	F	S25
	Islamic Sciences	3	22	F	S26
	Islamic Sciences	1	21	F	S27
	Islamic Sciences	2	21	M	S28
	Islamic History and Arts	2	23	M	S29
	Islamic History and Arts	1	20	F	S30
	Islamic History and Arts	1	20	F	S31
Faculty of Agriculture	Department of Plant Protection	1	20	F	S32
	Department of Plant Protection	4	23	F	S33
	Department of Horticulture	3	22	M	S34
	Department of Horticulture	2	21	F	S35
Faculty of Arts and Sciences	Department of History	3	20	F	S36
	Department of History	2	22	F	S37
	Department of Geography	4	23	M	S38
	Department of Geography	2	25	M	S39
	Mathematics	4	23	F	S40
	Mathematics	1	19	F	S41
Faculty of Architecture and Engineering	Mapping	2	19	M	S42
	Mapping	2	20	F	S43
	Food Engineering	3	24	F	S44
	Food Engineering	3	23	M	S45
	Mechanical Engineering	2	21	F	S46
	Mechanical Engineering	1	20	M	S47
Faculty of Economics and Administrative Sciences	Public Administration	3	22	M	S48
	Public Administration	2	21	M	S49
	Public Administration	1	20	F	S50
	Public Administration	3	23	M	S51
	Public Administration	2	20	F	S52
	Finance	1	20	F	S53
	Finance	2	19	F	S54
	Finance	3	21	F	S55
	Finance	2	22	M	S56

As seen in Table 1, students from different faculties and departments participated to the study.

2.3. Data Collection and Data Collection Tool

A semi-structured interview form developed by the researcher was used to collect qualitative data. For the validity and reliability of the interview form, the opinions of two experts were taken and corrections were made in line with the suggestions. The forms also include demographic information about the participants. In the individual interviews, consent was obtained from the participants, and the answers of the participants were recorded on the interview forms by the researcher using paper and pencil. The researcher tried not to be directive and he intervened to prevent the participants from going

out of the subject and to remind them of the subject. An average interview took 15 minutes with three questions.

2.4. Data Analysis

The collected data has been combined into a text file and analyzed using the content analysis method. Assistance was taken from an expert for coding, creating themes, obtaining findings and coding reliability. The reliability of the study was done according to the formula suggested by Miles and Huberman (1994). According to the formula the number of agreed ideas (75) is divided to the total number of coding (83) and multiplied with 100 to find out the percentage of correlation. According to Miles and Huberman (1994, p. 64), if the consensus correlation is above 70% or more, the research is considered reliable. In this study, the correlation between the encoders was 90%. For the coding where there is disagreement, the researcher and the expert instructor decided together which coding to be used. The themes and codes that emerged as a result of the content analysis were converted into tables and given in the findings together with the frequency numbers. The encodings in the tables were interpreted by the researcher and supported by direct citations with the views of the participants.

3. FINDINGS

In this section, the collected data were analyzed and answers to the problem questions were sought in the light of the data.

3.1. Reasons For University Students' Absenteeism

In the individual interviews the students participating in the study were first asked to answer following questions: “What are your reasons for not attending classes? In what situations would you prefer not to attend classes?” The answers of the participants were noted by using pen and pencil, and categorized into themes and codes as given in Table 2. While coding, expressions with similar meanings were gathered under a single expression, and this expression was given by choosing the sentences that best expressed the situation from the participants in order to be meaningful. All other coding were done in this way

Table 2. Reasons for Absenteeism of University Students

Themes	Participant Codes	*f*
Health problems,	S1, S2, S4, S5, S6, S11, S13, S15, S16, S17, S18, S19, S21, S22, S23, S24, S25, S26, S28, S30, S32, S38, S40, S41, S42, S43, S45, S47, S49, S50, S53, S54, S55, S56	34
Difficulty in waking up early,	S3, S5, S6, S7, S8, S9, S10, S15, S20, S21, S22, S34, S35, S39, S44, S45, S48, S49, S50	19
Psychological-stress-depression	S7, S9, S10, S16, S17, S18, S21, S23, S24, S30, S44, S48, S49, S53, S54	15
Boring/monotonic lesson,	S1, S3, S5, S6, S9, S30, S36, S38, S40, S44, S46, S48, S50, S52, S53	15
Early course hours,	S3, S12, S13, S19, S20, S24, S32, S43, S45, S46, S47	11
When bored,	S2, S3, S9, S10, S21, S22, S40, S44, S48, S49, S53	11
Family reasons,	S11, S14, S16, S17, S19, S23, S24, S4, S48, S50, S56	11
Transportation,	S8, S9, S17, S22, S23, S32, S35, S47	8
Instructors,	S9, S31, S36, S38, S45, S56	6
Weather conditions	S37, S38, S50, S56	4
Long course hours,	S8, S9, S44	3
Bad environment,	S6, S8, S44	3
To study KPSS	S27, S29, S51	3
Uninformative courses	S12, S21	2
At exam times,	S2, S4,	2
When absenteeism is not a problem,	S37, S38	2
For sightseeing	S7	1
For hospital appointment	S15	1
Prolongation of work	S16	1

Short lesson breaks,	S3	1
End of term,	S34,	1
The distance from the dormitory,	S9	1
When the courses are at the upstairs	S6	1
Pennilessness	S50	1
Conflict of lessons	S51	1
Friends	S53	1

When Table 2, which summaries the reasons for absenteeism is examined, “health problems” are stated as the most important reason by the majority of the participants (f=34). The second important reason is the “difficulty in waking up early” (f=19). Students' absenteeism due to psychological factors is in the third place (f=15). There are other important reasons such as early class hours, boredom, family problems, transportation problems, and reasons originating from the instructor. The students have sleeping problems, especially when they are sick due to the early hours of the lessons, and they are absent when the instructors do not make the lessons interesting enough. The statements of some students regarding the reasons for absenteeism are as follows:

I do not prefer going to school because of illness. I am afraid of catching Covid-19 as some of my friends were Covid-19 and they had to stay in hospital for days. Also, I prefer to be absent because some classes are boring. I don't want to attend the lesson when I feel asleep, when I don't want to interrupt my sleep, I stay at home and do not go school (S5).

When there is a health problem, when I cannot wake up, when the lessons do not interest me, when the school environment is not good, I do not go to school. If I don't like the lectures of some instructors, I do not attend. Also, when the classes are on the upper floors, I do not attend because the elevators are not open to students (S6).

I don't attend when the lesson doesn't interest me. My flat is far from school and transportation increase absenteeism. If I do not like the teacher, if the course hours are long and the teacher reads and passes the PDF, I prefer not to attend the lesson (S9).

Health status, inability to wake up, depressed mood, stress. When parents have a health problem. Being far from home, not being able to catch public transport are my reasons of absenteeism, I am also absent from psychological factors. Or a job may arise for family reasons. Desire to see my family before the holiday break (S17).

Sometimes I find it difficult to attend the lessons because the hours are at 08:00 in the morning. Another reason is that I have to be absent because the buses are very full at 08:00 and students are victimized (S32).

I am absent when I have health problems. I prefer not to attend class when I am not feeling very well psychologically. Because in those situations, even if I go to school, I cannot be productive (S38).

I do not continue when I do not feel well both psychologically and physically. I don't want to go to that class when I don't enjoy it. The same is true for the courses I had difficulty with. The friend environment also affects attendance (S53).

When I don't feel well, I am absent because I can't be productive. I don't want to go to class because of the teachers' attitude towards students. Sometimes the reason why I don't go is because of the weather conditions. Sometimes I do not go away from the problems in my private life (S56).

The above statements seem to support the Table 2. Students do not attend lessons when they feel ill or fear to catch illness. Moreover, they stated that some lessons are boring and if the instructors make the lessons more interesting, the attendance rate may increase. In addition, transportation-related problems need to be solved. Students state that due to the lessons that start at the same time in many departments, there is an excessive intensity at the bus stops, they cannot wake up early for the lessons that are put in the early hours, and they generally have sleeping problems.

3.2 Should Attendance be Compulsory?

"What do you think about the necessity of attending university courses? Should attendance be compulsory? Shouldn't it be? Why do you think so? These questions were asked to get data about compulsory attendance. The answers of the participants were analyzed and the results were given in Table 3.

Table 3. Opinions on compulsory attendance

Themes	Participant Codes	*f*
Attendance shouldn't be compulsory	S1,S3,S5,S6,S7,S8,S9,S10,S14,S16,S17,S18,S19,S21,S24, 29,S30,S32,S33,S34,S35,S36,S38,S41,S42,S43,S44,S46, S47,S48,S49, S50, S51, S52, S55	35
We are at a certain age,	S7, S9, S33, S34, S41, S43, S47, S49	8
May not attend due to private reasons,	S1, S10, S14, S16, S24, S46, S50	7
Must participate voluntarily,	S7, S8, S18, S41, S44, S49, S52	7
Student must decide attendance,	S2, S9, S33, S36, S44, S52	6
You should be eager to take the course,	S29, S35, S36, S41, S49	5
The one who is responsible attends,	S2, S41, S43, S47	4
One may have health problems,	S1, S17, S21	3
Student may get bored,	S5, S8, S21	3
University education is not compulsory,	S6, S44	2
Attendance should change according to the course,	S30, S42	2
No friends	S5	1
Not to have crowded classes,	S50	
Makes you a social	S5	1
Some courses are irrelevant to department,	S18	1
There is no point in sleeping in the class,	S19	1
One may know the course content,	S21	1
We sleep late,	S24	1
Attending courses nonstop may destroy your psychology.	S5	1
Attendance should be compulsory	S4, S11, S12, S13, S15, S20, S22 S23, S25, S26, S27, S28, S31, S37, S39, S40, S45, S53, S54, S55, S56	21
Necessary for education	S4, S25, S37, S39, S40, S45, S53, S55, S56	9
Most do not attend courses,	S22, S25, S28, S31, S40, S45	6
Necessary for success and productivity,	S11, S25, S31, S39, S45, S53, S56	7
There should be more absenteeism right,	S13 S20, S23, S26, S54	5
There would be no missing information in business life,	S3, S4, S37, S40	4
Studying makes no sense otherwise	S12, S37, S39, S56	4
Required for a regular life,	S11, S15, S37	3
We lose every day we do not attend	S4, S25	2
No discipline is achieved,	S15.	1
Must be dependent on free will	S51	1
No learning without the instructor,	S27	1
We need practice.	S27	1

When Table 3 is examined, the views of the participants are grouped under two important themes. 30 different coding were made under the themes of "compulsory attendance". Most participants (f=35) have the opinion that attendance mustn't be compulsory, and the others (f=21) think the opposite. The participants show their age as a reason (f=8) in the first place under the theme of not being compulsory. Participants who see themselves as adults state that they are old enough to make their own decisions about attending the courses. Participants who think that there should be no obligation because they cannot attend school for some special reasons (f=7) are in the second place.

The first most voted reason under the theme of attendance should be compulsory in the table (f=9) is "Necessity of attendance for education". According to the students who think that attendance must be compulsory cited that if the courses were not compulsory, most students would not attend the courses (f=7), and success and productivity would decrease. There were students (f=5) who think that attendance to classes must be compulsory but the legally allowed duration for absenteeism should be longer. Statements of some of the participants are given below:

> *I'm in favor of compulsory attendance as it is necessary for our education. I think we lose something for every day that we are absent. This situation may force us in the future in terms of being lack of necessary knowledge, experience and practice for our jobs (S4).*
> *Attendance should not be compulsory. It's absurd to have an absenteeism limit. Anyone who does not want to attend, shouldn't attend. We are 20 years old. Let those who want to come, do people who do not come harm the school? How many of us will have jobs when school is over anyway? They do not tell us how to find a job, they teach us what to do if we find a job (S7).*
> *I don't think it should be compulsory. Because we are people who have come to a certain age. We are old enough to make our own decisions. In all our lives, from primary school to high school, we always attended to school as it was compulsory. I think that this decision should be left to us in our university life (S9).*
> *Attendance should not be compulsory. In case of health problems, rest is required (S17).*
> *Attendance should not be compulsory because students may experience difficulties due to their special circumstances. In other words, there could be private situations, we may go to bed late, we may have fun at night, or there can be other special reasons (S24).*
> *It should be compulsory in my opinion. We will be professionals, have jobs. We need to be educated. If we are absent, we will not understand anything from the department we are studying or from our university life (S37).*
> *Attendance should not be compulsory. Everyone is over the age of nineteen and is of legal age. Individuals who know their responsibilities already know which courses to take and care about. Imposition always provokes negative reactions. I think that people should not be forced in the early hours of the morning (S41).*
> *Attendance should be compulsory because when this situation is removed, the efficiency of lessons will decrease. There will be indiscipline. If absenteeism is eliminated, everyone will begin to act arbitrarily and not attend classes. Classes that no one goes will cease to be held. In such a case, school becomes meaningless. Continuation is required (S53).*

Compulsory attendance to classes is not supported by most of the participants as seen above statements and Table 3. However, as some of the participants stated above, without attendance there won't be any meaning of schooling. Most are ready not to attend classes and they already have some reasons. Without compulsory attendance classes will not be productive without class environment provided by the instructors.

3.2. Ways to Ensure Attendance to Classes

Providing student attendance to classes is very important for academic development, learning and teaching activities. Without attendance it is not possible to diagnose student needs, and learning requirements. It would not be realistic to accept students developing necessary skills without the instructions at the school environment. However, a different point of view can be found by questioning those who do not attend courses regularly to get a striking response to question "What makes a student attend the classes?" So, the questions "What would make you attend the classes? What would you recommend to administrators and instructors?" were asked, and the answers were analyzed and the results are given in the table below.

Table 4. Ways to ensure attendance to classes

	Themes	Participant Codes	*f*
class and instructor related issues to ensure attendance	No classes at early hour of the morning.	S5,S6,S12,S13,S17,S19,S21,S22,S23,S25, S28,S31,S32,S34,S35,S36,S39,S42,S43, S44, S45, S46, S48	23
	Classes should be a fun.	S1,S4,S8,S12,S20,S21,S26,S37,S38,S40,S41, S45, S47, S49, S51, S52, S55, S56	15
	Classes should attract attention.	S1,S2,S4,S15,S24,S26,S29,S29,S37,S41, S47, S49, S51, S52, S55, S56	12
	More practice.	S3, S5, S12, S15, S27, S30, S46, S48, S51, S55	8
	More visualized classes.	S15, S31, S37, S38, S40, S41, S49, S51	7
	Short class hours.	S2 S6, S7, S10, S18, S43,S45, S53	7
	Using effective teaching technics.	S9, S30, S37, S40, S41, S48, S51,S55	6
	Being more understanding.	S14, S16, S20, S35, S46, S52, S53	5
	Longer breaks.	S6, S7, S9, S44, S53, S54, S56	4
	Less classes.	S8, S23, S31,	3
	More meaningful classes.	S3, S12, S31, S55	3
	No rigid instructor.	S2, S26,S52	2
	Group assignments.	S8,	1
	More breaks.	S4,	1
	Difficult classes not in one day.	S4, S54	1
	Friendly Instructors	S5, S55, S56	1
School related issues to ensure attendance	More activities (academic, sports, social, cultural).	S2, S3, S5, S7, S8, S9, S10, S12, S16, S17, S18, S21, S23, S24, S41, S42, S46, S47, S50, S52	18
	Easier transportation	S22, S23, S32, S35, S46, S49	6
	Comfortable seats in the classes.	S12, S33,S46	2
	Solving students' problems.	S11, S14,	2
	A better curriculum.	S23, S56	1
	Fun competitions.	S17,	1
	Colorful cushions on the lawn.	S17,	1
	Cheaper coffee in the canteen.	S44,	1
	No class one day in week days.	S7,	1
	Electronic boards.	S12,	1

As seen in Table 4, the suggestions of the participants were gathered under two important themes. These themes are named as the duties for the classes and the instructors, and duties for the school. Nearly half of the participants (f=23) recommend no lessons in the early hours in the morning. In fact, some of the students whose statements were examined suggested that the lessons should be put in the afternoon. In addition, when Table 2, in which the reasons for students' absenteeism are given, is examined, it is seen that sleep distress emerges as the second most important reason for absenteeism after health problems. This shows that the students made their suggestions in parallel with the reasons for absenteeism. The second suggestions of the students regarding the courses and the instructors are that the lessons should be fun (f=15), and thirdly, that the lesson should attract attention (f=12). Some other important suggestions are that more practical classes, visual-based lectures should be given, course durations should be short, and teachers should not just read, they should add something to the content of the course.

When the duties regarding the school in Table 4 are examined, the first important duty is to increase the activities (f=18). The activities such as concerts and competitions held outside of classes will attract students to school. The second suggestion regarding the school in the table is the

suggestion of easy transportation. Considering that students' waiting for the bus for a long time and not being able to find a place in the buses are among the reasons for their absenteeism, so their suggestion to have easier transportation is more meaningful. The following statements support the data in Table 4:

> *Lessons can be handled in a more fun way. It would be better if the slides were explained in a way that would attract the attention of the students without reading them (S1).*
> *I recommend shortening the duration of the lessons, reducing the number of lessons or not having a class on a weekday. I recommend increasing the activities in the school. There are more activities outside, so why should we come to school (S7).*
> *Since there are not many activities to attract our attention to the school, students are not depended to the school. Activities can be done at school. I think the most logical way would be to reduce the lesson times. Or I suggest that there should not be block lessons, this increases fatigue (S10).*
> *Instructors should teach more effectively, lessons should be interesting, and there should be a visual-based lecture. In addition, I recommend that there must be more practical classes than theoretical classes (S15).*
> *Setting the class hours to early hours prevents the student from attending the classes. That's why I suggest that classes be put at a late time, so I think there will be more participation (S25).*
> *I think the majority of classes should start in the afternoon. Students have difficulty in waking up during the day. If the classes start in the afternoon, it will not be so difficult for the students to wake up (S28).*
> *First of all, classes should be fun for me, which is related with the instructor. Classes should involve the student in the lesson, the type of narration made through the presentation bores the students since it is generally a straight information loading. If this method, which is generally used by our instructors is changed, the classes will be more fluent, entertaining and based on visual elements, and students' attendance will increase (S40).*

As the statements above analyzed, it is apparent that instructors must improve their teaching methodology, have a friendly atmosphere in the classroom. The university campuses must have extracurricular activities to make students come to campuses most of which are generally localized outside the city centers in Turkey.

4. DISCUSSION AND CONCLUSION

It is seen that students' absenteeism due to health problems is not directly related to the epidemic. As in similar studies in the literature (Sarıdere & Arslan, 2017) health problems as a reason for absenteeism was also found as an important reason. However, fear of being ill and catching Covid-19 could be a specific finding for the study. The analysis showed that to increase the attendance to the courses, instructors, schools and students have tasks to do. The schools for example should not plan lessons in the early hours. However, in similar studies (Altınkurt, 2008; Pehlivan, 2011; Şimşek et al., 2016; Uğurlu et al., 2015; Usta et al., 2014) there is not any similar recommendation. This situation can be explained by the long school closure due to Covid-19 which would change students sleeping habit. The course attendance habits of the students have changed in a period of about 2-year school closure, when the courses were not held face-to-face, and the course evaluations were made online with homework and project studies. The duties regarding the course and the teaching staff are related to the way the courses are taught. It has been observed that suggestions such as entertaining lessons, interesting lessons, more practice rather than theoretical explanations, and teaching lessons with visual materials are similar in the literature (Altınkurt, 2008; Uğurlu et al. 2015; Usta et al., 2014).

In this study, the reasons for absenteeism of university students were tried to be examined. In addition, whether attendance should be compulsory or not and the ways to ensure students' attendance to the courses were examined. In the study, qualitative methodology was used, and the content analysis method was used in the analysis of the data collected in accordance with the phenomenology.

According to the findings, the most important reason for absenteeism is health problems. It is seen that the second important reason for students' absenteeism is waking up early. Stress and depression, classes being at early hours of the morning, family and transportation problems, and attitudes of academic staff were mentioned as important reasons for absenteeism. It is seen that the long course hours, lack of sufficient activities in the school environment, not finding the lessons meaningful and informative enough also affect the students' attendance. It was revealed that there should be no obligation to attend classes according to the university students as they desire to be conducted as adults due to their ages. Furthermore, students would listen to the lesson more efficiently if they attend with their own will. University students also claim that those who are responsible would attend without any forcing power.

The analysis of the opinions showed that to increase the attendance there are duties for teaching staff, school and students. Lessons should not be planned in the early hours. Schools must increase the number of the social, cultural and sportive activities and solve the transportation problem. Instructors must use more interesting teaching technics and improve their teaching skills.

In accordance with the results of the study, the following suggestions have been developed to increase attendance rate at universities:

1) Course hours can be set to later hours during the day, or methods for students to go to bed early and wake up early can be developed as waking up early is one of the main problems.
2) Preventing the lessons from being boring and monotonous, making them more fun, increasing the interest of the students in the lessons and providing sufficient motivation would increase the attendance to the lessons. In this direction, instructors should develop their own teaching methods and techniques and make the lessons more interesting.
3) Transportation problem is seen as a reason for students' absenteeism in many studies. The municipality should increase the number of vehicles on the university route for the transportation of university students, and take into account the start and end times of the lesson hours, and add additional vehicles according to the student density. Alternatively, when the municipalities cannot find a solution to transportation problem, university administrations should follow a different timetable policy by changing the course hours on the basis of faculty or program, preventing thousands of students from starting or finishing the course at the same time, in order to prevent student cluttering.
4) Reducing the theoretical knowledge load, omitting the courses that are not related to the student's field from the curriculum, simplifying the course content and reducing the number of lessons, and not making block lessons can increase student attendance to the courses.
5) Schools should not be designed as spaces consisting of only four walls. The school is also the living space of the students. Among the students' suggestions for the school, the most important issue was the organization of social, cultural and sportive activities and the organization of fun competitions. Considering this suggestion, social activity programs should be organized, and university campuses should have the appearance of abandoned building blocks outside the classroom.

Similar studies can be done for specific faculties and departments to find out specific reasons and locally changeable reasons for absenteeism. Moreover, this is a qualitative study and the data collected were limited to the participants at a university. More participants and different study methods can be used with multiple university environments to better diagnose and examine the reasons of absenteeism. Administrators and policy makers are suggested to take into consideration the results of scientific researches and develop policies to minimize student absenteeism.

Ethics Committee Decision

Ethics Committee Report of this research; It was taken from the Social and Human Sciences Research Ethics Committee of Tokat Gaziosmanpaşa University, with the decision dated 27.04.2022, Session No.07 and numbered 07.54.

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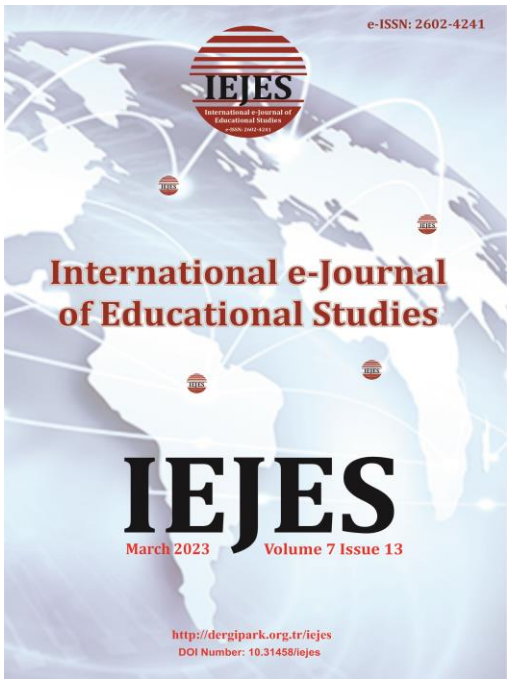

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Abstract

It is one of the important qualifications of teachers to know contemporary instructional technologies and to use them in their lessons. However, the studies have concluded that teachers' use of technological tools and equipment is inadequate and their level of using materials is generally not at a desirable level. In this context, the aim of this study is to determine the level of Technological Pedagogical content knowledge of preservice mathematics teachers in the context of technology-supported activities they prepared. The study was conducted with 13 preservice secondary school mathematics teachers studying at a state university. Preservice teachers were given a training lasting 8 weeks. After the training, they were asked to prepare technology-supported activities including concept cartoon (Powtoon, Canva), concept map (Bubbl.us, Luchidchart), interactive worksheet (Teachermade), gamification applications (Puzzlemaker, Wordwall, Matific, ClassDojo) and digital stories (Pixton, Powtoon, StoryboardThat, Storyjumper). The activities they prepared were analyzed by document analysis method with the Technological Pedagogical Content Knowledge [TPACK] rubric developed by Lyublinskaya and Tournaki (2012) and preservice teachers' TPACK levels were evaluated in terms of purpose knowledge, instructional knowledge, curriculum knowledge and strategy knowledge components. The study has revealed that preservice teachers were able to reach the highest level of discovery, curriculum knowledge was the most successful component and they showed the lowest success in the strategy knowledge component. In this context, we suggest that course content that includes such activity design tasks should be prepared and included in the teaching process for the development of preservice teachers' Technological Pedagogical content knowledge.

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Research Article

Determination of Technology Pedagogy Content Knowledge Levels of Preservice Mathematics Teachers through Activities*

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Abstract

It is one of the important qualifications of teachers to know contemporary instructional technologies and to use them in their lessons. However, the studies have concluded that teachers' use of technological tools and equipment is inadequate and their level of using materials is generally not at a desirable level. In this context, the aim of this study is to determine the level of Technological Pedagogical content knowledge of preservice mathematics teachers in the context of technology-supported activities they prepared. The study was conducted with 13 preservice secondary school mathematics teachers studying at a state university. Preservice teachers were given a training lasting 8 weeks. After the training, they were asked to prepare technology-supported activities including concept cartoon (Powtoon, Canva), concept map (Bubbl.us, Luchidchart), interactive worksheet (Teachermade), gamification applications (Puzzlemaker, Wordwall, Matific, ClassDojo) and digital stories (Pixton, Powtoon, StoryboardThat, Storyjumper). The activities they prepared were analyzed by document analysis method with the Technological Pedagogical Content Knowledge [TPACK] rubric developed by Lyublinskaya and Tournaki (2012) and preservice teachers' TPACK levels were evaluated in terms of purpose knowledge, instructional knowledge, curriculum knowledge and strategy knowledge components. The study has revealed that preservice teachers were able to reach the highest level of discovery, curriculum knowledge was the most successful component and they showed the lowest success in the strategy knowledge component. In this context, we suggest that course content that includes such activity design tasks should be prepared and included in the teaching process for the development of preservice teachers' Technological Pedagogical content knowledge.

Keywords: Mathematics teaching, preservice mathematics teacher, technology supported activity, technological pedagogical content knowledge

1. INTRODUCTION

In order for teachers and preservice teachers to teach effectively in the classroom, they need to acquire skills related to the use of educational technology and to apply and use these skills effectively in the classroom (Varank & Ergün, 2005). It is one of the important qualifications of teachers to know contemporary instructional technologies and to use them in their lessons. In addition, preservice teachers should be able to develop new instructional materials to be used in their lessons or to develop and use existing materials and maintain these competencies when they become teachers. In the study conducted by Köğce, Özpınar, Mandacı-Şahin and Aydoğan-Yenmez (2013), the most emphasized competencies of preservice teachers were "having knowledge on technology, being open to technological innovations and using technological tools well". A good teacher should be competent not only in terms of content knowledge and pedagogical knowledge but also in terms of technological

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pedagogical content knowledge (TPACK). TPACK is a type of knowledge that emerged when Mishra and Koehler (2006) added technology knowledge to the definition of pedagogical content knowledge developed by Shulman (1986). According to this model, three knowledge/competency types, namely technology, pedagogy and content knowledge, interact with each other (Çetin, 2017). Niess (2005) stated that preservice mathematics teachers should take into account four important aspects of the TPACK framework in their technology-assisted instruction. Accordingly, these four components are:

- Knowledge about the purpose of teaching mathematics with technology,
- Students' understanding, thinking and learning knowledge about the outcomes with technology in teaching mathematics with technology,
- Knowledge of curriculum and curriculum materials that enable learning and teaching mathematics with technology,
- Knowledge of representations and teaching strategies to be used for learning and teaching mathematics with technology.

Niess et al. (2009) proposed a developmental model of TPACK. According to this model, mathematics teachers experience a five-stage developmental process while integrating technology into teaching and learning mathematics. The levels of this process are briefly as follows; 1. Recognition (Knowledge) Level: This is the level at which teachers are able to use technology and realize the compatibility of technology with the content of mathematics but are unable to integrate technology into mathematics teaching and learning. 2. Acceptance (Persuasion) Level: This is the period in which teachers' positive or negative attitudes towards the use of appropriate technology in mathematics teaching and learning emerge. 3. Adaptation (Decision) Level: This is the level in which teachers are involved in activities that lead them to accept or reject the choice of appropriate technology for teaching and learning mathematics. 4. Exploring (Application) Level: The level at which teachers actively incorporate technology into mathematics teaching and learning. 5. Developing (Confirming) Level: This is the level at which teachers evaluate the results of the technology they incorporate in the mathematics learning and teaching process (Çetin, 2017).

When we look at the studies on TPACK levels, Lyublinskaya and Tournaki (2012) examined the strategies of preservice teachers that differentiate their lesson plans and teaching with the TPACK rubric they developed. The research revealed that while all preservice teachers had the same differentiation strategies before TPACK, as their TPACK scores improved, their differentiation strategies for their lessons and lesson plans also improved. Akyüz (2016) examined whether 80 preservice teachers reached TPACK level and investigated the effect of students' grade level and teaching method on TPACK. According to the results of the study, it was noted that many preservice teachers did not reach the TPACK level and remained at the level of Technological Content Knowledge (TCK). It was also observed that the teaching method followed, and the grade level of the students were also effective on TPACK. Aydoğmuş and Ibrahim (2022) found in their study that project-based learning significantly increased students' TPACK competencies. Suharwoto (2006), in his study with preservice teachers, found that the four components of TPACK, knowledge of purpose, knowledge of curriculum and curriculum materials, knowledge of teaching strategies, and knowledge of students' learning, understanding and thinking, were at different levels. These different understandings of preservice teachers also affected their teaching. When the course practices of preservice teachers were examined, it was stated that their TPACK development levels were at the level of acceptance, adaptation, exploration and development. In their study, Erdoğan and Şahin (2010) showed that there were significant differences between TPACK sub-dimensions of primary and secondary mathematics teacher candidates. In addition, TPACK levels of preservice teachers explain their achievement levels. Yurdakul (2011) found that preservice teachers' techno-pedagogical education competencies differed according to their ICT usage levels and in parallel with this, as the ICT usage levels of preservice teachers increased, their techno-pedagogical education competencies

also increased. In his study, Timur (2011) pointed out that technology-supported instruction helped preservice teachers to develop knowledge of purpose, knowledge of curriculum and curriculum materials, knowledge of instructional strategies and knowledge of assessment, which are subcomponents of TPACK. However, it was found that these teaching practices were not effective on the development of teacher knowledge about students' understanding, thinking and learning, which is another subcomponent. In a study conducted by Balgalmış (2013), it was revealed that there was an increasing change in the TPACK levels of preservice mathematics teachers who planned and implemented mathematics lessons with GeoGebra. The results of the study revealed that technology-supported teaching experience and reflective thinking processes are necessary to improve the TPACK levels of preservice teachers. Mutluoğlu and Erdoğan (2016) examined the TPACK levels of elementary mathematics teachers according to their teaching style preferences. According to the results of the study, TPACK levels of teachers do not vary according to "gender", but they vary according to "seniority" and "technology knowledge". Çetin (2017) examined the change in TPACK competencies and levels of 33 secondary mathematics teacher candidates. Preservice teachers received training on TPACK-based lesson plan preparation, software, site and manipulative use for 6 weeks. Afterwards, they prepared TPACK-based lesson plans. At the end of the process, it was shown that the training they received during the research increased their TPACK development and their ability to integrate technology into their lessons. Valtonen et al. (2019) conducted a study to reveal the development and changes in TPACK of preservice teachers during the first 3 years of teacher education. As a result of the study, it was revealed that teacher education has a positive effect on TPACK. Mailizar, Burg and Maulina (2021) conducted a study on the impact of Online Teacher Professional Development (OTPD) on TPACK of secondary school mathematics teachers. At the end of this study, it was revealed that teachers' TPACK constructs were strongly interconnected and significantly influenced teachers' OTPD. Jin and Schmidt-Crawfor (2022) organized an (educational technology) Edteach course for preservice teachers. This study investigated the difference between TPACK scores of preservice teachers before and after the course. As a result, TPACK scores of preservice teachers increased after the Edteach course. However, there is still a gap between the post-course scores of preservice teachers with low pre-course scores and preservice teachers with high pre-course scores. Following the course, it was determined that there was still a knowledge gap between the groups of preservice teachers. They stated that there is a need for method courses with more specialized content and technology in their studies, applied trainings and field experiences. There is also a need for additional studies that use more research and evaluation criteria to investigate the TPACK development of preservice teachers. According to Agyei and Voogt (2012), in order for preservice teachers to develop their TPACK, they needed to participate in technology-rich design activities (such as basic technology acquisition, technology-supported lesson plans, teamwork and microteaching discussions) and more systematic efforts (such as courses, workshops) were needed for this. This situation highlighted the importance of courses in teacher education programs that include the characteristics of various instructional technologies, their place and use in the teaching process, the development of instructional materials (worksheets, transparencies, slides, video, computer-based course materials, etc.) through instructional technologies, and the evaluation of materials of various qualities. "Instructional Technologies and Material Development" course is one of these courses. The knowledge, attitudes and skills gained in the Instructional Technologies and Material Development course will help teachers to make teaching-learning processes more effective (Tutkun & Koç, 2002). Akkoç, Özmantar and Bingölbali (2008) stated that it would be effective to use TPACK components to diagnose the difficulties of preservice teachers in integrating technology into teaching. They also stated that TPACK framework can be used to determine the content of courses such as "Instructional Technologies in Mathematics Teaching" to be organized for preservice teachers and to create the content of courses on the integration of technology into teaching.

The competence of preservice teachers in the use of instructional technology will be the determinant of being a qualified teacher when they become a teacher. Knowing in which areas they are effective and in which areas they are inadequate will provide solution perspectives with a critical view of the problems. This will help our education system to function more effectively and efficiently and contribute to raising qualified individuals. Preservice teachers who are trained with adequate and effective qualifications will use the teaching material efficiently in their classes. For this reason, it was deemed worth investigating the level of TPACK of preservice teachers in the context of technology-supported activities. In this context, the research question of the study was: "What is the level of technology pedagogy content knowledge of preservice mathematics teachers in the context of technology supported activities they prepared?". This study is also expected to be a source for future studies in the light of developing effective materials, comparing and evaluating materials. In addition, knowing the level of TPACK of preservice teachers at the end of the education they receive in education faculties will contribute to the field. The situations that emerged as a result of this study will be evaluated and suggestions will be presented.

