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The Effect of Differentiated Mathematics Homework on 4th Grade Primary Students' Attitudes Towards Homework*

Nilay Ceylan Dalmaz, PhD Student, Corresponding Author
Gazi University, Türkiye
nilceylan10@gmail.com
Orcid ID: 0000-0001-7346-0903

Neşe Işık Tertemiz, Prof. Dr.
Gazi University, Türkiye
tertemiz@gazi.edu.tr
Orcid ID: 0000-0001-7033-7192

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Abstract

The purpose of the current study is to examine the effects of homework designed with a differentiated method and traditional homework on the attitudes of 4th grade primary school students towards homework in mathematics. A quasi-experimental design with a pre-test-post-test control group, one of the quantitative research methods, was used in the study. The study group consists of 25 experimental and 26 control group students continuing their education in the 4th grade at a state primary school in Kayseri province in the 2023-2024 school year. In the study, the "Attitude Scale towards Mathematics Homework" developed by Bora (2018) and a "Semi-Structured Interview Form" were used as data collection tools. Differentiated homework designed by the researcher was given to the experimental group, and traditional homework was given to the control group for 10 weeks. At the end of the study, a significant difference was found in the post-test results of the experimental and control group students in favour of the experimental group. In addition, it was determined that there was a significant difference between the within-groups post-test scores for both the control and experimental group students and this difference was higher in the experimental group. The findings obtained from the interviews also supported the quantitative findings. Within the scope of the research, changes in students' attitudes and experiences towards homework in the transition from primary to secondary school can also be analysed.

Keywords: Differentiated mathematics homework, primary school mathematics education, differentiated homework, differentiated instruction, attitude towards homework.

Introduction

Homework, which is one of the extracurricular activities in the learning process, plays an important role in the school years and includes the tasks that teachers want students to do outside the school. Homework is assigned to help students learn by conducting research and thinking more deeply about subjects outside the school (Gün, 1995). Homework, which provides students with an opportunity to practice what they have learned, is an important tool in education for teachers and school administrators (Zentall & Goldstein, 1999). In our country, teachers generally acknowledge that homework plays an important role in education. Moreover, extracurricular activities are an important tool for effectively incorporating the influence of environmental and family factors, which are crucial elements in shaping students' minds (Albayrak et al., 2004). In a study, it was found that teachers believe that homework is not only important for learning school subjects but also for developing a good study routine (Holte, 2016). Through homework, students can be taught to fulfil individual responsibilities and develop a study routine. In addition, homework serves as a tool to develop students' intellectual abilities, foster creative and critical thinking and promote self-directed learning (Algani & Alhaıja, 2022). The purposes of homework are stated as follows:

a) Practicing skills,

b) Enhancing the learning experience,

c) Increasing responsibility, self-confidence and time management,

d) Establishing and maintaining communication between schools and parents,

e) Following instructions related to homework,

f) Informing parents about activities at school and in the classroom,

g) Maintaining classroom policies (Epstein, 2001; as cited in Pfeiffer, 2018).

Homework is expected to contribute to the more effective management of students' mental processes by allowing them to review the knowledge they acquire during their learning process. The effectiveness of this process depends largely on students' attitudes towards homework and how these attitudes are shaped. The way students perceive homework can play a determining role in their motivation and thus directly affect learning outcomes. Therefore, improving students' attitudes towards homework is of strategic importance for educators.

Research on Homework

Homework is seen as an important part of the education system. Homework is considered an effective tool for students to acquire knowledge outside the classroom and to reinforce what they have learned in the classroom (Cooper, 2001). However, opinions in national and international studies on whether homework should be assigned or not vary widely. Studies on this subject mainly focus on the impact of homework on academic success and its contribution to students' learning processes (Cooper, 2001; Demir, 2013; Epstein & Van-Voorhis, 2001; Işık Tertemiz, 1991; Jamal & Rizvi, 2021). Indeed, there are studies that strongly emphasize the importance of homework as a tool to support student learning, especially in lower-performing schools where students lag behind in fundamental mathematics concepts (Cooper et al., 2006; Maltese et al., 2012; Trautwein & Köller, 2003). In these studies, it is particularly emphasized that assigning homework is important as a solution to many difficulties that contribute to poor learning and performance (Graven, 2016).

Contrary to these studies that claim homework is effective on academic success, the report titled "Education in Eastern Europe and Central Asia: Findings from PISA", published in July 2021, presents a comparison of Türkiye's frequency of assigning homework with that of other countries in the region in the section titled "Time Spent on Out-of-School Learning". According to the report, Türkiye ranks fifth among Eastern European and Central Asian countries in terms of the amount of homework assigned to students. The countries ranking above Türkiye are, in order, Kazakhstan, Romania, Croatia and Bulgaria. However, as a striking finding, Türkiye is the only country among these five countries that ranks below the Organisation for Economic Co-operation and Development [OECD] average (World Bank, 2021).

Table 1.

Out-of-School Learning Time (OECD, 2019)

Country	Homework or other assignments given by teachers	Paid or unpaid one-on-one tutoring	Attending commercial courses paid for by the family	Studying with parents or other family members	Total time (hour/week)
Bulgaria	3	5	1	5	5
Croatia	4	1	2	1	8
Kazakhstan	12	1	3	1	17
Romania	5	5	0	5	6
Türkiye	7	1	2	1	11
OECD average	5	5	1	5	7

Despite the high amount of homework assigned to students in Türkiye, only 61.3% of students were able to reach the minimum performance level in mathematics according to the 2022 Programme for International Student Assessment [PISA] results (Ministry of National Education [MoNE], 2022).

It can be said that homework is a factor influential not only on academic success but also on students' affective characteristics and daily lives. When viewed from a positive perspective, teachers state that homework increases family involvement and strengthens students' interest in lessons (Epstein & Van-Voorhis, 2001). On the other hand, Kohn (2006) argues that homework creates an unnecessary burden on students, causing excessive stress and burnout. According to Kohn (2006), the impact of homework on academic success is exaggerated and children need to spend more time resting, playing and socializing in their free time. In a study conducted by Demir (2013), some teachers stated that giving more homework than necessary negatively affected the family life of students. In the study, it was observed that primary school teachers mostly assign homework for the purpose of revision.

In relation to the effects of homework on parents, Çetinkaya and Uzunkol (2019) stated that homework encourages parents to get involved in the educational process, but at the same time, it creates an additional responsibility for them. In their study, they emphasized that especially working parents are unable to dedicate time to their children's homework, and this can lead to family conflicts. The challenges and time constraints families face while helping with homework also show that this process may not always be a positive experience (Çetinkaya & Uzunkol, 2019). Hattie (2013) referred to 116 studies from around the world, which show that homework has almost no impact on children's learning in primary school. Furthermore, some studies have shown that homework can have a negative effect due to children developing strategies to do as little as possible, experiencing physical and emotional fatigue and losing interest in school (Hattie, 2013; as cited in Holte, 2016). In a study examining the impact of homework on academic success in Türkiye, it was concluded that there is no significant difference between assigning homework to students or not. The study also stated that although this finding contradicts the general consensus in the literature that homework has positive effects on success, it may be related to the quality of the homework given (Kapıkıran & Kıran, 1999). Although most teachers acknowledge the importance of homework, they do not pay enough attention to the planning and implementation processes of homework (Hallam, 2004; as cited in Turanlı, 2009). This highlights the need for homework to be assigned based on students' individual needs and teachers' unique evaluations, rather than general assumptions. In other words, it is crucial that homework be designed to accommodate individual student differences, be carefully evaluated and be followed by detailed feedback to students. Moreover, a teacher's attitude towards homework can influence both students and parents to take it more seriously, as it reflects the importance placed on homework (Hallam, 2004; as cited in Turanlı, 2009).

Homework and Attitude

In the examination of the effects of homework, another factor of interest besides academic success is children's attitudes towards homework. The term attitude is understood as an evaluative tendency (positive or negative) that conditions the subject to perceive and

respond in a certain way in light of objects (people, groups, ideas, situations, etc.). It is a learned tendency, not innate, and while it can change, it is relatively stable (Suárez et al., 2019). The subject of interest in the current study is how much students enjoy their homework. In this regard, the study focuses on students' attitudes towards the homework assigned in mathematics class because it is believed that primary school students' attitudes towards homework play an important role in their academic success and the effectiveness of their learning processes. Research shows that positive attitudes towards homework increase the frequency and quality of students' homework completion, thereby improving learning outcomes (Cooper et al., 2006).

Although gender is not included as a variable in the current study and time allocated for homework is not addressed, some studies suggest that girls may put more effort into the assigned homework and have more positive attitudes towards homework compared to boys (Corno, 2000; Çetinkaya & Uzunkol, 2019; Trautwein & Köller, 2003). Moreover, in a study conducted on twelfth-grade students to examine the effects of motivation, interest and engagement on mathematics achievement, the structural equation model established revealed that the time spent on math homework was significantly and positively related to attitudes toward mathematics (Singh et al., 2002; as cited in Smith et al., 2021). Students' interest in assignments and the value they place on these tasks directly affect their motivation and enable greater participation in the learning process. In this context, it is emphasized that educational policies should be structured in a way that supports students' positive interaction with homework (Vatterott, 2009). When individual differences are considered, it is thought that assigning differentiated homework could influence students' attitudes towards mathematics homework.

Differentiated Homework

From the past to the present, homework has been a significant topic that has occupied scientists interested in developing and evaluating education in many countries around the world in terms of quantity, quality, difficulty level and the way homework is assigned. In addition, it has been pointed out that the homework assigned to students is not of sufficient quality (Algani & Alhaija, 2022). In Türkiye, in addition to the fact that a large amount of homework is assigned, it is observed that the same amount and content of homework are given to all students. However, it is emphasized that individual differences should be considered in education, as students' levels of benefit from a particular teaching practice and their responses to this practice vary according to their individual characteristics (Kuzgun & Deryakulu, 2004). When differentiated instruction is taken into account, it is an approach that aims to personalize the learning process by differentiating teaching approaches and learning environments according to students' individual characteristics, different learning styles, needs and levels (Demir, 2021; Sousa & Tomlinson, 2018; Tomlinson, 2014). In this approach, it should be taken into account that homework can also be differentiated.

When studies on differentiated instruction in mathematics teaching at the primary school level are examined, it is generally seen that differentiated instruction focuses on its effects on students' achievements (Demir, 2013; Göl, 2021), mathematical reasoning skills, use of metacognitive learning strategies and problem-solving abilities (Çoban, 2019), attitudes

towards mathematics lessons (Ekinci, 2016) and the academic success of students with special needs (King, 2016). Other studies are found to be conducted at the middle school level with similar focuses (Avcı et al., 2022; Çoban, 2019; Karakaş, 2019; Şaldırdak, 2012; Taş & Sırnacı, 2018).

Educational research has focused on the critical role of homework in shaping elementary students' attitudes towards homework, academic performance and skill development. It has been noted that perceptions of homework change with age, with younger students exhibiting more positive attitudes compared to older students (Cooper et al., 2006). Therefore, it is important for students at the beginning of their school years to have a positive attitude towards homework, as it is known that affective traits acquired early are more resistant to change later (Brophy, 1986). The data collected from the current study will reveal the attitudes of fourth-grade students towards homework. What distinguishes the current study from others is its focus on examining the effect of providing differentiated homework, tailored to individual differences, on students' attitudes towards homework.

Homework is a method frequently used at the primary school level to help students acquire various skills and reinforce the knowledge they have learned. However, in the literature, there are many different perspectives and practices regarding homework at the primary school level. Moreover, when the literature is reviewed, it is seen that the need to examine the effect of differentiated homework in mathematics lessons on students' attitudes towards homework emerges as significant, particularly in the context of addressing students' individual learning needs and enhancing their engagement in the learning process. Traditional homework is often assigned to all students at the same level of difficulty and in the same quantity, which may not be suitable for each student's learning style, pace and needs (Tomlinson, 2001). Therefore, differentiated homework can better address students' individual learning needs and help maintain their interest in the subject. Differentiated homework consists of tasks that are varied according to students' readiness levels, learning styles and areas of interest (Tomlinson, 2001). This approach allows students to participate more effectively in their learning processes by taking their individual differences into account.

Research shows that students' attitudes towards homework have a significant effect on their academic success and motivation (Cooper, 2001; Cooper et al., 2006; Trautwein & Lüdtke, 2007; Zimmerman & Kitsantas, 2005). Students with a positive attitude towards homework complete their assignments more regularly and willingly, while negative attitudes can lead students to develop resistance towards homework. Differentiated homework in mathematics allows students to develop a positive attitude towards homework because this type of homework is tailored to the student's own skill level and interests (Tomlinson, 2001). Similarly, students' display of positive attitudes towards homework and their expression of emotions are directly related to their consistent effort, as well as the development of their independent learning skills. This situation indicates that students, by being aware of their own learning processes, can develop learning habits even without teacher guidance, and it is considered one of the key components of homework motivation (Graven, 2016). It is stated that traditional homework in mathematics can create anxiety and stress in students, and this situation can negatively affect students' interest in the subject (Elgit, 2019). It is emphasized

that differentiated homework can reduce these negative effects and contribute to students developing positive attitudes towards lessons (Tomlinson, 2001).

In this context, the main purpose of the current study is to comparatively examine the effects of differentiated and traditional homework methods applied in the 4th grade mathematics lessons on students' attitudes towards homework. The examination of the effect of differentiated homework in mathematics on students' attitudes towards homework is expected to contribute to the educational sciences literature and also help teachers improve their in-class and out-of-class practices. Understanding the potential of differentiated homework to increase student motivation and success can raise teachers' awareness of this approach and support the implementation of more effective teaching strategies.

In the current study, the aim is to answer the question, "Is there an effect of differentiated homework in the 4th grade mathematics lessons on students' attitudes towards mathematics homework?" In line with this main question, the sub-problems of the study are as follows:

1. Is there a significant difference between the pre-test and post-test mean attitude scores of the control group students towards mathematics homework?

2. Is there a significant difference between the pre-test and post-test mean attitude scores of the experimental group students towards mathematics homework?

3. Is there a significant difference between the post-test mean score of the experimental group students, who were given differentiated homework, and that of the control group students, who were given traditional homework, regarding their attitudes towards mathematics homework?

4. Do the emotional expressions of the students in the control group support their attitude scores towards traditional homework?

5. Do the emotional expressions of the experimental group students towards differentiated homework support their attitude scores after the completion of the experimental process?

Method

Research Model

The current study was conducted using a pre-test/post-test control group quasi-experimental design (Büyüköztürk, 2020). Quasi-experimental designs are preferred in situations where the controls required in true experimental models cannot be ensured or are insufficient (Karasar, 2012). Participants in this design are selected through a matching process from pre-existing groups (Büyüköztürk et al., 2019). In the study, since there was no possibility of random assignment of participants to the experimental and control groups, the use of a quasi-experimental design was deemed appropriate.

Study Group

This study was conducted with the participation of fourth-grade students attending two different classes of a primary school in Kayseri during the 2023-2024 school year. The school

was selected from Kayseri province by using convenience sampling, one of the purposive sampling techniques. This method allows the researcher to select a sample that is easily accessible, thereby facilitating the data collection process (Yıldırım & Şimşek, 2021).

Although the school was selected using the convenience sampling method, care was taken to ensure that the control and experimental groups selected from the eight classes in the school were equivalent in terms of their homework attitudes to contribute to the establishment of the validity and reliability of the study. In this context, the developed homework attitude scale was administered as a pre-test to the eight fourth-grade classes. The pre-test results were analyzed, and four classes that exhibited a normal distribution and showed no significant differences between them were selected. Two of these four classes were assigned to the experimental and control groups using the random sampling method. As a result, a total of 50 students, with 24 in the experimental group and 26 in the control group, were included in the study. The distribution of students by class is presented in Table 1.

Table 2.

The Distribution of the Students in the Experimental and Control Groups

	f	%
Experimental group	24	48
Control group	26	52
Total	50	100

Table 1 shows the distribution of students in the experimental and control groups of the study. The experimental group constituted approximately 48% of the study group (EG=24), while the control group constituted approximately 52% (CG=26).

Determining the Equivalence of the Study Groups

The current study was conducted in two different classes of a primary school in the Kocasinan district of Kayseri during the 2023-2024 school year. The study was carried out in two classes that were equivalent in terms of their pre-test mean scores on attitudes towards mathematics homework, selected from the eight classes available in the school.

Table 3.

Pre-Test Mean Scores of the Experimental and Control Group Students' Attitudes towards Mathematics Homework

Variables	Groups	*n*	*M*	*SD*	*t*	*df*	*p*
Homework attitude	Experimental group-pre-test	24	.81	.31	.95	49	.343
	Control group-pre-test	26	.73	.29			

Data Collection Tool

In the current study, the "Attitude Scale towards Mathematics Homework" developed by Bora (2018) was used to determine the attitudes of the students in the experimental and control groups towards mathematics homework.

Attitude Scale towards Mathematics Homework

In the current study, the "Attitude Scale towards Mathematics Homework" developed by Bora (2018) was used to determine the effect of differentiated homework designed by the researcher and traditional homework assigned by the primary teacher on the attitudes of fourth-grade primary school students towards mathematics homework. In the current study,

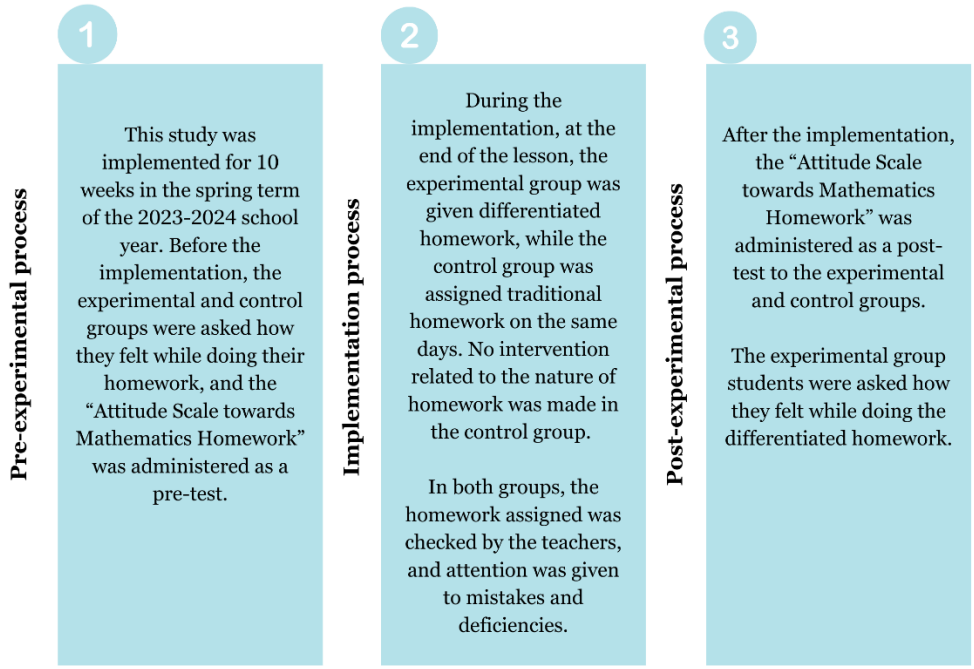
the "Attitude Scale towards Mathematics Homework", developed by Bora (2018) and subjected to validity and reliability studies, was administered to the students before and after the implementation. This scale is a five-point likert-type scale and the response options are "Strongly Agree", "Agree", "Undecided", "Disagree" and "Strongly Disagree". The scale consists of a total of 21 items, including 14 positive statements and 7 negative statements (4, 9, 11, 12, 16, 18, 21). At the end of the experimental process, the Cronbach's Alpha reliability coefficient of the scale was calculated as .85. The researchers conducted the reliability study of this scale, developed by Bora (2018), with 91 students attending the 4th grade of primary school. The content validity of the scale was evaluated through expert opinions, and the Cronbach's Alpha coefficient obtained from the reliability analysis was determined to be .80. In addition, in order to better interpret the attitude scores, the students in the experimental and control groups were asked the question, "How do you feel while doing the homework assigned in the mathematics lesson?" at the beginning of the experimental process, and they were asked to write down their feelings.