2. METHOD

2.1. Research Design

The study utilized the case study design, one of the qualitative research designs. Case study is defined as a method in which an event or an environment is examined in depth (McMillan, 2004). In research, case study is used to identify and see the details that make up an event, to develop possible explanations for an event, and to evaluate an event (Gall, Borg & Gall, 1996). Due to these characteristics, case study design was preferred in this study conducted to determine the TPACK levels of preservice teachers.

2.2. Participants

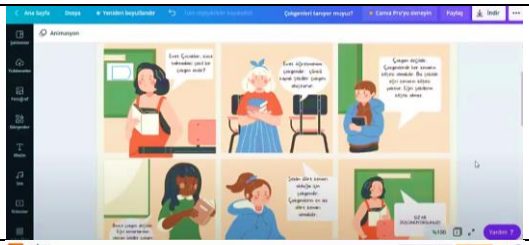
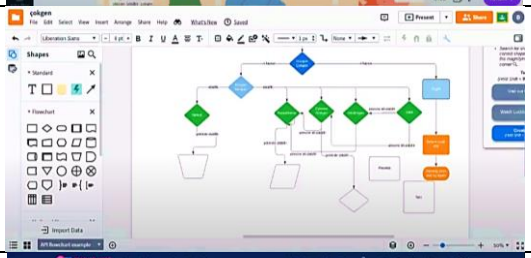
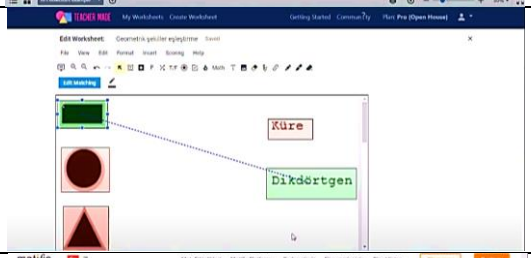
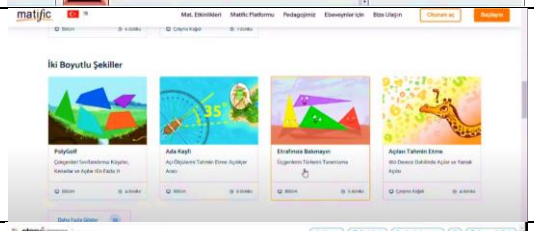
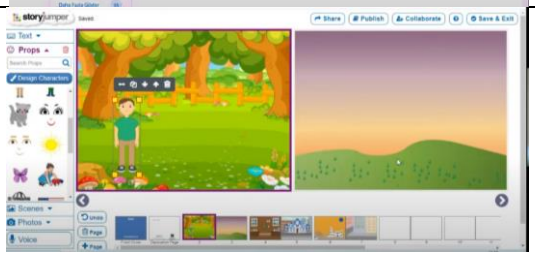
The study was conducted with 13 preservice mathematics teachers studying in the 2nd and 3rd grades at a state university in Türkiye. Criterion sampling method, one of the purposive sampling methods, was used in the selection of preservice teachers. The first criterion for the selection of the participants was that they had basic computer skills and had received computer education before. In addition to this, another criterion was that they had taken the computer-assisted mathematics teaching course. Thus, it was accepted that the preservice teachers had the technology knowledge they would need in the process of designing technology-supported activities.

2.3. Research Process

The permission required for this study was obtained by the Publication Ethics Committee of Recep Tayyip Erdoğan University in Türkiye with the decision numbered 2022/304 on 14.11.2022. The preservice teachers were involved in an 8-week process. In the first two weeks, preservice teachers were presented with the theoretical framework and examples of integrating technology into the teaching process, using and designing activities in mathematics teaching, and designing technology-supported activities in mathematics teaching. In the following weeks, the materials selected within the scope of the research were introduced. The technology-supported materials used in the process, the programs and environments used for the design of these materials, and their visuals are given in Table 1.

Table 1. Research process

Week	Technology Supported Materials	Used programs	Sample Images of the Programs Used
1	Technology integration into the teaching process	-	-
2	Using and designing	-	-

	activities in mathematics teaching		
3	Technology supported activity design in mathematics teaching	-	-
4	Concept Cartoon Introduction	Powtoon, Canva	
5	Concept Map Introduction	Bubbl.us, Luchidchart	
6	Interactive Worksheet Introduction	Teachermade	
7	Introduction of Gamification Applications	Puzzlemaker, Wordwall, Matific, ClassDojo	
8	Digital Story Promotion	Pixton, Powtoon, StoryboardThat, Storyjumper	

Starting from the fourth week, the related programs were introduced to the preservice teachers and the activity design process including technology-supported materials that they could use these programs was carried out. At the end of each week, preservice teachers were individually asked to prepare technology-supported activities to include the learning outcomes in the middle school mathematics curriculum.

2.4. Data Collection Tool

The data group of this study consists of technology-supported activities prepared individually by preservice teachers. Each preservice teacher designed activities in which the learning outcomes in the middle school mathematics curriculum and the relevant material of that week were used. A total of 65 technology-supported activities prepared by preservice teachers were evaluated within the scope of this study and the TPACK levels of preservice teachers were determined. While these activities were being prepared and practiced, there was no restriction on the subject matter and objectives; on the contrary, various activities suitable for the objectives that can be used at the primary education level

were introduced, how these activities can be developed and how they can be integrated into the lessons/subjects were taught. The TPACK levels of preservice mathematics teachers were examined in terms of how they use the technology knowledge and technological tools they have acquired through the education they received. This examination is only in TPACK dimension and sub-dimensions such as technology knowledge (TK), pedagogy knowledge (PK), content knowledge (CK), technology pedagogy knowledge (TPK), technology content knowledge (TCK) and pedagogy content knowledge (PCK) were excluded from the examination.

2.5. Data Analysis

Technology-supported activities prepared by preservice teachers were analyzed in the context of TPACK levels by document analysis method. In the evaluation of TPACK levels, the TPACK level rubric developed by Lyublinskaya and Tournaki (2012) was used. In the rubric, the TPACK components that preservice teachers should have are respectively; 1. Determining the purpose 2. 4. Strategy knowledge. These components are evaluated in five stages through the rubric. Within the framework of TPACK defined by Niess (2011), mathematics teachers' performances in integrating technology into their lessons are based on the assessment of each of the components of TPACK that preservice teachers should have at five levels [Recognizing (1), Accepting (2), Adapting (3), Exploring (4) and Developing (5)]. The level ranges of these components vary between 0 and 5 points. The scores written opposite the levels are accepted as an indicator that the preservice teacher is at that level in line with the score received. In order to be at this level, preservice teachers must meet both indicators specified in the rubric. Half scores represent transitions between levels. Accordingly, TPACK components level ranges are given in the table below.

Table 2. TPACK components level ranges

Points Received from Level	Level
0	No level
0,5	Switch to recognition level
1	Recognition level
1,5	Transition from Recognition to Acceptance
2	Acceptance level
2,5	Transition from Accept to Adaptation
3	Adaptation level
3,5	Moving from Adaptation to Discovery
4	Exploration level
4,5	Transition from Exploration to Development
5	Development level

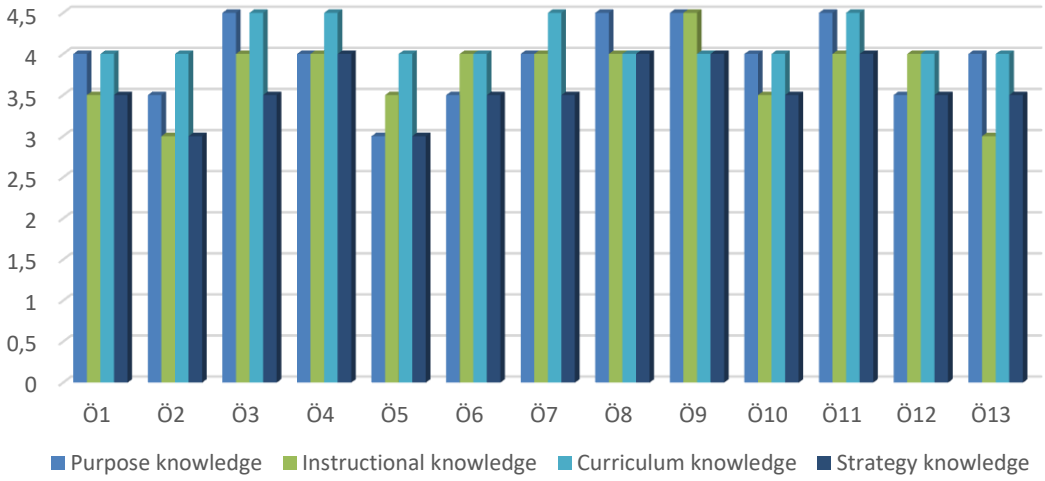
The TPACK level of preservice teachers is determined by the lowest score from the four components. On the other hand, the total scores of the preservice teachers from the four components (Determining the purpose, Teaching knowledge, Curriculum knowledge, Strategy knowledge) in each activity were calculated and their success status in terms of the components in the context of the related activity was interpreted. The highest score that 13 preservice teachers can get in total for each component is 65 and the lowest score is 0. The scores were evaluated with a field expert and a consensus was reached.

3. FINDINGS

In this section, the TPACK levels of preservice teachers were evaluated according to the activities they developed and presented in tables. The evaluation and activity examples for each teaching material are presented in detail.

3.1. TPACK Levels of Preservice Teachers in Concept Cartoon Design

The TPACK levels of preservice teachers in the activities they prepared using concept cartoon are given in Graph 1.



Graph 1. Preservice teachers' TPACK performances in concept cartoon

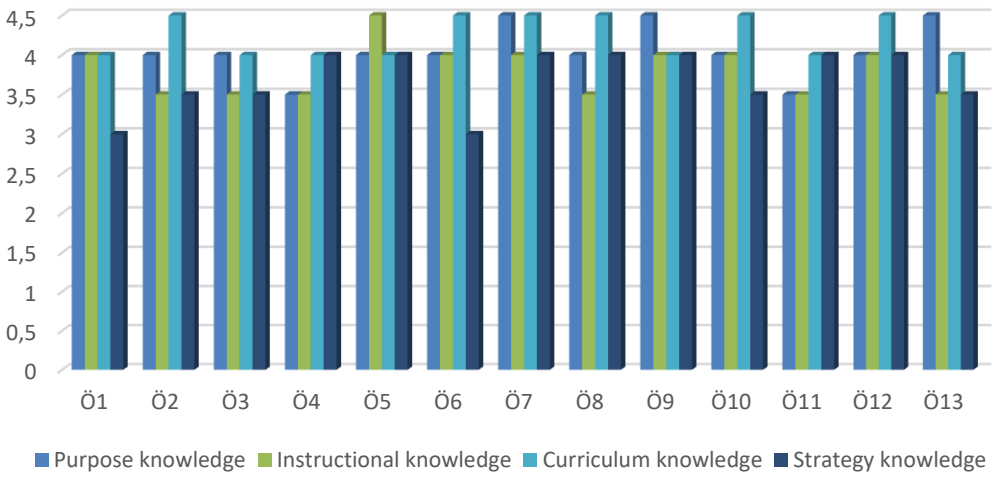
Based on the graph, when the total scores of the preservice teachers for each component were calculated, it was revealed that they scored a total of 44, 42.5, 46 and 40 points for the determination of purpose component, teaching knowledge component, curriculum component and strategy knowledge component, respectively. When the overall evaluation in terms of components was analyzed, it was determined that preservice teachers showed the highest performance in the curriculum knowledge component. The component in which they showed the lowest performance was the strategy knowledge component. When the individual performances of the preservice teachers were analyzed, it was seen that they were at the lowest level of adaptation and at the highest level of transition from exploration to development. When the levels of preservice teachers for four components in the design of concept cartoon material were examined, it was found that T2, T5 and T13 were at the adaptation level; T1, T3, T6, T7, T10 and T12 were at the transition level from adaptation to exploration level; and T4, T8, T9 and T11 were at the exploration level. No preservice teacher reached the development level in the components. The concept cartoons designed by the preservice teachers generally had deficiencies such as not expressing the reasons for misconceptions in the texts in the speech bubbles, the thought forms in the speech bubbles being too long and not expressed in legible sentences, and the use of irrelevant visuals.

An example of the designed concept cartoons is presented below. This concept cartoon was prepared to include the learning outcome "Addition and subtraction with fractions". In addition, misconceptions such as “When adding fractions with unequal denominators, consider the numerator and denominator separately”, "When adding fractions with unequal denominators, do not multiply the numerators while multiplying the denominators by the expansion coefficient while equalizing the denominators" and “When adding fractions with unequal denominators, add the expansion coefficient to the numerator and denominator while equalizing the denominators” were used for the concept cartoon. This material was designed using the Canva tool.

Figure 1. Concept cartoon of T8

3.2. TPACK Levels Of Preservice Teachers in Concept Map Design

The TPACK levels of preservice teachers in the activities they prepared using concept maps are given in Graph 2.



Graph 2. Preservice teachers' TPACK performances on concept map

Based on the graph, when the total scores of the preservice teachers for each component were calculated, it was revealed that they scored 52.5, 49.5, 55 and 48 points for the determination of purpose component, teaching knowledge component, curriculum component and strategy knowledge component, respectively. When the overall evaluation in terms of components was analyzed, it was determined that preservice teachers showed the highest performance in the curriculum knowledge component. The component in which they showed the lowest performance was the strategy knowledge component. When the individual performances of the preservice teachers were analyzed, it was seen that they were at the lowest level of adaptation and at the highest level of transition from the level of discovery to the level of development. When the levels of the preservice teachers for the four components of concept map material design were examined, it was found that T1 and T6 were at the adaptation level; T2, T3, T4, T8, T10, T11 and T13 were at the transition level from adaptation to exploration level; and T5, T7, T9 and T12 were at the exploration level. No preservice teacher reached the development level in the components. The concept maps designed by the preservice teachers had deficiencies such as the map not being detailed enough, not placing the main concept at the center of

the map, lack of verbs or conjunctions connecting two concepts between concepts, and the verbs or conjunctions connecting two concepts not being understandable.

An example of the designed concept map is presented below. This material was prepared by T5 using the bubbl.us tool to include the learning outcome "Recognizes rectangle, parallelogram, trapezoid and rhombus; determines angle properties".

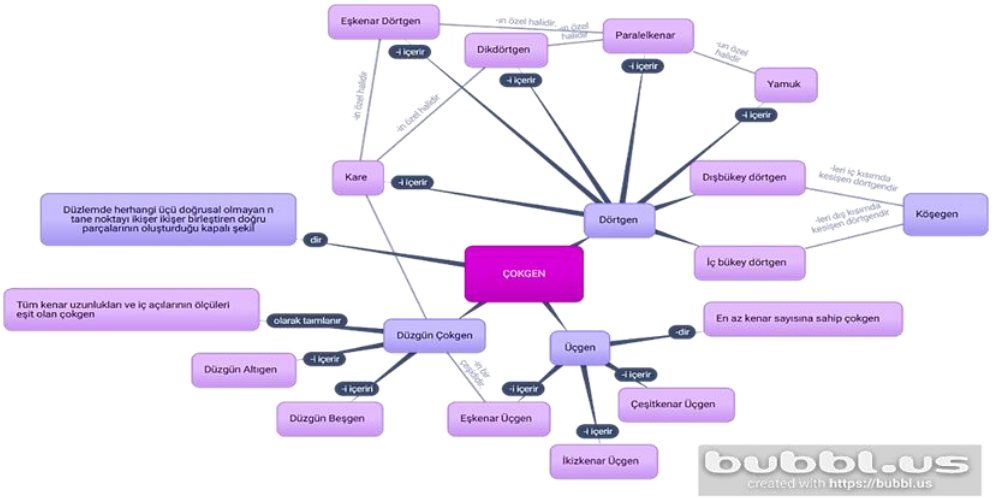
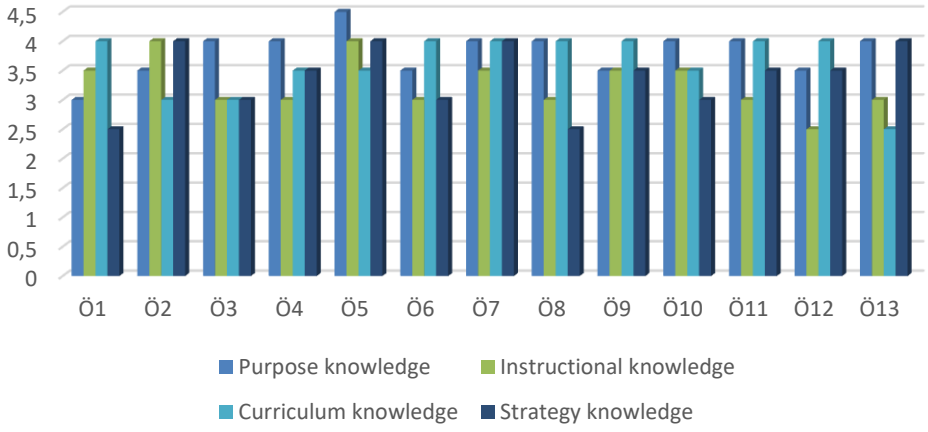


Figure 2. Concept map of T5

3.3. Preservice Teachers' TPACK Levels in Interactive Worksheet Design

The TPACK levels of preservice teachers in the activities they prepared using interactive worksheets are given in Graph 3.



Graph 3. Preservice teachers' TPACK performances on the interactive worksheet

Based on the graph, when the total scores of the preservice teachers for each component were calculated, it was revealed that they scored a total of 43, 35, 40, and 37.5 points for the determining purpose, teaching knowledge, curriculum, and strategy knowledge components, respectively. In terms of the overall evaluation in terms of components, it was determined that preservice teachers showed the highest performance in the determining the purpose component. The component in which they showed the lowest performance was the teaching knowledge component. When the individual performances of the preservice teachers were analyzed, it was seen that they were at the lowest level

of transition from acceptance level to adaptation level and at the highest level of transition from adaptation level to exploration level. When the levels of preservice teachers for the four components in the design of interactive worksheet materials were examined, it was found that T1, T8, T12 and T13 were at the level of transition from acceptance to adaptation; T2, T3, T4, T6, T10 and T11 were at the level of adaptation; and T5, T7 and T9 were at the level of transition from adaptation to exploration. There were no preservice teachers who reached the exploration and higher level in the components. In the interactive worksheet designed by the preservice teachers, it was determined that there were deficiencies such as not presenting the information in accordance with the worksheet structure (step by step), not having a hierarchical order in the questions, not reflecting the selected outcome sufficiently in the worksheet, insufficient and inappropriate instructions.

An example of the designed interactive worksheet is presented below. This material was prepared by T7 using Teachermade tool to include the learning outcome "Recognizes right prisms, determines their basic elements, constructs them and draws their angles".

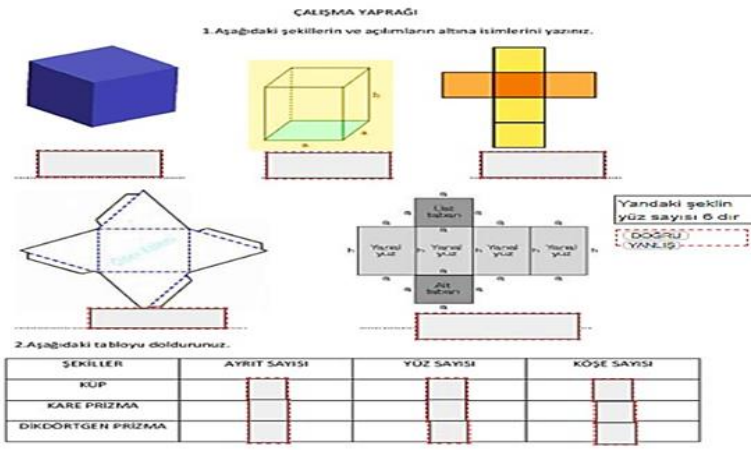
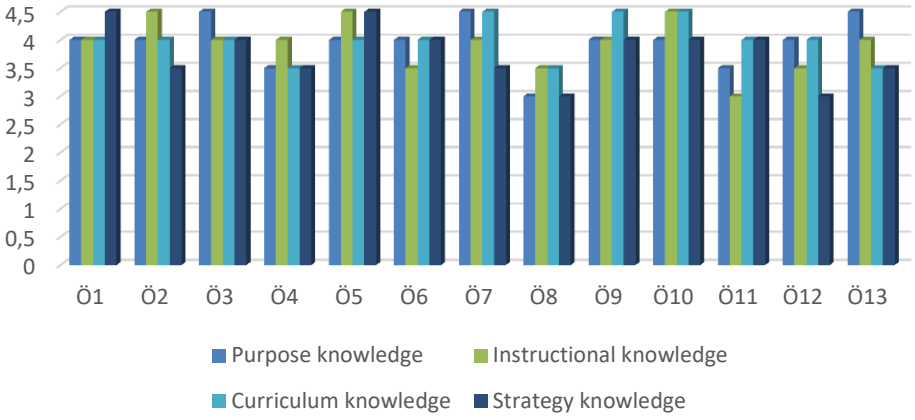


Figure 3. Interactive worksheet of T7

3.4. TPACK Levels of Preservice Teachers in Gamification Application Design

The TPACK levels of preservice teachers in the activities they prepared using gamification applications are given in Graph 4.



Graph 4. Preservice teachers' TPACK performances in gamification applications

Based on the graph, when the total scores of the preservice teachers for each component were calculated, it was revealed that they scored 51.5, 51, 52 and 49 points for the determination of purpose component, teaching knowledge component, curriculum component and strategy knowledge

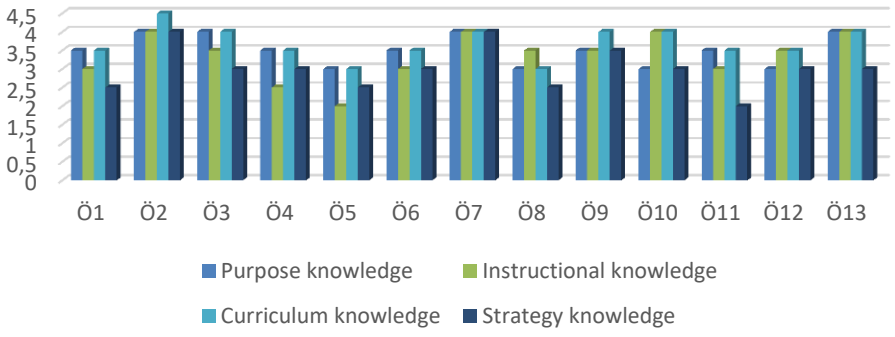
component, respectively. When the overall evaluation in terms of components was analyzed, it was determined that preservice teachers showed the highest performance in the curriculum knowledge component. The component in which they showed the lowest performance was the strategy knowledge component. When the individual performances of the preservice teachers were examined, it was seen that they were at the lowest level of adaptation and at the highest level of exploration. When the levels of preservice teachers for four components in the activity design including gamification application were examined, it was found that T8, T11 and T12 were at the adaptation level; T2, T4, T6, T7 and T13 were at the transition level from adaptation to exploration level; and T1, T3, T5, T9 and T10 were at the exploration level. In this material, there were no preservice teachers who performed above the exploration level for all components. In the gamification applications designed by the preservice teachers, it was determined that there were deficiencies such as the tasks given did not serve the purpose and the tasks for strategy development were limited.

An example of the designed gamification application is presented below. This material was prepared by T10 using the ClassDojo tool to include the learning outcome "Calculates the perimeter lengths of triangles and quadrilaterals and creates different shapes with a given perimeter length". Through this site, various tasks including the related outcome were defined to the students and those who fulfilled the task were given badges and students were given titles such as leader of the week.

Figure 4. Gamification application of T10

3.5. Preservice Teachers' TPACK Levels in Digital Story Design

The TPACK levels of preservice teachers in the activities they prepared using digital story applications are given in Graph 5.



Graph 5. Preservice teachers' TPACK performances in digital story applications

Based on the graph, when the total scores of the preservice teachers for each component were calculated, it was revealed that they scored 45.5, 43.5, 48 and 39 points respectively in the determining the purpose component, the teaching knowledge component, the curriculum component and the

strategy knowledge component. When the overall evaluation in terms of components was analyzed, it was determined that preservice teachers showed the highest performance in the curriculum knowledge component. The component in which they showed the lowest performance was the strategy knowledge component. When the individual performances of the preservice teachers were analyzed, it was seen that they were at the lowest level of acceptance and at the highest level of discovery. When the levels of the preservice teachers for four components in the design including the digital story were examined, it was found that T5 was at the level of acceptance, T4 was at the level of transition from acceptance to adaptation, T1, T6, T8, T11 and T12 were at the level of adaptation, T2, T3, T7, T9 and T13 were at the level of transition from adaptation to exploration and T10 was at the level of exploration. In this material, there were no preservice teachers who performed above the exploration level for all components. The digital stories designed by the preservice teachers had deficiencies such as the stories did not fully include the learning outcomes, the visuals used did not fully reflect the purpose, there were some limitations in terms of teaching, and there were problems in creating a storyboard.

An example of the designed digital story is presented below. This material was prepared by T2 using the Powtoon tool to include the learning outcome "Construct the area relation of a triangle and solve related problems."

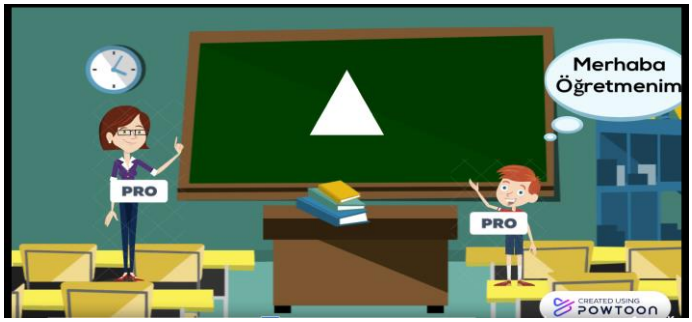


Figure 5. The digital story application of T2

4. DISCUSSION and CONCLUSION

In this study, the TPACK levels of preservice teachers were evaluated within the TPACK framework defined by Niess (2011) within the scope of the technology-supported activities they developed. This assessment is based on the evaluation of their performance in integrating technology into the activities at a five-stage level in each of the four components of TPACK. The performance levels of preservice teachers in each of these components were determined using the rubric of preservice teachers' TPACK level developed by Lyublinskaya and Tournaki (2012).

Concept cartoons are drawings in the form of interesting and surprising cartoons in which each character defends different perspectives on an event or phenomenon in daily life (Keogh & Naylor, 1999; Martinez, 2004). In the activity involving concept cartoons, it was determined that the preservice teachers showed high performance at the level of curricular knowledge. Curricular knowledge means the comprehension of materials and programs that serve as tools especially for teaching. Just as a doctor should know the different treatment methods that can be used to cure a patient, a teacher should know the different curriculum options that can be used for teaching (Öner, 2015). In this context, preservice teachers showed high performance in terms of curriculum knowledge component. This showed that the preservice teachers were successful in choosing which learning outcomes they should choose in accordance with the concept cartoons they used. In all components, preservice teachers were at the lowest level of adaptation and the highest level of transition from

exploration to development. This shows that preservice teachers are successful in preparing activities that include activities for discovering and experiencing knowledge, but they have not yet been able to use inquiry learning activities intensively in these activities. The component in which preservice teachers showed the lowest performance was the strategy knowledge component. In this context, preservice teachers did not show high success in terms of the strategies they used in teaching the selected outcomes. This may be attributed to the fact that the preservice teachers have not yet gained experience, have not taken a teaching practice course and have not practiced learning-teaching using technology. The fact that the preservice teachers could not express the reasons for misconceptions clearly and comprehensibly in the texts in speech bubbles in the concept cartoons they designed can be attributed to the fact that they have not yet taken the "Misconceptions" course. The fact that the thought forms in the speech bubbles were too long and not expressed in legible sentences is thought to be due to the deficiencies in the use of mother tongue. The use of irrelevant visuals may be due to the lack of knowledge about instructional technology design. However, the most important issue in concept cartoons is the visuals they use. Dabell (2008) defined a concept cartoon in mathematics teaching as; "The correct answer to a question or problem, distractors and possible wrong answers that can be found are visual arrangements that are prepared in a way to create a discussion environment within the same visual arrangement and enable the student to find the correct answer among all the answers." In his study, Cengizhan (2011) concluded that concept cartoons guide preservice teachers on how to construct knowledge and that cartoons are the most interesting teaching activities and visuals. Therefore, it is important for preservice teachers to overcome this deficiency in concept cartoons.

Throughout the designed activities, technology was used in a structure that focuses on students' understanding of mathematical concepts and can guide students. An example of this is that the structures established in concept maps focus on students' conceptual understanding. For this activity, it was concluded that the preservice teachers showed the highest performance in the curriculum knowledge component. In other words, preservice teachers showed high success in determining the outcomes appropriate to the concept map. In all components, preservice teachers showed the lowest level of adaptation and the highest level of transition from exploration to development. This shows that the activities involving concept maps prepared by preservice teachers enable them to explore and experience knowledge, but do not enable them to use deeper inquiring concepts by using higher level cognitive skills. Hassan, Rosli and Zakaria (2016) developed i-think maps, claiming that concept maps improve higher-order thinking skills, and suggested the creation of a map bank consisting of i-think maps among schools and teachers. The lowest performance was in the strategy knowledge component. Concept maps are concrete graphics that provide a concrete and visual organization of knowledge in the mind and indicate the relationship of a single concept with other concepts in the same category. It is an effective way to schematize the relationships between concepts within units. At the same time, a concept map is a learning and teaching strategy that bridges the gap between how people learn and meaningful learning topics (Kaptan, 1998). However, preservice teachers could not use this strategy adequately. The concept maps designed by the students had deficiencies such as not being detailed enough, not placing the main concept in the center of the map, lack of verbs or conjunctions connecting two concepts between concepts, lack of comprehensibility of verbs or conjunctions connecting two concepts, and insufficient use of cross-connections between concepts. Tuluk (2015) conducted a study to evaluate the angle concept knowledge of preservice secondary school mathematics teachers based on concept maps prepared in a computer-aided environment. At the end of the study, it was revealed that preservice teachers could not establish meaningful relationships in cross-connections in terms of subject area knowledge in the concepts they used while creating concept maps. In our study, in which similar results with this study were observed, it is revealed that preservice teachers should practice more and review their existing conceptual structures.

Looking at the general evaluation in terms of components in the activity involving the interactive worksheet, we found that the preservice teachers showed the highest performance in the component of determining the purpose. In this context, preservice teachers were successful in using appropriate technology procedures. The highest level in the components was the level of transition from adaptation to exploration. In this context, preservice teachers were successful in making associations with technology procedures and using inquiry activities to develop these associations. However, they could not reach the exploration level which involves discovering and experiencing new knowledge. The component in which they showed the lowest performance was the teaching knowledge component. The underlying reason for this is that worksheets are generally used in activities for evaluation purposes rather than for exploration. Kutluca and Baki (2013) concluded that the students found the worksheets instructive and that the computer-assisted worksheets were applicable in teaching. Worksheets give students the opportunity to reflect on the activities carried out in the learning and teaching process, to share and discuss the solutions found (McMillan, 2004). However, it was observed that this situation was not provided in the activities. In the interactive worksheet designed by the students, there were deficiencies such as the fact that the information was not presented in accordance with the worksheet structure (step by step) and there was no hierarchical order in the questions. Worksheets aim to involve all students in the lesson and help them to follow the plan prepared by the teacher by using worksheets, summarize and repeat the topics (Saka et al., 2001). In other words, worksheets are also useful because they attract students' attention and interest and provide the opportunity to follow and evaluate the steps in the implementation process one by one (Yiğit, Akdeniz & Kurt, 2001). However, the preservice teachers ignored this feature of the worksheet and could not use enough steps. Another component in which they performed poorly in this activity was the strategy knowledge component. We found that some preservice teachers could not move away from the traditional teaching approach and only used their own personal learning experiences. In a study conducted by Kılıç et al. (2019) on the TPACK levels of preservice teachers in Türkiye, they stated that approximately 63.51% of the preservice teachers made unscientific explanations about teaching strategies and methods, some of the preservice teachers could not move away from traditional teaching approaches in which technology is used in a teacher-centered way, and some preservice teachers did not know exactly how and how to integrate which technologies into the classroom environment. This study is similar to our study in this regard.

With the developments in technology, the forms and qualities of games are changing. The development of information technologies has brought games everywhere from computers to cell phones, increasing the rate at which they are played. On the one hand, traditional games are being functionally restructured, while on the other hand, new and powerful designs can create any desired environment virtually. This situation leads to the use of games with rich learning environments in the teaching process even more (Akpınar, 1999). In this study, inquisitive tasks were given to students in gamification activities and students were expected to be able to complete these tasks only by concentrating on doing mathematics. One of the tasks given in the gamification applications was related to different ways of calculating the volume of geometric objects. It can be said that preservice teachers who performed successfully in this activity were able to design activities that would develop students' different questioning and reasoning skills. In his study, Çetin (2017) stated that preservice teachers similarly designed technology-supported activities that would improve students' communication, association, etc. skills. Thus, we can say that the activities designed with technology support develop students' skills such as questioning, reasoning and communication. In terms of the overall evaluation in terms of components, we found that the preservice teachers showed high performance in the curriculum knowledge component. The preservice teachers succeeded in using the appropriate topics/outcomes in the mathematics curriculum in preparing games. However, they showed low performance in the strategy knowledge component and could not move away from the

traditional approach of using their personal experiences. In terms of level, they could not go beyond the exploratory level in preparing mathematics games that contain deep inquiring conceptual knowledge in which high-level cognitive skills are used in general. According to Li, Lemieux, Vandermeiden and Nathoo (2013) providing preservice teachers with the ability to prepare digital games, which is one of the 21st century skills, can provide them with the opportunity to experience and test pedagogical and technological strategies.