Implementation Process in the Study

The "Attitude Scale towards Mathematics Homework" was administered as a pre-test at the beginning of the experimental process and as a post-test at the end to the experimental and control groups. By evaluating the obtained results, an analysis was conducted to determine whether assigning differentiated homework in mathematics compared to traditional homework had an effect on students' attitudes towards the mathematics homework assigned. The implementation process of the study is as follows.

Figure 1.

Implementation Process and Its Stages

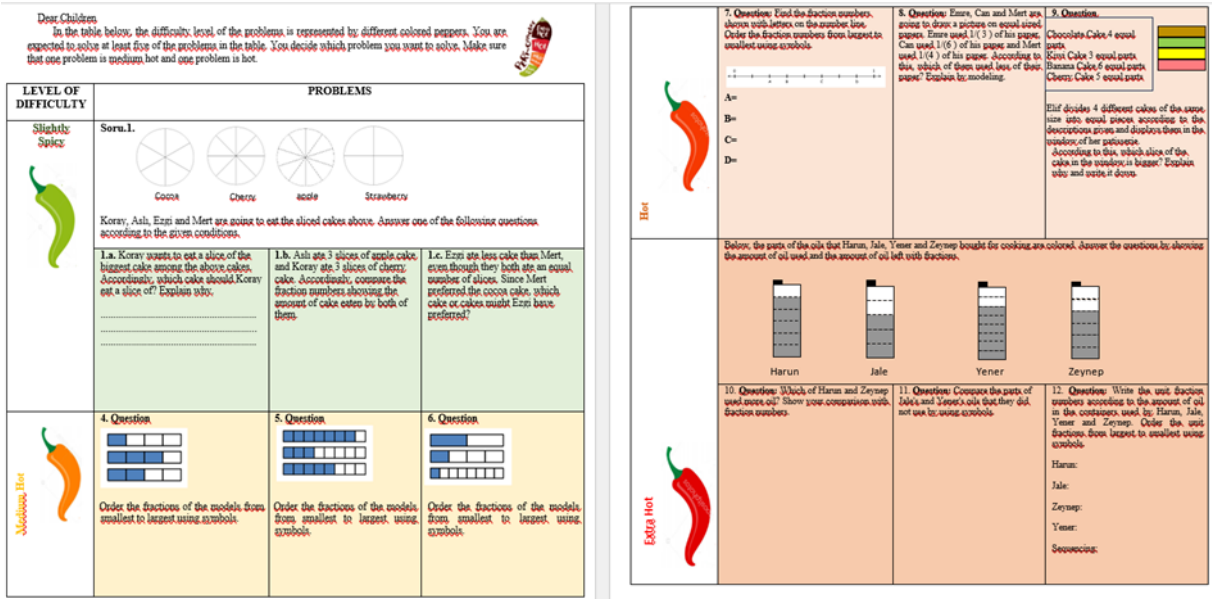


During the study, the students in the experimental group received 5 hours of mathematics lessons per week for 10 weeks, with two assignments each week. At the end of

each mathematics lesson, differentiated mathematics homework was assigned, collected during the process, checked, feedback was provided in the classroom, and a discussion environment was created. In the control group, homework was also assigned by the primary teacher during the same weeks and hours, and the researcher did not intervene in the homework. However, just like in the experimental group, the homework in the control group was collected during the process, checked, feedback was provided in the classroom, and a discussion environment was created. In both groups, after each homework assignment, a discussion environment was created with the students, and the deficiencies and mistakes in the homework were addressed and evaluated. During the in-class correction, the "class-wide correction homework technique" was used, where the mistakes made by the students were projected onto the board and corrected. The class-wide correction technique involves writing the mistakes on the board and making corrections with the input of the entire class (Atlı, 2012). This technique encouraged students to search for different solutions to each other's mistakes and ensured that correct solutions were learned by other students as well (Demirel, 2011). After reviewing the relevant literature, the differentiated homework assignments were presented to a mathematics education professor, a Turkish language teacher, a mathematics teacher and four primary school teachers, and expert opinions were gathered and evaluated. In addition, the researcher has been conducting lessons using the differentiated instruction approach for many years at her educational institution. The necessary adjustments to the homework assignments were made based on the experts' recommendations. The homework assignments prepared for the subjects of "Fractions" and "Time Measurement" were distributed to the experimental group. In both groups, the learning outcomes related to the subjects of "Fractions" and "Time Measurement" were covered by the primary teachers.

Figure 2.

Example 1 of Differentiated Mathematics Homework on Fractions



In Figure 2, an example of differentiated homework is provided, where level differentiation is made according to the mathematics learning level, and the homework includes questions that students can choose from based on their own level. In Figure 2 given as a differentiated homework, students are expected to choose one problem from the horizontal

columns according to the difficulty levels of the questions. In the differentiated homework sheet, the problems become more difficult in the horizontal columns (mildly challenging, moderately challenging, challenging, and extra challenging), with every third problem in each row becoming progressively harder, from problem 1 to problem 3. This approach allows students to select problems based on their perceived difficulty, while ensuring that all problems address the same learning outcome.

Figure 3.

Example 2 of Differentiated Mathematics Homework on Fractions

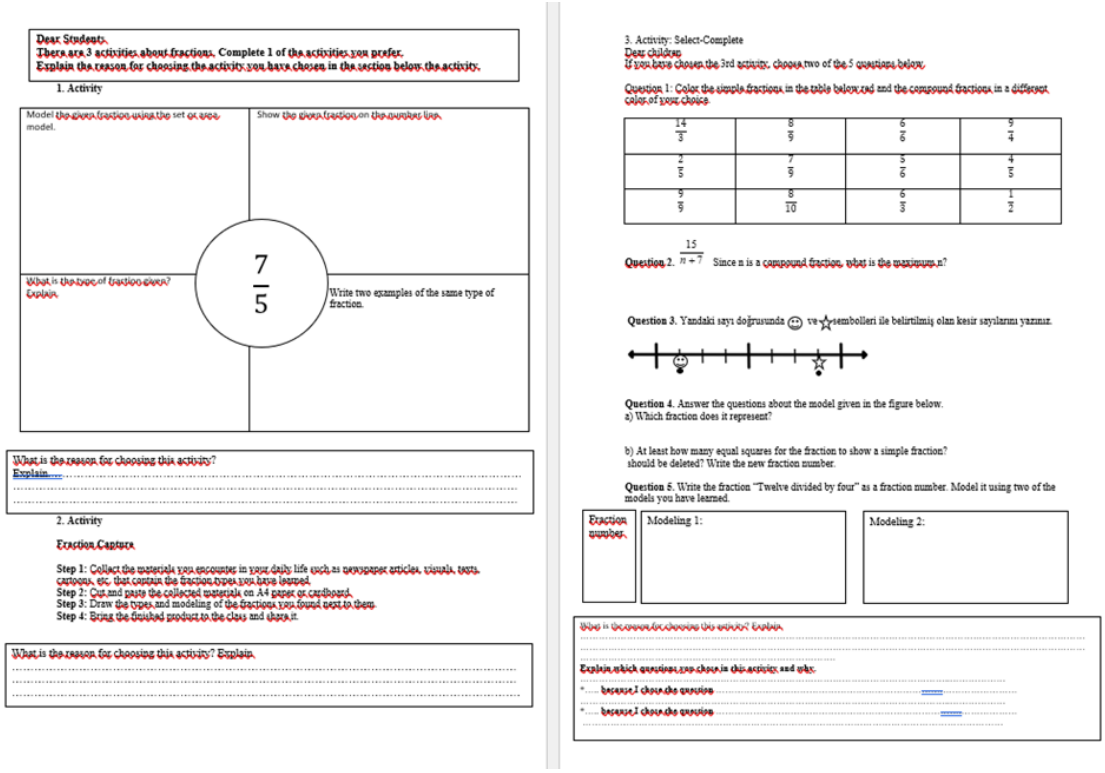


Figure 3 shows another example of differentiated math homework. In the homework sheet in Figure 3, students are presented with three activities and are asked to choose one activity. In the activities, the first activity uses the Frayer model, which progresses from easy to difficult. In the second activity, students are asked to find examples of fractions from newspapers, magazines, and various sources that include real-life fraction examples, and create a poster displaying the types and models of fractions found there. In the third activity, five questions related to the subject are presented to the students, and they are asked to choose and solve three of the five questions. Students were given the opportunity to choose both the amount of homework and the types of questions.

Figure 4.

Traditional Math Homework Example on Fractions

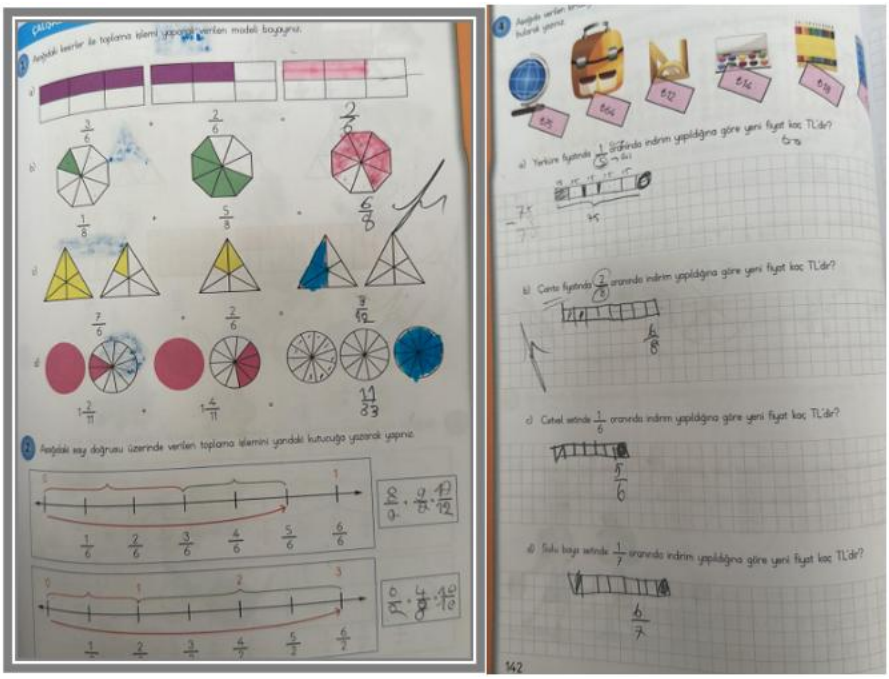


Figure 4 presents an example of the fractions homework given to all students from the same page, with the same amount and level of difficulty.

Data Analysis

In the current study, various statistical methods and techniques were used for the analysis of the collected data. Data classification procedures were carried out by calculating frequency and percentage values. The scale items were separated based on the positive or negative direction of the statements they contained, and reverse coding was applied to the data based on this separation. Then, the obtained data were organized in tables. To determine the attitudes of the groups, a pre-test was administered to both the experimental and control groups, and the groups were found to be equivalent.

To compare the attitude levels of the experimental and control groups towards mathematics homework, the pre-test and post-test mean scores of the experimental and control groups were analyzed using an independent samples t-test. At the same time, the differences between the pre-test and post-test attitude scores of the experimental group were examined using the paired samples t-test. to test the normality of the groups' data distributions, the Shapiro-Wilk normality test and kurtosis-skewness values were examined, and it was determined that the normality assumption was met for both groups. The data analysis was conducted using the SPSS 27 statistical software package. The pre-test and post-test distributions of the data showed normal distribution for both the experimental and control groups. The data analysis was conducted using the SPSS 27 statistical software package. To better assess the students' attitude scores towards the mathematics homework, a table was created based on the content analysis of the emotional expressions related to the homework. The frequencies were calculated, and the results were supported by direct student quotations.

Ethical Permits of Research:

In the current study, all the rules specified under the "Regulations on Scientific Research and Publication Ethics of Higher Education Institutions" were followed. None of the actions listed under the second section of the regulation, titled "Actions Contrary to Scientific Research and Publication Ethics", were carried out.

Ethics Committee Permission Information:

Name of the committee that made the ethical evaluation = Gazi University Rectorate Ethics Commission

Date of ethical review decision = 22.01.2024

Ethics assessment document issue number = 2024 - 79

Findings

This section presents the findings obtained from the data analysis related to the main aim and sub-aims of the study, along with the interpretations of these findings. The findings related to the comparison of the pre-test and post-test attitude scores of the control group students, who were given traditional homework, are presented in Table 4.

Table 4.

Comparison of the Pre-Test and Post-Test Attitude Scores of the Control Group Students

Variables	Groups	*n*	*M*	*SD*	*t*	*df*	*p*
Homework attitude	Control group-pre-test	24	3.73	.46	1.86	25	.001
	Control group-post-test	26	3.69	.24			

When Table 4 is examined, it is seen that there is a significant difference between the control group students' pre-test mean attitude score and post-test mean attitude score ($t_{(26)}$=1.86; p<.05). The control group students' pre-test mathematics homework attitude mean score (M=3.73) is higher than their post-test mean attitude score (M=3.69). According to the data in Table 4, there is a statistically significant difference between the control group students' pre-test mean attitude and post-test mean attitude scores in favour of the pre-test. In other words, the traditional homework given to the students negatively affected their attitudes towards homework.

The findings obtained from the comparison of the pre-test and post-test mean attitude scores of the experimental group students, who were assigned differentiated homework in mathematics lessons, are presented in Table 5.

Table 5.

Comparison of the Pre-Test and Post-Test Attitude Scores of the Experimental Group Students

Variables	Groups	*n*	*M*	*SD*	*t*	*df*	*p*
Homework attitude	Experimental group-pre-test	24	3.81	.31	-7.18	24	.001
	Experimental group-post-test	26	4.29	.22			

When Table 5 is examined, it is seen that there is a significant difference between the experimental group students' pre-test and post-test mean attitude scores ($t_{(25)}$=-7.18; p<.05). The pre-test mean attitude score of the experimental group students (M=3.81) is lower than their post-test mean attitude score (M=4.29). The significant difference found between the pre-test and post-test mean scores is in favour of the post-test mean score. In other words, it can

be said that differentiated homework positively affected the students' attitudes towards homework.

The findings obtained from the comparison of the post-test mean attitude scores of the experimental group students, who were assigned differentiated homework, and the control group students, who were assigned traditional homework, are presented in Table 6.

Table 6.

Comparison of the Post-Test Mean Attitude Scores of the Experimental and Control Groups

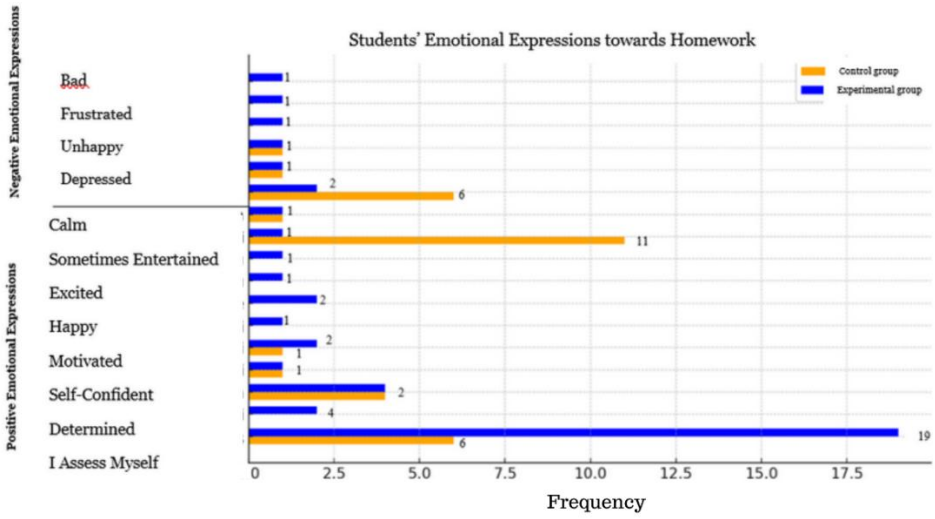
Variables	Groups	*n*	*M*	*SD*	*t*	*df*	*p*
Homework attitude	Experimental group-post-test	24	4.29	.22	7.73	49	.001
	Control group-post-test	26	3.69	.31			

When Table 6 is examined, it is seen that the homework attitudes of the students in the experimental group show a significant difference compared to those of the students in the control group. The post-test mean attitude score of the experimental group students (M=4.29) is higher than that of the control group students (M=3.69). As a result of the analysis, it was determined that the mean attitude score of the students in the experimental group is significantly higher than that of the students in the control group ($t_{(51)}$=-7.73; p<.05). In other words, it can be said that the differentiated mathematics homework assigned to the experimental group significantly improved the students' attitudes towards homework compared to the homework assigned to the control group.

The responses of the experimental and control group students to the question, "How do you feel while doing mathematics homework?", which reflects their emotional expressions towards homework in mathematics lessons at the beginning of the experimental process, are presented in Graph 1.

Graph 1.

Students' Emotional Expressions towards Homework



When the emotional expressions of the experimental and control group students towards the homework assigned to them in mathematics lessons at the beginning of the experimental process are examined, the prominent emotions expressed in the experimental group include "feeling good, nice and pleasant while doing the homework" (f=19) and "feeling they can understand the subject better" (f=4). In the control group, students expressed that

they sometimes felt entertained (f=11), experienced good, nice and pleasant feelings (f=6), but at times also felt bored (f=11) regarding the mathematics homework assigned to them. Other emotional expressions include positive feelings such as feeling successful, hardworking, determined, confident, motivated and happy while doing homework, while negative emotions like feeling nervous, bad, frustrated, unhappy and depressed are present, though to a lesser extent, in both groups.

The direct quotations for the emotional expressions mentioned in the above graph are as follows:

E1. I feel successful.

E10. I feel happy, proud and determined.

E13. It feels so good.

E14. I feel good.

E18. I feel entertained, nice and pleasant.

C5. I feel excited and nice.

E12. I feel that I can understand the lesson better.

E20. … because I improve on the subject

C21. … I can do it from easy to difficult by assessing myself.

E24. … I feel bad.

C16. Bored and frustrated.

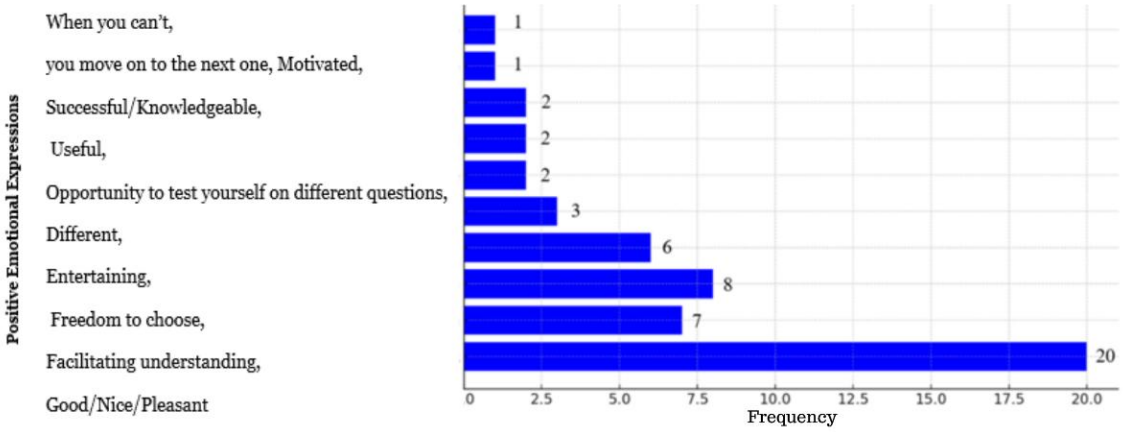
C18. I get bored because we already do the same things at school.

C23. I'm so bored.

In the study, after the experimental process, the emotional expressions of the experimental group students in response to the question, "How did doing the homework of your choice make you feel?" regarding the mathematics homework assigned to them, are presented in Graph 2.