When the overall evaluation in terms of the components of the activity involving digital stories was analyzed, we found that the preservice teachers showed the highest performance in the curriculum knowledge component. The lowest performance was in the strategy knowledge component. The stories designed by the students were found to have deficiencies such as the stories did not fully include the learning outcomes, the visuals used did not fully reflect the purpose, and the selected learning outcomes could not be fully reflected in the story texts from an instructional perspective. Kılıç et al. (2019) determined that although one preservice teacher in their study on TPACK levels was successful in developing digital stories, the other participant preservice teacher had deficiencies in strategy knowledge about technology integration. This preservice teacher could not move away from the traditional approach and stated that she could identify students' learning difficulties with a one-way strategic approach without using technology. In our study, although the preservice teachers performed well in terms of developing or creating stories, they performed poorly in terms of developing strategies appropriate to the subject/outcome. "Teaching Methods and Techniques" and "Material Design" courses are of great importance for preservice teachers to improve these performances and reach a sufficient level. In these courses, it is necessary to include methods and techniques such as “teaching with stories” and for preservice teachers to gain experience and skills. One of the difficulties experienced by preservice teachers is creating a storyboard. In this section, there were deficiencies especially in creating complementary situations. There are studies in the literature with similar results (Çetin, 2021; Karakoyun, 2014)

The preservice teachers themselves chose the practices that they would use in their activities in accordance with their learning outcomes. The aim here is to provide the flexibility of the activities to use the experience and knowledge of the preservice teachers comfortably. In this way, it was seen that the development of their technology knowledge progressed positively during the process of designing the activities. In his study, Timur (2011) provided the preservice teachers with the freedom to choose the software themselves in the process of designing technology-supported mathematics instruction. Thus, he stated that preservice teachers experienced a process that resulted in a positive development in their technology knowledge similar to this study.

As a result, we concluded that although the preservice teachers generally had high level competencies on the basis of the technology-supported activities they designed at TPACK levels, they could not reach the development level, which is the highest level. At the development level, technology should be used in a way to provide students with the deepest conceptual understanding in mathematics and the tasks should include this understanding process. The activities are expected to include inquiry tasks that involve high-level cognitive skills and the use of deep mathematical knowledge representing strategic knowledge. In addition, the activity should be fully compatible with the school curriculum. It is thought that this situation occurred due to the fact that preservice teachers do not yet have full knowledge of curriculum and strategy and have problems in integrating technology.

Suggestions: Experiences are important in raising the TPACK levels of preservice teachers to a higher level. For this purpose, the content of “Material Design in Mathematics Teaching”, “Teaching Principles and Methods” and “Misconceptions” courses should be changed in a way to provide preservice teachers with these experiences. In fact, it is important to create the content of the courses in terms of TPACK components in order for preservice teachers to gain competence in this important

field. In these courses, preservice teachers should gain more skills related to the use of technology. In addition, in the context of curriculum knowledge, more activities should be done for school mathematics subjects/outcomes, and text reading, story writing and visual design activities should be done for effective use of mother tongue. Teachers should be encouraged and supported in material development. Preparation of materials should be encouraged and efforts should be made to develop them through field competitions, in-service trainings, courses, seminars, success and incentive awards. Teachers should be provided with in-service trainings and their TPACK competencies should be maximized. For this, it is recommended that preservice teachers share a common platform with teachers, which includes concept maps, concept cartoons, digital games, technology-supported worksheets and digital stories. Similar studies can be conducted with different technological tools and software in mathematics and can be done in quantitative dimension.

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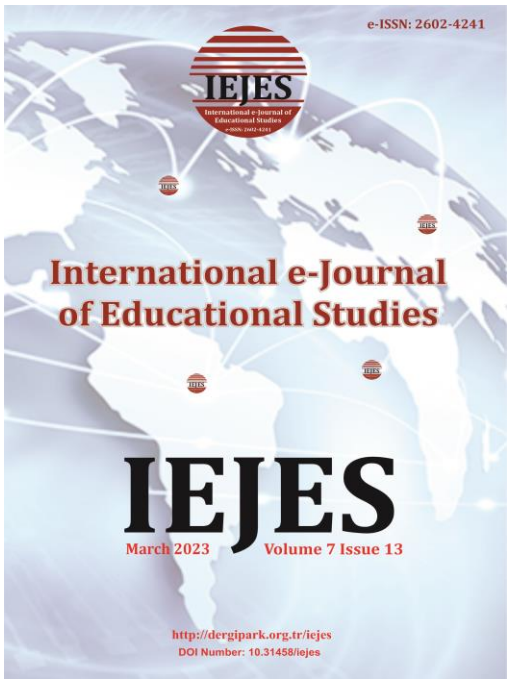

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Abstract

Education-teaching activities have been affected by many natural or man-made factors from past to present and have been interrupted. The biggest of these interruptions was caused by the Covid-19 pandemic, which emerged in China and caused a deadly pneumonia, and education activities were interrupted all over the world and students started education with distance education systems. With the reduction of the effects of the disease, students returning to school faced various problems. It is important to determine what these problems are and to take measures to eliminate them. Therefore, the aim of this study is to determine the opinions of secondary school teachers about the adaptation of students to school after the Covid-19 pandemic. For this purpose, the opinions of nine secondary school teachers from various branches were tried to be determined with semi-structured interview questions by using a case study design, one of the qualitative research methods. The reliability analyzes of the data obtained from the teacher interviews were carried out and the findings were presented in the form of codes and themes. The main problems that the teachers saw in the students after the pandemic were identified as incompatibility, slowness in reading, writing, and understanding, not obeying the classroom rules, lack of attention, and difficulties in establishing social interaction. Various suggestions were made according to the results obtained within the scope of the study.

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Research Article

Teachers' Opinions on Students' Adaptation to School after the COVID-19 Pandemic*

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Abstract

Education-teaching activities have been affected by many natural or man-made factors from past to present and have been interrupted. The biggest of these interruptions was caused by the COVID-19 pandemic, which emerged in China and caused a deadly pneumonia, and education activities were interrupted all over the world and students started education with distance education systems. With the reduction of the effects of the disease, students returning to school faced various problems. It is important to determine what these problems are and to take measures to eliminate them. Therefore, the aim of this study is to determine the opinions of secondary school teachers about the adaptation of students to school after the COVID-19 pandemic. For this purpose, the opinions of nine secondary school teachers from various branches were tried to be determined with semi-structured interview questions by using a case study design, one of the qualitative research methods. The reliability analyzes of the data obtained from the teacher interviews were carried out and the findings were presented in the form of codes and themes. The main problems that the teachers saw in the students after the pandemic were identified as incompatibility, slowness in reading, writing, and understanding, not obeying the classroom rules, lack of attention, and difficulties in establishing social interaction. Various suggestions were made according to the results obtained within the scope of the study.

Keywords: Covid-19, adaptation, teacher opinions, secondary school students.

1. INTRODUCTION

Education activities are a process that emerged because of people's joint knowledge production activities. These processes, whose main goal is to provide individuals with the knowledge and skills that will enable them to meet their own needs, and to contribute to social development and change, can be affected by many factors. Epidemics such as Spanish Flu, Ebola, and SARS showed negative results in the past years, but global education activities continued. In the recent past, the whole world has experienced the most severe of these diseases, and education activities have been interrupted globally due to the COVID-19 epidemic. The epidemic, which started in Wuhan, China in the last months of 2019, was expressed as a disease caused by an unprecedented virus in humans on January 7, 2020. On March 11, 2020, when the first case was detected in Turkey, the World Health Organization (WHO) declared this disease to be a global pandemic (Ministry of Health, 2020; WHO, 2020). With the announcement of the epidemic, the whole world started to announce various measures

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and action plans. Since the disease is highly contagious, protective measures such as personal isolation, masks, gloves, and disinfectants have been implemented (WHO, 2020). However, contacts arising from human mobility (common areas and public transport, etc.) have caused the disease to spread rapidly all over the world (Hang, 2020). This situation has mobilized the country's governments and made it necessary to implement measures to stop contacts. All over the world, including Turkey, schools have been closed, entry and exit to public areas have been banned, and curfews have been imposed. Although these measures provided control over the spread of the disease (Tian et al., 2020), they caused various problems related to education activities. According to the data announced by UNESCO (2020), 92% (approximately 1.6 billion) of students who continue their education activities globally were affected by this epidemic.

Countries and local governments have had to take measures to stop the COVID-19 outbreak, such as quarantine, travel restrictions and ending face-to-face education in schools. In addition, millions of children, youth, and adults have had to stay away from institutions for education. This situation negatively affected the students' education under equal conditions (Giannini & Lewis, 2020). As a result of schools ending face-to-face education, it has created serious difficulties for states, teachers, students, and parents to ensure continuity in education (Chang & Yano, 2020). The suspension of face-to-face education in schools has led countries to take new decisions to ensure the continuity of education. With the shaping of a new approach in education on a global scale, it has been tried to find continuous solutions for the continuity of education and it has been argued that a system that works in education mostly depends on the level and quality of digital access (Gilani, 2020). Distance education applications have started with the Internet and mass media, and students have been tried to be kept in the education system through online courses. With the pandemic process, schools in Turkey were suspended between March 16 and April 30, 2020, and it was decided to continue their education through the Education Information Network (EIN) and three television channels in line with open and distance education activities at all education levels (Ministry of National Education [MoNE], 2020). Due to the continuing effects of the pandemic, the holiday period of schools was extended between April 29 - May 31, 2020, and it was decided to continue education with distance activities. Regarding the assessment and evaluation process, it has been stated that the first semester grades of the students will be used, and the students will be transferred to the next grade regardless of whether these grades are below the passing grade (Republic of Turkey Official Journal, 8 May 2020, no: 31121).

Although distance education activities were used before the pandemic, it is thought that it has become important by spreading to all levels of the education system with the pandemic process. The distance education process has some advantages compared to face-to-face education. It can be stated as one of the most important advantages of distance education that it provides information transfer for a very large audience in a system that does not have time and space limitations. On the other hand, it provides the opportunity for continuity and independent learning by providing flexibility to all stakeholders with distance education (Kör, Çataloğlu & Erbay, 2013). It facilitates access to information, provides an objective measurement and evaluation process, and considerably reduces the costs of education and training activities (Elitaş, 2017; Kasap, 2020). In addition to these advantages, distance education also has some disadvantages that should not be ignored. The individualization of the learning process and the lack of knowledge and discipline about group work, the alienation of students from social processes, the inability to make in-class applications and the incompleteness of teaching these subjects, the reliability problems related to the assessment and evaluation process and finally the technology addiction to students can be expressed as important points for these disadvantages (Elitaş, 2017).

It has been observed that other problems have arisen in the distance education process due to the pandemic. Difficulties in accessing technology, the constant change of school and exam dates,

teachers experiencing a crisis regarding the in-service training process (Arslan, 2021), children and young people living in restricted areas staying away from the healthy eating opportunities they have at school, distance education or home education imposes responsibilities on parents. An example of these difficulties can be expressed as obstacles to the socialization of children and young people (Chang & Yano, 2020). However, understanding that there is no one way to learn means that school is not just a place to learn; it has shown that it is a social ecosystem that also helps in the areas of socialization, care, and coaching. The existence of inequalities in accessing education, how difficult teaching practices are, the school hosts many factors other than education, the fact that open and distance education is interesting in the global arena and how important technology is (Anderson, 2020). Along with this process, researchers have tried to examine the effects of the pandemic from many perspectives. It is possible to come across various studies on the distance education process (Balaman & Hanbay-Tiryaki, 2021; Erdemci & Elçiçek, 2022; Güneş & Kaya, 2022; Özyurt & Kısa, 2021). In the study conducted by Balaman and Hanbay-Tiryaki (2021), they examined the opinions of 12 teachers about distance education conducted due to COVID-19. In the study, it has been determined that although the infrastructure and facilities offered by the ministry are sufficient, they do not see distance education as effective as face-to-face education. Researchers emphasized the opportunities and infrastructure inequalities among students in the distance education process and identified the deficiencies of students in attending the course. In the literature, in the distance education process carried out due to the pandemic, students have problems focusing on the lesson (Kurnaz et al., 2020); it causes emotional gaps in students due to the fact that it is an environment where social interaction is almost absent (Lee et al., 2020); It has been determined that the distance education system is not suitable for individual differences (Başaran et al., 2020).

It has been emphasized in many studies in the literature that the distance education process is evaluated in various contexts with elements such as teachers, students, and parents, and that the above-mentioned advantages and disadvantages often emerge in this process. At this point, considering that the process of returning to normal regarding the pandemic has begun, it can be stated as an important element to examine the return to school and adaptation processes of students who have been away from the face-to-face education system for a long time. Examining the adaptation to the face-to-face teaching process will contribute to the literature, with the disappearance of the advantages and disadvantages of distance education of these students, who have been teaching away from the school environment, teachers, and friends for more than two academic years. In this context, the aim of the study is to determine the opinions of teachers about the adaptation of students to school after the COVID-19 pandemic. Within the framework of this purpose, the main problem sentence of the study is "What are the teachers' views on the adaptation of students to school after the COVID-19 pandemic?" is in the form.

2. METHOD

2.1. Research Design

This study was carried out with the case study method, one of the qualitative research methods since it was aimed to examine the opinions of teachers about the adaptation of students to school after the distance education process applied due to the COVID-19 pandemic process. In case studies, the case or event that the researcher has difficulty in controlling directly is examined in detail, based on how and why questions (Yıldırım & Şimşek, 2013). According to Merriam (2013), a limited system is analyzed and examined in depth in case studies. In studies, it is suggested that it would be more accurate to use case studies when information is tried to be obtained with first-hand sources about individuals and events and when research problems are revealed in an explanatory and descriptive way (Çepni, 2011).

2.2. Participants

This research was conducted with nine secondary school teachers working in public schools in the 2021-2022 academic year. While determining the teachers participating in the study, the convenience sampling method, and the condition of being volunteer were taken as basis. Five of the teachers in the study were female and four were male. Table 1 includes information about branch teachers.

Table 1. Demographic Information of participants

Participants	Branch	Gender	Seniority Year
S1	Math teacher	Female	3-5 years
S2	Math teacher	Male	5-10 years
S3	Social studies teacher	Female	5-10 years
S4	Science teacher	Female	1-3 years
S5	Science teacher	Male	5-7 years
S6	Visual arts teacher	Male	5-10 years
S7	Turkish teacher	Male	5-10 years
S8	English teacher	Female	3-5 years
S9	ICT teacher	Female	1-3 years

When Table 1 is examined, it is seen that 4 teachers have 1-5 years, 2 teachers 5-8 years, and 1 teacher has more than 8 years of experience. In addition, it is observed that the branch teachers selected in Table 1 work in the fields of mathematics, social studies, science, and visual arts, Turkish, English and ICT.

2.3. Data Collection Tool

In this study, a semi-structured interview form developed by the researchers was used, since it was aimed to determine the opinions of teachers about the problems experienced by students in their school life after the COVID-19 pandemic. In order to prepare the semi-structured interview form, the necessary literature was searched and an idea about the subject was obtained. As a result of this screening, a question pool consisting of 10 questions was created. Opinions were received from four faculty members, one for science education, two classroom education and one Turkish education, for the created question pool. In line with the expert opinions, the deficiencies regarding the interview questions were corrected and the necessary revision procedures were carried out. For example, the previously prepared *"What do you think about the sociability of students with their friends and surroundings?"* With the arrangements made for the question *"What do you think about the students' communication with their friends, spending time together, in short, socializing?"* format has been corrected. In addition, a question was removed from the question pool. Reliability analyzes were conducted for the final version of the validated form. In this direction, the semi-structured interview form, which was finalized, was given to five randomly selected teachers from different branches. Teachers were asked whether the questions in the form were suitable for the purpose of the study. The answers given by the teachers who marked as suitable or not suitable were recorded in the Excel file. Then, the data obtained from randomly selected teachers were calculated using the reliability formula (Reliability=agreement/agreement+disagreement) proposed by Miles and Huberman (1994). The percentage of agreement obtained with the above formula was calculated as .88. Since it is stated in the literature that this coefficient is sufficient for the application, nine questions are included in the semi-structured interview form with the latest regulations (Appendix-1).

2.4. Validity and Reliability

Since this study was shaped within the framework of qualitative research methods, validity and reliability studies were also carried out in this context. In this direction, a clear and consistent presentation was provided to find the results believable by other researchers. In the process of analyzing the data obtained from the study, a detailed description was carried out, and the data were subjected to content analysis in an objective and unbiased manner. Compliance analyzes were carried out regarding the codes and themes obtained as a result of the analysis, and it was seen that the analysis was in sufficient harmony as a result of the references in the literature. Finally, the level of confirmability was tried to be kept high by giving examples in the raw data obtained from the participants regarding the codes and themes determined.

2.5. Data Analysis

The data obtained within the scope of the study were subjected to content analysis. The teachers who participated in the interview were coded as T1, T2, T3…T9. The personal information of the teachers was kept confidential during the coding process. The answers given by the participants in the interview form were completely transcribed without any changes. The data were analyzed individually by two researchers and codes and themes were created. Then, the researchers evaluated the analyzes together. In this evaluation, they discussed together and reached a common view. The inter-coder reliability formula was used by Miles and Huberman (1994) to determine the rate of agreement regarding themes and codes. According to this formula, the compliance rate of the data analysis made by the two researchers was calculated as .83. This ratio indicates that the coding of the data is reliable (Miles & Huberman, 1994).

3. FINDINGS

In this part of the study, the findings of the data obtained from the semi-structured interview form are included. In the first stage, the teachers who participated in the study asked, *"What do you think are the main problems seen in students after the pandemic?"* The answers given to the question were analyzed. The themes and codes obtained from the answers to this question are given in Table 2.

Table 2. Findings regarding the answers of the teachers to the first question

Theme	Codes	Participants	Frequency (f)
Post-Pandemic Issues	Discordance	T1, T2, T3, T5, T6, T7, T9	7
	Slowing down in reading, writing and comprehension	T1, T2, T3, T4, T6, T8	6
	Don't forget school rules	T3, T4, T6, T7, T8	5
	Don't forget learned information	T3, T4, T5, T6, T9	5
	Disciplinary issues	T2, T4, T5, T7	4
	Communication problems	T6, T7, T8	3
	Decreased sense of responsibility	T1, T5	2
	Decreased gaming	T2, T6	2

When Table 2 is examined, secondary school teachers' views on the main problems seen in students after the pandemic; mismatch (f=7), slowing down in literacy and comprehension (f=6), forgetting school rules (f=5), forgetting learned information (f=5). Some of the teachers' views on this subject are given below.

> *"An important part of the information learned educationally has been forgotten. Behaviorally, how to behave in the classroom, how to play games has been forgotten." (T4)*

"Fifth graders still feel like they are in elementary school because of the pandemic. They have difficulty following the rules in the classroom. They are very slow in reading and writing and have difficulty understanding." (T8)

"After the pandemic, the most common problem among students is their inability to adapt, they cannot perform basic tasks such as listening to the lesson, doing homework, and not listening to the lesson." (T9)

Secondary school teachers asked, *"What do you think are the disciplinary problems that students observe during the lesson?"* The themes and codes obtained from the answers given to the question are given in Table 3.

Table 3. Findings regarding the answers of the teachers to the second question

Theme	Codes	Participants	Frequency (f)
Disciplinary Issues	Don't forget the class rules	T1, T2, T3, T4, T5, T6, T8	7
	Having a distraction	T2, T3, T4, T6, T7, T9	6
	Inability to focus on the lesson	T1, T3, T4, T5, T9	5
	Communication disorder with friends	T2, T5, T7	3
	Failure to fulfill their responsibilities	T3, T6, T8	3
	Not listening to the lecture	T1	1

When Table 3 is examined, the majority of secondary school teachers stated that the most important discipline problem seen in students is forgetting the classroom rules (f=7). When the answers given were examined, it was seen that there were problems with distraction (f=6), not being able to focus on the lesson (f=5), and communication problems with friends (f=3). Some examples of teachers' views on the disciplinary problems they observed in students are given.

"Not listening well to the lesson, being constantly distracted and still not being able to get out of elementary school psychology, constantly asking questions that are not necessary outside the subject are the biggest problems." (T1)

"There are many discipline problems because they forget the school culture. They do not know what to do during the lesson. They ask everything. Note taking, notebook layout etc. they have serious problems. They complain all the time and always want to have a say." (T3)

"Speaking without permission, the desire to walk around the classroom without permission, the desire to go to the toilet all the time." (T8)

Secondary school teachers' *"What are your thoughts on students' attention and focus on the lesson?"* The themes and codes obtained from the answers to the question are given in Table 4.

Table 4. Findings regarding the answers of the teachers to the third question

Theme	Codes	Participants	Frequency (f)
Attention and Focus	Lack of attention	T1, T2, T3, T5, T6, T7	6
	Short-term focus	T1, T3, T5, T6, T8, T9	6
	Lack of knowledge in bookkeeping	T1, T3, T4, T5, T8	5
	Inability to express oneself	T2, T4, T6	3
	Non-compliance with class rules	T3, T4, T9	3

When Table 4 is examined, it is seen that the majority of secondary school teachers (f=6) who participated in the study stated that attention deficit was high in students. The number of teachers who stated that they had short-term focusing problems was 5. In addition, some teachers stated that

students had deficiencies in keeping a book in class (f=5). Some of the opinions of the teachers participating in the study are given below.

> *"Attention times are very short. Constantly sharpening, throwing garbage, etc. They want to stand up with their excuses. They can give quite a bit of attention to themselves. If the reading texts are long, they get distracted after a while." (T3)*
>
> *"They can maintain their focus for up to 20 minutes. But then they get distracted." (T6)*
>
> *"I think it is because the students continue their habits from their past years. It was effective that they were away from the school environment during their critical period and the children were adversely affected by this period." (T9)*

What do you think about secondary school teachers' communication with their friends, spending time together, in short, their socialization? The themes and codes obtained from the answers given to the question are given in Table 5.

Table 5. Findings regarding the answers of the teachers to the fourth question

Theme	Codes	Participants	Frequency (f)
Sociability	Don't forget to play	T2, T3, T4, T5, T6, T7, T8	7
	Increasing tendency to violence	T2, T3, T4, T6, T7, T8,	6
	Arguments due to miscommunication	T1, T4, T5, T6, T7	5
	Observing aggressive movements	T1, T2, T4, T5	4
	Avoiding multiple communications	T5, T7, T8	3
	Mismatch	T4	1

When Table 5 is examined, the biggest problem that most of the secondary school teachers (f=7) face in terms of socialization is that they forgot to play together. When the answers given were examined, the problems caused by miscommunication (f=5) and the tendency to violence in students (f=6) were given as the sources of this situation. Avoiding multiple communication (f=3) and observing aggressive actions (f=4) negatively affect socialization. One teacher stated that there is no problem of socialization in students. Some sample opinions reflecting the teachers' general view on this subject are given below.

> *"It would not be wrong to say that they even forgot to play games. Because they do not know how to play games, they constantly chase each other, hit etc. They present situations." (T3)*
>
> *"Disagreements, repulsions are too much. They physically harm each other under the name of games and jokes. At the beginning of the year, work was needed to create the classroom culture and to enable the student to adapt to the school culture again." (T4)*
>
> *"There is a decline in socialization skills. There are students who forget to play games. There are frequent arguments due to misunderstandings. They are far from communicating properly." (T6)*

Secondary school teachers' *"Did you observe any difference in students' behavior and hand skills due to the constant exposure of students to tablets, computers and television during the pandemic process?*" The themes and codes obtained from the answers to the question are given in Table 6.

Table 6. Findings regarding the answers of the teachers to the fifth question

Theme	Codes	Participants	Frequency (f)
Using Technological Equipment for a Long Time	Slowness in typing	T1, T2, T3, T4, T6, T8, T9	7
	Listening only to lectures, not giving feedback	T2, T3, T4, T6, T7, T8	6
	The desire to live lives in the virtual environment	T1, T3, T4, T6	4
	Difficulty speaking and expressing oneself	T1, T2, T4, T7	4
	Increasing tendency to violence	T4, T6, T9	3
	Difficulty in learning	T1, T4, T6	3
	Decrease in imagination	T1, T2, T3, T4, T6, T8, T9	3
	Regression in dexterity	T2, T3, T4, T6, T7, T8	2

When Table 6 is examined, the biggest problem faced by the majority of secondary school teachers (f=7) about the students' being so intertwined with technology is that they think that students slowdown in writing. When the answers given were examined, they stated that the students did not just listen to the lesson and gave feedback (f=6) and that the students wanted to experience the characters and experiences they encountered in the virtual environment (f=4) as the sources of this situation. Some examples of teachers' views on the problems experienced by students as a result of being intertwined with technology during the pandemic period are given.

> *"Very slowing down in typing, letter swallowing, etc. cases increase. There are serious problems with speech and self-expression and permanence of learning." (T1)*
>
> *"I think that computer games and television have a great influence on their tendency to violence as a behavior. Many of them have trouble with writing. They write badly in form." (T4)*
>
> *"They like to listen and just watch more, as opposed to practices like writing in class, doing homework." (T8)*
>
> *"I observed that the students' being away from school during the pandemic made them forget their skills, and that there was almost no family support, so their literacy skills weakened." (T9)*

Secondary school teachers' *"What are your thoughts on the problems you have with students in teamwork?"* The themes and codes obtained from the answers to the question are given in Table 7.

Table 7. Findings regarding the answers of the teachers to the sixth question

Theme	Codes	Participants	Frequency (f)
Teamwork	Willingness to act individually	T1, T2, T3, T4, T5, T6, T7, T8, T9	9
	Inability to act in unity	T1, T2, T3, T6, T8	5
	İnability to cooperate	T3, T4, T6, T8	4

When Table 7 is examined, the biggest problem faced by the majority of secondary school teachers (f=9) in terms of being able to work in teams is that students prefer to work individually instead of group work. When the answers given were examined, they stated that they could not act in unity (f=5) as the source of the situation. Another problem observed by our teachers is that students cannot cooperate (f=4). Some examples of the problems that teachers have experienced in teamwork with students after the pandemic are given.

> *"Since the students have not been in the community for a long time, they have the opportunity to live in the community, teamwork, etc. they are having difficulties. It's all about individuality. If something is going to be done, everyone wants to do it themselves. When his friend does it, he can't follow it." (T3)*

"He prefers to be individual rather than working with his teammates. Conflicts arise." (T4)

"More time should be devoted to teamwork. They generally tend to think and act individually." (T5)

"As children spend more time at home with their siblings and families, the desire to act individually has intensified." (T9)

Secondary school teachers' *"What are your observations about the affective changes in students from the pandemic process?"* The themes and codes obtained from the answers given to the question are given in Table 8.

Table 8. Findings regarding the answers of the teachers to the seventh question

Theme	Codes	Participants	Frequency (f)
Affective Changes	The disappearance of school culture	T1, T3, T4, T5, T7, T8, T9	7
	Disruption of gaming culture	T1, T2, T3, T6, T7, T8	6
	Mask and disinfectant sensitivity	T4, T5, T6, T7, T9	5
	fear of students	T2, T3, T6, T7, T8	5
	Don't show all cause pandemic	T1, T2, T4, T7	4
	Difficulties in socializing	T5, T7, T9	3
	Not taking the pandemic seriously	T4, T6	2
	Emotional changes	T1, T6	2
	Selfishness	T3, T6	2

When Table 8 is examined, secondary school teachers; loss of school culture (f=7), deterioration of game culture (f=6), mask and disinfectant sensitivity (f=5), fear of students (f=5), showing a pandemic that causes everything (f=4) and difficulties in socializing (f=3) made explanations. Some examples from teachers' observations regarding the psychological problems that occurred in students after the pandemic were given.

"I did not observe a problem related to the pandemic in most of the students. I don't think they realize the seriousness of the situation. Some of our students are sensitive to those who are sick and not wearing masks." (T4)

"Situations where I have observed fear, emotional change, and selfishness. I did not observe any major psychological problems. In the first weeks, I sensed some timidity, a sense of fear and anxiety." (T7)

"I hear from time to time statements such as constantly warning each other (like, do not touch me, do not approach me, did you wash your hands?), stay away from your friends who do not wear masks, you will make me sick." (T9)

Secondary school teachers asked, *"When you observe the students, what kind of differences do you think there are between those who attend distance education without interruption and those who fail?"* The themes and codes obtained from the answers to the question are given in Table 9.

Table 9. Findings regarding the answers of the teachers to the eighth question

Theme	Categories	Codes	Participants	Frequency (f)
Distance Learning	Continue	Good academic level	T1, T3, T4, T5, T6, T7	6
		Know your responsibilities	T1, T2, T5, T8, T9	5
		Better socialization	T4, T6, T7, T9	4
		Good reading, writing, and processing skills	T3, T5	2
	Discontinuous	lack of information	T2, T4, T6, T7, T8	5
		Mismatch	T1, T2, T5, T9	4
		Being indifferent to the lesson	T3, T5, T8	3

When Table 9 is examined, the most important factor (f=6) observed by secondary school teachers in students continuing in distance education is that their academic levels are better than those who do not continue in distance education. In addition, teachers stated that they know their responsibilities (f=5) and their socialization is better (f=4). For those who did not continue in distance education, teachers observed lack of knowledge (f=5), incompatibility (f=4) and indifference towards the lesson (f=3). Some examples of teachers' views on the difference between students who continue in distance education and those who do not are given below.

> *"Because the lessons are cumulative, I see that the students who participate in the live lesson are more active, more open to new information, easier to understand and give feedback." (T1)*
>
> *"We have very few students participating in distance education. Participants make themselves known in the lesson. They are more involved. They are also in good standing academically." (T4)*
>
> *"Participants perceive the topics I am talking about faster and better. Basic skills such as writing, reading and mathematical operations are higher than those who do not participate. In addition, the participants are much better in terms of coursework, doing homework, taking responsibility, and self-confidence." (T6)*
>
> *"The student participating in distance education; While he is more open to his teacher and friends, understands what he reads and has no difficulty in adapting, problems such as not knowing anything, not being able to grasp the subjects, and having difficulty in adapting have emerged in distance education." (T9)*

4. DISCUSSION and CONCLUSION

In this study, it was tried to determine the opinions of nine teachers with different branches and experiences about the adaptation processes of the students after the COVID-19 pandemic process. In this context, in the study, it was seen that the most common problem faced by students in the eyes of teachers was incompatibility. It has been stated that with the COVID-19 pandemic process, students' staying away from school culture and spending critical periods in development away from the school environment cause serious adaptation problems. Teachers stated that it is unknown to them how students should behave in the classroom, how the lesson is taught face to face, and how they establish social relations with their friends. Again, in line with the opinions of the teachers, it was stated by the teachers that the other important problem was that the students were slow in understanding and perceiving what was given, and that they regressed in literacy. It was stated that the students read the texts that they should read quickly, both slowly and in a way that they forgot the reading rules. It has been observed that students have a very difficult time trying to teach the new generation questions that are tried to be taught to students. It was stated by the teachers that because

the students were away from the school environment for a long time, they forgot how to behave at school and the school rules. They stated that they had a weak infrastructure about how the classroom layout was handled, especially since it was the transition period from primary school to secondary school, how to talk to their teachers, how to go to and from school, how to behave in the school environment and how to play games with their friends. In addition, it has been stated that students have deficiencies on an academic basis. It is thought that the reason for this situation is that students experience deficiencies in elements such as acting individually and studying on their own. When the literature is examined, it is stated in the study conducted by Altıparmak, Kurt and Kapıdere (2011) that students who cannot demonstrate the ability to study on their own have difficulty in the distance education process and fall behind in terms of academic knowledge.

The teachers were asked about their observations about the disciplinary problems they observed in the students during the lesson. The general response of the teachers is that the students forget the classroom rules and the students constantly get up and walk around the lesson and interrupt their speech while the teacher is speaking. It can be said that one of the reasons for this is that students must sit constantly during distance education and cannot be heard, or their microphones are turned off. Students learn the rules to be followed in the classroom through face-to-face education and become a member of the class society. It has been stated by the teachers that they have behavioral disorders because they have trouble learning these rules because they are away from the classroom with distance education. It is also one of the common views of teachers that students have distraction and inability to focus. In this context, they said that students can keep their attention for a maximum of 20 minutes, and then they need to draw their attention. The reason for this was that the visualization process offered in distance education was not in the lessons and they thought that it was difficult for the children due to the prolongation of the lesson times. Students also experience communication difficulties. In distance education, the microphones of the students in the primary school group are usually kept closed in order to minimize the process of speaking at once and to enable them to understand the lesson better. This situation creates difficulties in students' teaching by listening only, expressing themselves and communicating with the other person. When face-to-face education starts, it is seen that children who have been educated in this way for a long time make this situation a habit and experience communication disorders. It is seen that students experience incompatibility with each other and with the school, not fulfilling the responsibilities given, lack of self-confidence, not listening to the lesson and having many discipline problems put our teachers in a difficult situation. In the literature, such behavior is defined as undesirable behavior in the context of classroom communication. Başar (2003), all kinds of behaviors that prevent educational activities in classrooms and schools; Çetin (2013), any behavior that hinders educational efforts at school; Celep (2008) defines behaviors that affect students' learning in the classroom or that students show intentionally or unknowingly, and Yalçınkaya and Küçükkaragöz (2006) define all behaviors that negatively affect education in the classroom as undesirable student behaviors. The criteria used to determine undesirable student behaviors are It prevents the student from learning himself and his classmates, threatens the safety of the student himself and his friends, damages the tools and equipment in the school or the belongings of his friends, and prevents the student from socializing with other students (İra, 2014). There are studies showing that students exhibit undesirable behaviors such as speaking without permission, not bringing course materials, speaking irrelevant to the subject, not doing homework, talking to friends, being disrespectful towards the teacher, and coming to class unprepared (Kasap & Power, 2019).

When the teachers were asked their thoughts on the distraction and focusing problems they observed; they stated that the subjects were meaningless to them because they did not behave appropriately for their age, could not leave the concrete thinking period, and their study habits decreased due to the long duration of distance education. They stated that they were distracted in long

reading texts and only spoke when they had the right to speak. It is thought that they continue to exhibit this behavior in the classroom due to the short duration of distance education courses, limited teacher-student and student-student interaction, and the microphone and camera being turned off unless the student has the right to speak. Gürer, Tekinarslan and Yavuzalp (2016) stated in their study that the participation in the lessons is not at a high level due to the low level of teacher-student interaction in the distance education process. For this reason, the desire to continue the negative habit gained in the distance education process in the face-to-face education process is seen in the students.

When teachers were asked what they thought about students' friendship relations and communication problems; it is stated that students have an aggressive and belligerent attitude towards all their friends, especially their friends of the opposite sex. As a result, it is observed that they constantly complain about each other. It is thought that this situation causes uncertainty about the behaviors they will exhibit when they enter a crowded environment after being isolated at home and causes them to have difficulties in communicating. As expressed by Bölükbaş and Özdemir (2003), human is a being who thinks with language and feels through language; he/she conveys what he/she feels to the other person by establishing social communication through language. The lack of communication also led students to misunderstand each other both academically and socially. For this reason, arguments and fights are often seen. This situation pushes students to be alone. It is estimated that the reason for their display of this attitude may be that they cannot express themselves in the absence of communication and think that they are not understood.