Graph 2.

Emotional Expressions of the Experimental Group Students towards Differentiated Homework



The experimental group students expressed more positive emotions such as feeling good, nice and pleasant (f=20) while doing their differentiated mathematics homework. In addition, emotions such as experiencing the freedom to choose (f=8), finding it easier to understand (f=7), and feeling that it was entertaining (f=6) were also commonly expressed. To a lesser extent, students mentioned that they found these assignments different, had the opportunity to assess themselves with different questions, found them useful, and were able to move on to the next question when they couldn't complete one. They also stated that they felt successful and knowledgeable.

The direct quotations from the emotional expressions mentioned in the above graph are as follows:

E2. It made me feel good because the homework I chose myself is always very nice.

E5. It made me feel very nice because it made me feel better.

E8. It made me feel good because everyone could choose the easy or the difficult one, the one they liked, or the homework related to the subject they wanted.

E11. The homework we choose ourselves is better; we can learn quickly and understand how to do it.

E15. It helped me understand.

E16. When I couldn't solve a question, I chose another one, and this made the homework fun.

E22. It made me feel very good because I could choose the questions I wanted.

E24. I felt amazing because it helped me understand the lesson.

Discussion and Conclusion

In the current study, it was aimed to investigate the effect of differentiated mathematics homework assigned to fourth-grade primary students on their attitudes towards mathematics homework. The findings revealed that the experimental and control group students initially had equal attitude scores towards mathematics homework but the differentiated mathematics homework assigned to the experimental group had a positive effect on the students' attitudes towards mathematics homework compared to the traditional homework assigned to the control group. Moreover, while the attitudes of the experimental group students, who were assigned the differentiated homework, showed a positive change, the attitudes of the control group students, who were assigned the traditional homework, changed negatively.

At the beginning of the experimental process, when the students in both the experimental and control groups were asked, "How do you feel while doing mathematics homework?", the emotional expressions of the students revealed that in the experimental group, the emotions of "feeling good, nice and pleasant while doing the homework" and "feeling that they could understand the subject better" were more prominent. On the other hand, in the control group, students expressed that they "sometimes felt entertained, experienced good, nice and pleasant feelings, but at times also felt bored" while doing their homework. To a lesser extent, other emotional expressions such as feeling successful,

hardworking, determined, confident, motivated and happy while doing their homework, as well as negative emotional expressions such as feeling nervous, bad, frustrated, unhappy and depressed, are common in both groups. In response to the question, "How did you feel while doing the differentiated mathematics homework assigned in the mathematics lesson?" asked to the experimental group in the study, the students expressed emotions similar to their previous emotional responses, such as feeling much better, pleasant and nice while doing the homework, finding it easier to understand and enjoying it. They also mentioned feeling successful and knowledgeable. Notably, unlike the previous expressions, there were no negative emotions. The opportunity for children to choose in the differentiated homework might have provided them with a chance to take responsibility for their own learning because the opportunity for students to monitor themselves through homework not only fosters a sense of responsibility but also enables them to feel proud of themselves and experience a sense of achievement (Jamal & Rizvi, 2021).

In the study, students stated that with the differentiated homework, they had the opportunity to assess themselves with questions of different levels, found it useful, and were able to move on to the next question when they couldn't complete one. This may be an indication that the assigned homework served its intended purpose. At the same time, these emotions may have contributed to the positive change in students' attitudes towards homework. Moreover, the emotional expressions of the experimental and control group students towards homework align with the positive attitude statements in the attitude scale, such as "I enjoy doing homework, it helps me learn better and I have fun doing it", as well as the negative attitude statements like "it can sometimes be boring and I don't enjoy it".

When all the results are considered together, it shows that differentiated mathematics homework can be effective in helping students develop a positive attitude towards mathematics homework. It can be said that in both groups of students, and especially in the experimental group, the results showed that children had a more positive attitude towards homework. Similarly, Emily (2016) found in a study conducted in preparatory schools that students had positive perceptions of homework (as cited in Algani & Alhaija, 2022). Factors that positively influence students' attitudes towards homework include parental involvement, teacher feedback, and the students' intrinsic motivation (Cooper et al., 2006). Moss and Brookhart (2019) emphasized the importance of constructive feedback from teachers in creating positive homework attitudes, suggesting that timely feedback can increase students' participation in and compliance with homework. Constructive feedback and the relevance of homework to classroom learning can positively affect students' attitudes (Moss & Brookhart, 2019).

In the current study, differentiated homework was designed as a learning tool that is both challenging and achievable, taking into account students' interests, levels and various preferences and was used during the instructional process. It has been stated that teachers who design both challenging and achievable homework, and provide feedback that guides development, can help students view the homework process as a valuable learning tool (Corno, 2000). The suitability of homework to students' age and skill levels, its engaging nature and its connection to real life play a critical role in developing a positive attitude towards homework

(Trautwein et al., 2006). Boring, repetitive and highly difficult homework, on the other hand, increases students' avoidance behaviours towards homework and lead to the development of negative attitudes towards it. Some of the reasons why students develop negative attitudes towards homework are observed in students who perceive homework as a boring, uncomfortable and unpleasant task. This group may show reluctance towards doing homework, and this is often associated with low academic performance (Epstein & Van-Voorhis, 2001).

Considering factors such as students' interest, motivation and learning level in mathematics, the use of differentiated homework is believed to create a positive process, both in terms of the contribution of the homework to the students and in terms of students' attitudes and emotional expressions towards homework. Differentiating homework according to students' cognitive, affective and psychomotor characteristics, as well as allowing them to engage in activities that align with their preferences during this differentiation process, positively influenced students' attitudes towards homework, and this was reflected in their emotional expressions as well. Moreover, feedback was given and discussions were conducted with students during the differentiated homework process within the lessons. In this regard, in a study conducted by Işık Tertemiz (1991), it was stated that students in the group where homework was given and discussed scored higher on retention tests, indicating that retention was greater in this group. A similar situation occurred in the current study as well, and this may have been reflected in children's attitudes because children stated that they felt successful, knowledgeable and willing to try different questions. Although feedback was provided to both groups in the study, it can be considered that the feedback given according to individual differences in the experimental group was more effective. Arıkan (2017) stated that homework that is not effectively integrated into the teaching process is not beneficial for students, and that homework which is not discussed in the classroom or lacks feedback creates a burden for both students and families. Similarly, in the study by Kaur (2011), it was found that the purpose of homework assigned by teachers for instructional purposes is to help students reinforce what they have learned in class and prepare them for upcoming tests and exams. This finding aligns with the student opinions expressed in the current study, such as "it helps me understand better", "it contributes to my learning" and "I assess myself". In addition to all these results, the findings align with the expectancy-value theory proposed by Abu-Hilal et al. (2013), which approaches the topic through the value theory. According to this theory, homework motivation is conceptualized as having both an expectancy and a value component. A student's belief that he/she can successfully accomplish goal-directed behaviour represents the expectancy component. The value component, on the other hand, supports outcomes as various types of value, such as achievement value (succeeding in homework is important), intrinsic value (homework is an enjoyable task) and utility value (homework will be beneficial in the future).

In the control group, a decrease in attitude scores towards homework was observed in the post-test results, and more negative emotional expressions were uttered compared to the experimental group. In the mentioned study, it was concluded that homework assigned through a traditional approach, based solely on repetition and practice, can negatively affect students' perception of learning responsibility and their ability to take on that responsibility. This is in line with the findings of Duru and Çöğmen (2017). In this study, the traditional

approach is to rely solely on repetition and practice. It was concluded that homework assignments may negatively affect students' perception of learning responsibility and their ability to assume this responsibility.

Similarly, in the current study, it was determined that homework prepared in accordance with the traditional approach did not contribute positively to students' learning processes in terms of attitudes at the expected level. Similarly, Cooper et al. (1998), found that in lower grades (2nd and 4th), teacher-assigned homework was associated with negative student attitudes. It can also be said that the increasing and repetitive prestige loss of homework carries the risk of reducing the benefits of homework, encouraging students' negative attitudes towards homework and promoting intrinsic demotivation (Suárez et al., 2019).

According to Hong et al. (2015), many critics have addressed the negative impacts of homework on students and have stated that standardized homework policies should be revised. Similarly, while it is noted that the decrease in motivation for school tasks in older students affects their motivation to complete homework (Hong et al., 2011; Pfeiffer, 2018), on the other hand, as indicated in the emotional expressions towards homework, a significant portion of middle and high school students state that homework is effective in developing their academic skills and achieving success (Hong et al., 2011). In addition, among the reasons why students express negative feelings towards homework, it is mentioned that limitations such as homework sometimes overwhelming children's minds with academic information, which prevents them from participating in social activities or spending time on entertainment, may be contributing factors. Kaplan (2018) also states that students' reluctance to do homework is a common issue for both teachers and parents.

In conclusion, this study contributes to the literature supporting the integration of emotional components into educational strategies. The clear benefits observed in the experimental group improved students' attitudes towards mathematics, potentially leading to better educational outcomes. In general, homework designed using the differentiated instruction method confirms the commitment to developing and implementing educational interventions that lead to a more positive approach to learning.

Recommendations

Given the strong positive changes in attitudes observed in the experimental group, future research could explore scaling these interventions across different schools or educational systems and evaluate their effectiveness in various environments. Furthermore, it would be beneficial to examine the durability of these attitude changes over time to determine whether the improvements persist in the long term and how they relate to actual performance in mathematics.

Taking these findings into account, educational policymakers, when designing curricula that include not only cognitive goals but also emotional objectives, may aim to create a holistic educational experience that encourages both knowledge acquisition and positive emotional engagement with the subject. The similarity in attitudes towards homework before the study and the differences that emerged after the study in favour of the experimental group suggest that it is not so much the homework itself, but rather the way it is assigned, that plays

a crucial role. Therefore, the reasons behind the negative shift in the attitudes among the control group students can be examined in depth.