When the opinions of teachers about their students' constant exposure to tablets, phones, and computers during the pandemic process and to observe differences in their behavior and hand skills; the most common problem was that students had writing problems. In this regard, it is thought that the continuous use of technology causes them to stay away from the writing process and therefore experience a decline in their hand and writing skills. They stated that since they are constantly listening in distance education lessons, they continue this process in the classroom and they cannot get feedback from their students. The participants, who stated that they tried to help the children to dream that their imaginations were also negatively affected, observed that they tried to compare some behaviors of the students with the characters they often watched on television.

When teachers make students work as a team in the post-pandemic period, students' inability to act in unity and their desire to be individual and work all the time is seen as the biggest problem. Since they want to work individually, aggression and conflict are observed in students in teamwork or collaborative learning environments. There is no sharing of tasks or putting forward a product. They had difficulty in following their friends in group work. Horspol and Lange (2012) state that one of the disadvantages of the distance education process is the disappearance of socialization opportunities for students. In order to eliminate this situation, it is stated that socializing measures should be taken in the distance education process (Kaden, 2020).

When the teachers' opinions about the affective changes experienced by the students during the pandemic period were examined, it was seen that they frequently exhibited the sensitivity shown in wearing masks, the desire to use disinfectant constantly, and fear and uneasiness. One of the common views of the teachers is that the students feel like they have to warn each other all the time when they are with their friends (don't touch, stay away, wear your mask, etc.). They found a way for every event in which they could not be successful at school, as I could not do it due to the pandemic, and it was stated that they used it constantly. Contrary to all these, there are also participants who exhibit student behaviors who are not aware of the seriousness of the pandemic. In addition, it is mentioned how dangerous and risky the disease process is and that the students are not conscious about it.

It has been stated that there are differences between the students who participated in distance education and those who did not participate in the pandemic process, and that the academic levels of the participants were better than those who did not. Since the courses progressed cumulatively, it was

observed that there were major deficiencies in the course foundations of those who did not attend. This makes it difficult to understand new subjects. In addition, since the students who participate to some extent do not stay away from the school culture, their responsibilities, communication with their friends and their behavior in the classroom are in a way better than those who do not participate. Among the participating students, there is a difference between the students whose parents are interested and those who are not. It has been observed that students whose families are interested show themselves better academically (Bakırcı et al., 2021).

Suggestions

The following suggestions were made according to the results obtained from this study, which aims to determine the opinions of teachers about the adaptation of students to school after the COVID-19 pandemic.

In the face-to-face education process that started after the pandemic, it was observed that the students experienced adaptation problems, did not adequately exhibit the rules and behaviors that should be followed at school, had difficulties in communicating, and had deficiencies in the information about the courses conducted during the distance education process. At this point, it is obvious that students should be included in an orientation process as a result of being away from the school ecosystem for a long time. Therefore, before starting direct education, applications should be carried out to remind students of school rules, and various activities should be organized for them to socialize more easily in a friend environment.

It has been concluded that students have problems focusing on the lessons because they have been studying for a long time in front of the screen and in a limited interaction situation during the pandemic. In order to avoid this situation, the course process should be carefully planned. Visual and auditory materials should be frequently included in the lesson that will enable students to focus their attention. It has been determined that students who have to spend time in an isolated environment away from all their friends and peers during the pandemic experience socialization problems. For this situation, both in-class and out-of-school activities should be organized, and steps should be taken towards the interaction of students with the social environment in the school ecosystem.

Along with the results obtained as a result of the study, the following suggestions were made to other researchers. This study was carried out with nine secondary school teachers, whose opinions were taken with easily accessible sampling method. Subsequent studies can be carried out with groups of teachers from different branches and teaching levels. In the study, teachers' views on the problems they observed in students after the pandemic were examined. Studies that examine the reflections of this process from the eyes of the students can be carried out.

Ethics Committee Decision

This research was carried out with the permission of Van Yüzüncü Yıl University Social and Human Scientific Research and Publication Ethics Committee with the decision numbered 9056/10-23 dated 13/05/2022.

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Conceptualization, literature review, methodology, implementation, data analysis, translation, and writing

Abstract

This study was carried out to determine the behaviors of teachers about classroom management and the effects on their students, through experienced the real cases (or events, or stories) about classroom management written by the pre-service science teachers (PSTs). The stories about classroom management were collected using the documentation technique. The PSTs were asked to write down a real case that they encountered in the classroom environment in their earlier education phases and these collected cases were used as a data collection tool in the research. The study group was consisted of a totally 76 PSTs enrolled junior level in Science Education Department. The PSTs took the "classroom management" course and the presented real cases in the content of an assignment they prepared. The contents of the stories written by them were analyzed descriptively. As a result of the analyzes, it was found out that the classroom management events of the PSTs generally took place in the secondary and high school, in the mathematics course as the course type and in the strictly controlled classrooms as the classroom behavior environment. Also, it was determined that the classroom management events are generally caused by students and the reaction of teachers to these events is generally negative.

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Research Article

The Effects of Positive/Negative Teachers' Behaviors Related to Classroom Management on Pre-Service Science Teachers*

Fatma COŞTU [1]

Abstract

This study was carried out to determine the behaviors of teachers about classroom management and the effects on their students, through experienced the real cases (or events, or stories) about classroom management written by the pre-service science teachers (PSTs). The stories about classroom management were collected using the documentation technique. The PSTs were asked to write down a real case that they encountered in the classroom environment in their earlier education phases and these collected cases were used as a data collection tool in the research. The study group was consisted of a totally 76 PSTs enrolled junior level in Science Education Department. The PSTs took the "classroom management" course and the presented real cases in the content of an assignment they prepared. The contents of the stories written by them were analyzed descriptively. As a result of the analyzes, it was found out that the classroom management events of the PSTs generally took place in the secondary and high school, in the mathematics course as the course type and in the strictly controlled classrooms as the classroom behavior environment. Also, it was determined that the classroom management events are generally caused by students and the reaction of teachers to these events is generally negative.

Keywords: Classroom management, unwelcome students' behaviors, positive teachers' behaviors, negative teachers' behaviors

1. INTRODUCTION

In the student's life, the classroom educational activities take place is the most important environment coming after the family (Başar, 2002). Classroom management, like an orchestra, is the provision and maintenance of the necessary facilities and processes, the learning order and the rules of the environment. The classroom management can also be defined as providing and maintaining an environment and conducive to learning by effectively coordinating the curriculum and teaching activity or students and teacher (Başar, 2002; Shank & Santiague, 2022). The classroom management is also the organization and execution of academic and administrative activities necessary to create and maintain a positive learning environment (Başar, 2002). It is the removal of obstacles hindering the teaching in the classroom, the planning of teaching activities, the effective and appropriate use of class time, the participation of students, the selection and use of appropriate course materials and equipment (Başar, 2002). The classroom management is a responsibility that requires great skill, and it is a comprehensive process that requires effort to be in the classroom environment with a large group of students, to plan every step to be taken, and to ensure that the process goes smoothly (e.g. Bernier, Gaudreau, & Massé, 2022). Many related papers emphasized that teachers' classroom management skills are essential for determining the success of teaching (Bernier, et al., 2022; Shank & Santiague, 2022; Wolff, Jarodzka & Boshuizen, 2021). Also, creating positive atmosphere in the classroom and maintaining discipline in the classroom seem to be the most important and worrying problems of

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novice teachers (Adams, Koster & den Brok, 2022; Shank & Santiague, 2022; Wolff, Jarodzka, & Boshuizen, 2021). The classroom management is an important issue that concerns not only teachers but also the whole society (Wolff, et al., 2021). In a study (Lowell & Gallup, 2002) investigating the attitudes of the American public towards schools, it was concluded that the participants saw the lack of discipline in students as one of the most serious problems in schools. The influence of the teachers on education system and teaching activities at school might be multi-functional. Experienced teacher is defined as not only knows how to teach or how to solve the problems encountered during teaching, but also decides what s/he knows in which situations and when to apply it and can apply it (Adams, Koster, & den Brok, 2022; Bernier, et al., 2022; Wolff, et al., 2021). The experienced teachers, in addition, could also manage the classroom, one of the basic conditions of having an effective learning and teaching environment. The teachers may have a wide variety of philosophies and approaches to classroom management (e.g. Wolff, et al., 2021). The common feature of all the approaches is to increase the quality and continuity of education rather than controlling students (Yalçınkaya & Tonbul, 2002). The evaluation of teaching activities (Başar, 2002). Teachers' classroom attitudes and behaviors are essential on the learning climate and motivation of students, as well as on students' academic, social and emotional development. Hence, the teachers should avoid not affirmative in-class attitudes and behaviors negatively affect students' academic, social and emotional development (Bernier, et al., 2022). The teachers' classroom management competence is closely associated with their students' ability to understand interests, features and expectations (Bernier, et al., 2022). Although the trainings of the existence teachers are very similar, there have been significant differences in classroom management attitudes. The differences are mostly due to the teachers' personality traits, mentality, and theirs views about students (Bernier, et al., 2022). It was observed that the teachers exhibit authoritative, indifferent, liberal and instructional leadership attitudes in classroom management (Dunbar, 2004)

Classroom management is affected by many factors inside and outside of the classroom. These factors as follows; the individual characteristics of the teacher, the teaching strategies, methods and techniques used by them, the harmony with the social environment, the cooperation between the school and the family, the physical conditions of the classroom, the characteristics and needs of the students, the structure of the school, the rules adopted by the school, and the atmosphere in the classroom (Ağaoğlu, 2002; Demirel, 2000). There are also other factors as teaching activities students participated in, response types given by the teachers to their students, and teachers' awareness of the variables that affect students' attention (Snyder, 1998). In the literature classroom management activities was grouped under the five dimensions (e.g. Başar, 2002). The first dimension is the physical order of the teaching environment. Factors such as the width of the classroom, division for various activities, heat and light values, noise level, colors, cleanliness, aesthetic appearance, and seating arrangement were included in this dimension. The second dimension included teaching plan and activities. This included making lesson plans in line with teaching purposes, distribution of topics, selection of appropriate methods and techniques, supply of resource tools and materials, and formative and summative assessments. The third dimension was time management. The teachers must use time well in order to teach effectively. To manage their time carefully, they choose wisely their goals and practices without wasted time (Adair & Adair, 1994). The fourth dimension included the student and their teacher relationship in the classroom. The communication is one of the main interaction necessary for both management and teaching. Thus, the teacher as the administrator in the classroom should use the communication very well (Başaran, 1988). The last dimension was behavior regulations. This dimension included the activities such as making the classroom an environment where students can exhibit desired behaviors, preventing problems occurred, and changing unwanted student behaviors. Although the aforementioned dimensions were the elements of the classroom management, disturbing classroom events or unwelcome student behaviors may be seemed to be the

most important issue. In fact, most educators thought they mean as classroom management. Hence, disturbing classroom events or unwelcome student behaviors have been one of the most studied subjects in the literature from past to present (e.g. Bernier, et al., 2022). One of the most prominent reasons is the teachers' awareness of their responsibility about teaching. Even the most careful and well-planned instruction might be insufficient to achieve teaching goals for irresponsible and misbehaving students (Lewis, Romi, Qui & Katz, 2005). Unwelcome students' behavior could be defined as that seriously hinder the teaching process of the teacher, the learning of the student's own and others, directly or indirectly disturb the learning environment, and create confusion (Burden, 1995). Unwelcome students' behaviors have negative effects not only on the teachers' teaching process, but also the learner's own learning and socio-emotional development (Cunningham & Sugawara, 1988). Many unwelcome students' behaviors, whether important or unimportant, could be occurred in almost every classroom (Arwood-Barton, Morrow, Lane & Jolivette, 2005). As said earlier, disturbing behaviors and discipline problems in the classroom are among the frequently researched topics (e.g. Lewis et al., 2005; Türnüklü & Galton, 2001). Moreover, recent studies about classroom management are focused on the research topics as follows: the teachers' effectiveness in classroom management (e.g. Shank & Santiague, 2022), the perceptions about classroom management (Çoban & Cizrelioğulları, 2021; Lewis et al., 2005; Yalçınkaya & Tonbul, 2002), the teachers' classroom management practices (Duman, Gelişli & Çetin, 2004; Shank & Santiague, 2022), the relationship between self-efficacy and classroom management (Shen, Cheng, & Lee, 2022), the teachers' classroom management strategies and differences (Ritter & Hancock, 2007), the effects of the classroom management strategies on students' behavior (Herman, Reinke, Dong, & Bradshaw, 2022), and the classroom management in technology based instruction (Lim, Pek & Chai, 2005).

To be successful in classroom management, the teachers should make classroom environment safe for students in order to improve students' motivation to learn, to have knowledge and to acquire necessity skills without any interruption (disturbing students' behaviors, discipline problems, physical problems, etc.) (Adams, Koster & den Brok, 2022; Shank & Santiague, 2022). Non-novice teachers have more experience for effective classroom management than novice teachers. Thus, the novice teachers have a wide variety of problems managing classroom in comparison with the others (Adams, et al., 2022; Bernier, et al., 2022; Shank & Santiague, 2022; Wolff, Jarodzka & Boshuizen, 2021). As a matter of fact, classroom management is the most important problem for them (Bulut, 2020; Wolff, et al., 2021). This issue was confirmed that most of the novice teachers in the United States leave the profession with insufficient to provide discipline in the classroom (Ingersoll, 2001). Teacher training institutions (e.g. education faculties) should not only provide theoretical information about classroom management, but also provide practical experience with case study of it. To provide this, pre-service teachers (PSTs) should be confronted many real cases for classroom management. Hence, in the study presented here pre-service science teachers were asked to report real cases (or stories) related to real classroom management that they experienced and left a mark on them. With analyzing the real cases, PSTs not only provide to gain experience for classroom management, but also the positive and negative effects on them were determined. Based on all mentioned points, the main purpose of this study, is to reveal the effects of teachers' classroom management on the PSTs' academic and social development by examining stories related to real classroom management. In this context, answers to the following four research questions were sought:

1. In which environment did the events about classroom management experienced by the PSTs take place?
2. What are the sources of the events about classroom management experienced by the PSTs take place?
3. What are the positive and negative effects of the events for classroom management on students and teachers?

4. What are the reactions of the teachers to their students in the events experienced by the PSTs?

2. METHOD

2.1. Research Design

Biographical research design in qualitative research methods was used in this study (van Marrewijk, Sankaran, Müller, & Drouin, 2021). Biographical research is a method that includes examining the experiences and personal subjective perceptions of individuals based on their life stories (van Marrewijk, et al., 2021). The research design is usually based on the narrative analysis or life stories. Since the stories PSTs experienced contain the relationships, connections and meanings, it must be understood their social life and events (Sikes, 2007). Therefore, the data source of biographical research consists of the life stories of PSTs. In this study, PSTs' stories containing classroom memories were analyzed to describe the events encountered in classroom management.

2.2. Data Collection and Study Group

Documentation technique was used as a data collection tool in the research (Lincoln & Guba, 1985). This method, also known as document analysis, is one of the main data collection tools of historical and biographical research. The study group of this research consisted of a total of 76 PSTs enrolled junior level in Science Education Department at a university in Istanbul and took the "Classroom Management" course. The research was carried out within the "Classroom Management" course. In this course, PSTs prepared an assignment asking to write a story about a real event they experienced in the classroom environment in their earlier education life. The stories were collected as data of the research and analyzed. The PSTs prepared a total of 76 stories to the instructor as homework. Of 76 PSTs, 50 are female and 26 are male. The demographic features of the PSTs were also revealed in the study. PSTs were asked to give as much detailed information as possible about the classroom management. In order to ensure the confidentiality of personal information in the stories ethically, pseudonyms have been used instead of real names of individuals and institutions. Randomly selected two stories written by PSTs were given below.

Story 1

We were in the first grade of middle school. Our lesson was Turkish lesson. Although our teacher was sometimes very affectionate, he was actually a very angry person. It was as if he was even more angry and cruel towards male students. We were quieter as female students, maybe that's why he was warmer towards us. Our teacher told us that one day in the lesson, he would go to make a photocopy for us to do an activity and we should wait quietly without leaving the classroom without making a sound. Most of the male students got bored and made noise in the classroom. The reason why they do this may be the energy that those times gave to the person, they may be lively children, there is a high probability of such a situation. Our teacher was very angry when he saw the students outside while he was doing his job and returned, and he beat all the male students very badly, regardless of whether they went out or not. (Translated in English)

(In Turkish) Ortaokul 1. sınıftaydık. Dersimiz Türkçe dersiydi. Öğretmenimiz her ne kadar bazen çok sevecen davransa da aslında çok sinirli biriydi. Sanki erkek öğrencilere karşı daha da sinirli ve acımasızdı. Biz kız öğrenciler olarak daha sessizdik belki de bu yüzden bize karşı daha sıcak davranıyordu. Öğretmenimiz bir gün derste bize etkinlik yaptırmak için fotokopi çekmeye gideceğini ve bizimde ses çıkarmadan sınıftan dışarıya çıkmadan sessizce beklememizi söylemişti. Erkek öğrencilerin çoğu sınıfta sıkılarak dışarı çıkıp gürültü yapmışlardı. Bunu yapmalarındaki sebep o dönemlerin de kişiye verdiği enerji olabilir içleri kıpır kıpır çocuklar olabilir böyle bir durumun yaşanabilme ihtimali yüksektir. Öğretmenimiz işini halledip dönerken öğrencileri dışarıda görünce çok sinirlendi ve tüm erkek öğrencileri dışarı çıkan veya çıkmayan ayırt etmeksizin hepsini çok kötü bir şekilde dövdü. Sınıfta herkes bu olaydan çok etkilendi ve bir daha her Türkçe dersine korkuyla girdik.

Üzerinden yıllar geçmesine rağmen bu olayı hiç unutamıyorum. Türkçe dersini çok sevdiğim halde o derse girerken çocuk ruhumla yaşadığım stres hala aklımın bir köşesinde duruyor.

Story 2

When I just started my freshman year of high school, I was trying to get used to both my new environment and my new lessons. It was a very difficult time for me. It could not be said that I was extremely good in mathematics lessons, but until that year I had not had any problems. Our teacher who came to our math lesson was a really strange person. She would usually do everything but lecture and never control the class. Everyone was standing up and shouting. Our teacher was no different from the students. When she realized he couldn't quiet the class, she would first walk around the desks asking awkward questions, then offending students by making fun of their appearance or possessions. In fact, she would always say to me, 'This is broken,' because my last name is "Broken/Kırık (in Turkish)". She would have fun with the students by throwing the chalk and finished pencils into the trash can with his back turned. Of course, sometimes we liked to boil the lesson, so we supported him. But when exam weeks come, I can never forget the stress I experienced. I used to cry all the time, especially before math exams. Even though I studied for a week, the highest grade I could get was 30. We also complained about the teacher to the necessary places. However, no intervention was made. I couldn't stand this situation any longer and decided to change my school. It was the best decision I've made in my life. Two years of my high school were wasted like this, and I had to pack it right away. Because I had a university exam waiting for me. With the support of my mathematics teacher at the school I went to in the third grade of high school, I was able to increase my grades to 80-90. I regained my self-confidence. My teacher Ayşe [pseudonyms] has contributed a lot in getting me to where I am now. I have gained both a teacher that I will visit throughout my life and the first step to reach the profession I want. (Translated in English)

(In Turkish) Lise birinci sınıfa yeni başladığımda hem yeni ortamıma hem de yeni derslerime alışmaya çalışıyordum. Oldukça zorluk yaşadığım bir dönemdi. Matematik derslerinde aşırı iyi olduğum söylenemezdi ama o seneye kadar pek bir problem yaşamamıştım. Matematik dersimize gelen öğretmenimiz gerçekten çok garip biriydi. Genelde ders anlatmak dışında her şeyi yapar sınıfın kontrolünü de asla sağlayamazdı. Herkes kafasına göre ayakta gezer, bağırır çağırırdı. Öğretmenimiz de öğrencilerden farklı değildi. Sınıfı susturamadığını fark ettiğinde önce tek tek sıralarda dolaşıp garip sorular sorar sonra öğrencilerin görünüşleriyle ya da sahip oldukları şeylerle dalga geçip onları rencide ederdi. Hatta bana da soyadım "Kırık" olduğu için 'kırık bu ya' derdi sürekli. Tebeşiri, bitmiş kalemleri çöp kovasına arkası dönük atıp öğrencilerle eğlenirdi. Tabi bazı zamanlar dersi kaynatmak hoşumuza gittiğinden biz de onu desteklerdik. Ama sınav haftaları geldiğinde yaşadığım stresi asla unutamıyorum. Özellikle matematik sınavlarından önce sürekli ağlardım. Bir hafta çalışsam da alabildiğim en yüksek not 30 idi. Öğretmeni gerekli yerlere şikâyet de ettik. Ancak herhangi bir müdahale yapılmadı. Bu duruma daha fazla dayanamayıp okulumu değiştirmeye karar verdim. Hayatımda verdiğim en doğru karardı. Lisemin iki senesi bu şekilde çöpe gitmişti ve hemen toparlamam gerekiyordu. Çünkü önümde beni bekleyen bir üniversite sınavı vardı. Lisenin üçüncü sınıfında gittiğim okuldaki matematik öğretmenimin desteğiyle yerlerde olan notlarımı 80-90'lara çıkarmayı başarabilmiştim. Kendime güvenimi yeniden kazandım. Şu an olduğum yere gelmemde Ayşe hocamın katkısı büyüktür. Hem hayatım boyunca ziyaret edeceğim bir öğretmen hem de istediğim mesleğe ulaşmanın ilk adımını kazanmış oldum.

As seen in the above two stories, PSTs gave all details about classroom management. In addition to the details of the event, they also give the social, emotional, and psychological effects of this event on them. A total of 76 stories collected from PSTs were examined and descriptive analyzed. The qualitative data analysis process comprising "data reduction", "data display" and "conclusion" (Miles & Huberman, 1994) was followed. In this process, themes were generated from the stories and the relationships amongst the themes were interpreted. While analyzing the stories, a science educator with a Ph.D. in chemistry education (with above 15 years of teaching experience) and the author of paper, applied the categories separately to evaluate 20 stories (selected randomly). It was found that each evaluator coincided on the evaluation of lots of categories with few disagreements. Each

evaluator explained the points of disagreement. After some discussion, all disagreements were resolved and consensus between two evaluators was achieved. With this procedure, the validity and reliability of the study were tried to be ensured. With this experience, rest of the stories, were then evaluated by the author. Also, Miles and Huberman (1994) reliability formula was calculated for 20 stories. In the analysis of qualitative data, Miles and Huberman (1994) reliability formula (Reliability = Consensus / (Agreement + Disagreement)) was used and the agreement rate among the two evaluators was determined as 94.9%.

3. FINDINGS

In this section, the results obtained at the end of the analysis of the PSTs' stories were given. The characteristics of the environment where the classroom management event took place, the types of events that occurred, the teacher's reactions to the events and the effects of the event on the PSTs were given respectively. Firstly, a description of the event in the stories given by the PSTs and experienced in the classroom environment was made. Thus, the events determined in the given stories were analyzed under three categories such as "at which education level it took place", "in which course it took place", and "the classroom behavior environment". The results were given in Table1 as a whole. As seen from the Table 1, in the stories given by the PSTs, it was found out that middle school is the highest percentages (45%), high school is the second-high percentages (37%), primary school is the third-high percentages (16%), and lastly university is the lowest percentages (2%). As seen from the Table 1, it was found out that the case studies about classroom management mostly occurred in the "Mathematics" course (31%), secondly in the "Turkish Language" course (29%), and thirdly in the "Social Sciences" course (16%). Moreover, as seen from the Table 1, it was determined that the stories about classroom management the classroom occurred in the classroom behavior environment respectively, strictly controlled classroom (45%), controlled classroom (31%) and extremely free classroom (24%).

Table 1: Detailed information about the classroom management events presented by the PSTs

Education Level	*f*	*%*
Primary School	12	16
Middle School	34	45
High School	28	37
University	2	2
Courses		
Mathematic	24	31
Turkish Language	22	29
Social Sciences	12	16
Science	8	11
Visual Arts	6	8
Foreign Language	4	5
Classroom Behavior Environment		
Controlled Classroom	24	31
Strictly Controlled Classroom	34	45
Extremely Free Classroom	18	24

Secondly, a detailed analysis of the story about classroom management presented by the PSTs was made. It was determined whether the event about classroom management was caused by the student or the teacher. The results obtained are detailed in Table 2.

Table 2. Sources of the events about classroom management presented by the PSTs

	*Occurring Events about Classroom Management**	*f*	*%*
Student Originated Events	Talking and laughing loudly in the class despite warning	16	9
	Unconcern to the lesson despite warning	28	15
	Failure of the lesson	8	4
	Disturbing your friend in the class	10	6
	Copying in exam	2	1
	Show discourtesy to the teacher	12	7
	Succeed in the lesson	4	2
	Failure to do the assigned task the teacher gave	12	7
	Leaving the classroom without permission	6	3
	Making damage to classroom tools	4	2
	Being late for the lesson	8	4
	Walking the classroom without permission	6	3
Teachers Originated Events	Doing injustice to your students	24	13
	Doing interested solely a single student	16	9
	Tough attitude to the students	12	7
	Making discrimination	4	2
	Making misunderstood of students' behaviours	4	2
	Doing interested in the students	8	4

*In some events given by the PSTs, they gave more than one source. Therefore, the frequency and the number of the participants may not be matched.

As seen from the Table 2, the events were analyzed under two categories namely, student and teachers originated. From the student originated events, the three events with the highest frequency are as follows, respectively. Namely, "Unconcern to the lesson despite warning" (15%), "talking and laughing loudly in the class despite warning" and lastly "disturbing your friend in the class" (6%). From the teacher originated events, the three events with the highest frequency are as follows, respectively. From the teacher originated events, the three events with the highest frequency are as follows, respectively. Namely, "Doing injustice to your students" (13%), "Doing interested solely a single student" (9%) and lastly "Tough attitude to the students" (7%). Thirdly, it was determined the effects of the event about classroom management on students' and teachers' behaviors. The results obtained are detailed in Table 3. As seen from the Table 3, the events were analyzed under three categories namely, negative, and positive effects on the student and positive effects on the teachers. From the negative effects on the students, the three effects with the highest frequency are as follows, respectively. "negative attitude towards the lesson" (22%), "negative attitude towards the teacher"(19%), and "failure" (10%).

Table 3. The effects of the event about classroom management on students' and teachers' behaviors

*The effects of the event about classroom management**	*f*	*%*
Negative effects on the student		
Negative attitude towards the lesson	48	22
Negative attitude towards the teacher	42	19
Avoidant behavior	18	8
Failure	22	10
Perpetuating negative behavior	6	3
Change of the school	2	1
Complaining the teacher to the manager	2	1
Positive effects on the student		
Understanding own mistake	14	6
Being successful	12	6
Positive attitude towards the lesson	10	5
Positive attitude towards the teacher	10	5
Recognizing own talent	4	2

Positive effects on the teacher		
Understanding own mistake	12	6
Apologize from his/him student	12	6

**In some events given by the PSTs, they gave more than one effects. Therefore, the frequency and the number of the participants may not be matched.*

As seen from the Table 3, from the positive effects on the students, the four effects with the highest frequency are as follows, respectively. "Understanding own mistake" (6%), "Being successful" (6%), "Positive attitude towards the lesson/the teacher" (5%). From the positive effects on the students, it was determined that the positive effects on the teacher were in the two categories: "Understanding own mistake" (6%), and "Apologize from his/him student" (6%). Fourthly, it was determined the reactions of the teachers against to the classroom management events the PSTs gave. The results obtained are detailed in Table 4.

Table 4. The reactions of the teachers against to the classroom management events

The reactions of the teachers	*f*	*%*
Physical punishment	24	20
Doing interested the student	6	5
Break the student's trust	4	3
Verbal insult	36	29
Trying to understand the problem	8	7
Ignore the event	2	1
Verbal warning	12	10
Giving low point	6	5
Leave the lesson	2	1
Leave the school	2	1
Sending to the manager	8	7
Giving responsibility to the student	6	5
Rewarding to the student	2	1
Building student confidence	6	5

As seen from Table 4, it was determined that the teachers as reactions mostly use "verbal insult" (29%), "physical punishment" (20%), and "verbal warning" respectively. Also, it was found out that the teachers hardly utilized the reactions "ignore the event", "leave the lesson", "leave the school" and "rewarding to the student" respectively. Moreover, the teachers showed the reactions such as "doing interested the student" (5%), "break the student's trust" (3%), "trying to understand the problem" (7%), "verbal warning" (10%), "giving responsibility to the student" (5%), "giving low point" (5%), and so on.

4. DISCUSSION and CONCLUSION

Through real classroom management events from PSTs, this study revealed that there were many effects of positive or negative teacher behaviors on students' academic, cognitive, social, and emotional development. The results proved how important teachers' attitudes in classroom management are for students. It was also indicated that the effects of classroom attitudes and behaviors on students are not temporary but retention for a longtime. The research showed that PSTs are affected by the classroom management attitudes and behaviors of their teachers during their primary, middle, and high school education. It was seen that the classroom management events that PSTs couldn't forget are mostly experienced in the middle school and high school and included negative/unwanted student behaviors. The classroom management problems PSTs gave in period of middle school and high school may stem from the adolescence. Because, in this period, students were more affected by the events they experienced (e.g. Evans & Lester, 2010). The fact that many events related to

classroom management are encountered in early education periods may also be since the teachers mostly use authoritarian classroom management and obey strictly the classroom rules (e.g. Adedigba & Sulaiman, 2020; Duman, Gelişli & Çetin, 2004) also stated that the teacher-centered traditional management approach is dominant in our education practices in high schools. The result obtained in this study is very similar to the classroom management literature.

Analysis of the stories presented by the PSTs indicated that the classroom management events occurred mostly in the "Mathematics" course. The reasons for this may the students' anxiety and some fears towards the mathematics lesson (e.g. Whyte & Anthony, 2012). The students have anxiety are known to be more stressed and tense in the classroom. Hence, students may exhibit undesirable behaviors and cause negative behaviors related to classroom management. Relevant studies showed that most of the students in our country find the mathematics lesson very difficult and complicated, have anxiety about failure, and therefore, their attitudes towards the mathematics lesson may be negative (Alkan, Güzel & Elçi, 2004; Anıl, Özkan, & Demir, 2012; Dağdelen & Yıldız, 2022). It was also found out that the events about classroom management were at least in "social sciences" courses. The reason for this is that, unlike the mathematics course, such courses attracted more attention of students and therefore they can express themselves comfortably in them. Since students have the chance to prove themselves in the courses, it may be usual they are liked and not worried by them. Duman et al. (2004) stated that the classroom management strategies used by the teachers did not change according to the lessons. Considering that teachers do not change classroom management strategies according to the lessons, the reason for good classroom management in social sciences lessons may be due to the student's positive attitude towards them. From this point of view, it could be said that the development of negative events related to classroom management is directly related to the anxiety levels of the students and their success (e.g., Herman, Reinke, Dong, N. & Bradshaw, 2022).

The study demonstrated that the stories given by the PSTs mostly stemmed from student-oriented classroom management problems. The first four student-oriented classroom management events were determined as "unconcern to the lesson despite warning", "talking and laughing loudly in the class despite warning", and "show discourtesy to the teacher" "failure to do the assigned task the teacher gave" respectively. On the other hand, there are other less remembered events such as "being late for the lesson", "walking the classroom without permission", "leaving the classroom without permission" and so on. This may be an indication that the PSTs do not care about these situations or that the teachers ignore this situation.

The study displayed the classroom management events experienced by the PSTs mostly took place in strictly controlled classroom environments. The reason may mainly of under pressure in classrooms with strict control affects the students negatively and therefore classroom management problems may arise. As dealt with in the literature, the teachers who exhibit authoritarian, disinterested, and humiliating attitudes in classroom management negatively affect the academic and social development of the students (e.g. Adedigba & Sulaiman, 2020). The teachers' authoritarian and punitive attitudes can also cause students to be alienated from school and lessons, to be biased against the lesson, to be unable to learn, to fear, anxiety and lack of self-confidence (e.g. Adedigba & Sulaiman, 2020). It was cited (e.g. Arabacı, 2006), that classroom environments at middle school level in our country are authoritarian not democratic. Reversely, the students trained in democratic classrooms instructed to be more self-confident, entrepreneurial and able to express themselves more easily in their later lives (Weinstein, Tomlinson-Clarke & Curran, 2004). The results of this study once again proved that the positive attitudes and behaviors exhibited by the teachers in the classroom management positively affected the academic and social development of the students (e.g., Sieberer-Nagler, 2016). The study also represented that the teachers generally gave negative reactions to the classroom management problems in the classroom. This situation indicated that the teachers were not effective against the classroom management problems that arise in the classroom. The issues that

teachers exhibiting negative attitudes and behaviors in the problems cause their students to feel sadness, resentment, oppression, regret, lack of self-confidence, lack, hatred as well as learning difficulties and communication problems (e.g Allen, 2010). On the contrary, as stated in the literature (e.g. Cummings, 2000), positive attitudes and behaviors of the teachers in classroom management problems contributed to students' academic and social development by increasing their problem solving, gratitude, believing that they can be successful, loving the teaching profession, learning ambition and self-confidence. From the results, the study indicated that negative attitudes and behaviors of the teachers against to classroom management problems cause the PSTs to have biased against the teaching profession, to feel that they are unlucky, and to have feelings of regret, hatred, sadness, lack, anger and hatred. Similarly, the relevant papers (e.g., Şahin, 2011) also showed that the effects of teachers' attitudes and behaviors in the classroom on the development of students last a lifetime. The teachers' positive attitudes and behaviors in classroom management, on the other hand, contribute to positive personality development in the students, increase motivation and self-confidence, ensure that they take the teacher as a role model/example and be fair, gain an understanding of humanity, increase feelings of gratitude, and keep feelings of happiness/excitement, love and respect alive (e.g., Şahin, 2011).

The analysis of the stories given by PSTs revealed that the teachers' understanding of classroom management is one of the important variables that affect the students' the academic, social and emotional development. All the teachers should have a student-oriented understanding of classroom management. The teachers should also consider that exhibiting a strict and authoritarian attitude in the classroom negatively affects students' academic, social and emotional development while exhibiting a democratic and student-oriented attitude has positive effects on learning and personality development of the students. In the study, the effects of the attitudes of the teachers in classroom management on the development of the students were revealed from the perspective of the PSTs, whose lives are shaped by the attitudes and behaviors of the teachers in the classroom. Similar studies should be conducted different level involving primary, secondary and high school students. Moreover, longitudinal studies should be utilized on the academic and competencies about classroom management.

Acknowledgement

This study utilized document analysis method that requires examining the existed documents of PSTs' stories about classroom management. Hence, ethics committee permission was not required.