Furthermore, the subject can be approached from a broader perspective and evaluated with a holistic viewpoint (in-depth perspective on homework, teacher behaviour, parental approach and contribution, activities after homework, etc.). Moreover, a broader range of findings and insights can be obtained through interviews. On the other hand, it could be explored how students' attitudes towards and experiences with homework change as they move up in grade levels, from primary to middle school.

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Conflict Statement

There is no conflict of interest that the authors will declare in the research.

Notice of Use of Artificial Intelligence

The authors did not utilise any artificial intelligence tool(s) for the research, authorship and publication of this article.

İlkokul 4. Sınıfta Farklılaştırılmış Matematik Ev Ödevlerinin Öğrencilerin Ödeve Yönelik Tutumlarına Etkisi

Özet

Bu araştırmanın amacı matematik dersinde farklılaştırılmış yöntem ile tasarlanan ev ödevleri ile geleneksel ev ödevlerinin, ilkokul 4. sınıf öğrencilerinin matematik dersi ev ödevlerine yönelik tutumlarına etkisini incelemektir. Araştırmada nicel araştırma yöntemlerinden ön test-son test kontrol gruplu yarı deneysel desen kullanılmıştır. Çalışma grubu 2023-2024 eğitim öğretim yılında Kayseri ilinde yer alan bir devlet ilkokulunda 4. sınıfta öğrenim sürecine devam eden 25 deney, 26 kontrol grubu öğrencisinden oluşmaktadır. Araştırmada veri toplama aracı olarak Bora (2018) tarafından geliştirilen "Matematik Dersine Yönelik Ödev Tutum Ölçeği" ile "Yarı Yapılandırılmış Görüşme" uygulanmıştır. Deney grubuna araştırmacının tasarladığı farklılaştırılmış ev ödevleri, kontrol grubuna ise geleneksel ev ödevleri 10 hafta boyunca verilmiştir. Çalışma sonunda deney ve kontrol grubu öğrencilerinin son test sonuçlarında deney grubu lehine anlamlı fark bulunmuştur. Ayrıca hem deney hem de kontrol grubunun grup içi ön test-son test karşılaştırmalarında son test lehine anlamlı fark olduğu, bu farkın deney grubunda daha yüksek olduğu tespit edilmiştir. Öğrencilerin ödeve yönelik duygu ifadeleri, nicel bulguları destekler nitelikte olduğu belirlenmiştir. Araştırma kapsamında öğrencilerin ilkokuldan ortaokula geçişte ev ödevine yönelik tutum ve deneyimlerindeki değişimler de incelenebilir.

Anahtar Kelimeler: Farklılaştırılmış matematik ödevi, ilkokul matematik eğitimi, farklılaştırılmış ev ödevi, farklılaştırılmış öğretim, ev ödevine yönelik tutum.

Giriş

Ev ödevleri, öğrencilerin bireysel sorumluluk kazanmalarını, entelektüel yeteneklerini geliştirmelerini ve kendi kendine öğrenmelerini destekleyen önemli bir eğitim aracıdır (Algani & Alhaija, 2022; Zentall & Goldstein, 1999). Ancak, öğrencilerin ödevlere yönelik algıları, akademik başarı ve motivasyon üzerinde belirleyici bir faktördür (Cooper, 2001; Demir, 2013; Epstein & Van-Voorhis, 2001). Ödevlerin akademik başarı üzerindeki etkisi tartışmalı olup, bazı araştırmalar olumlu katkılar sunduğunu belirtirken (Cooper vd., 2006), aşırı ödev yükünün stres ve tükenmişliğe yol açabileceği ifade edilmektedir (Hattie, 2013; Kohn, 2006). Ayrıca, ödevlerin niteliği ve bireysel farklılıkların dikkate alınması başarı üzerinde etkili olabilir (Kapıkıran & Kıran, 1999). Farklılaştırılmış ödevler, öğrenci seviyesine uygun olarak düzenlendiğinde, motivasyonu artırabilir ve kaygıyı azaltabilir (Elgit, 2019). Ancak, geleneksel yöntemler öğrencilerde stres yaratabilir ve öğrenme sürecini olumsuz etkileyebilir.

Bu araştırmada, matematik dersinde uygulanan farklılaştırılmış ve geleneksel ev ödevlerinin, öğrencilerin tutumları üzerindeki etkileri karşılaştırmalı olarak incelenmiştir. Özellikle, farklılaştırılmış ödevlerin akademik motivasyon ve başarı üzerindeki rolü değerlendirilmiştir. Araştırmanın, eğitim bilimleri literatürüne katkı sağlaması ve öğretmenlerin sınıf içi ve sınıf dışı uygulamalarını geliştirmelerine yardımcı olması

beklenmektedir. Öğretmenlerin bu yaklaşıma yönelik farkındalıklarının artırılması, daha etkili öğretim stratejilerinin uygulanmasını destekleyebilir.

Bu araştırmada, "İlkokul dördüncü sınıfta matematik dersinde farklılaştırılmış ev ödevlerinin öğrencilerin matematik ev ödevine yönelik tutumlarına etkisi var mıdır?" sorusuna cevap aramaktır. Bu temel soru doğrultusunda araştırmanın alt problemleri aşağıdaki gibidir:

1. Kontrol grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik tutumu ön test-son test tutum puan ortalamaları arasında anlamlı fark var mıdır?

2. Deney grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik tutumu ön test-son test tutum puan ortalamaları arasında anlamlı fark var mıdır?

3. Farklılaştırılmış ev ödevinin verildiği deney grubu öğrencileri ve geleneksel ev ödevinin verildiği kontrol grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik tutumu son test puan ortalamaları arasında anlamlı fark var mıdır?

4. Deney ve kontrol grubu öğrencilerinin geleneksel ev ödevlerine yönelik duygu ifadeleri tutum puanlarını desteklemekte midir?

5. Deney grubu öğrencilerinin denel işlem sonrası farklılaştırılmış ev ödevlerine yönelik duygu ifadeleri tutum puanlarını desteklemekte midir?

Yöntem

Araştırmanın Modeli

Bu araştırma, ön test-son test kontrol gruplu yarı-deneysel bir desen kullanılarak gerçekleştirilmiştir (Büyüköztürk, 2020). Yarı-deneysel desenler, gerçek deneysel modellerde gerekli olan kontrollerin sağlanamadığı veya yeterli olmadığı durumlarda tercih edilmektedir (Karasar, 2012). Bu tür bir desende, katılımcılar mevcut gruplar arasından eşleştirilerek belirlenmeye çalışılır (Büyüköztürk vd., 2019). Araştırmada, katılımcıların deney ve kontrol gruplarına rastgele atama imkânı bulunmadığı için yarı-deneysel desenin kullanılması uygun görülmüştür.

Araştırmanın Çalışma Grubu

Bu araştırma 2023-2024 eğitim-öğretim yılı Kayseri ilinde bir ilkokulun iki farklı şubesinde öğrenim gören dördüncü sınıf öğrencileriyle yürütülmüştür. Örneklem seçimindeki okul seçimi amaçlı örneklem türlerinden, kolay ulaşılabilir örnekleme ile Kayseri ilinden seçilmiştir. Bu yöntem, araştırmacının veri toplama sürecini kolaylaştırmak amacıyla erişim sağlayabileceği bir örneklem seçmesine olanak tanımaktadır (Yıldırım & Şimşek, 2021).

Okulun seçimi kolay ulaşılabilir örneklem yöntemi olarak seçilmesine rağmen araştırmanın geçerliği ve güvenirliği açısından okulda bulunan sekiz şube arasından seçilecek kontrol ve deney grubunun ödev tutumu bakımından birbirine denk olmasına dikkat edilmiştir. Bu kapsamda, dördüncü sınıf düzeyindeki sekiz şubeye geliştirilmiş ödev tutum ölçeği ön test olarak uygulanmıştır. Ön test sonuçları analiz edilmiş ve normal dağılım sergileyen, aralarında anlamlı bir farklılık bulunmayan dört şube belirlenmiştir. Bu dört şubeden ikisi, rastgele küme örnekleme yöntemiyle deney ve kontrol gruplarına atanmıştır. Bu

süreç sonucunda, deney grubunda 24, kontrol grubunda ise 26 öğrenci olmak üzere toplamda 50 öğrenci araştırma kapsamına alınmıştır.

Bu araştırma 2023-2024 eğitim-öğretim yılında Kayseri ili Kocasinan ilçesinde bir ilkokulun iki farklı şubesinde öğrenim gören ve okulda bulunan sekiz şube arasından matematik dersinde ev ödevlerine yönelik tutum ön test puan ortalamaları bakımından birbirine denk olan iki şubede gerçekleştirilmiştir. Bu çalışmada, deney ve kontrol gruplarındaki öğrencilerin matematik dersine yönelik ev ödevi tutumlarını belirlemek amacıyla Bora (2018) tarafından geliştirilen "Matematik Dersinde Ev Ödevlerine Yönelik Tutum Ölçeği" kullanılmıştır.

Matematik Dersinde Ev Ödevlerine Yönelik Tutum Ölçeği

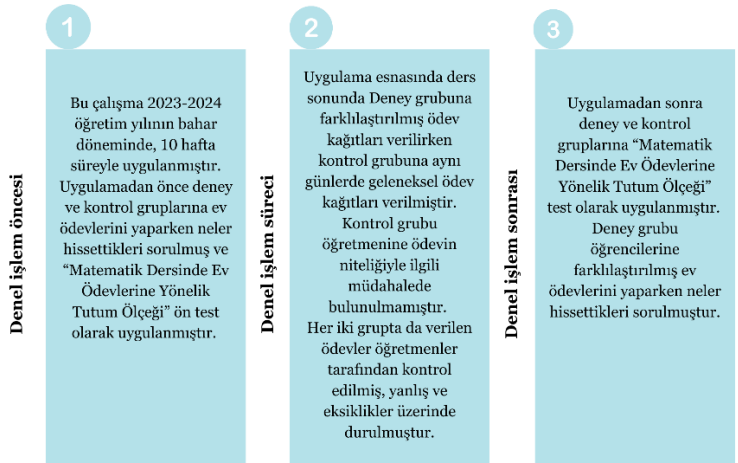
Araştırmada, matematik dersinde araştırmacı tarafından tasarlanan farklılaştırılmış ev ödevleri ile sınıf öğretmeni tarafından verilen geleneksel ev ödevlerinin, ilkokul dördüncü sınıf öğrencilerinin matematik dersine yönelik ev ödevi tutumları üzerindeki etkisini belirlemek amacıyla Bora (2018) tarafından geliştirilen "Matematik Dersinde Ev Ödevlerine Yönelik Tutum Ölçeği" kullanılmıştır. Araştırmada, uygulama öncesi ve sonrası öğrencilere Bora (2018) tarafından geçerlik ve güvenirlik çalışmaları yapılmış beşli likert tipi 21 maddeden oluşan bu ölçek uygulanmıştır. Ölçekte 14 olumlu, 7 olumsuz ifade bulunmakta olup, Cronbach's Alpha güvenirlik katsayısı .85 olarak hesaplanmıştır. Ölçeğin güvenirlik çalışması 91 ilkokul 4. sınıf öğrencisi üzerinde gerçekleştirilmiş ve kapsam geçerliliği uzman görüşleriyle değerlendirilmiştir. Ek olarak, tutum puanlarının daha iyi yorumlanabilmesi için deney ve kontrol grubu öğrencilerine denel işlem başında "Matematik dersinde verilen ev ödevlerini yaparken neler hissediyorsunuz?" sorusu yöneltilmiş ve duygu ifadeleri toplanmıştır.

Araştırmanın Uygulama Süreci

"Matematik Dersinde Ev Ödevlerine Yönelik Tutum Ölçeği" deneysel sürecin başlangıcında ön test, sonunda ise son test olarak deney ve kontrol gruplarına uygulanmıştır. Elde edilen sonuçlar değerlendirilerek matematik dersinde farklılaştırılmış ev ödevleri ile geleneksel ev ödevlerinin verilmesinin, öğrencilerin matematik dersinde verilen ev ödevlerine yönelik tutumları üzerinde bir etkisinin olup olmadığı analiz edilmiştir. Araştırmanın uyulama süreci aşağıdaki şekilde verilmiştir.

Şekil 1.

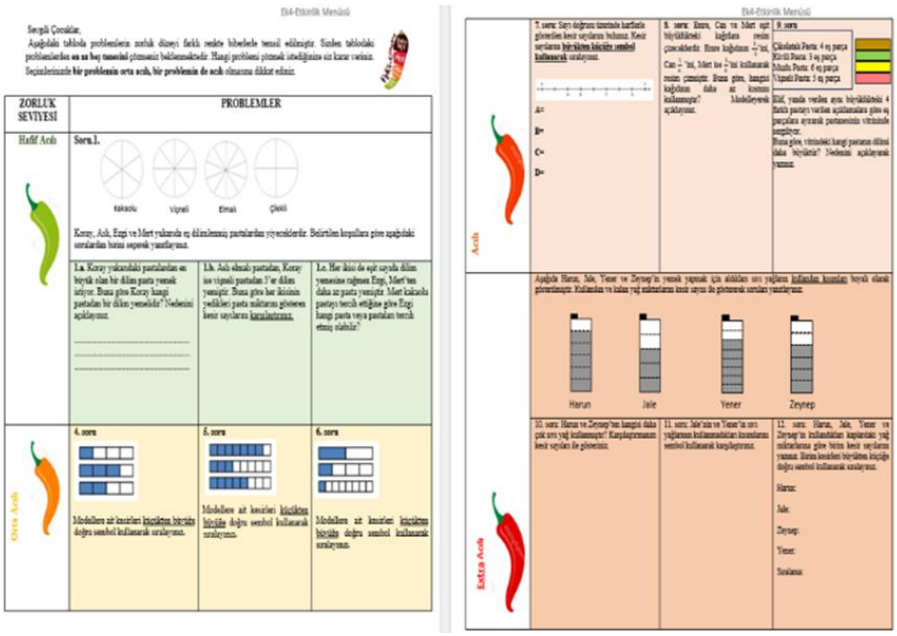
Araştırmanın Uygulama Süreci ve Aşamaları



Çalışma süresinde deney grubundaki öğrencilere 10 hafta, her hafta 5 saat matematik dersi, haftada iki ödev olmak üzere; matematik dersi sonunda farklılaştırılmış matematik ödevi verilmiş, ödevler süreç içerisinde toplanmış, kontrol edilmiş, sınıf içinde geri bildirim verilmiş ve tartışma ortamı da yaratılmıştır. Kontrol grubunda da yine aynı hafta ve saatlerde sınıf öğretmeni tarafından ödev verilmesi sağlanmış ve ev ödevlerine araştırmacı tarafından müdahale edilmemiştir. Ancak deney grubundaki gibi ödevler süreç içerisinde toplanmış, kontrol edilmiş, sınıf içinde geri bildirim verilmiş ve tartışma ortamı da yaratılmıştır. Her iki grupta da verilen her ödevin ardından öğrencilerle birlikte bir tartışma ortamı oluşturulmuş, ödevlerdeki eksiklikler ve hatalar ele alınarak değerlendirilmiştir. Sınıf içi kontrol sırasında, öğrencilerin yaptığı hatalar tahtaya yansıtılarak düzeltildiği "sınıfça düzeltme ödev tekniği" kullanılmıştır, sınıfça düzeltme tekniği yapılan yanlışların sınıfta tahtaya yazılarak ve bütün sınıfın görüşünü alarak düzeltme yapılmasıdır (Atlı, 2012).

Şekil 2.

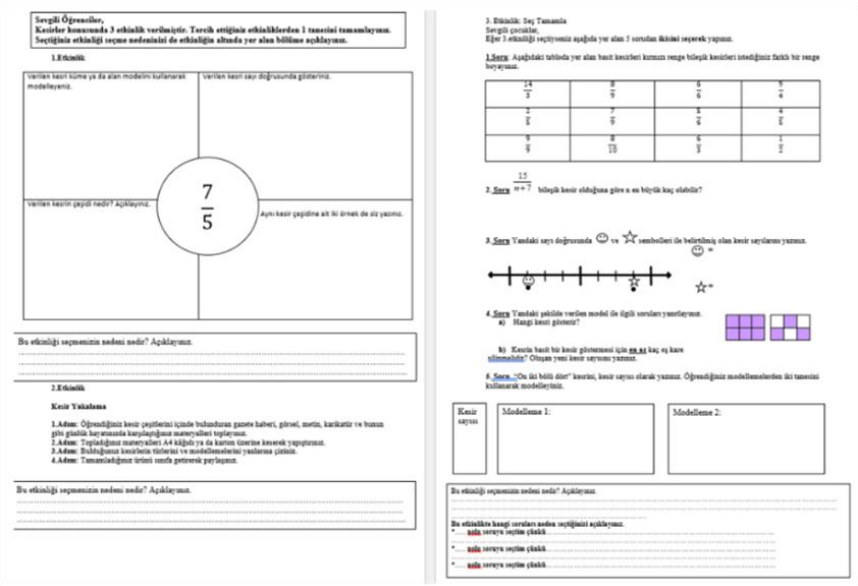
Kesirler Konusunda Farklılaştırılmış Matematik Ödevi Örneği 1



Şekil 2'de matematik öğrenme düzeyine göre seviye farklılaştırılması yapılmış, öğrencilerin her seviyeden kendi tercihiyle yapacağı soruların bulunduğu farklılaştırılmış ev ödevi örneği verilmiştir. Farklılaştırılmış ödev olarak verilen Şekil 2'de öğrencilerin, soruların zorluk seviyelerine göre bir yatay sütunlardan bir tane problem seçmesi beklenmektedir. Farklılaştırılmış ödev kağıdında, problemler yatay sütunda (hafif acılı, orta acılı, acılı ve ekstra acılı) olarak zorlaşırken bu satırlarda bulunan her 3 problemde 1, 2 ve 3. probleme doğru kendi içinde zorlaşmaktadır. Öğrenciler zorluk bakımından soruları tercih edebilirken hem de problemlerin hepsi aynı kazanım üzerine çalışma yapmalarını sağlamaktadır.

Şekil 3.

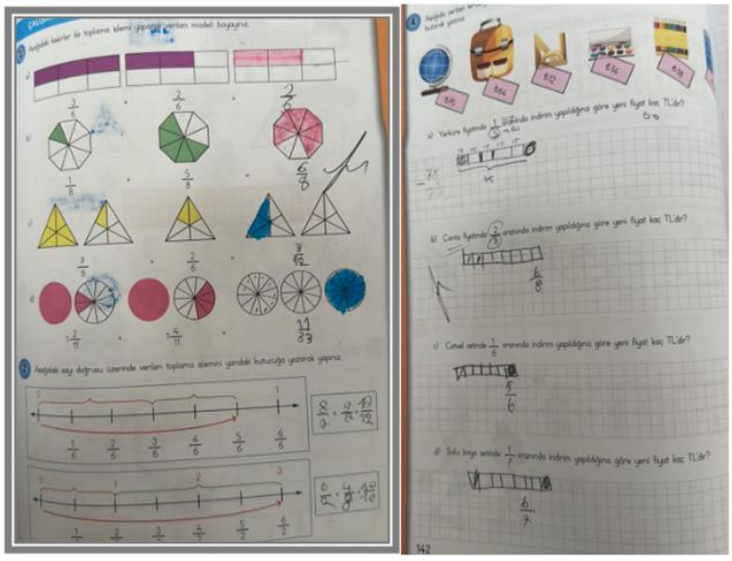
Kesirler Konusunda Farklılaştırılmış Matematik Ödevi Örneği 2



Şekil 3'te yine farklılaştırılmış başka bir matematik ödevi örneği bulunmaktadır. Şekil 3'te yer alan ödev kağıdında, öğrencilere 3 etkinlik sunulmuş 1 etkinliği tercih etmeleri istenmiştir. Etkinliklerde ise ilk etkinlik kendi için kolaydan zora giden Frayer modeli kullanılmış, ikinci etkinlikte öğrencilerden içerisinde günlük hayatta kesir örnekleri bulunan gazete, dergi ve çeşitli kaynaklardan örnekler bulmalarını ve orada geçen kesir tür-modellerini poster haline getirmeleri istenmiştir. Üçüncü etkinlikte ise öğrencilere konu ile ilgili beş soru sunulmuş, beş sorudan üç soruyu tercih ederek çözmeleri istenmiştir. Öğrenciler hem ödev miktarı hem de soru çeşidi olarak öğrencilerin tercih yapmasına fırsat verilmiştir.