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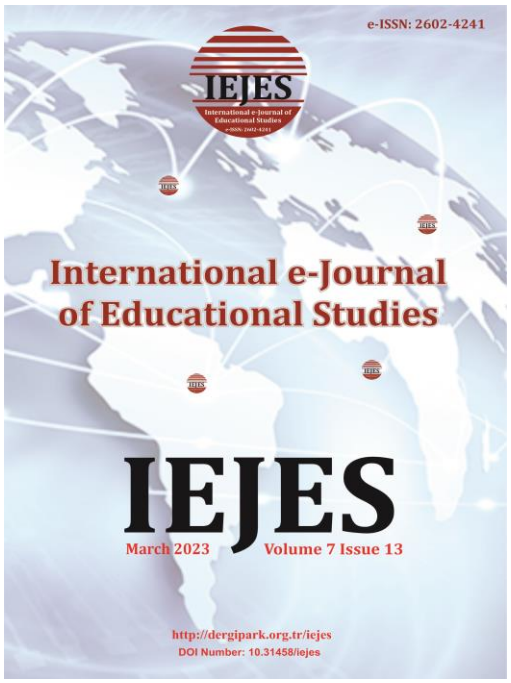

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Abstract

The study was carried out the case study method under the category of descriptive research approaches. A purposeful sampling method was used in the study because it allows in-depth research by selecting rich situations. Semi-structured interviews and semi-structured observation forms were used as data collection tools. Interviews are preferred in the research process because they provide the opportunity to analyze the situation in depth with flexible questions as well as questions directed to discover the richness of the schemas in the brain of individuals. Observations have been preferred because they allow the examination of human behavior in natural environments. In this research, the content analysis method was used in which the existence of codes in the qualitative data obtained during the analysis process was determined, themes were formed by combining these codes, and inferences were made. The analysis of the research findings, it was determined that the majority of pre-service science teachers associated the concept of distance education with the 'problem'. When it is explained that the pre-service science teachers will conduct the 'teaching practice' course with distance education during the Covid-19 pandemic process, their emotional state, anxiety, fear, curiosity, and sadness. As a result of the research, "Various projects can be developed to improve the existing infrastructure and provide more infrastructure support to prospective science teachers and schools, especially science teachers, within the framework of distance education and educational technologies. In this way, universities, schools, teachers, students, and parents are a stakeholder in educational technologies.

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Research Article

Experiences of Pre-Service Science Teachers in "Teaching Practice" During the Covid-19 Pandemic*

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Abstract

The study was carried out the case study method under the category of descriptive research approaches. A purposeful sampling method was used in the study because it allows in-depth research by selecting rich situations. Semi-structured interviews and semi-structured observation forms were used as data collection tools. Interviews are preferred in the research process because they provide the opportunity to analyze the situation in depth with flexible questions as well as questions directed to discover the richness of the schemas in the brain of individuals. Observations have been preferred because they allow the examination of human behavior in natural environments. In this research, the content analysis method was used in which the existence of codes in the qualitative data obtained during the analysis process was determined, themes were formed by combining these codes, and inferences were made. The analysis of the research findings, it was determined that the majority of pre-service science teachers associated the concept of distance education with the 'problem'. When it is explained that the pre-service science teachers will conduct the 'teaching practice' course with distance education during the COVID-19 pandemic process, their emotional state, anxiety, fear, curiosity, and sadness. As a result of the research, "Various projects can be developed to improve the existing infrastructure and provide more infrastructure support to prospective science teachers and schools, especially science teachers, within the framework of distance education and educational technologies. In this way, universities, schools, teachers, students, and parents are a stakeholder in educational technologies.

Keywords: Pre-service science teachers, teaching practice, covid-19

1. INTRODUCTION

As of December 2019, a virus that has radically affected and changed the world (Huang, et al., 2020), has become the center of life, starting from central China, and spreading all over the world. The epidemic caused by the effect of the virus has been defined as a "pandemic" by the World Health Organization (World Health Organization, 2020). From this definition, it would be quite appropriate to say that all our habits have changed and evolved into a process of innovation full of differences. The education system is one of the areas that are greatly affected by these innovations (Sá & Serpa, 2020). As a matter of fact, considering the sample of Turkey, as of March 13, 2020, all levels of the education process have suspended face-to-face education. After the interruption of face-to-face education, various structuring and training studies started to be carried out. At primary and secondary school levels, GSM operators have 8 GB internet usage rights agreements (Ministry of National Education of Turkey [MNET], 2020a). By using 3 EBA TV channels (EBA TV Primary School, EBA TV Middle

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School and EBA TV High School) (MNET, 2020b), it was tried to ensure that education was not interrupted. At the university level, this process; is shaped by activities such as online lectures, course content videos and recording of lectures, and conducting assessments and evaluations (Higher Education Institution, 2021) using homework, project, or online exam methods. With the effect of the pandemic, many countries such as Turkey have directed various practices in their educational activities. Some countries and examples are given in Figure 1.

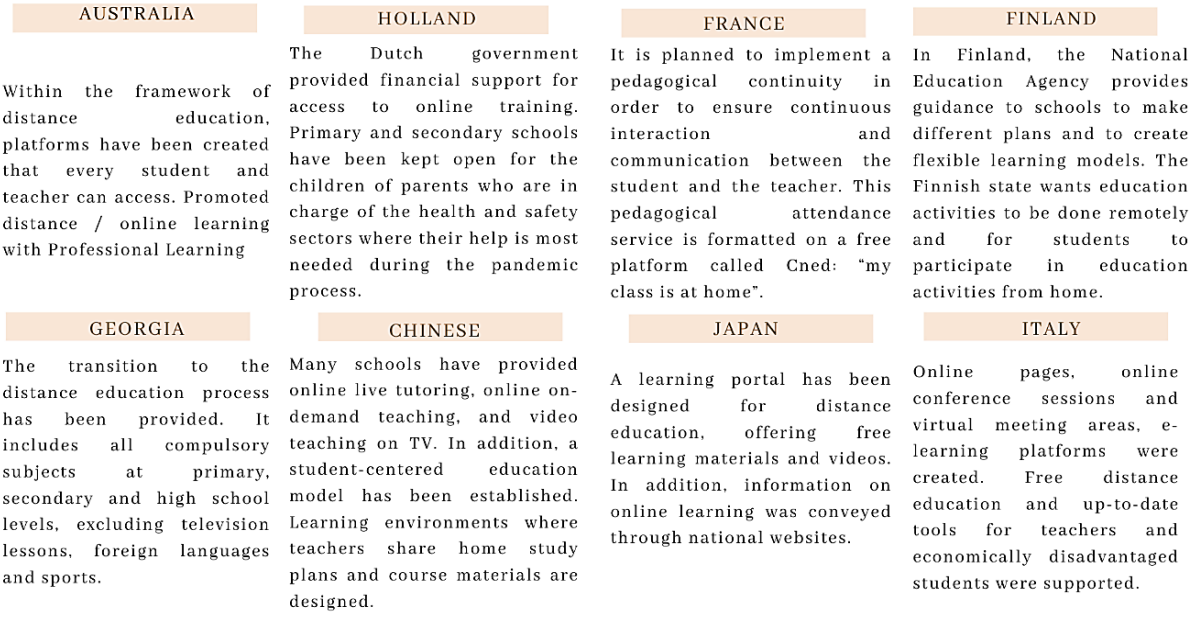

Figure 1. Educational activities of some countries in the pandemic (Reimers & Schleicher, 2020**)**

As can be seen in Figure 1, the concept of "distance education" has come to the fore with the pandemic's effect in almost most countries, including Turkey. Training carried out in planned and online environments is called distance education (Hodges, Moore, Lockee, Trust & Bond, 2020). In other words, distance education is the conduct of courses (Usun, 2006) within a certain program in which learners and teachers are together in online environments, based on virtual hereness principles, in communication and face-to-face teaching activities. Although the concept of distance education has not entered our lives during the COVID-19 process, it can be said that it has provided its permanence with the pandemic (Giannini & Lewis, 2020). It is an important factor in preferring the fact that it does not require the student and the teacher to come to the same environment and does not require transportation fees in addition to saving time (Davis, Gough &Taylor, 2019) and that it is student-centered because it appeals to various sensory organs, that it has a widespread impact by reaching a wide student body and that it is effective in terms of offering equal opportunities to students. It should be taken into consideration that distance education aims to create a new educational environment, integrate work and teaching, ensure lifelong learning, and integrate information technologies into the educational process (Cavanaugh, 2001). Having all these advantages has ensured that distance education has existed for a long time in the education process, distance education activities have been carried out in places, but with the COVID-19 pandemic process and health in mind, even "theoretical" courses as well as "applied" courses have been carried out through distance education. Therefore, the "teaching practice" courses carried out in the faculties of education have also been processed by distance education. Teaching practice involves the lessons which each pre-service teacher teaching experiences most actively (Cohen, Hoz & Kaplan, 2013), and the pre-service teachers prepare for the profession by linking theory and practice (Greve, Weber, Brandes & Maier, 2020), the selection and application of methods and techniques, classroom management, instructional technologies, and

material design, and a process through which they can apply their knowledge of assessment and evaluation (Krzywacki, 2009).

The practice of teaching is seen as one of the most important components of teacher education programs as it acts as a bridge in undergraduate education since the pre-service teachers can experience the information they have learned in daily life and realize their implementations (Greve et al., 2020). This course, which is given to ensure that pre-service teachers are prepared in the best way for the teaching profession, aims to have the competence to use the knowledge, attitudes, skills, and behaviors related to the teaching profession gained by the pre-service teachers during their education in the educational environment (Lin, 2020). Therefore, in most teacher training programs, long-term teaching practices or internships are carried out (Hascher & De Zordo, 2015). The fact that the teaching practice process is carried out remotely within the scope of the pandemic can be described as a critical period. Obtaining detailed data covering the whole process such as the perspectives, attitudes, methods, and techniques of the pre-service teachers about this process, classroom management, etc. have great value in eliminating the problems that may occur in the future. For this reason, it is foreseen that researchers will turn to research that defines the process of "pandemic" and "teaching practice". During the pandemic period, opinions were determined with various sample groups related to distance education (Davis et al., 2019). Additionally, there are studies examining various variables related to teaching practice (Cohen et al., 2013; Greve et al., 2020; Güneş & Kaya, 2022; Uzun & Koparan, 2021). However, during the COVID-19 pandemic period, the sparse research that considers the activities and perspectives of pre-service teachers holistically in the "teaching practice" process carried out by distance education has emerged. In addition, it portends that the course process, which is integrated with the context of "hands-on activities" and daily life contexts based on practice activities such as science teaching, will be a research that will contribute to the literature of the depiction of the "teaching practice" course activities of the pre-service teachers. For this reason, this research is aimed to determine the perspectives and course activities of pre-service science teachers within the scope of the "teaching practice" course during the COVID-19 pandemic process.

1.1. Distance Education

Distance education has been defined as a form of education made from a certain center by using various communication tools without being face-to-face between the student and the teacher (Mshvidobadze & Gogoladze, 2012). It is also expressed as a comprehensive learning process supported by new communication technologies and carried out in a planned manner. Provides education and training opportunities to people with systems that can keep up with the developing technology and contribute to human education without being affected by time and space by removing the time and geographical barriers that disrupt education. In another definition, it is explained as an education system where teachers and students in different places meet by using information technologies, in a planned way, by an institution that has the right to issue official documents such as diplomas or certificates.

It is accepted that the first organized attempt in the field of distance education was made in the Langenscheid language school in 1956. Then, distance education was used by Rustinches Distance Education School in university entrance exams in Germany (Mastan, Sensuse, Suryono & Kautsarina, 2022). Australia was the first country to implement distance education in primary and secondary education. Distance education applications in New Zealand were started in 1922 at the New Zealand Letter Teaching School. To provide students who attend night courses in Poland, with learning opportunities from television, experimental distance education studies were started between 1966-1968. In Spain, the National Distance Education University was established in 1972 and this university started education in 1973 (Abuhammad, 2020). Developments in the field of information and communication technologies have increased the interest in distance education together with large

commercial enterprises. Partnerships established by universities with companies such as Caliber Learning Network, AT&T Learning Network, and MCI Communication in the USA have led to the development of a new understanding of distance education together with teaching models. Education lessons are given via satellite, video conference, and computer. Kentucky Virtual University, Western Governors University, Pennsylvania, and South Carolina Universities, which were established in the USA in 1997, can be specified as a few of the educational institutions that provide distance education (Chen, Kaczmarek & Ohyama, 2021). Some institutions in the UK, such as the "United Kingdom Open University", have re-established themselves as virtual universities. There are institutions that use both physical and virtual environments, called dual or mixed mode, as well as institutions that provide only network-based education such as "The University of the Highlands and Islands" (Churiyah, Sholikhan, Filianti & Sakdiyyah, 2020). Distance education has emerged in parallel with the technological developments and changes in time and the change in human needs and has taken its current form by constantly updating its existence. Although distance education has a dynamic character, it constantly renews itself and maintains its existence in line with the requirements of the age.

Distance education offers the opportunity to learn for people who cannot continue face-to-face education due to time, age, and socioeconomic reasons. With distance education, individuals have the opportunity to progress according to their own learning speed. Due to these features, distance education is an educational application that provides a lot of convenience to the learner and is easy to implement (Alea, Fabrea, Roldan & Farooqi, 2020; Erdemci & Elçiçek, 2022). The importance of distance education, which emerged with the end of the fact that education can only be done in school buildings, was better understood during the COVID-19 pandemic. With the closure of schools due to the pandemic, face-to-face education was interrupted, and online education was started. Thanks to distance education, the subjects in the curriculum were explained to the students with various applications (ZOOM, Teamlink, Skype, and Google Meet). The implementations prepared for the teachers and students to come together on a common platform to carry out their lessons, for the students to gain the achievements of the academic year, have enabled the teachers to improve themselves in the use of technology in the distance education process. Teachers who lacked information about technology literacy had difficulties in courses conducted over ZOOM and had problems with technology and communication (Iwai, 2020). Students and teachers who started the distance education process suddenly experienced anxiety due to their lack of experience in distance education (Allam, Hassan, Mohideen, Ramlan & Kamal, 2020). However, teachers should be able to use the word, pdf, and PowerPoint applications at a simple level, and be able to start and end the lesson and control the lesson process in online courses. The distance education process has created a step for students and teachers to see their technological deficiencies and to improve themselves technologically by eliminating these deficiencies. On the other hand, distance education provides the opportunity to repeat. The fact that it provides various opportunities in terms of facilitating students' learning shows that distance education is sustainable (Bakirci, Ozcan & Kara, 2021; Karakaya-Cirit & Aydemir, 2020). In line with the developments and changes in technology, houses can be turned into small libraries by using individual facilities.

1.2. Distance Education Applications in the Covid-19 Pandemic in Turkey

Since the epidemic that affected the world started in our country, various measures were taken to protect the health of students, teachers, and parents and to ensure that students do not break away from the education process. For primary and secondary school students in Turkey, distance education has been started by the Ministry of Education between 23 March-29 June 2020 over the Education Informatics Network (EBA) and TRT, and EBA TV primary, secondary and pre-school channels. In the "MONE 2020 Administrative Activity Report", distance education activities carried out to ensure

the continuity of education during the COVID-19 pandemic period were published. To provide uninterrupted access to distance education, free access to EBA up to 8 GB was provided via mobile networks. 14 267 EBA support points and 164 Mobile EBA support points have been established for students who are in rural areas and have transportation problems. More than 500 thousand tablets with GSM internet usage rights up to 25 GB were distributed to disadvantaged students.

2. METHOD

2.1. Research Model

The study was carried out by determining the case study method under the category of descriptive research approaches. The reason why the case study method was chosen within the scope of the research is that the method uses multiple sources of information about a situation or an event (McMillan & Schumacher, 2010) and allows the process to be examined and described in depth (Creswell & Poth, 2016). The most appropriate method was the case study to reveal the experiences of the pre-service teachers in this process in detail and to find answers to the questions of what, how, and why.

2.2. Participants

In the study, the purposeful sampling method was used because it allows in-depth research by selecting rich situations. Purposeful sampling is a widely used technique for the most efficient use of limited resources (Palinkas et al., 2015). Saturation, which is given importance in qualitative research, is defined as the continuation of purposeful sampling methods until no different data is obtained from the research (Gentles, Charles, Ploeg & McKibbon, 2015). As can be seen, the size of the sample differs according to the purpose of the study and the available sources (Dongre, Deshmukh, Kalaiselvan & Upadhyaya, 2010). In the selection of the participants by purposive sampling method, it was taken into account that they were fourth-grade students, they were taking the teaching practice course from the same advisor, they could attend weekly evaluation meetings and they were volunteers. At the same time, the focus of the research and the principles of data amount were taken into consideration in determining the sample size. The demographic information of the participants is presented in Table 1.

Table 1. Demographic information of participants

Code Names	Gender	Grade Level	Grade Point Average
T01	Female	4th Grade	2,50 – 3,00
T02	Female	4th Grade	2,50 – 3,00
T03	Female	4th Grade	2,50 – 3,00
T04	Female	4th Grade	3,00 and up
T05	Male	4th Grade	2,50 – 3,00
T06	Male	4th Grade	2,50 – 3,00
T07	Male	4th Grade	2,50 – 3,00
T08	Male	4th Grade	3,00 and up

When Table 1 is examined, the participants were coded as T01, T02, … and T08; a total of four participants were female and four participants were male, and a total of six participants' grade point averages were 2,50 – 3,00 and a total of two participants' grade point average were 3,00 and up.

2.3. Data Collection Tool

Semi-structured interviews and semi-structured observation forms were used in the data collection process. Interviews are preferred in the research process is that they provide the opportunity to analyze the situation in depth with questions that are flexible and can be shaped according to the speaking situation, as well as the questions directed to discover the richness of the schemas that exist in the brain of individuals (Milles & Huberman, 1994). Therefore, the interviews are conducted in a semi-structured manner that offers the opportunity to add to the questions, to change the location of the questions according to the priority status, and to make detailed explanations regarding the questions by the research conditions (Neuman, 2012). Observational work is done in natural environments and allows the study of human behavior. The observation form can describe the observed feature at different levels and allows seeing how often and at what rate the performances are met (Gillham, 2000). The use of observation forms in the professional development of teachers is an accepted method. Observations are carried out to collect information about the environment, event, or individuals to be evaluated in detail (Tashakkori & Teddie, 2003).

The questions asked to the participants within the scope of the research are as follows:

1. What do you think about the concept of distance education?
2. What are your feelings about the concept of distance education?
3. What do you think about the concept of "teacher" in distance education?
4. What are the problems you encounter in distance education?
5. What are the preferred teaching methods in distance education?
6. What are the preferred teaching activities in distance education?
7. What do you think about the implementation and management process in distance education?

2.4. Data Collection Process

The research process was carried out in 6 steps. These six digits are presented as follows;

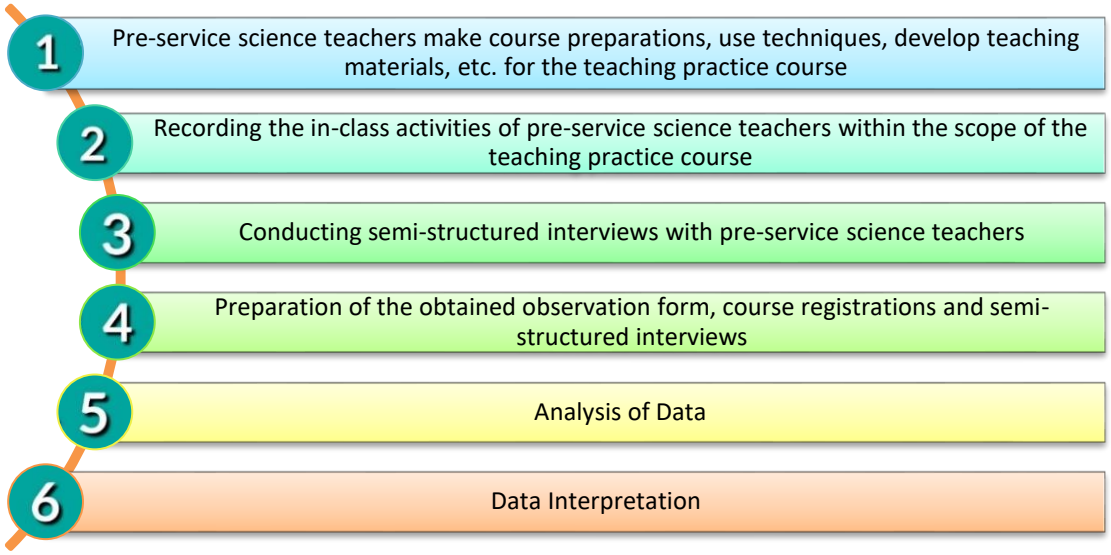

Figure 2. Data collection process

As stated in Figure 2, the research was completed with the continuation of distance education of science teacher candidates within the scope of 'teaching practice', recording of courses, filling out observation forms, conducting interviews, organizing data, analyzing data and finally interpreting the data.

2.5. Analysis of Data

In the study, the content analysis method was used in which the existence of codes in the qualitative data obtained during the analysis process was determined, themes were created by combining these codes and inferences were made (Creswell, 2007). The data obtained as a result of the semi-structured interviews and the observation form were subjected to content analysis in parallel with this and presented through tables and figures. In the meantime, NVivo 9 package program was preferred to facilitate analysis. Thanks to this program, a very comprehensive analysis process is carried out from the creation of categories to the provision of relationships, from the easy change of theme names to the creation of matrices (MacMillan & Koenig, 2004). As a result of the repetition of the codes by different researchers within the framework of the consistency dimension, the compatibility between the codes was examined and the Kappa Reliability coefficient was calculated as 0.81. It would not be wrong to say that there is a perfect match between the codings depending on the fact that the corresponding match is above 0.75 (Bakker et al., 2015).

3. FINDINGS

This research which is aimed to determine the perspectives and course activities of pre-service science teachers within the scope of the 'teaching practice' course during the COVID-19 pandemic process detailed information about the distance education thoughts, distance education emotions, the concept of “teacher” in distance education, problems and suggestions in distance education, preferred teaching methods in distance education, preferred teaching activities in distance education and implementation and management process in distance education will be conveyed in this section.

Table 2. Opinions of participants about thoughts regarding distance education

Theme	Category	Explanation	Frequency
Thoughts Regarding Distance Education	Internet	Internet access	1
	Technological Tools	Computer, tablet phone etc.	2
	Online Courses	Conducting online courses and assessment and evaluation activities	1
	Problems	Communication/connection etc. problems	4

As outlined in Table 2, when pre-service science teachers heard the concept of distance education for the first time, they answered under four categories: internet, technological tools, online courses, and problems. The opinions of pre-service science teachers about the categories are presented below:

> ***Internet:*** T01; *“When I heard the concept of distance education, the concepts that first came to me were the Internet, the online classroom environment, and the web-based applications used. Since, as you can see from the name, distance education is a non-face education program. We can only provide that on the internet. Where there is no internet, there is no talking about distance education”*
> ***Technological Tools:*** T02; “*I think that distance education is technological tools. For example, computers, tablets, phones, or any tools for online training.*”
> ***Online Course:*** T05; *“The concept of distance education calls for online courses and online exams”*
> ***Problems:*** T08; *“Internet breakdowns, connection slowdowns, sound imports, and other concepts that I can think of in ping. Students certainly have a harder and more challenging learning process than one-on-one training.”*

Table 3. Opinions of participants about emotions regarding distance education

Theme	Category	Explanation	Frequency
Emotions Regarding Distance Education	Anxiety	Nervous and depression	2
	Fear	Afraid, horror etc.	4
	Curiosity	Curious about online system	1
	Sadness	Unhappy	1

As seen in Table 3, the feelings that students feel when they first hear the concept of 'distance education' were collected under four categories: anxiety fear, curiosity and sadness. The opinions of pre-service science teachers about the categories are presented below:

Anxiety: T06: *"I was nervous when I heard about distance education. What concerns me was that I thought my technological knowledge was inadequate. I have been thinking long and hard about whether I cannot get on the site if I am out of attendance or I am in a bad Internet jam. Like everyone else, I had the idea of how efficiently a person can study in a computer environment."*

Fear: T05; *"I was afraid of how to do it at first. Because I do not know the system. I am not good at computer skills. I had ambiguities in my head because of the first internship experience and the first situation I encountered in distance education. Since I didn't get any distance education training, I thought I'd be forced to plan because the course process is limited."*

Curiosity: T07; *"I was curious about how it would be since we have never trained in such a system before."*

Sadness: T08; *"I was very unhappy to hear about it the first time. Since I think your teaching students are seeing."*

Table 4. Opinions of participants about the Concept of "Teacher" in Distance Education

Theme	Category	Explanation	Frequency
Opinions on the Concept of "Teacher" in Distance Education	Technological Skills	In the distance education process, the teacher should have technological skills.	6
	Innovation	In distance education, a teacher must be innovative.	2

As illustrated in Table 4, the pre-service science teachers' minds about 'teacher' in distance education were collected under the technological skills and innovation categories. The opinions of pre-service science teachers about the categories are presented below:

Technological Skills: T01; "*The hardware that teachers should have: First, they should be able to closely monitor technological developments and use technology effectively and use the activities on the web correctly.*" and T05; *"They must have digital capability, digital literacy, application capability, and computer domination."*

Innovation: T07; *"The teacher must take advantage of a lot of materials and be equipped with them, different and remarkable activities will make it more fun for students to stay on the PC. The teacher should add new things to their information, and it will always make learning the same words or activities boring. I have tried to be understanding with students about everything, and I know that the process is difficult for them, and it takes time to learn new information*

. I tried to regenerate myself, always trying to add new ones to my knowledge."

Table 5. Opinions of participants about the Concept of "Teacher" in Distance Education

Theme	Category	Explanation	Frequency
Problems Encountered in Distance Education	Lack of Infrastructure	*No audio, no audio transmission, Internet interruption, etc.*	4
	Inexperience	*Lack of time to schedule, not knowing activities, not knowing applications, not knowing how to include students in the online process, etc.*	2
	Lack of Infrastructure + Inexperience	*There are problems with both problem states*	2
Suggestions for Problems in Distance Education	Skills Training	*Communication, technical skills, digital literacy skills, etc. various skills training*	4
	Innovation	*To find new activities in the distance training process, to focus on new techniques*	2
	Lower Structure Support	*Internet interruptions, tool-tool disruptions, etc. alternative ways to setbacks*	2

As Table 5 demonstrates, the problems faced by the pre-service science teachers in distance education were identified as lack of infrastructure, inexperience, and lack of infrastructure + inexperience, and suggestions for problems in distance education were collected under three categories as skills training, innovation, and lower infrastructure support. The opinions of pre-service science teachers about the categories are presented below:

Problems encountered in Distance Education

> ***Lack of Infrastructure:*** T02; *"We are experiencing systemic problems. For example, we can have a falling out of the system when we are doing a lecture. We can also have Internet problems. During the course, we can experience problems such as a freeze in the image, and no sound is transmitted. It can also be caused by problems caused by students."*
>
> ***Inexperience:*** T06; *"My biggest problem was I never saw the faces of the kids, I didn't know their names, and I didn't know where the names were seen on the zoom program, and when I asked a question, I didn't know whom to give the right to say, and I was saying, "there were two names on the screen."*
>
> ***Lack of Infrastructure + Inexperience:*** T01; *"Insufficient knowledge of the practices to be used in distance education. Causing class turmoil as a result of students not attending class or not being able to control attendees. Although we spent effort in maintaining class dominance in the normal classroom environment, I think it was more difficult in distance education. Sometimes I was negatively affected by the fact that students did not participate in the process at all or participated in a very active way."*

Suggestions for Problems in Distance Education

> ***Skill Training:*** T08; *"I'll explain this as follows. My friend wanted to share content with the students and turned-on screen sharing. Nevertheless, the sound was not going the other way. It is a big problem, the students start talking, and everybody says something. The teacher cannot solve the problem with my friend, etc. So, the point is that they can use computers and technology effectively"*
>
> ***Innovation:*** T02; *"To reduce student-related problems, we can create student-centered plans to increase their participation in the course, apply different teaching methods to suit the acquisition rather than the narrative method to separate our course from the monotony and provide relevant computer-assisted activities to keep students engaged in the course.*
>
> ***Lower Structure Support:*** T05; *"Computer technical problems, internet interruptions in students or teachers, electrical problems are a problem in preventing distance education."*

Table 6. Opinions of participants about Preferred Teaching Methods in Distance Education

Theme	Category	Explanation	Frequency
Preferred Teaching Methods in Distance Education	Daily life contexts	*Supporting the lesson with examples from everyday life in order to embody the concepts and attract the attention of the students*	2
	Plain narration	*Clear, understandable, short, concise expression, often repeated*	4
	Concept Teaching Materials	*To enrich concept teaching with teaching materials such as Structured Grid, concept map, concept network, etc.*	1
	Instructional Technology	*Animation, simulation, augmented reality, online competition applications for assessment and evaluation, etc. to be included in the course*	1

As Table 6 illustrates, the teaching methods preferred by the pre-service science teachers in distance education were collected under four categories: daily life contexts, plain narration, concept teaching materials, and instructional technology. The opinions of pre-service science teachers about the categories are presented below:

> ***Daily Life Context:*** T01; *"To draw students' attention to the subject and to raise their interest. My advice on this is to include examples of everyday life. In order to provide distance education, we need to provide examples of many activities we do in everyday life in classroom environments and attract students' attention."*
> ***Plain Narration:*** T03; *"Sentences should be short and self-explanatory in the teaching of concepts and basic principles too long sentences can make it difficult for students to learn. The concept can cause misconceptions."*
> ***Concept Teaching Materials:*** T04; *"The concepts are abstract, making it difficult for students to visualize. Therefore, to embody concepts, the meaning Resolution Table, the concept Network, the concept Map, and the Information Map must be used."*
> ***Instructional Technologies:*** T06; *"The course narration is absolutely essential to use simulations of images. Videos on some animation sites focus children's attention on the course."*

Table 7. Opinions of participants about Preferred Teaching Activities in Distance Education

Theme	Category	Frequency
Preferred Teaching Activities in Distance Education	Video	4
	Virtual Laboratory	3
	Animation and Simulation	3
	Interactive Game Play	2
	Education Informatics Network (EBA)	2
	Online Measuring Tools	2

As Table 7 exhibits, the teaching activities preferred by the pre-service science teachers in distance education were collected under six categories: video, virtual laboratory, animation and simulation, interactive gameplay, education informatics network, and online measuring tools. The opinions of pre-service science teachers about the categories are presented below:

> **T01;** "*The videos should be watched where necessary, and lectures should be performed with questions answered. Experiment environments must be prepared. Visual, video, animation, simulation, etc., as I mentioned at the beginning activities must be included. Groups should be formed and the discussion environment should be prepared so that students can learn the concepts."*

T02; "*The use of applications of virtual laboratory environments can be activated because the science course is a very suitable lesson for experimenting."*

T03; *"The technology should be utilized by using technology tools to attract students in the distance education process, and by drawing attention to the course with the help of visuals and simulations, experiments that cannot be done in visual or classroom environments. The concept misconceptions must be corrected"*

T04; *"In distance education, interest can be achieved through the abundance of visuals and using videos. Having activities that students can be active in increases their interest in the course. Students can be confronted with their misconceptions by creating a discussion environment to solve the concept illusion."*

T05; *"The activities can be carried out together. Online tests can be solved. Students may be asked to provide homework in the course, so they can learn to use technology and be active in the course."*

T06; *"Entering a video at the beginning of the course, using a photo that will be interesting, etc. activities are available. Their technological skills are already evolving over time, and sometimes when we ask students some things we do not know, they know better."*

T07; *"They should take advantage of many types of intelligence and areas such as videos, and songs, to attract attention. Interactive games attract students and create a more dynamic environment. To determine the concept misconceptions, questions should be asked about the learned concept, based on the answers given, the concept misconception should be identified, and the misconception corrected by various examples, practice questions, and similar activities."*

T08; *"As students are aged (from 10-15 to 15) when using remote education, I tried to choose easy-to-understand activities that would not overexert students or confuse them by looking at the idea of how much computer use can be the maximum, which is the maximum. I tried not to go outside the EBA where the students have already met, so that there would be no illusions or illusions in the students."*

Table 8. Opinions of participants about implementation and management process in distance education

Theme	Category	Explanation	Frequency
Implementation Process in Distance Education	Diversity	*To include differences in method, technique, visual, material, etc. that will appeal to each student in all educational activities*	3
	Time	*Managing time well, planning activities accordingly*	5
	Student-Centered	*Aiming to engage and activate the student*	4
	Learning Outcomes	*Adhering to the stated achievement*	3
Management Process in Distance Education	Time Management	Right to Speak: *Eliminating students from speaking and responding on their own during the course process*	3
		Uninterrupted Internet: *Alternative ways for Internet outages*	2
		Again: *Increasing frequency of repetitions since students are disconnected from the lesson, their interest in other things cannot be controlled*	4
	Classroom Management	Right to Speak: *Elimination of students speaking on their own during the course process and responding or not taking any words at all*	3
		Chat: *Block the chat environment where students can communicate with each other through the app*	1
		Hardware: *Disruptions in sound, internet and video make it difficult*	4

Communication	Using Sound Effectively: *The use of sound, which is an important tool for communication with students*	1
	Transmission of Sound: *Elimination of disruptions to the transmission of sound*	2
	Camera View: *Mutual image to ensure eye contact*	4
	Concept Usage: *Correct use of concepts in order not to cause misconceptions*	1

When Table 8 is examined, the implementation process of the pre-service science teachers in distance education was collected under four categories: diversity, time, student-centered, and acquisition-oriented categories. The management process of the pre-service science teachers in distance education was collected in three categories: time management, classroom management, and communication

Implementation Process in Distance Education

Diversity: T01*: "To include various methods and techniques. Because in the process, it should be able to activate the student and correct their concept misconception"* and T06; *"I did a study of what method of location I would describe the course by, as I explained the course using different methods and techniques."*

Time: T02; *"The criteria I consider when planning my lesson include time. I took care to look at the concepts I could give within half an hour because we were limited in time and to include activities where students could test their learning and reinforce their learning."*

Student-Centered: T01; *"Preparing activities that may attract students. Because the more attention the student is drawn to a subject, the catchier it is and the more relevant it is. The student should be given a voice and enabled."*

Learning Outcomes: T06; *"I prepare a learning plan for the learning outcome. I have got a plan for that, according to the textbooks."*

Management Process in Distance Education

Time Management: T01; "*The time-efficient use of thumb removal can be allocated time to pre-determined activities.",* T04; *"Internet slowness may take some time to open a presentation or event while performing a course presentation. There can be a fall from the system. You must keep taking students to class, and time goes by when you're following them. In such cases, the teacher may not be successful in terms of time control."* and T07; *"Students are involved in extracurricular activities during the course, and it is difficult to control the student because it is distance. He doesn't answer enough when I ask a question, so I must summarize it repeatedly."*

Classroom Management: T01; *"The finger lift can be used for classroom management. Ideas or answers that are intended to be shared can be specified in this way. This allows all students to participate in the course and eliminate complexity."*, T02; *"Students can have private conversations between courses. Therefore, students are disassociating from the course. The presence of messaging in the app allows students to have private conversations."* and T03; *"Disruptions, such as cutting the Internet, the microphone not working, or the fact that it remains on, have made it very difficult for me to focus on what I'm going to be told to keep the classroom organized."*

Communication: T01; *"Assuming that the teacher is the one who started the communication, he should use the language effectively. Considering the recipient is also a student, they are expected to respond to the message being sent. Because communication needs to be mutual to be healthy."*, T04; *"The lack of response from some students in the course process due to Internet infrastructure and technical shortcomings, which is the lack of feedback in communication, harms communication. When there's no sound, the teacher is suspicious to see if the student is listening. And it's getting the teacher's motivation down"* and T06; *"The must-have eye contact in effective communication. Eye contact means feedback. But there was no eye contact in distance training."*

The opinions of pre-service science teachers about the categories are presented below:

4. DISCUSSION and CONCLUSION

When pre-service science teachers heard the concept of distance education for the first time, they answered under four categories: internet, technological tools, online courses, and problems. Most of the pre-service science teachers have been determined to refer to the concept of distance education as a 'problem'. Concordantly, the pre-service science teachers have experienced problems in teaching and have developed prejudices on the concept of distance education during the period of 'teacher practice'. On the other hand, the definitions for the problems and suggestions of teachers in the distance education process in Table 5 also prove this situation. When table 4 is examined, it is seen that the pre-service science teachers define the problems encountered in distance education as lack of infrastructure and inexperience. In the study conducted by Tabata and Johnsrud (2008), the study found that 3 different factors such as conditions, time and space were effective in the development of attitudes toward distance education. Moreover, the lack of infrastructure and inexperience of pre-service science teachers in distance education affected education process. Therefore, given the limitations of pre-service science teachers to support technological pedagogical content knowledge and the continued domination of traditional approaches in the education process, the conditions available in education faculties may be said to be effective in describing distance education as a problem. In addition, like the Covid-19 pandemic process, it can be said that a process that has not been experienced and portended has suddenly erupted, resulting in rapid digitization and that a quick change of the process has a direct effect on people such as health factors from a sensory perspective, science studies have directly and indirectly affected pre-service science teachers' distance education associations. Most participants in the concept of distance education can be characterized as a "problem", and after the Covid-19 pandemic process is completed, pre-service science teachers will not provide access to distance education. Additionally, the disadvantaged situations experienced in distance education, and advantageous situations are highly varied, so it is very valuable to identify and address the causes of these biases. In this regard, the prerequisite for teachers to raise tech readers is for teachers to become technology readers and to use the technical information they have in classroom applications in a meaningful and harmonious manner (Bakırcı, Ercan & Cengiz, 2022; Mishra & Koehler, 2006).

Pre-service science teachers will conduct the 'teaching practice' through distance education in the Covid-19 pandemic process, their emotional state is identified as anxiety, fear, curiosity, and sadness and presented in Table 3. When table 3 is examined, it is seen that a significant proportion of science teachers experience a sense of fear. Concordantly, these findings of the study suggest that the students of the science program in Turkey are focusing on disadvantages within the framework of distance education. It is estimated that the students of science teachers focus on these disadvantages and experience fears because they find themselves inadequate within the scope of technological pedagogical content knowledge. Technological pedagogical content knowledge is that a teacher knows how to use their technological knowledge in pedagogically meaningful classroom applications (Ayvaci, Simsek & Bebek, 2019). It can be said that there are fears of carrying out the process because they are not capable of technological pedagogical autonomy. The definitions for the concept of teacher in the distance education process in Table 4 also prove this situation. When Table 4 is examined, it is seen that the pre-service science teachers define the concept of 'teacher' in the distance education process with technological skills and innovation. Mishra and Koehler (2006) explained to pedagogical content knowledge for teachers to be able to train effectively, effectively integrating education technologies into their classroom and subject matter will make remote training activities more effective. Therefore, it can be said that the fears of the teachers of science are directly related to technological pedagogical content knowledge and their self-qualifications in this regard. CAO and others (2020) have determined that in the process of the Covid-19 pandemic, students in China have

been concerned about the outbreak of a 25% slice of their university students in their study to understand their psychology. This occasion can portend that the feelings of fear and anxiety that teachers carry are unpredictable and caused by an outbreak that has never been experienced before. However, Burke and Dempsey (2020) reported that there was an opportunity to embrace the world of digital learning because it was said to save time for exploration, procurement, and creation of resource and learning plans, while at the disadvantage, educators were under pressure to provide online learning, and that when schools were reopened, they were concerned that teaching programs would not grow. Similarly, Angoletto and Queiroz (2020) highlighted that digitization logic is not simple and underlined that "learning technologies", which are adopted in emergencies, is an exit point. In this regard, it should be said that it will be important to turn impossibilities into possibilities.

When the opinions of pre-service science teachers about problems in distance education were examined, the problems in distance education as stated in Table 5 were determined as a lack of infrastructure and inexperience. Carrillo and Flores (2020) also discussed the presence of some students in their homes who did not have computer-internet access and found that there was a decline in their education. The problems with internet connectivity have been highlighted several times by researchers regarding the hardware (Asmara, 2020; Dias, Lopes & Teles, 2020). Dutta and Smita (2020) expressed that the Covid-19 pandemic process found that students experience problems such as lack of electronic devices, limited internet access, expensive internet fee, slow internet speed and difficulties using online platforms in their studies with university students in Bangladesh. Concordantly, there are parallels between the studies in the literature and the data obtained in the research. On the other hand, the delivery of internet services in distance education is a very effective factor in the socioeconomic situation of families (Bennett, Uink & Cross, 2020). As a matter of fact, it has been determined that the number of students who are not able to benefit from distance education services in the pandemic process in our country is at serious levels, in this sense the lack of opportunity has reduced the quality of education. However, science is a remarkable finding that teachers should often talk about the factor of inexperience within the scope of 'teaching practice'. Although studies were included in the international literature as stated above in the background of infrastructure fencing, there were no studies that mentioned the inexperience of teachers or lack of experience for teachers. The findings and area of the summer clearly show that in the context of Turkey, teachers have distance education experience shortcomings. The basis for this lack of experience is a clear indication that although the conventional concept of 'traditional education' has been tried to change, it cannot be eliminated. Although the perspective of education has taken an effort to raise the pre-service teachers with innovative approaches in mind, it is observed that it is not easy to move away from adopted approaches. In this regard, innovative educational approaches should be adopted by pre-service teachers and their experiences obtained should be developed through practice. When the opinions of pre-service science teachers about suggestions for problems in distance education were examined in Table 5 were determined as skill training, innovation, and lower structure support. The Covid-19 pandemic process is clear that there is a catalyst for effective use of digital devices, online resources, social media technology and e-learning activities (Mulenga & Marban, 2020). Therefore, the recommendations provided to address the mentioned negatives aim to extend this effective use beyond the Covid-19 pandemic process. In addition to the use of technological skills and training of pre-service science teachers, it has been noted that innovative activities will close the lack of experience and improve self-sufficiency through the course process and that infrastructure support will be a solution for the remediation of infrastructure deficiencies.

When the opinions of pre-service science teachers about preferred teaching methods in distance education were examined in Table 6 were determined as daily life contexts, plain narration, concept teaching materials and instructional technology. Table 6 detailed narration activities obtained by the observation forms of the pre-service science teachers. It was determined that the teaching

methods were mostly questions and answers, problem-solving and straight narration (Basilaia & Kvavadze, 2020). This result is largely parallel to the methods teachers use in the reports of researchers in some countries (Burke & Dempsey, 2020; Mulenga & Marban, 2020). Literature reports that in the Covid-19 process teachers and teacher candidates must use many technological hardware and software for distance education (Mohan et al., 2020). It has been determined that the pre-service science teachers have positive effects of the Covid-19 process as part of the "teaching practice" and are obliged to diversify distance education activities and tend to innovative approaches.

The opinions of pre-service science teachers about the implementation process in distance education were identified as diversity, time, student-centered and learning outcomes in Table 8. It portends that the pre-service science teachers are on the "time" element, especially as a result of inexperience, as part of the distance execution of the 'teaching practice' process. The pre-service science teachers experience the teaching profession, feel teaching and practice, there was a concern that the process would return to education remotely and therefore the period would not be reached, and the issue would not be completed. This result demonstrates that the skills of pre-service teachers for teaching technologies and the activities of material development in education technologies are not capable and should be developed. In this regard, the process of "teaching practice" should be discussed. Because researchers suggested that the time of the course for 'teacher application' is insufficient in Turkey (Kaba & Urey, 2022). Additionally, it is stated that pre-service teachers have a high degree in senior year and have a high degree in KPSS, which prevents them from giving time and importance to teacher practice. Given all these reasons, it is likely to be suspicious of the effectiveness of the distance education. Moreover, it is considered that the process of teaching practice is not fully qualified to improve the skills of technological pedagogical content knowledge and teaching technologies and to be actively used. The considerations of the course processes have been reviewed in 3 sections as time management, classroom management and communication. The studies have said that the most repetition in time management during the course preparation process is affecting and making the process difficult during the course, as teachers have often mentioned time in the course preparation process in the distance of the process as part of the "teaching practice". They mentioned that students have broken out of the course, repeated more often because they don't listen and that the students who have recently failed to make one-on-one eye contact have become more frequent because they have a sense of not understanding, and that they have tightened the repetition.

Recommendations

A variety of projects can be developed to improve the existing infrastructure and provide more infrastructure support within the framework of distance education and instructional technologies to pre-service science teachers. Thus, universities, schools, teachers, students, and parents will be able to become a stakeholder in education technologies.

Pre-service teachers should be given the training to enable them to develop themselves in the context of the distance education process, applications that can be carried out in the process, points to be considered, and technology literacy.

It is thought that the fact that the teaching practice course was carried out on a distance education platform for the problem of time experienced in the face-to-face implementation of the teaching practice course may break the prejudices of the pre-service teachers towards the course. In this regard, it is suggested that teaching practice or internship courses can be conducted in the form of distance education in areas that do not require complex application methods and techniques.

The Covid-19 pandemic process may include research in various departments for teacher implementations to teaching practice, where their views are determined and even compared.

The Covid-19 pandemic process is considered to be a major contributor to field writing, especially in the scope of "teaching practice" and in the studies in all countries where comparisons are made.

The courses for technological pedagogical content knowledge are emphasized and encouraged to be aimed at classroom applications that are free of theoretical knowledge. This will prevent students from taking the challenges faced by teachers, especially during the Covid-19 pandemic process, to educational environments.

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Abstract

The purpose of the study is to develop a scale that determines the attitudes of secondary school students towards distance mathematics education, and to examine the attitudes of the students by certain variables. The study included 271 secondary school students studying in Sivas province during the 2020-2021 academic year. Exploratory and confirmatory factor analyses were performed on the data obtained from the scale to examine the psychometric structure of the scale. A t-test and an analysis of variance were performed to determine the differences among secondary school students' attitudes towards distance education in mathematics by gender, school type, and grade level. It was found that the attitudes of secondary school students towards receiving distance mathematics education were negative. Gender does not constitute a significant difference in the attitude scores of secondary school students towards receiving distance mathematics education. In terms of the type of school in which students studied, a significant difference was found in favor of public schools in secondary school students' attitude scores towards distance mathematics education. In terms of grade levels, a statistically significant difference was found in favor of the 5th, 6th, and 7th grades regarding their attitudes towards distance mathematics education, among 5th, 6th, 7th, and 8th grade students.

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Research Article

A Scale Development Study Determining the Attitudes of Secondary School Students towards Distance Education of Mathematics*

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Abstract

The purpose of the study is to develop a scale that determines the attitudes of secondary school students towards distance mathematics education, and to examine the attitudes of the students by certain variables. The study included 271 secondary school students studying in Sivas province during the 2020-2021 academic year. Exploratory and confirmatory factor analyses were performed on the data obtained from the scale to examine the psychometric structure of the scale. A t-test and an analysis of variance were performed to determine the differences among secondary school students' attitudes towards distance education in mathematics by gender, school type, and grade level. It was found that the attitudes of secondary school students towards receiving distance mathematics education were negative. Gender does not constitute a significant difference in the attitude scores of secondary school students towards receiving distance mathematics education. In terms of the type of school in which students studied, a significant difference was found in favor of public schools in secondary school students' attitude scores towards distance mathematics education. In terms of grade levels, a statistically significant difference was found in favor of the 5th, 6th, and 7th grades regarding their attitudes towards distance mathematics education, among 5th, 6th, 7th, and 8th grade students.

Keywords: Distance mathematics education, attitude, scale development

1. INTRODUCTION

Distance education, which originated in the 1700s as mail correspondence education, has evolved and become increasingly popular in recent times. Today, education is delivered online and planned remotely at all levels (Yamamoto & Altun, 2020). In the most general sense, distance education is the organization, presentation and evaluation of the teaching processes of teachers and students in different environments from a distance and from a center (Sönmez, 2009). The most distinctive feature that distinguishes distance education from face-to-face education is the independence between the learner and the teacher in terms of time and space (Ağır, 2007). Thanks to distance education, the individual's ability to learn independently can be developed, and the course contents can be easily changed. In addition, by eliminating the opportunity gap between students, education can be provided in line with students' needs. In this way, traditional education processes can be enriched, and it could be possible to benefit from them at all stages of education in various disciplines (Uşun, 2006). However, the fact that it is not possible to implement some courses that require practice and that it is more difficult to provide learning and teaching motivation in distance education than in traditional education are among its disadvantages (Ağır, 2007). Distance education

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can cause asociality as it limits face-to-face interaction and communication. In cases where the technological infrastructure is insufficient, learning activities may lose their efficiency (Uşun, 2006).

Distance education is highly related to developments in the technology field. Therefore, distance education is carried out online thanks to internet technology (Okur, 2012). In parallel with these developments and the fact that technology is further embedded in education and training, the idea of individual learning is gaining importance. The idea that an effective and efficient learning environment can be provided with the concomitant use of the constructivist learning approach and technology has become widespread, and a new perspective on the use of technology in education has been gained (Erbaş & Demirer, 2015).

There are four principles proposed by Heid (1997) for technology-enriched learning environments. According to the first principle, student-centered teaching is valuable, and technology is a powerful alternative for student-centered learning environments. According to the second principle, the student should have a working/studying experience just like a mathematician. The third principle states that learning can be strengthened by deep thinking, and technology can play a strong thought-provoking role. In the fourth principle, epistemological authority is redefined in conjunction with technology. It is possible to say that these principles can also provide guidance on how mathematics courses can be conducted through distance education. In other words, according to Heid's principles, technology becomes a source of information that has a decisive effect on the formation of the students' knowledge. This student-centered approach is supported by individuals' work and experiences. From this point of view, it is seen that technology aims to improve mathematical understanding and thinking by supporting the environment of learning and teaching of mathematics. Accordingly, in mathematics education given by distance education, technology should be considered just a presentation tool, and students should be provided with learning environments where they can interact with mathematics software at various levels.

When the literature is reviewed, it is seen that there are studies examining the views, perceptions and beliefs of teachers and/or students on distance education (Arslan, Kutluca & Özpınar, 2011; Boz, 2019; Bozkurt, 2020; Erfidan, 2019; Mercan, 2018; Özer, 2011; Özyurt & Kısa, 2021). These studies show that while there is a positive opinion in terms of flexibility of time and space, there are also negative views expressing that it is not possible to have direct communication and interaction in distance education. It is stated that some instructors define distance education as a system that is inefficient, with hardships and difficulties (Şeren, Tut & Kesten, 2020), and that they have a more negative view than the students in terms of the processes and the evaluation (Özer, 2011). Moreover, it is also observed that instructors have a low level of knowledge and awareness about distance education and have a more positive stance towards traditional education (Erfidan, 2019). Mercan (2018) stated that most of the undergraduate students evaluated distance education positively. Students were examined in the context of learning, environment and technology about the positive aspects of distance education. Additionally, students expressed that the lack of active participation, technical problems, lack of obligation to attend and low interaction compared to formal education are the negative aspects of distance education (Mercan, 2018).

Literature contains studies that reveal teachers' and students' attitudes to distance education. According to Ülkü (2018), primary school teachers generally have negative attitudes towards distance education, but there are no significant differences between classroom and branch teachers working in primary schools. However, Ağır (2007) stated that primary teachers had a positive attitude towards distance education and that the Internet was preferred as a technique of distance education. The common conclusion found in the studies of Ülkü (2018) and Ağır (2007) is that teachers who have a master''s degree have more positive attitudes towards distance education. While Sipahi (2019) studied the attitudes of high school students towards distance education, Gürkan (2017) and Uslusoy (2017) examined the attitudes of higher education students. Uslusoy (2017) compared the attitude of students

studying in Turkey and the United States towards distance education. The sample of the study conducted by Uslusoy (2017) consists of students studying in Turkey and the USA. According to the study results, students at the higher education level were found to have a negative attitude towards distance education in Turkey compared to students in the United States. It was stated that a significant portion of the students from Turkey were not able to benefit from the distance education courses that they had taken previously. This brings up the limitations of distance education. The results of the study conducted by Sipahi (2019) show that students encounter significant problems and obstacles online. Similarly, Horzum (2003) stated that students experience socialization problems with distance education, that there are some problems in applied lessons conducted with distance education, and that learning cannot be carried out properly. Özdemir Baki and Çelik (2021) identified the problems experienced by mathematics teachers working in secondary schools who were faced with the distance education process for the first time due to Covid-19. It has been determined that teachers have difficulties due to lack of infrastructure, lack of tools such as computers, tablets, phones because of financial impossibilities among students, and difficulties in accessing the internet. The study reveals that mathematics subjects are interrelated, and therefore, the fact that students cannot attend one class and attend the next, that is, not being able to attend every live lesson, negatively affects the learning of the subjects covered in the lessons. Similar results were obtained in literature research, in which teachers and parents decided on distance education during the pandemic period (Erdemci & Elçiçek, 2022; Gören, Gök, Yalçın, Görgen & Çalışkan, 2020; Oflaz & Adalar, 2020).

Due to the Covid-19 pandemic, billions of learners around the world had to continue their education with distance education (Bozkurt, 2020). The experiences and gains achieved with early widespread digital learning, which was rapidly adapted as a result of the Covid-19 pandemic, contributed to the development of this method all over the world. It is expected that digital learning, whose functionality will increase with the contribution of new technologies and systems in the near future, will become the main learning structure (Yamamoto & Altun, 2020). In this case, it becomes important to determine the relationship between technology and mathematics learning and teaching environments, as the attitudes of the students are shaped accordingly. This is true because the teaching methods employed while teaching mathematics are also effective factors determining the interest in and attitudes towards mathematics (İrmak & Çelik 2021; Şengül & Dereli, 2013). In other words, attitude is influenced by math learning experiences. In the literature, there are studies examining the attitudes of the teachers and the students who do not receive distance education except for mandatory courses. However, no study was found to measure the attitudes of secondary school students who spent this period of education taking mathematics courses through mandatory distance education. The aim of this study was to develop a scale of attitudes of secondary school students who had previously undertaken compulsory distance education in mathematics and to study their attitudes from the perspective of various variables. In the study, it is thought to be important in terms of developing a valid and reliable scale for middle school students to take mathematics courses via distance education.

For this purpose, answers to the following sub-problems were sought.

1. Is the scale developed to determine the attitudes of secondary school students toward distance mathematics education a valid and reliable scale?
2. What is the level of attitudes of secondary school students towards distance mathematics education?
    a. Is the difference between the attitude scores towards distance mathematics education statistically significant in terms of the differences in gender, school types, and grade levels of the secondary school students?.

2. METHOD

2.1. Research Model

This study used a survey model to develop a valid and reliable tool to determine students' attitudes to distance mathematics education in secondary schools. Survey models are research models aimed at describing past or present situations in their own conditions (Karasar, 2005).

2.2. Study Group

The study group for the research consists of students studying in secondary schools that were identified in Sivas province during the 2020-2021 academic year. Criterion sampling, one of the techniques of purposeful sampling, was preferred in the study as the participants of the study group needed to get more information about the situation investigated. According to the study, the criteria are that students are studying in secondary school and taking mathematics courses through distance education. This study was conducted with two separate study groups. The study was carried out with one of the groups during the development of the attitude scale towards distance mathematics education and with the other group at the stage where the attitudes of the students were determined by applying the scale that had just been developed. The demographics of the study groups are provided in Table 1 and Table 2.

Table 1. Demographics of the group participating in the development of the attitude scale regarding distance mathematics education

		f
Gender	Female	159
	Male	151
School type	State school	310
	Private School	0
Grade Level	5th Grade	70
	6th Grade	78
	7th Grade	71
	8th Grade	91
Total		310

As can be seen from Table 1, 159 of the 310 students who participated in the scale development part, which is the first stage of the research, are female, and 151 are male students. The entire study group is studying at a public school. The study group consists of 70 students studying in the 5th grade, 78 students in the 6th grade, 71 students in the 7th grade, and 91 students in the 8th grade.

Table 2. The demographics of the group where the students' attitudes were determined by applying the scale that had been developed.

		f
Gender	Female	154
	Male	117
School type	State school	204
	Private School	67
Grade Level	5th Grade	56
	6th Grade	60
	7th Grade	58
	8th Grade	97
Total		271

Table 2 shows that 154 of the 271 students who participated in the second stage, in which the students' attitudes were determined by applying the attitude scale developed, were female and 117 were male students. In this study group, there are 204 students studying at a public school and 67 students studying at a private school. 56 students from 5th grade, 60 students from 6th grade, 58 students from 7th grade and 97 students from 8th grade participated in the study.

In the scale development study, the sample size of 50 participants is considered to be very low, 100 low, 200 medium, 300 good, 500 very good. In addition, the size of the sample depends on the number of factors and population correlation coefficients (Tavşancıl, 2010). In this context, as seen in Table 1 and Table 2, it can be concluded that the sample size is sufficient for both stages of the study.

2.3. Data Collection

The "Attitude Scale of Secondary School Students towards Distance Mathematics Education" developed by the researchers, was used as a data collection tool in the research. The Personal Information Form created by the researchers was used to determine the independent variables taken into account in determining the attitudes of the students towards distance mathematics education.

2.3.1. Personal information form

The "Personal Information Form" which constitutes the first part of the data collection tool, consists of items that allows to get to know the students who constitute the study group and to obtain the necessary information to determine their attitudes towards distance mathematics education according to some variables. In this section, the gender, class, and school type of the students were requested. Students were asked to write down their thoughts, experiences, opinions, and suggestions in relation to taking a mathematics course through distance education.

2.3.2. Attitude scale of secondary school students towards distance mathematics education

Literature reviews examined various measurement tools used to develop attitudes scales to determine attitudes of secondary school students to distance education and mathematics courses. In order to determine the items on the scale, 34 students attending 8th grade and 6th grade in a secondary school in central Sivas were asked to write a composition in which they shared their experiences about distance education, stated the positive and negative characteristics, and presented suggestions, if any. The scale items were prepared as a result of the evaluation of the compositions written by the students and the examination of the attitude scales towards distance education that already exist in the literature. The statements that can be used as sentences expressing attitudes from these prepared scale items were selected and arranged in a way so that they can express attitude in accordance with the item writing rules.

The content validity is an indication whether the items in the content of the test are sufficient in terms of quality and quantity to measure the behavior to be measured. Taking into account the expert opinion is one of the logical ways to test content validity (Büyüköztürk, 2005). The scale, which consists of 46 items, was examined by 2 experts working in the field of mathematics education and 1 expert working in the field of measurement, and their opinions were taken into account. It was checked to see whether each question sufficiently explained the situation it aimed to explain, and the necessary corrections were made in this direction. Then, the study was presented to a Turkish teacher to get his/her opinion for language validity. In order to determine whether a respondent understood each item in the same way, the scale was applied to a group of 15 students and then finalized.

The 46 items created were distributed on a draft scale, paying attention to the ordering of positive and negative items and not creating any bias in participants. Positive items on the 5-point Likert scale were scored as 5, 4, 3, 2, and 1 from the "Completely Agree" option to the "Strongly

Disagree" option. The negative items were scored as 1, 2, 3, 4, 5 from the "Strongly Disagree" option to the "Strongly Agree" option. Thus, the highest score that can be obtained from the scale is 230 and the lowest score is 46.

Within the scope of the research, the scale that was created was applied to secondary school students studying in 1 provincial central public school, 1 district public school, and 1 private school in the center of the Sivas province in March of the 2020-2021 academic year. 203 students completed the questionnaire online, and the questionnaires were distributed physically to 150 students. Out of the 150 questionnaires sent, 100 were returned, and 32 were invalidated and hence excluded from the study. In total, 271 questionnaires were answered.

2.4. Data Analysis

Different analysis techniques were used in the scale development part of the study and in the application part of the developed scale. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed respectively for the construct validity of the scale. SPSS 22.0 software was used for EFA and LISREL 8.7 software was used for CFA. In addition, the reliability calculations of the scale were interpreted according to the Cronbach Alpha Coefficient.

With the completion of scale development, students' attitudes towards distance mathematics education were determined according to various variables. SPSS 22.0 software was used for this purpose. Kolmogorov-Smirnov Test $\left|\frac{\text{skewness}}{\text{standart error}}\right|$ techniques were used to determine the normality of the measurements. According to the results of the Kolmogorov-Smirnov Test (p=0.085), it can be said that the scores are normally distributed. In addition, when the skewness coefficient is divided by its standard error and the value is smaller than 1.96, it is decided that the distribution is normal (Bursal, 2017). Since the result of the measurement is within the specified range, it can be said that the data shows a normal distribution. Independent sample t-test and variance analysis were performed to determine the differentiation of secondary school students' attitudes towards distance education in mathematics according to gender, school type, and grade level. In addition, calculations of the standard deviation and arithmetic mean were performed to determine the attitudes of secondary school students towards distance mathematics education.

3. FINDINGS

In this part of the study, first the findings of the studies made on the validity and reliability of the scale were reported, and then the results of the analysis on whether the attitudes of secondary school students towards distance mathematics education differ according to various variables were reported.

3.1. Is the scale developed to determine the attitudes of secondary school students toward distance mathematics education a valid and reliable scale?

To determine the reliability of the scale, the Cronbach Alpha internal consistency coefficient was calculated. The Cronbach Alpha value of the 46-item attitude scale related to the attitude of the secondary school students towards distance mathematics education was found to be 0.91. Values above 0.80 are described as highly reliable in the literature (Tavşancıl, 2010). In order to ensure content validity, the opinions of three faculty members, who are experts, on the 46-item scale were obtained, and the necessary corrections were made by examining whether each question explained the situation it aimed to explain in line with their opinions. Then, the study was presented to a Turkish teacher, and his/her opinion was obtained for language validity. In order to determine whether each item was understood in the same way by each participant, the scale was applied to a group of 15

students and finalized. The 46 items created were distributed on a draft scale, paying attention to the ordering of positive and negative items so as not to create any bias in the participant.

Factor analysis technique was used to test the construct validity of the scale. Factor analysis explains the measurement with a small number of factors by gathering the variables that measure the same structure or quality (Büyüköztürk, 2005). In factor analysis, two general approaches are used: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The repeatability of EFA results and the reliability of the results obtained are directly related to various factors. The size of the dataset affects the strength of the analysis and the accuracy of the results (Uyumaz, Dirlik &Çokluk, 2016). In this study, 310 participants were studied. Therefore, it can be said that the sample size is "good" (Tavşancıl, 2010).

Table 3. Results of Kaiser-Meyer-Olkin (KMO) test and Bartlett's test for sphericity

Measurement of Kaiser-Meyer-Olkin Sampling Competence		.91
Bartlett Sphericity Test	Approximately Chi-Square	2888,224
	Df	210
	Sig.	.00

In order to perform factor analysis, the normality assumption must be met. In Table 3, it is seen that the KMO test is 0.91 and the Bartlett's test has a significance level (sig<0.05) for the scale of "determining the attitudes of secondary school students towards distance mathematics education". As these values were significant, factor analysis techniques were applied to determine the construct validity.

The scale initially consists of 11 factors with eigenvalues greater than 1. These factors explain 59.418 of the variance. After the scale was rotated with the Varimax rotation technique, items with a load value less than 0.4 were removed from the scale (Çokluk, Şekercioğlu & Büyüköztürk, 2010). Table 4 shows the total variance values explained regarding the attitude scores of the scale applied.

Table 4. Total variance values

Component	Initial Eigenvalues			Subtotals of Quadratic Loads			Rotation Totals of Square Loadings		
	General	Percentage	ofCumulative	Total	Percentage	ofCumulative	Total	Percentage	ofCumulative
1	6.60	31.44	31.44	6.60	31.44	31.44	5.12	24.36	24.36
2	3.66	17.42	48.86	3.66	17.42	48.86	4.19	19.96	44.32
3	1.14	5.42	54.27	1.14	5.42	54.27	2.09	9.96	54.27
4	.95	4.51	58.78						
5	.81	3.89	62.67						
6	.77	3.65	66.32						
7	.72	3.43	69.74						
8	.68	3.26	72.99						
9	.67	3.18	76.17						
10	.65	3.09	79.27						
11	.59	2.84	82.11						
12	.54	2.55	84.66						
13	.51	2.45	87.11						
14	.51	2.40	89.51						
15	.42	1.99	91.50						
16	.40	1.92	93.42						

17	.34	1.61	95.03
18	.33	1.57	96.59
19	.29	1.41	98.00
20	.24	1.14	99.15
21	.18	.85	100.00

In Table 4, it is seen that the variance explanation rate of 3 factors is 54.27%. The variance values explained by the factors in the scale were determined as 24.36% for factor 1, 19.96% for factor 2 and as 9.96% for the factor 3. On the other hand, the total variance explanation value of all 3 factors was found to be 54.27%. Excessive variance can be stated as evidence that the relevant structure or concept is well-measured (Çokluk et al. 2010).

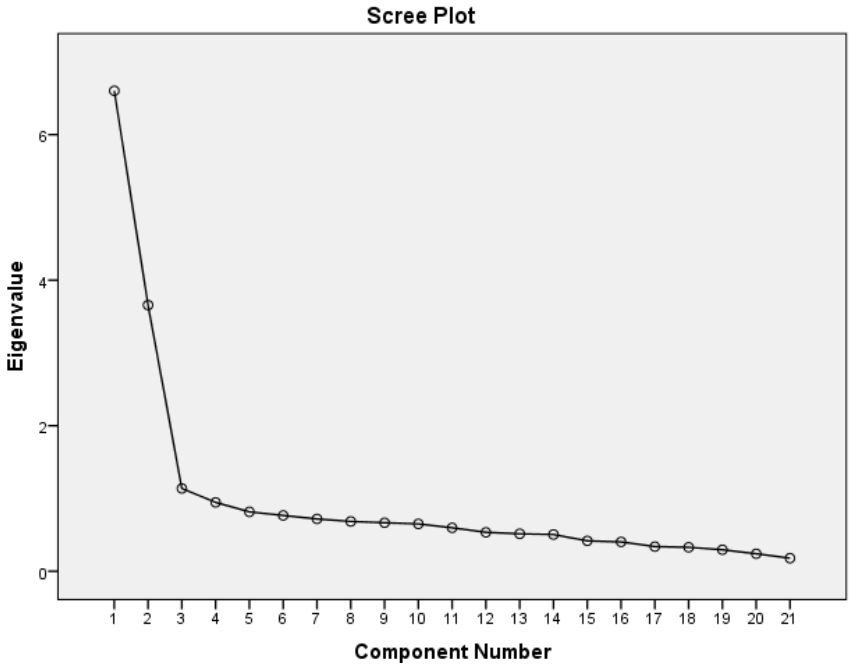

Figure 1. Scree plot

While determining on how many factors the data are collected, "eigenvalue statistics" are examined with the "scree plot" graph. When Figure 1 is examined, it is seen that the line graph follows a horizontal path after the third factor. This shows that it is appropriate to gather the items under 3 factors.

Table 5. Factors and load values in the scale

Factors and items	**Explained Variance**	**Factor Load**
Factor : Satisfaction factor	24.36%	
i19		.88
i15		.87
i34		.80
i8		.76
i23		.73
i9		.66
i11		.64
i45		.63

i6		.62
Factor 2: the Factor for Reservations and Difficulties	19.96%	
i24		.77
i31		.75
i33		.73
i35		.71
i30		.68
i14		.67
i28		.63
i3		.49
Factor 3: Factor for Impact on Learning	9.96%	
i27		.72
i41		.69
i18		.59
i39		.55

The distribution of the items decided to be included in the scale according to factor loadings and dimensions is shown in Table 5. It is observed that the load values of the items in the scale vary between 0.49 and 0.88. It is seen that the load value of the items in the first factor varies between 0.62 and 0.88. It is seen that the load value of the items in factor 2 varies between 0.49 and 0.77, and the load value of the items in factor 3 varies between 0.55 and 0.72. In line with the literature review and expert opinions, the first factor was named the "satisfaction factor," the second factor was named the "reservations and difficulties factor," and the third factor was named the "effect on learning factor."

The data of 271 people, who were not included in the first sample, were used in the structure consisting of 21 items and 3 factors obtained after EFA, and then CFA was performed. The indices of CFA are given in Table 6.

Table 6. Item dimensions fit model values

Criterion	Perfect Fit Value	Compliance value obtained from the scale	Degree of matching
Chi-Square	-	356.89	
Df	-	186	
Chi-square/df	0≤x2/df<2	1.92	Perfect fit
RMSEA	≤0.05	0.06	Good fit
SRMR	≤0.05	0.06	Good fit
GFI	0.90 ≤ GFI	0.90	Good fit
CFI	0.95≤CFI	0.97	Perfect fit
NFI	0.90 ≤ NFI	0.94	Good fit
NNFI	0.95≤NNFI	0.97	Perfect fit

When Table 6 is examined, the fit values of the model are seen. When we look at each of the fit indices in the Fit Statistics, it is understood that the Chi-Square value is calculated as 356.89 and it is statistically significant (p<.00). The fact that the ratio of x^2 /df is 2.5 or less for the confirmatory factor analysis indicates that it is a perfect fit. When Table 6 was examined, the ratio of x^2 /df was calculated as 1.92, and thus, it was determined that it was a perfect fit. It was determined that RMSEA

value (0.06), SMRM value (0.06), GFI value (0.90), NFI value (0.94) showed good fit; CFI value (0.97), NNFI value (0.97) showed perfect fit (Çokluk et al., 2010).

The significance levels of the t values of the variables observed in the model were examined.

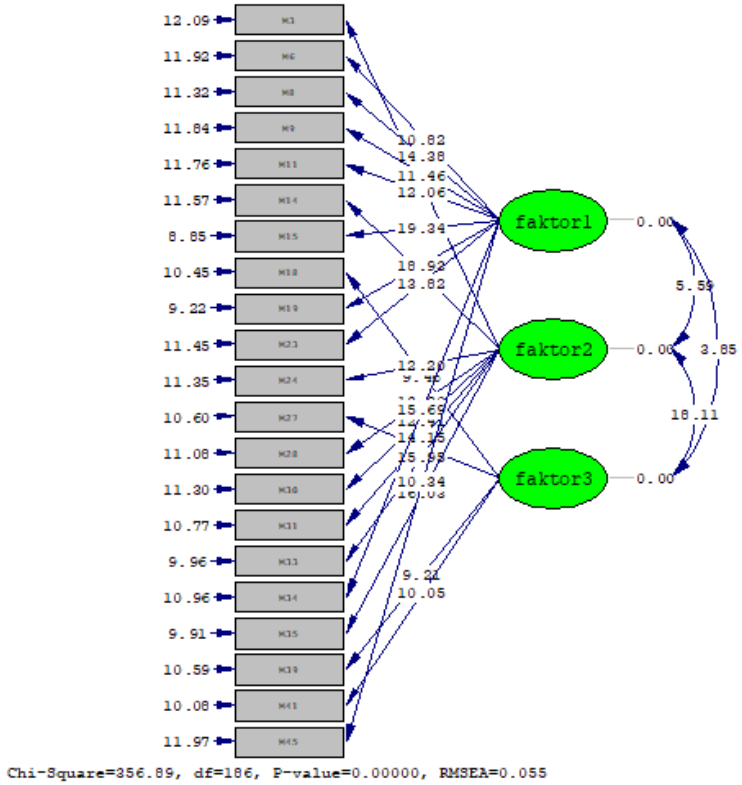

Figure 2. The significance level of the rates of explanation of latent variables by the observed variables for the three-factor model of the attitude scale

Figure 2 shows the t values of the latent variables explaining the observed variable. If the t values exceed 1.96, it can be said that the parameter estimates are significant at the level of 0.05 (Çokluk et al., 2010). As seen in Figure 2, t values are significant at the level of 0.05.

Cronbach's alpha value was used to determine the reliability of the scale. The Cronbach's alpha value of the scale was to be 0.91. This value shows that the scale is highly reliable (Tavşancıl, 2010).

Table 7. Cronbach's Alpha values of the determined factors

Factors	Number of Items	Cronbach's Alpha
Satisfaction Factor	9	.90
Reservations and Difficulties Factor	8	.86
Impact on Learning Factor	4	.66
Total Scale	21	.91

As can be seen in Table 7, the reliability values of the developed scale are quite good. Therefore, developed scale can be considered a reliable tool for determining the attitude of secondary school students towards distance education.

3.2. Is the difference between secondary school students' attitude scores towards distance mathematics education in terms of gender, school types and grade levels statistically significant?

In this section, descriptive statistics on the attitude scale applied are presented first. Then, the students' attitudes towards distance mathematics education were examined according to gender, school type and grade level variables.

According to Table 7 the reliability coefficient of the attitude scale regarding distance mathematics education was determined to be 0.91. This value shows that the reliability of the developed scale is at a very good level.

Table 8. Overall mean and standard deviation results based on factors

	N	Mean	Sd
Satisfaction Factor	264	2.09	.94
Reservations and Difficulties Factor	264	3.16	.1
Impact on Learning Factor	264	3.02	1.06
Total	264	2.65	.72

According to the descriptive analysis data. the mean value for the scale was determined as 2.65. With this value, it is seen that the scale mean is low. In general, it is seen that almost all the students gave negative answers to the items related to the satisfaction factor. When Table 8 is examined, the mean satisfaction factor item (x=2.09) also shows a similar situation. This leads to the conclusion that the students participating in the study are not satisfied with taking the mathematics course through distance education. In other words, it can be said that students have a negative attitude with regard to the satisfaction they get from distance education. When the item means of the reservation and difficulties factor (x=3.16) are examined, it can be said that they have an indecisive attitude towards the relevant items. When the item means of the impact on learning factor (x=3.02) are examined, it is seen that the students are undecided about the effect of the mathematics course taken with distance education on learning.

Table 9 shows whether there is a significant relationship between the attitudes of secondary school students towards distance mathematics education and their gender.

Table 9. Comparison of attitudes towards distance mathematics education by gender

Gender	N	Mean	Sd	Sd	t	p
Female	154	2.67	.75	.06	0.42	0.67
Male	110	2.63	.68	.07		

Levene's test determines whether the variances are equally distributed. As a result of the Levene test (p=0.301), it can be said that the variances are equally distributed as the p is >0.05. Accordingly, since the significance value calculated as a result of the independent sample t test (p=0.67) is p>0.05, there is no significant difference between the attitude scores of female and male students. According to Table 9. Although the mean attitude score of female students is higher than that of male students. This difference is not significant (t(264) = .42;p = 0.67).

Table 10 shows the extent to which there is an important relationship between attitudes towards distance education among secondary school students and the type of school.

Table 10. Comparison of attitudes towards distance mathematics education by school type

School type	N	Mean	Sd	Sd	t	p
Public	198	2.72	.70	.05	2.76	0.01
Private	66	2.44	.75	.09		

As a result of the Levene's test conducted to determine whether the variances are equally distributed (p=0.826). it can be said that the variances are equally distributed since p>0.05.

As shown in Table 10, the significance value calculated by independent sample t-tests (p=0.01) is p<0.05, so there is a significant difference in attitudes of students studying at public schools and private schools. It is seen that the mean of the attitude scores of the students studying at the public school is higher than the mean of the attitude scores of the students studying at the private school. According to the test results, it can be said that this difference between attitude scores is significant ($t_{(264)}$ = 2.76;p=0.01).

ANOVA was used to determine whether the difference between secondary school students' attitude scores towards distance mathematics education was significant according to grade level.

Table 4. The results of the one-way analysis of variance for the attitude scores regarding distance mathematics education according to grade level

	Sum of Squares	Sd	Mean of Squares	F	p
Between groups	10.32	3	3.44	7.13	.00
Within groups	125.43	260	.48		
Total	135.76	263			

As seen in Table 11, it can be said that there is a significant difference between the attitude scores of at least two grade levels ($F_{(3.260)}$ =7.13;p=0.00). In cases where the variances are equal, Scheffe or Tukey HSD test is often used to understand among which groups the differences are in terms of grade levels. A Tukey HSD test was performed to determine between which classes the difference occurred in terms of attitude scores.

Table 12. Tukey HSD test results

Grade	(J) Grade	Difference between means (I-J)	P
5	6	.09	.91
	7	.03	.99
	8	.45*	.00
6	5	-.09	.91
	7	-.04	.98
	8	.37*	.01
7	5	.04	.99
	6	-.05	.98
	8	.41*	.00
8	5	.45*	.00
	6	.37*	.01
	7	-.41*	.00

As seen in Table 12, there is a significant difference between the attitudes of 5^{th} (p= 0.00), 6th (p = 0.01) and 7^{th} (p = 0.00) grades and 8th grades. A statistically significant difference was found between the attitudes of 5^{th}, 6th and 7^{th} grade students towards distance mathematics education and the attitudes of 8^{th} grade students. This difference benefits students in the 5^{th}, 6^{th} and 7^{th} grades. There were no statistically significant differences between the other groups.

4. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In this study, a scale was developed to measure the attitudes of secondary school students towards distance mathematics education. The prepared scale was applied to 5th grade, 6th grade, 7th grade and 8th grade students studying in secondary school. As a result of the analyses, it can be said that the scale developed is a valid and reliable scale that will determine the attitudes of secondary school students towards receiving distance mathematics education. Similarly, Deniz (2021) developed a valid and reliable scale to determine and evaluate teachers' attitudes towards distance education program. Ağır (2017) developed a scale to determine the teachers' thoughts about distance education.

As a result of the study, it was concluded that secondary school students had a negative attitude towards receiving distance mathematics education. Similarly, Akpolat (2021), Gören et al. (2020), Kaynar, Kurnaz, Doğrukök and Barışık (2020), Oflaz and Adalar (2020) conclude that students prefer face-to-face education than distance education. They think effective education requires direct interaction. Therefore, they believe that direct education is more beneficial than distance education. In their studies conducted with students in high school and higher education, Sipahi (2019), and Uslusoy (2017), stated that students have a negative attitude towards distance education. Distance education is no longer seen as an aid to face-to-face education but as a substitute for it (Yamamoto & Altun. 2020) and as a part of education (Bozkurt, 2017). However, it is seen that students have a negative attitude towards distance education, which is expected to be a part of education in the future. Similarly, it was stated that attitudes of male students towards mobile learning were higher than female students since they were more motivated by fast learning, easy access, and multimedia factors in learning (Gürkan, 2017).

In line with the results obtained from the findings, there is no statistically significant difference between male and female students' attitudes towards distance mathematics education. A similar result is supported by other studies (Deniz, 2021; Kaynar et al., 2020; Uslusoy, 2017; Tevetoğlu, 2021). As the reason for this situation, it was stated that students are in similar and equal opportunities by drawing attention to the equality of opportunity and possibility. This reason is thought to be valid for our study as well. Sipahi (2019), stating that the students' distance education attitudes did not change according to gender, found that as the social interactions increased, the attitudes of the students also increased. In contrast, Sarıbıyık (2022) found a significant gender difference in secondary school students' opinions on distance education mathematics courses during the Covid-19 period. In this context, it was stated that the opinions of male students were more positive than female students. Akpolat (2021) stated that there are perceptual differences between male and female students regarding distance education. While female students describe distance education as more demanding, non-interactive and inefficient, male students perceive it as providing easy accessibility, creating more diversity and causing loneliness. However, it was stated that female students had a more negative approach than male students. Boz (2019) stated that as the technology acceptance level of male students is higher than female students, distance education perception level of male students is higher. Similarly, it was stated that attitudes of male students towards mobile learning were higher than female students since they were more motivated by fast learning, easy access, and multimedia factors in learning (Gürkan, 2017; Mercan, 2018). In our study, the reason why there is no significant difference in students' attitudes towards distance mathematics education according to the gender variable is thought to be that there is no difference between male and female students in terms of motivation with factors such as fast learning and easy access.

According to the results obtained, there was a statistically significant difference between private and public schools in the attitudes of secondary school students to distance mathematics education. Similarly, Sarıbıyık (2022) stated that students studying at public schools have a more positive attitude than students studying at private schools. The reason for this was associated with the

higher educational expectations of students from private schools than those from public schools. Kaynar et al. (2020) concluded that students studying in public schools had more difficulties accessing the necessary equipment, so the secondary school students studying in private schools had more positive opinions about distance education than their peers studying in public schools. In addition, Deniz (2021) stated that teachers in private schools have a positive attitude than those in public schools. It is stated that the reason for this is that private school students and teachers have better access and participation in classrooms and better technological opportunities. Ağır (2007) examined the attitudes of primary school teachers working in public and private schools towards distance education and found no statistically significant difference. However, in a way similar to this study, he stated that teachers working in public schools had a more positive attitude. In conclusion, it is thought that the fact that private schools are more convenient than public schools in terms of some opportunities increases the desire of students to receive face-to-face education in private schools, and therefore their attitudes towards distance education are lower than those of students studying in public schools. In addition, it is thought that the education expectations of the students studying in private schools may be higher than those in public schools.

When examined in terms of grade levels, a statistically significant difference was found in terms of attitudes towards distance mathematics education between 5th, 6th, and 7th grade students on the one hand, and 8th grade students on the other. This difference is in favor of the 5th, 6th, and 7th grades. The reason for this difference is thought to be that 8th grade students prefer face-to-face education, which they are used to because they are preparing for high school exams. Similarly, Gören et al., (2020) stated that satisfaction in the distance education process decreases as the grade of education increases. Akpolat (2021) stated that 5th and 6th grade students used both positive-negative metaphors about distance education in-half, and 7th and 8th grade students used more negative metaphors. Similarly, Sarıbıyık (2022) found that 5th and 6th grade students approached distance education more positively than 7th and 8th grade students. The reasons for this situation were explained as follows: the 7th and 8th grade math subjects were more abstract and difficult, and the 5th and 6th grade math subjects were more entertaining and less challenging. Unlike our study, Tevetoğlu (2021) stated that there was no significant difference between students' expectations and readiness for the distance education process in terms of grade levels. He pointed out that the reason for this situation is that training programs are presented appropriately for each grade level. Gürkan (2017) stated that university students'' attitudes towards distance education and mobile learning were not statistically significant according to their grade levels. However, since it was determined that students had a positive attitude in the study, it is thought that students generally adapted to and used technology for each grade level. In conclusion, in our study, the reason for the significant difference in attitudes towards taking distance mathematics education in favor of the 5th, 6th, and 7th grades between the 5th, 6th, 7th, and 8th grades is thought to be the increase in the level of anxiety as the grade level increases and the expectations from education due to the central exam.

In this study, a valid and reliable scale was developed for assessing the attitudes of secondary school students towards distance mathematics education. By applying this scale to a larger sample, it will be possible to determine their attitudes towards taking mathematics lessons through distance education. Valid and reliable measurement tools can be developed to determine students' attitudes towards taking other courses through distance education. Hence, it could be possible to investigate the attitudes of students studying at different school types and grade levels toward distance education. If the data collected by qualitative research methods are included in determining the attitudes of students towards taking a course through distance education, student attitudes can be examined in more detail.

When evaluated in the context of attitudes towards the factors constituting the scale, learning environments in which students interact with mathematics software at various levels can be offered by making more use of the richness of the internet and computer instead of the direct lecture technique in

distance education. Lessons can be taught using a constructivist approach with a view to ensuring more active student participation in the lesson during the distance education process and reducing learning losses. In distance education, students can be guided to develop individual study methods to control their own learning. Work can be carried out to enable students to learn more about distance education and to ensure and develop the use of related technologies.

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Abstract

The aim of this study is determine the effectiveness and usefulness of direct instruction method in teaching certain "solid, liquid and gas" substances to students in a special education classroom in secondary school. The study was carried out through the case study that is one of the qualitative research methods. The teaching method used in order to test the efficiency of the study is the direct teaching method. Four students with intellectual disabilities participated in the study. One of the students was female (14 years old) while other students were male (15, 10, 10 years old). Three students had moderate disability and one had mild disability. In this study, the data were collected through semi-structured interviews and non-structured observations. Semi-structured interviews were conducted with the implementation teacher. Data obtained through interviews and observations in the study was analysed using qualitative data analysis approach and content analysis was performed on the data. Semi-structured interviews with the teacher were transcribed and analyzed. At the end of the study, it was found that three students learned all of the solid, liquid and gas substances that were taught to them and achieved permanent learning while one of the students learned solid, liquid and gas substances but did not achieve permanent learning for gas substances. Thus, it was concluded that direct instruction is an effective and useful method for teaching solid, liquid and gas substances to students with intellectual disabilities.

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Research Article

Teaching of Solid, Liquid and Gas Substances to Students with Intellectual Disabilities through Direct Instruction Method *

Cüneyt ÇAPRAZ [1]

Abstract

The aim of this study is determine the effectiveness and usefulness of direct instruction method in teaching certain "solid, liquid and gas" substances to students in a special education classroom in secondary school. The study was carried out through the case study that is one of the qualitative research methods. The teaching method used in order to test the efficiency of the study is the direct teaching method. Four students with intellectual disabilities participated in the study. One of the students was female (14 years old) while other students were male (15, 10, 10 years old). Three students had moderate disability and one had mild disability. In this study, the data were collected through semi-structured interviews and non-structured observations. Semi-structured interviews were conducted with the implementation teacher. Data obtained through interviews and observations in the study was analysed using qualitative data analysis approach and content analysis was performed on the data. Semi-structured interviews with the teacher were transcribed and analyzed. At the end of the study, it was found that three students learned all of the solid, liquid and gas substances that were taught to them and achieved permanent learning while one of the students learned solid, liquid and gas substances but did not achieve permanent learning for gas substances. Thus, it was concluded that direct instruction is an effective and useful method for teaching solid, liquid and gas substances to students with intellectual disabilities.

Keywords: Intellectual disabilities, science teaching, direct instruction, states of matter

1. INTRODUCTION

Individuals with intellectual disabilities lack necessary education to assume responsibility for their lives, to make choices and decisions and participate in the society actively (Avşar-Tuncay & Kizilaslan, 2022). In this case, they have difficulty in accessing knowledge, and thus, they cannot become productive and independent individuals, show active participation in social life or have a proper job (American Psychological Association (APA), 2013). Individuals with Disabilities Education Act that was first passed in 1974 in the USA and changed its name to I.D.E.A. in 1990 defends the education right of all individuals with disability (Jackson, 2005). That is because, intellectually disabled individuals who receive sufficient education will have no problems in making decisions, achieving personal independence and increasing the quality of their lives and prove more successful in social life (Ministry of National Education [MoNE], 2008).

Individuals with intellectual disabilities undergo the same cognitive processes with those without intellectual disabilities. However, in all these cognitive processes, these persons go through different stages than their peers (MoNE, 2008). Like their non-disabled peers, they can learn and continue their learning. However, they differ from their non-disabled peers in learning speed as they learn more slowly (Kizilaslan, Sözbilir & Zorluoğlu, 2020). They have difficulty in reading-writing, reading comprehension and acquiring basic arithmetic skills (APA, 2013; MoNE, 2008). They learn concrete concepts or topics more easily than abstract concepts or topics (MoNE, 2008).

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The percentage of the population with a disability is 12.29% within the total population. The percentage of individuals with orthopaedic, visual, hearing, language, speech and mental disabilities is 2.58%, that is, approximately 1.8 million. When considering the distribution of number of students receiving education at special education schools, special education classrooms and inclusive classes by years according to the data provided by the Ministry of National Education, a significant increase is seen. While the number of students receiving education in 2001-2002 was 53.306, this number became 353,610 by increasing approximately 7 times. Of the students receiving education at private education institutions, when comparing those enrolled at special education schools, special education classrooms and inclusive classes, most of these students receive education at inclusive classes. As to 2017-2018 school year, of all students receiving education, 72.9% of them have education at inclusive education, 13% are in special education classes and 14.1% are enrolled at special education schools. In the statistics published by the Ministry of National Education in 2018-2019 school year, a total of 2.222 mentally disabled students, 814 of whom were at primary and 1.408 were at secondary schools, were receiving education. When considering this data, the importance of science education to be provided and the contribution it will make to these individuals are clear. Science education provides a conceptual and theoretical basis for these individuals to access necessary knowledge, understand and interpret what is happening around them and adapt into these situations (MoNE, 2008). In addition, science education is highly important for intellectual and creative development (İşman, Baytekin, Balkan, Horzum & Kıyıcı, 2002).

Countries with advanced education have adopted “science for individuals” approach in science education. According to the National Science Education Standards (NSES) by the U.S. National Research Council (NRC), all students need science education regardless of age, gender, cultural or ethnic background, disabilities, interest and motivation (NRC, 1996). United Nations Educational, Scientific and Cultural Organization’s (UNESCO) Salamanca Statement declares that every child has a right to education (UNESCO, 1994). In this context, underscoring the significance of increasing students' interest in science and of science education, the statement stresses that science education is necessary for everyone. In line with this understanding, Türkiye started to implement a student-centred education approach in 2005 (Toraman & Aydın, 2013). The vision of science course was determined as training all students to be individuals with scientific literacy regardless of individual differences (MoNE, 2018).

The main aim of current science curricula is raising individuals with scientific literacy (American Association for the Advancement of Science’s (AAAS), 1993). In line with this aim, individuals will have scientific literacy and can learn scientific topics, concepts, laws and principles. At the same time, they can become aware of the nature of science and scientific developments, and understand the relationship between technology, science and environment. Having scientific literacy will also help people to lead their lives in a more fertile and satisfactory environment (Köseoğlu et al., 2003). Furthermore, science is an activity that enriches children's lives. People at all ages have an innate curiosity for observation and exploration through which they take pleasure. The sooner such curiosity and pleasure are aroused, the better it is for them (Yıldırım, 2011). It is seen in the program issued by the Ministry of National Education in 2018 on the compulsory and elective courses to be given to the individuals with mild mental disability at the schools affiliated to the ministry that the weekly compulsory course hours of science education was three as of the third grade of primary school while it was 4 at secondary schools. The elective course hour was 2 at both primary and secondary schools. The weekly course hour of science to be received by the students with mental disability and healthy students is similar. In this regard, these individuals follow the same curriculum with their healthy peers. However, although science education is of importance for students with intellectual disabilities, most of them cannot receive sufficient science education (Mete, Çapraz & Yıldırım, 2017). This is caused by shortcoming and insufficiency in educational opportunities used

for these individuals. When considering the weekly hour of compulsory science course and the number of students enrolled at both special education classrooms and inclusive classes, this resulted in the studies that must be carried out for these students related to science course. Because it has been concluded that the mentally disabled students have not been provided with an effective science education in both literature review and the observations made at schools. When considering all this data, the significance of science education to be given to these students is of paramount importance (Çapraz, 2016; Çapraz & Boynikoğlu, 2021; Mete, 2016).

It is seen that studies in literature on the impact of teaching methods that can be used in science course on student success are very few (İlik, 2009). Among studies on individuals with intellectual disabilities that were conducted in Türkiye, only three of them are directly relevant to science education. The subjects addressed in these studies include organs in digestive system (Demir, 2008); solar system and planets (İlik, 2009) and hard-soft substances (Mete, 2016). We have found no study on teaching solid, liquid and gas matters to these students through direct instruction. This study aims to determine the effectiveness and usefulness of direct instruction method in teaching certain "solid, liquid and gas" substances to students with intellectual disabilities in a special education classroom in secondary school. It is considered that the study will contribute to teaching scientific concepts to students with intellectual disabilities using teaching materials so that they can take responsibility for their lives, make choices and decisions, actively participate in the society, and grow up to be individuals with scientific and technological literacy depending on their disability.

2. METHOD

This study was designed as a case study, a qualitative research approach. Of the case study designs, the holistic multiple case was utilised based on the classification made by Yin (2013). In this design, holistic multiple cases can be seen. Each case is evaluated holistically and then compared with each other (Yildirim & Simsek, 2018). The teaching method to be used in order to test the efficiency of the study is the direct teaching method. Direct instruction is a teaching method in which teacher is responsible for the learning of all students and plays an active role while students are more passive compared to the teacher. The teacher helps students to learn accurately by rewarding students when they become successful in learning, and by doing or demonstrating the accurate performance when they fail (Mastropieri & Scruggs, 2016). It is also an effective model for students with different learning needs (Kinder, Kubina & Marchand-Martella, 2005). As distinct from other instruction methods, the content of curriculum can be organized in direct instruction (Mastropieri & Scruggs, 2016). Direct instruction is also called systematic instruction, explicit instruction and active instruction (Çelik & Vuran, 2008). In the implementation stage of the study, three initial sessions were held with each student to show each substance and its photo before starting teaching. With instructions like "Look at the substance and tell us in which state it is." and "Look at substances on the desk. Show us which one is solid/fluid/gas.", these sessions aimed at identifying whether the students knew these substances. To teach the substances, the steps in direct instruction (setting the stage, modelling for students, guided practice and independent practice) were implemented in the instruction sessions. The experimenter followed these steps during instruction and when the student was stuck in a step, he returned to the previous step and repeated teaching. When the student completed these stages successfully, teaching was ended. In other words, instruction session ended when the student told/showed the physical state of the relevant substances correctly at the end of these steps. Following the instruction sessions, the experimenter assessed whether the student learned the substance that was taught in a monitoring session at the end of the day, and teaching of the next substance started for the student who became successful in the end of day session. For each substance that was taught, monitoring sessions were held for 1, 2 and 4 weeks later (7th, 14th and 30th days). Monitoring

sessions assessed whether the students still had the knowledge of substances that were taught to them. The implementation process is summarized below.

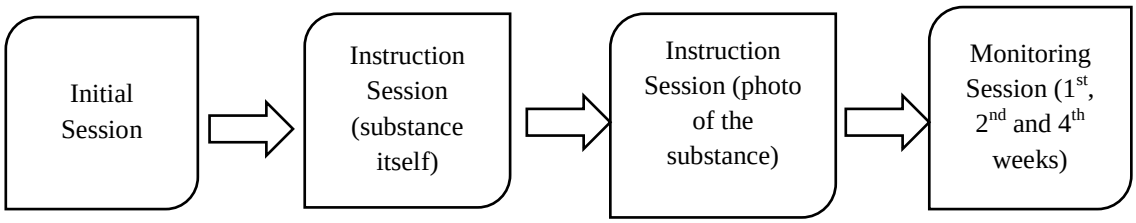

Figure 1: Implementation process

2.1. Sampling Selection

Criterion sampling method, a purposive sampling technique, was used in sampling selection for the study. Purposive sampling allows in-depth studies in cases that abundant data can be collected. (Teddlie & Yu, 2007). On the other hand, criterion sampling is used to study cases that meet a predetermined criterion. Criteria can be set by the researcher or pre-specified criteria can be used (Büyüköztürk, 2014; Teddlie & Yu, 2007). The solid, liquid, gaseous substances were not previously taught to the students in the study group by the direct teaching method. In other words, the participants did not have any previous systematic education by direct teaching method.

The following criteria were used in the selection of the working group;

1) Following verbal instructions,
2) Being capable of taking someone as model,
3) Focusing attention on an activity at least for 5 minutes,
4) Keeping knowledge in mind,
5) Using hands and fingers,
6) Attending the school on a regular basis (Çelik & Vuran, 2008; İlik, 2009).

To identify whether the subjects met the prerequisite skills, classroom observation was carried out for 2 hours a day in a week for 10 weeks, which corresponds to a total of 20 hours. In addition, interviews were conducted with a special education teacher. Through these observations and interviews, it was concluded that the students had the abovementioned prerequisite skills.

2.2. Participants

The sample of the study consisted of four students with intellectual disabilities who were taking courses in a special education class in a school in Erzurum, Türkiye. One of the students was female (14 years old) while other students were male (15, 10, 10 years old). Three students had moderate disability and one had mild disability. One of the boys (Student-1) had a second disability, visual disability (not seeing enough). Another male student (Student-2) was autistic while another one (Student-3) had chronic epilepsy. The students were in the 5th and 6th grades.

2.3. Data Collection Methods and Data Analysis

In this study, the data were collected through semi-structured interviews and non-structured observations. Semi-structured interviews were conducted with the implementation teacher. For these interviews produced a semi-structured interview form with 34 questions. 15 questions were asked to the teacher before the implementation and 19 questions after the implementation. Interview questions were given to the teacher and the teacher was asked to write down the answers. Data obtained through interviews and observations in the study was analysed using qualitative data analysis approach and content analysis was performed on the data. Semi-structured interviews with the teacher were transcribed and analyzed. The researcher and one colleague independently examined the interviews,

and the results were compared. A concordance of more than 80% was found between the analyzes of both researchers. The inconsistencies that emerged in this process were discussed and resolved, and the analysis of the interview data was completed. To determine the effectiveness and permanence in education, data obtained through criterion dependent measurement tools and observations and interviews was analysed, reported and presented in the findings section.

3. FINDINGS

3.1. Findings on the Effectiveness and Usefulness of Direct Instruction

The findings on the effectiveness and usefulness of education using individualized education materials that were prepared based on direct instruction of solid/fluid/gas substances for students with intellectual disabilities are presented in tables. In the tables, outcomes concerning initial sessions demonstrate students' learning after three sessions. The outcomes concerning instruction sessions display learning status after the sessions. However, the number of instruction sessions varies based on the student's learning. When the student told/showed the physical state of the matter in question correctly, an instruction session was ended. For example, while the student-1 learned in seventh instruction session that stone is a solid substance (Table 1), the same student learned that air is in gas state in third session (Table 1). As for outcomes on monitoring sessions in the tables (Table 1-4), "+" is used to show that learning is permanent for those who gave correct answers to the instructions in all these sessions. However, "-" is used to refer to cases in which no correct answer was given in the monitoring sessions.

Table 1. Initial, instruction and monitoring sessions and correct responses/learning status of the student-1

Item	**Itself**				**Picture**			
Solid	IS	NIS	LS	MS	IS	NIS	LS	MS
Stone	-	7	+	+	-	1	+	+
Pencil	-	3	+	+	-	1	+	+
Book	-	2	+	+	-	1	+	+
Spoon	-	2	+	+	-	1	+	+
Glass	-	2	+	+	-	1	+	+
Liquid								
Water	-	6	+	+	-	1	+	+
Milk	-	1	+	+	-	1	+	+
Juice	-	2	+	+	-	1	+	+
Olive Oil	-	2	+	+	-	1	+	+
Tea	-	2	+	+	-	1	+	+
Gas								
Air	-	3	+	+	-	1	+	+
Vapor	-	6	+	+	-	2	+	+

IS: Initial Sessions (Pre-Teaching) NIS: Number of Instruction Sessions LS: Learning Status
MS: Monitoring Sessions (1st, 2nd and 4th weeks) +: Positive Outcome -: Negative Outcome

While the student-1 did not know any of the substances in the initial sessions, he learned the physical state of the substances thanks to the instruction sessions conducted with the substance itself and its photo (Table 1). The student's learning took place in varying number of sessions. For example, while the student learned that stone is solid after seven sessions using the substance itself, he learned that glass, metal spoon and book are solid substances after two sessions. On the other hand, he learned that water and milk is fluid in six sessions and one session, respectively, which is remarkable. It is also interesting that he learned that steam and air are in gas state in six and three sessions, respectively

(Table 1). While he learned in two sessions that steam is gas through teaching using photos following the use of substances themselves, he learned other substances in one session. It was found in the monitoring sessions held after instruction that the student achieved permanent learning for all the substances (Table 1).

Table 2. Initial, instruction and monitoring sessions and correct responses/learning status of the student-2

Item	**Itself**				**Picture**			
Solid	IS	NIS	LS	MS	IS	NIS	LS	MS
Stone	-	1	+	+	-	1	+	+
Pencil	-	1	+	+	-	1	+	+
Book	-	1	+	+	-	1	+	+
Spoon	-	1	+	+	-	1	+	+
Glass	-	1	+	+	-	1	+	+
Liquid								
Water	-	1	+	+	-	1	+	+
Milk	-	2	+	+	-	1	+	+
Juice	-	1	+	+	-	1	+	+
Olive Oil	-	1	+	+	-	1	+	+
Tea	-	1	+	+	-	1	+	+
Gas								
Air	-	2	+	+	-	1	+	+
Vapor	-	1	+	+	-	1	+	+

IS: Initial Sessions (Pre-Teaching) NIS: Number of Instruction Sessions LS: Learning Status
MS: Monitoring Sessions (1st, 2nd and 4th weeks) +: Positive Outcome -: Negative Outcome

As in the student-1, student-2 also did not know any of the substances in the initial sessions (Table 2). While the student-2 learned that milk is fluid and air is gas after two instruction sessions; he learned the physical states of other materials after one instruction session (Table 2). He learned the physical forms of the substances in an instruction session using the photo of the substance in question. In the monitoring sessions, it was found that the student achieved permanent learning for all the substances.

Table 3. Initial, instruction and monitoring sessions and correct responses/learning status of the student-3

Item	**Itself**				**Picture**			
Solid	IS	NIS	LS	MS	IS	NIS	LS	MS
Stone	-	4	+	+	-	1	+	+
Pencil	-	1	+	+	-	1	+	+
Book	-	2	+	+	-	1	+	+
Spoon	-	1	+	+	-	1	+	+
Glass	-	1	+	+	-	1	+	+
Liquid								
Water	-	2	+	+	-	1	+	+
Milk	-	1	+	+	-	1	+	+
Juice	-	1	+	+	-	1	+	+
Olive Oil	-	1	+	+	-	1	+	+
Tea	-	1	+	+	-	1	+	+
Gas								
Air	-	5	+	-	-	2	+	-
Vapor	-	1	+	-	-	1	+	-

IS: Initial Sessions (Pre-Teaching) NIS: Number of Instruction Sessions LS: Learning Status
MS: Monitoring Sessions (1st, 2nd and 4th weeks) +: Positive Outcome -: Negative Outcome

Like the student-1 and student-2, student-3 failed in telling the physical state of any of the substances in the initial sessions (Table 3). During the instruction sessions using the substances themselves, he learned that air is gas, stone is solid and book is solid in five, four and two sessions, respectively while he learned the physical states of other substances in a single session (Table 3). In instruction using photos, the student who learned in two sessions that air is gas learned other substances in one session. However, it was found that the student-3 achieved permanent learning for solid and fluid substances while he failed in learning gas substances.

Table 4. Initial, instruction and monitoring sessions and correct responses/learning status of the student-4

Item	**Itself**				**Picture**			
Solid	IS	NIS	LS	MS	IS	NIS	LS	MS
Stone	-	3	+	+	-	1	+	+
Pencil	-	2	+	+	-	1	+	+
Book	-	2	+	+	-	1	+	+
Spoon	-	1	+	+	-	1	+	+
Glass	-	2	+	+	-	1	+	+
Liquid								
Water	-	1	+	+	-	1	+	+
Milk	-	1	+	+	-	1	+	+
Juice	-	1	+	+	-	1	+	+
Olive Oil	-	1	+	+	-	1	+	+
Tea	-	1	+	+	-	1	+	+
Gas								
Air	-	1	+	+	-	1	+	+
Vapor	-	2	+	+	-	1	+	+

IS: Initial Sessions (Pre-Teaching) NIS: Number of Instruction Sessions LS: Learning Status
MS: Monitoring Sessions (1st, 2nd and 4th weeks) +: Positive Outcome -: Negative Outcome

According to Table 4, the student knew none of the substances in the initial sessions while he learned these substances in the instructions sessions using the physical substances and their photos. While he learned that stone is solid after three sessions, he learned after two sessions that pencil, book and glass are solid substances. He also learned in two sessions that steam is gas. Monitoring sessions identified that he achieved permanent learning for all the substances. The tables summarize the findings on whether the students knew or learned solid, fluid and gas substances and achieved permanent learning after the 1st, 2nd and 4th weeks in the initial, instruction and monitoring sessions. None of the students who participated in the study had pre-learning of the substances in solid/fluid/gas states. Following instruction, each student learned the substances that were taught using the substances themselves and their photos although the number of sessions differed for everybody. It was found in the monitoring sessions that student-1, student-2 and student-4 achieved permanent learning for all the substances that were taught using the substances themselves and their photos. However, while the student-3 achieved permanent learning for solid and fluid substances in the monitoring sessions, he did not make positive statements in any of the three monitoring sessions for gas substances.

4. DISCUSSION and CONCLUSION

This study aimed at determining the effectiveness and usefulness of direct instruction in teaching "solid, liquid and gas" substances to four students with intellectual disabilities. To that end, certain substances in solid, fluid and gas states were taught to the students. The study investigated the effectiveness and usefulness of direct instruction method in education as well as permanence of learning by assessing whether the substances taught using this method were remembered after 7, 14 and 30 days. When the data obtained from the study conducted on 4 students was analysed, it was

found that none of the students knew the states of the substances taught before instruction, and every student learned after instruction that the substances were in solid, fluid or gas states. It is natural that the students displayed similar performances in learning as their disability type and level as well as level of education were similar or close (Strickland, 2011; Türer, 2010). Another study indicating that direct instruction method is effective in the education of persons with intellectual disabilities was conducted by İlik (2009). The study found that direct instruction method was effective for all the subjects in teaching solar system in science course to students with mild learning difficulty.

When the findings of the study were analysed, it was seen that direct instruction was an effective method for teaching solid, fluid and gas matters to the students who participated in the study with enough time and using appropriate educational tools. The reason for success results in teaching solid, fluid and gas substances using direct instruction is that the topic was taught in a couple of steps, the help students received was decreased gradually and responsibility for learning passed to the students and thus, the students actively participated in each step of education and made minimum number of mistakes with the help of teacher (Türer, 2010). During instruction, the same steps were followed for each educational objective. Thus, the student needed teacher support less in the following learnings. In addition, as teaching was carried out in the classroom, other students may have been influenced positively when one of them was learning. Indeed, previous studies revealed that the most significant aspect that separated children with disabilities from their non-disabled peers was the difficulties they experienced in learning (Şahbaz, 2005) and frequent repetition allowed students to remember the subjects that were taught more easily in the assessment of teaching (Aruk, 2008). The study indicated that student-1, student-2 and student-4 achieved permanent learning in the monitoring sessions for all the substances that were taught to them. (Table 1, Table 2, Table 4). However, the student-3 recalled solid and fluid matters in all the monitoring sessions while he did not gave positive responses for the gas matters in any of the monitoring sessions (Table 3). The reason for that may be the students' active participation in teaching process and having the opportunity to repeat the subject while one of them was learning. Besides, individual activities may affect the attention time of the individuals with intellectual disabilities (Çetin, 2011). The reason for failing in achieving permanent learning by one student (student-3) may be that these students' attention time is not very long, they cannot keep information in mind for long and they may lose interest in the material (Ahmetoğlu, 2004; Çetin, 2011). Direct instruction is an effective and useful method in learning and remembering solid, fluid and gas matters for each student who participated in the study. This method enables the student to achieve the objectives of the course (Watkins & Slocum, 2004). There are various studies in literature that support the findings on the effectiveness and usefulness of direct instruction method. In a study on teaching the names of vegetables to three preschool children with Down Syndrome through direct instruction method, Batu (2006) found that direct instruction method proved effective in teaching the names of vegetables to children with Down Syndrome and the subjects remembered such knowledge in the monitoring sessions held after four and five weeks. In a study conducted by Mete (2016), certain hard and soft substances were taught to students with intellectual disabilities through direct instruction method in the context of visible and perceivable properties of substances. At the end of the study, it was found that two of the three students in the sampling learned and remembered the subject, but one student did not deliver expected result in learning. In this study, the student who did not have pre-learning in the initial level learned all the substances in solid, fluid and gas states after teaching through direct instruction method and achieved permanent learning in the monitoring sessions to a considerable extent. These findings indicate that direct instruction method is effective and useful in teaching substances in solid, fluid and gas forms to students with intellectual disabilities in special education classroom in secondary school.

5. RECOMMENDATIONS

It was found that direct instruction is an effective and useful method in teaching substances in solid, fluid and gas forms to students with intellectual disabilities. Furthermore, this method ensured permanent learning and increased academic achievement as it did not allow mislearning in students. Therefore, this method can be recommended for teaching solid, fluid and gas substances and other topics in science course or in other courses in special education classrooms or mainstreaming classrooms. In addition, the following recommendations can be made:

- The implementation stage of the study was limited with 11 weeks and 10 materials. The substances that was aimed to be taught in a short time was taught with an intensive program. Therefore, longer studies on science education can be conducted using different substances and materials.
- In Türkiye, adequate importance is not given to science education for persons with special needs. However, as is seen in the studies conducted so far, such individuals can learn certain scientific topics and concepts. Thus, there is a need for studies on science education for persons with special needs.

As part of the study, direct instruction method was used in education. However, there are various methods that can be used for science education for persons with special needs. By using other effective teaching methods, it is also possible to examine the effectiveness of teaching and usefulness of the method.

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Abstract

The aim of this study was to review the research which focused on *'Reading Anxiety'* in Turkish language systematically. According to the questions derived from the aim, 16 papers were re-examined based on the rules of systematic review method. These papers were analysed in terms of their aims, designs, sampling and results. In addition to this, similarities and differences of the reviewed papers were discovered. It was seen that these studies were conducted with primary and middle school students. It was also found that the methodology of these reviewed studies was designed with quantitative approaches. The results of the review indicates that reading anxiety is related with reading comprehension, reading habit, reading fluency and reading motivation. Such factors as gender, parents' income, having books and place of residence have relation with reading anxiety. The results gathered from reviewed papers suggest that studies designed with qualitative and mixed-method are needed. Additionally, focusing on various topics related with 'reading anxiety' with different participant groups are needed. In conclusion, it is believed that this systematic review study can provide fruitful information for the area and new perspectives for the further studies.

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Research Article

'Reading Anxiety in Turkish Language': A Systematic Review Research*

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Abstract

The aim of this study was to review the research which focused on *'Reading Anxiety'* in Turkish language systematically. According to the questions derived from the aim, 16 papers were re-examined based on the rules of systematic review method. These papers were analysed in terms of their aims, designs, sampling and results. In addition to this, similarities and differences of the reviewed papers were discovered. It was seen that these studies were conducted with primary and middle school students. It was also found that the methodology of these reviewed studies was designed with quantitative approaches. The results of the review indicates that reading anxiety is related with reading comprehension, reading habit, reading fluency and reading motivation. Such factors as gender, parents' income, having books and place of residence have relation with reading anxiety. The results gathered from reviewed papers suggest that studies designed with qualitative and mixed-method are needed. Additionally, focusing on various topics related with 'reading anxiety' with different participant groups are needed. In conclusion, it is believed that this systematic review study can provide fruitful information for the area and new perspectives for the further studies.

Keywords: Reading anxiety, systematic review, primary school students, middle school students

1. INTRODUCTION

Throughout their lives, human beings have tried to receive and respond to the message in the environment through communication channels and language competencies. The equivalent of this process in every language has been the use and sharing of linguistic skills. Mother tongue teaching, which can be considered equivalent to having the ability to perceive and interpret learning areas, starts to be given to the individual before school and can also affect the level of success in various fields. Because the most dominant elements of mother tongue education and teaching are comprehension and expression competencies. Turkish language teaching is structured on four learning areas: listening, speaking, reading, and writing, combined with grammar teaching. This teaching is continued with perceptive and productive linguistic skills, which can also be called as comprehension and expression skills. Listening and reading skills are related to perception while speaking and writing skills are related to productivity. The individual who makes sense of sounds with perceptual skills can also perform linguistic coding with productive skills. The auxiliary elements at this point are grammar and vocabulary learning.

There are many definitions of reading skill, one of the receptive language skills that constitute the subject of the study. Reading can be defined as interpreting a literary text in a general sense; in a narrower sense, as decoding a written text, decoding a graphically coded statement (Onan, 2017: 64). Reading is a development process with communication, perception, learning, cognitive, affective and kinesthetic dimensions (Sever, 2011). Reading is defined in the 'Misalli Büyük Turkish

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Dictionary' (Ayverdi, 2011: 946) as deciphering what is written in a text only by eye or by vocalizing and understanding the meaning intended to be conveyed in a text followed by learning. The act of reading, which is effective in giving meaning and value to human life and in the sustainability of these, is not only an intellectual ability but also a language element that is socially analyzed. Because to look at reading only as a physical skill is to remain alien to the cultural and social genetics of that society. Reading, one of the most important ways of learning, is also a process of acculturation. Because reading is not only a process of making sense of the totality of signs belonging to a language; it is also a struggle to contribute to the common heritage of the world. In this process, reading can create acculturation and acculturation can create social memory. Reading is also a communication system that realizes the relationship between the author and the reader, a perception process that enables the interpretation of messages by the reader, a learning area that forms the basis of teaching in schools, and a multidimensional development/learning curriculum that brings words and ideas into a meaningful whole. In this process, the discovery of one's essence and the creation of new words and new minds can also show that reading is a high-level mental and spiritual language skill.

1.1. Reading Anxiety

For a healthy and accurate reading, an individual is expected to have physical, mental, and spiritual competencies. The characteristics of being a good reader are not limited to physical competencies. The mental state of the reader can affect both his/her physical and mental feedback. A reader's emotional states can directly affect his/her comprehension and interpretation process, either positively or negatively. One of the emotional feedback that arises in the reading process is anxiety. Anxiety towards reading is an important affective factor affecting language learning. An individual's anxiety has been defined from various perspectives in terms of its level and effects. Anxiety, which needs to be analyzed under its level and influence areas, is a concept similar to fear and has some interrelated and interdependent qualities. In the concept of anxiety, which can contain differences, while the source of fear is certain, severe, and short-term, there is also a process of anxiety whose source is more uncertain and spread over a longer period of time. "Anxiety is a future-oriented, unpleasant, distressing affective state that is innate in humans, uncertain, unconnected with reality, impossible to understand, explain, visualize, design" (Kōknel, 2004: 15-16). According to Jalongo and Hirsh (2010), anxiety is a negative emotion that threatens an individual's self-esteem and can harm learning.

Anxiety, which is one of the feelings that arise due to biological factors and non-specific stimuli (Hay, 2009: 12), is defined as the uneasiness created by the fear or expectation of danger, misfortune, fear or expectation of unknown danger, misfortune, irrational fear; anxiety, worry, overwhelm (Bakırcıoğlu, 2012: 502). Reading anxiety, which is a special and situational fear (inability to read, reluctance, physical difficulty, mental environment, anxiety, restlessness, procrastination, avoidance, etc.) for the act of reading, is a reflex created against reading and can occur during a reading in a lesson or exam, as well as in moments when reading depends on the person (Melanlıoğlu, 2014a). When a person encounters a serious source of stress or when the duration of stress exceeds a few minutes, the adrenal glands stimulate the release of cortisol. Cortisol is a hormone of the adrenal cortex that can be used as a peripheral indicator of hypothalamic neural activity (Kalman & Grahn, 2004: 41). While moderate anxiety contributes to positive processes such as aspiration, decision-making, and motivation for success, very low and high levels of anxiety can have a negative effect on the contrary.

Anxiety towards reading can be resulted from reading in front of the classmates, length of text to read, fear of making mistakes while reading and also troubles in comprehension. This negative attitude towards reading can be started to be seen in childhood and developed throughout the life. Even though there have been studies about the relationship between reading and anxiety there has no

studies about drawing an exact personality feature who can be anxious in reading one day. On the other hand, it can be said that reading anxiety is a feeling that can be experienced by everyone.

Considering Turkish context, some studies indicated that reading anxiety is related with reading habits, attitudes towards reading (Baki, 2017; Dursun & Özenç, 2019; Yalman, Özkan & Kutluca, 2013); reading comprehension (Kuşdemir & Katrancı, 2016; Türkben, 2020; Yamaç & Sezgin, 2018) and with reading motivation (Türkben, 2020; Yamaç & Sezgin, 2018). Even though some studies done about finding out the relationship between 'reading anxiety', there is a lack of studies concerning systematic review of research about 'reading anxiety in Turkish language'. A systematic review of research about 'reading anxiety in Turkish language' can be helpful for the researchers to see the scope related with this topic. It is expected that the results of this study can draw attention to researchers to focus on reading anxiety, causes and prevention of it.

Aim of the Study

The aim of this study was to review the previous research focused on *'reading anxiety'* in Turkish context systematically. Based on this aim, following questions were replied:

- What are the main aims of the research?
- What type of methodology is used in the research about 'reading anxiety'?
- Who are the main participants of the research reviewed?
- What are the main outcomes?
- What are the main similarities and differences of the research reviewed?
- What needs to be done in the area reviewed?

Based on the main aim of this study, the given questions formed and were answered according to the rules of systematic review. With this review, the main similarities and differences of the research about 'reading anxiety in Turkish language' were clarified. Additionally, it was tried to determine the research which differed from the broad of previous research on 'reading anxiety'.

2. METHOD

2.1. Research Model

This study aimed to investigate the previous studies related with *'reading anxiety'* considering their aims, research designs and results. Therefore, a systematic research method was used to review previous research focusing on *'reading anxiety in Turkish language'* done in Turkish context. In a systematic review research method, systematic rules are significant while selection of previous studies about the research topic. In this method, critically evaluation of decided studies and analysis of them according to systematic rules should be done (Millar, 2004; Torgerson, 2003). This study aimed to select and evaluate research about the topic *'reading anxiety in Turkish language'* done in Turkey. Consequently, studies focused on topics about *'reading anxiety'* were re-examined by using the steps of systematic review process.

Millar (2004) suggested that systematic review process should follow such stages. These stages are; a) resolution of the aim, b) selecting the studies which are consonant with the aim in terms of selective criteria, and c) drawing conclusions from the collected information. In this study, all these stages were considered and thereby the process was carried out.

2.2. Sample

In terms of systematic review rules and based on the given questions, primarily 35 research published between the years 2012 and 2022 were downloaded. It is aimed to focus on reading anxiety in Turkish context therefore, studies were downloaded through such databates as ULAKBIM and

Google Scholar. Through the given databates, the keyword *'okuma kaygısı'* (in Turkish) and 'reading anxiety' (in English) was searched.

Theses, books, projects and conference papers were excluded during searching and so not included to review process. After the completion of downloading papers published in journals, those not having the words *'reading anxiety'* and *'okuma kaygısı'* in the keyword and not focusing on main topic were excluded. It should be noted that the papers' being directly related with *'reading anxiety in Turkish language'* was the significant criterion in the selection of papers for this study. In other words, papers focusing on *'reading anxiety in foreign language'*, *'reading anxiety in English language'* and *'reading anxiety in teaching Turkish as a foreign language'* were excluded. Eventually, 16 papers were included in the review process.

2.3. Data Collection and Analysis

The purpose of this study and the questions derived were decisive in this study. In this context, this study designed in terms of systematic review method followed the criteria below: These papers were

- published between 2012 and 2022
- focused mainly on reading anxiety in Turkish context
- concerned with reading anxiety in Turkish language
- published in journals

The data gathered from papers focusing on reading anxiety in Turkish language and Turkish context and published between 2012 and 2022 in journals was analyzed in terms of systematic review analysis rules. Analysis process followed the steps based on the questions drawn by the aim of this study.

3. FINDINGS

This research included in the review process were analysed in terms of the questions outlined above. Primarily, the aims, research designs and participants of researches were given. After that, the results and recommendations of the papers were presented.

3.1. Main Aims of the Research

The main aims of the previous research indicated that eleven topics were used in these studies. Some of them focused on distinguishing the relation between reading anxiety and reading comprehension. (e.g. Esen-Aygün, 2021; Kuşdemir & Katrancı, 2016; Yamaç & Çeliktürk-Sezgin, 2018). It can be also seen that some of them about identification of reading anxiety in Turkish related with some variables (e.g. Çevik, Orakçı, Aktan & Toraman, 2019; İzci & Kaya, 2021; Şahin, 2019; Yıldız & Ceyhan, 2016). Some other issues were aldo investigated in given studies. For instance, such issues as relationship between attitudes and reading anxiety (e.g. Baki, 2019; Dursun & Özenç, 2019), relationship between reading anxiety and motivation (e.g. Türkben, 2020; Yamaç & Çeliktürk-Sezgin, 2018), relationship between reading anxiety and prosodic reading skills (e.g. Ateş, 2016) and relationship between reading anxiety and reading habits (e.g. Baki, 2017).

Table 1 showed the whole picture of the primary purposes of the previous research. As seen in Table 1, while some research focused on finding out reading anxiety based on some variables, some of them investigated the relationship between reading anxiety and reading comprehension, listening anxiety and writing anxiety. It was seen that there were three studies focusing on designing reading anxiety scale for middle school and for primary school students (Çeliktürk & Yamaç, 2015; Melanlıoğlu, 2014).

Table 1. Main aims of the research

Aims of the Research	Examples
Measurement of reading anxiety at Middle School	Melanlıoğlu, 2014a; Çeliktürk & Yamaç, 2015
The effects of metacognitive strategies on reading anxiety as Middle School	Melanlıoğlu, 2014b
Measurement of reading anxiety at Primary School	Çeliktürk & Yamaç, 2015
Relationship between reading anxiety and reading comprehension	Kuşdemir & Katrancı, 2016; Esen-Aygün, 2021
Relationship between reading anxiety and listening anxiety	Uçgun, 2016
Relationship between reading anxiety and prosodic reading skills	Ateş, 2016
Relationship between reading anxiety and reading habits	Baki, 2017
Relationship between reading anxiety and reading motivation, fluency and comprehension	Yamaç & Çeliktürk-Sezgin, 2018
The impacts of reading anxiety on the attitudes towards Turkish course	Baki, 2019; Dursun & Özenç, 2019
Investigating reading anxiety based on various factors	Yıldız & Ceyhan, 2016; Çevik, Orakçı, Aktan & Toraman, 2019; Şahin, 2019; İzci & Kaya, 2021
Relationship between reading anxiety and motivation levels and comprehension skills	Türkben, 2020

When the reviewed papers are examined, it can be said that most of the research tried to find out whether reading anxiety is related to reading comprehension and attitudes toward reading. This means that researchers had assumptions about the relation between reading comprehension and anxiety. Another point gathered from the studies is that three scales were developed and these scales were used in other studies. On the other hand, it can be said that there is a lack of focus on what causes reading anxiety, results of this anxiety and how to resolve this problem.

3.2. Types of Methodology Used in Research

The research reviewed in this study indicated that all of these studies used quantitative approach. These quantitative researches designed according to the survey method as illustrated in Figure 1 below. Beside this, it can be seen that none of them used qualitative and mixed method approaches.

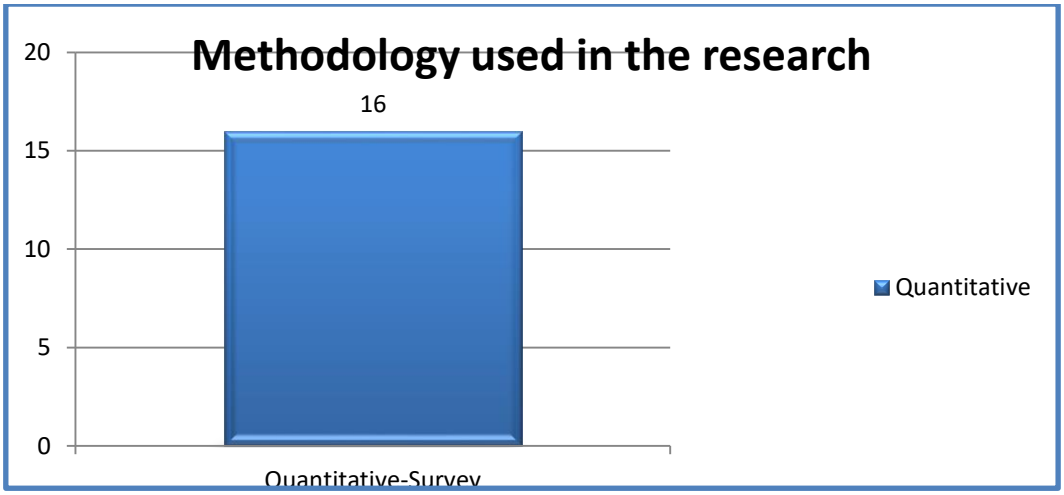

Figure 1. The distribution of the type of methodology in research

As said earlier and as given in Table 2, it can be said that studies were used one approach like quantitative. In other words, papers were designed based on quantitative methodology. The studies indicated that only one study (Melanlıoğlu, 2014b) was used experimental method compare to others. Since other studies were used survey method.

It was seen that data collection tools used in these quantitative studies were scales. The majority of researchers used reading anxiety scale with other scales in order to find out the relation among situations faced in learning Turkish language. 4 of reviewed studies (e.g. Baki, 2017; Esen-Aygün, 2021; Türkben, 2020; Yamaç & Çeliktürk-Sezgin, 2018) showed that researchers used more than one scale. In that these studies used 3 or more scales in order to find out the relation among such factors as reading anxiety, comprehension, habit, motivation, fluency and attitudes. Apart from other studies, it was seen that these four studies collected data with various tools in order to detail the relation.

Although quantitative research methodology enable researchers to find out the answers of their research questions, it could be said that there is a need to use other research methodology. For instance using qualitative and mixed method approaches can enable researchers to discover the phenomenon in detail. As seen in Table 2, scales were the data collection tools in research designed with quantitative approach. This result also indicates that there is a need to combine other quantitative tools for both triangulating the data and detailing the aim.

Table 2. Type of methodology used in research

Research Approach		Data Collection Tools	Examples
Quantitative	*(survey)*	Reading Anxiety Scale for Middle School Students	Melanlıoğlu, 2014a; Melanlıoğlu, 2014b; Çevik, Orakçı, Aktan & Toraman, 2018
		Reading Anxiety Scale for Primary and Secondary School Students	Çeliktürk & Yamaç, 2015; Şahin, 2019; İzci & Kaya, 2021
		Reading Anxiety Scale and Reading Comprehension Test	Kuşdemir & Katrancı, 2016;
		Reading Anxiety Scale and Prosodic Reading Scale	Ateş, 2016
		Reading Anxiety Scale, Attitude towards Reading Scale and Reading Habit Scale	Baki, 2017
		Reading Anxiety Scale, Reading Comprehension Scale, Reading Fluency Scale and Reading Motivation Scale	Yamaç & Çeliktürk-Sezgin, 2018
		Reading Anxiety Scale and Attitude towards Turkish Scale	Baki, 2019; Dursun & Özenç, 2019
		Reading Anxiety Scale, Reading Comprehension Scale and Reading Motivation Scale	Türkben, 2020
		Reading Anxiety Scale, Reading Comprehension Test and Reading Habit Scale	Esen-Aygün, 2021
		Reading Anxiety Scale and Writing Anxiety Scale	Yıldız & Ceyhan, 2016
		Reading Anxiety Scale and Listening Anxiety Scale	Uçgun, 2016

3.3. Main Participants of Research

The main participant of the reviewed studies was students since they are facing with reading anxiety during Turkish language. The results of the reviewed studies indicated that mostly middle school students were selected as participants. In addition to this, 5 of these studies were conducted with primary school students. It was seen that only one of the studies was done with primary and middle school students. The list of participants and example of research are given in Table 3.

Considering the participants it can be said that most of the studies conducted with middle school students. This situation suggests that there could be an idea accepted by researchers that middle school students were more anxious in reading compare to other levels. On the other hand, there is a few research conducted with primary school students. Basically this could suggest that researchers did not have negative assumption about this group. However, this situation points two significant situations. One is that researchers could not notice the problems faced in Turkish language at primary schools. The other one is that researchers might see that conducting a study with primary school students is difficult. The reviews about the participants of the research suggest that studying with various groups like middle school students, primary school students, high school students and undergraduates could add extra information to the area. It could be good to understand *'reading anxiety'* from the lenses of different group of participants. Additionally, it is seen that there is a need to study with multi groups in order to determine the differences among levels.

Table 3. The main participants of research

Main Participants	Examples
Middle School Students	Melanlıoğlu, 2014a (*616 students*); Melanlıoğlu, 2014b (*60 students*); Ateş, 2016 (*558 students*); Uçgun, 2016 (*2673 students*); Baki, 2017 (*341 students*); Baki, 2019 (*409 students*); Çevik, Orakçı, Aktan & Toraman, 2019 (*368 students*); Şahin, 2019 (*767 students*); Türkben, 2020 (*286 students*); İzci & Kaya, 2021 (*623 students*)
Primary School Students	Kuşdemir & Katrancı, 2016 (*211 students*); Yamaç & Çeliktürk-Sezgin, 2017 (*128 students*); Dursun & Özenç, 2016 (*556 students*); Yıldız & Ceyhan, 2016 (*317 students*); Esen-Aygün, 2021 (*403 students*)
Primary School Students and Middle School Students	Çeliktürk & Yamaç, 2015 (*630 students*);

3.4. Main Outcomes of Research

A general overview of the reviewed studies' outcomes is given in Table 4. The main outcomes of the studies are classified according to the participants selected in the studies as seen in the Table 4. In addition to this, these outcomes of reviewed studies about reading anxiety are categorised under themes. The numbers of studies presented under three themes in Figure 2 are correspondingly given in Table 4. As given earlier, the most of the research under the review were designed in terms of quantitative research approach and mostly conducted with middle school students. A few of these studies were done with primary school students. In this sense, the results of these studies founded on middle and primary school students' perceptions regarding reading anxiety and its relationship with such factors.

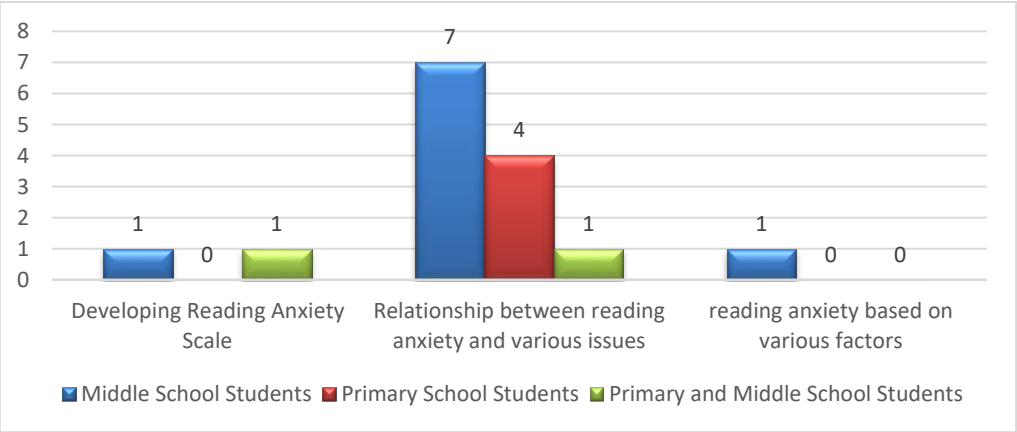

Figure 2. Themes emerged from reviewed research

It is seen in Figure 2 that most of the studies' results are related with the theme *'relation between reading anxiety and various issues'*. The highest number of studies within this theme conducted with middle school students. The review results indicate that there is a relation between reading comprehension and reading anxiety. Additionally, motivation and reading habits have impact on reading anxiety (see Table 4).

Under the theme '*relation between reading anxiety and various issues'*, studies found that there was a negative relation between reading anxiety and reading comprehension (Türkben, 2020; Yamaç & Çeliktürk Sezgin, 2018). In addition to this, reading habits and reading anxiety has negative corelations. It was also found that listening anxiety and reading anxiety have relation at middle school (Uçgun, 2016) and writing and reading anxiety have relation at primary school level (Yıldız & Ceyhan, 2016).

There are only two studies under the themes *'developing reading anxiety scales'* and one study under the theme *'relation between reading anxiety and various factors'*. The scales developed by Melanlıoğlu (2014a) and by Çeliktürk and Yamaç (2015) were used by other researchers. It can be said on the one hand that researchers found these scales effective in collecting the data. On the other hand it was thought that developing a scale was difficult.

Some studies under the *'relation between reading anxiety and various factors'* resulted that gender on reading anxiety show differences. For instance, Uçgun (2016), studied with middle school students, stated that gender has impact on reading anxiety and emphasized that girls were more anxious in reading compare to boys. On the other hand, the results of study conducted by Çevik, Orakçı, Aktan and Toraman (2019) found that there was no relation between gender and reading anxiety.

Table 4. Main outcomes emerged from the reseach

Participants	Themes	Main Outcomes	Examples
Middle School Students	○ Developing Reading Anxiety Scale	- *The scale consisting of 14 items were developed*	∗ Melanlıoğlu, 2014a
	○ Impacts of metacognitive strategies on Reading Anxiety	- *There is a relation between metacognitive strategies and reading anxiety* - *Metacognitive strategies help to decrease the level of anxiety in reading*	∗ Melanlıoğlu, 2014b
	○ Relation between reading and listening anxieties	- *There is a moderate relation between reading and listening anxieties* - *There is a relation between gender and parents' education level and the level of anxieties in reading and listening.*	∗ Uçgun, 2016 ∗ Ateş, 2016
	○ Prosodic reading and reading anxiety	- *There is a relation between prosodic reading and reading anxiety.* -*There is not any gender differences in the level of reading anxiety* - *Reading habits and attitudes have positive relation* - *There is a relation between reading attitudes and reading anxiety*	∗ Baki, 2017 ∗ Baki, 2018

	○ Attitudes, habits and reading anxiety	*- There is a relation between reading anxiety and Turkish lesson however this does not have negative impact on the language. In other words reading anxiety has positive affect on language*	∗	Çevik, Orakçı, Aktan and Toraman, 2019
	○ Attitudes to Turkish lesson and reading anxiety	*-There is a relation between reading comprehension and reading anxiety*	∗	Türkben, 2020
	○ Effects of such factors on reading anxiety	*- There is no relation between reading anxiety level and gender, parents' income, the level of success in Turkish*	∗	İzci & Kaya, 2021
	○ Reading anxiety, motivation and reading comprehension skills	*-There is a negative moderate relation between reading anxiety and motivation and reading comprehension*	∗	Şahin, 2019
	○ Reading anxiety and variables	*- Low anxiety high success in reading comprehension and high level motivation*		
	○ *Reading anxiety and variables*	*- Students started to school at early ages have higher level of anxiety*		
		- Males are more anxious than females		
		- There is a relation between the level of reading anxiety and parents' education level		
		- Students in villages are more anxious than the others live in town and city		
		- There is no relation between reading anxiety and gender and also the level of class		
		- The level of parents' income has impact on reading anxiety		
		- The books read at home by others have relation with reading anxiety		
Primary School Students	○ Relation between reading comprehension and reading anxiety	*- Students have nearly low anxiety level in reading.*	∗	Kuşdemir & Katrancı, 2016
		- There is a slightly negative relation between reading comprehension and anxiety in reading.	∗	Yamaç & Çeliktürk-Sezgin, 2018
		- Instinct motivation has a relation with reading comprehension		
	○ Relation between reading anxiety and reading comprehension, motivation and fluency	*- Fluency has positive relation to reading comprehension*		
		- Fluency has negative relation to reading anxiety		
		- There is a negative relation between reading comprehension and reading anxiety	∗	Dursun & Özenç, 2019

		- The participant group has slight anxiety level in reading *-There is a moderate and negative relation between attitudes and reading anxiety*	*	Esen-Aygün, 2021
	○ Reading anxiety and attitudes towards Turkish lesson	*-Reading habits have impacts on reading comprehension and reading anxiety* *- Reading habits have a significant role in improving comprehension and in decreasing the level of reading anxiety*	*	Yıldız & Ceyhan, 2016
	○ Reading anxiety, reading habits and reading comprehension skills	*-There is a negative relation between reading anxiety and gender and the education level of parents* *- There is a negative relation between reading anxiety and the education level of parents* *-There is a positive relation between reading and writing anxieties.*		
	○ Reading and writing anxieties			
Primary and Middle School Students	○ Developing a Reading Anxiety Scale	*- A scale was developed with 29 items*	*	Çeliktürk & Yamaç, 2015

4. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This systematic review study was focused on research about *'reading anxiety in Turkish language'*. With the result of this study, it is believed that significant points in regard to *'reading anxiety'* are identified for further studies. A whole descriptive picture of reading anxiety in Turkish language at middle school and primary school and its relation with such issues was given with this review.

The reviewed studies showed that all studies were done with students. In addition to this, the sampling group was selected mostly from middle school students (Ateş, 2016; Baki, 2017; Baki, 2019; Çevik, Orakçı, Aktan & Toraman, 2019; İzci & Kaya, 2021; Melanlıoğlu 2014a; 2014b; Şahin, 2019; Türkben, 2020; Uçgun, 2016). These findings, on the one hand suggest that students have crucial roles in clarifying reading anxiety and its relation with other factors. It can be said that the data gathered from students provide a valuable insight to the area. On the other hand, it is seen that there is a lack of studies done with primary and other levels like high school and undergraduate. It is clear that reading comprehension is problem at all levels and there is no evidence that this problem could be result of reading anxiety for all levels. Therefore, there is a need to conduct studies with students from different school levels in order to outline the reading anxiety at various levels.

Most of the studies conducted with both primary and middle school students stressed that reading comprehension and reading anxiety are related negatively. However the result of the study (Kuşdemir & Katrancı, 2016) conducted with primary school students indicated that there is a slight relation between comprehension and reading anxiety. This could be result of having an effective language lesson and motivation of students to reading. For instance, the study done by Dursun and Özenç (2019) is supporting this view in that the results emphasized that primary school students were less anxious in reading.

Most of the reviewed studies aimed to measure the level of reading anxiety and to investigate the relation of reading anxiety with comprehension, attitude, motivation, gender, parents' income level, age of starting to school. However, the causes of reading anxiety and resolution of reading anxiety are needed to study. Moreover, reasons of reading anxiety are need to be studied in detail in order to be clarified. This study contributed to the area that there is a lack of studies in identifying reading anxiety.

Concerning all reviewed studies it can be said that all of them designed according to quantitative research methodology. The results emerged from these studies show that survey method is preferred and scales were used as data collection tools. It can be said that these quantitative studies provide productive information to the literature. Additionally, the scales used in these quantitative studies are helpful to reach the high level participant group at a particular period and also to maintain definite results. Nevertheless, it is seen that there is a lack of studies designed according to mixed method and qualitative research methodologies. It should be noted that mixed method and qualitative research studies could provide fruitful knowledge for the area. In addition to this, such data collection tools as interviews, observations, focus groups are needed to be used to comprehend students' reactions during facing with anxiety in reading as well as to define and to explain reading anxiety.

In conclusion, as mentioned the studies under the review were designed in terms of the quantitative research methodology as well as gathered the data by scales based on students' perceptions. It could be accepted that students' reading anxiety can be measured or clarified by their perceptions, but there should be studies considering other groups of participants like teachers or parents. In terms of the results of reviewed studies, it can be said that there is a similarity in aims of most of the studies. This suggests that there should be studies focusing on different topics relating with *'reading anxiety'*. It might be concluded that further studies about *'reading anxiety'* need to widen the scope of the topic, to use multiple data collection tools and to gather data from various groups of participants in order to discover the whole picture.

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