Şekil 4.

Kesirler Konusunda Verilen Geleneksel Matematik Ödevi Örneği



Şekil 4'te öğrencilerin hepsine aynı sayfadan, aynı miktarda ve aynı düzeyde verilen kesirler konusundaki ödev örneği verilmiştir.

Verilerin Analizi

Bu araştırmada, matematik dersinde araştırmacı tarafından tasarlanan farklılaştırılmış ev ödevleri ile sınıf öğretmeni tarafından verilen geleneksel ev ödevlerinin, ilkokul dördüncü sınıf öğrencilerinin matematik dersine yönelik ev ödevi tutumları üzerindeki etkisini belirlemek amacıyla Bora (2018) tarafından geliştirilen "Matematik Dersinde Ev Ödevlerine Yönelik Tutum Ölçeği" kullanılmıştır.

Araştırmada, uygulama öncesi ve sonrası öğrencilere Bora (2018) tarafından geçerlik ve güvenirlik çalışmaları yapılmış beşli likert tipi 21 maddeden oluşan bu ölçek uygulanmıştır. Ölçekte 14 olumlu, 7 olumsuz ifade bulunmakta olup, Cronbach's Alpha güvenirlik katsayısı .85 olarak hesaplanmıştır. Ölçeğin güvenirlik çalışması 91 ilkokul 4. sınıf öğrencisi üzerinde gerçekleştirilmiş ve kapsam geçerliliği uzman görüşleriyle değerlendirilmiştir.

Veri analizi sürecinde, frekans ve yüzdelik değerler hesaplanarak ölçek maddeleri ters kodlama yöntemiyle düzenlenmiştir. Grupların tutumlarını belirlemek için deney ve kontrol grubuna ön test uygulanmış, grupların denkliği sağlanmıştır. Ön test ve son test puan ortalamalarının karşılaştırılmasında bağımsız gruplar t-testi, deney grubu içinde ön test ve son test farklarını incelemek için bağımlı örneklem t-testi kullanılmıştır. Veri dağılımının normalliği Shapiro-Wilk testi ve çarpıklık-basıklık değerleri ile doğrulanmış, analizler SPSS 27 yazılımı ile gerçekleştirilmiştir.

Öğrencilerin ödevlere yönelik duygu ifadeleri, içerik analizi ile incelenmiş ve elde edilen veriler tablo halinde sunularak doğrudan öğrenci ifadeleri ile desteklenmiştir.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir.

Etik Kurul İzin Bilgileri:

Etik değerlendirmeyi yapan kurulun adı = Gazi Üniversitesi Rektörlük Etik Komisyonu

Etik Kurul Etik inceleme karar tarihi = 22.01.2024

Etik değerlendirme belgesi konu numarası = 2024 - 79

Bulgular

Bu bölümde, araştırmanın temel amacına ve alt amaçlarına ilişkin verilerin analizinden elde edilen bulgular ile bu bulguların yorumlarına yer verilmiştir. Geleneksel ev ödevinin verildiği kontrol grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik ön test ve son test tutum puan ortalamalarının karşılaştırılmasına ait bulgularda kontrol grubundaki öğrencilerin matematik dersine yönelik ev ödevi tutumlarının kendi içinde anlamlı bir farklılık gösterdiği görülmektedir ($t_{(26)}$=1.86; $p<.05$). Kontrol grubundaki öğrencilerin ön test matematik dersi ev ödevi tutum puan ortalamaları (M=3.73), son test tutum puan ortalamalarından (M=3.69) daha yüksektir. Öğrencilere verilen geleneksel ev ödevleri öğrencilerin ödeve yönelik tutum puanlarını olumsuz yönde etkilemiştir.

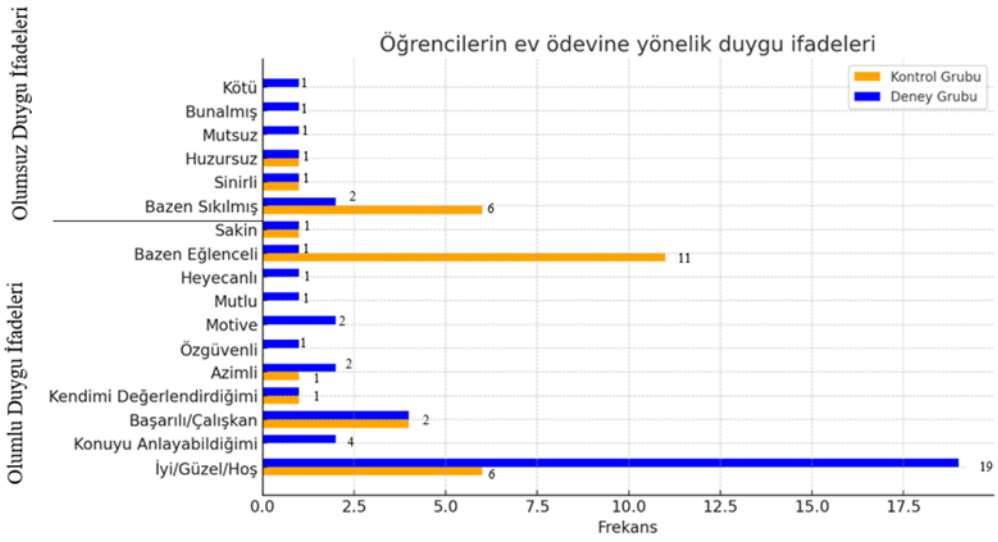
Araştırmada elde edilen farklılaştırılmış ev ödevinin verildiği deney grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik ön test ve son test tutum puan ortalamalarının karşılaştırılmasına ait bulgularda deney grubundaki öğrencilerin matematik dersinde verilen ev ödevlerine yönelik tutumlarının kendi içinde anlamlı bir farklılık gösterdiği görülmektedir ($t_{(25)}$=-7.18; p<.05). Deney grubunda yer alan öğrencilerin ön test matematik dersi ev ödevlerine yönelik tutum puan ortalamaları (M=3.81), son test tutum puan ortalamalarından (M=4.29) daha düşüktür. Yapılan analizler sonucunda farklılaştırılmış ev ödevleri öğrencilerin ödeve yönelik tutum puanlarını olumlu yönde etkilemiştir denilebilir.

Farklılaştırılmış ev ödevinin verildiği deney grubu öğrencileri ve geleneksel ev ödevinin verildiği kontrol grubu öğrencilerinin matematik dersinde ev ödevlerine yönelik tutum son test puan ortalamalarının karşılaştırılmasına ait elde edilen bulgularda, deney grubundaki öğrencilerin matematik dersine yönelik ev ödevi tutumlarının, kontrol grubundaki öğrencilerle karşılaştırıldığında anlamlı bir farklılık gösterdiği görülmektedir. Deney grubu öğrencilerinin tutum puan ortalamaları (M=4.29), kontrol grubu öğrencilerinin tutum puan ortalamalarından (M=3.69) daha yüksektir. Yapılan analiz sonucunda deney grubunda verilen farklılaştırılmış matematik ev ödevleri kontrol gurunda verilen ödevlere göre öğrencilerin matematik dersinde verilen ev ödevlerine yönelik tutum puanları üzerinde etkili olduğu söylenebilir.

Deney ve kontrol grubu öğrencilerinin denel işlem başında matematik dersinde ev ödevlerine yönelik duygu ifadelerinin yer aldığı "Matematik dersi ev ödevlerini yaparken neler hissediyorsunuz?" sorusuna verilen cevaplar Grafik 1'de sunulmuştur.

Grafik 1.

Öğrencilerin Ev Ödevlerine Yönelik Duygu İfadeleri



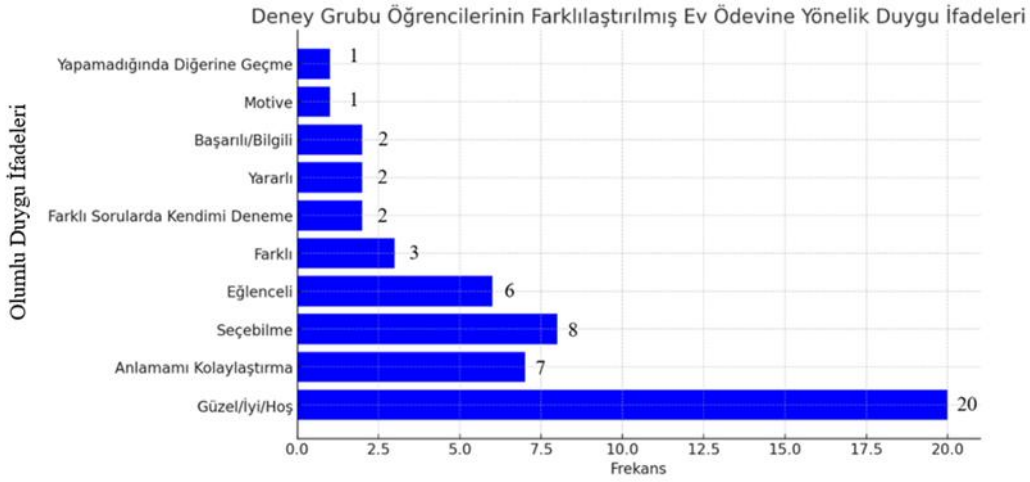
Deney ve kontrol grubu öğrencilerinin denel işlem başında matematik dersinde kendilerine verilen ev ödevlerine yönelik duygu ifadeleri incelendiğinde ön plana çıkan duygular deney grubunda Ödevi yaparken kendilerini iyi, güzel ve hoş hissettikleri (f=19) ve konuyu daha iyi anlayabilecekleri duygusu (f=4) taşıdıkları görülmektedir. Kontrol grubu öğrencilerinde ise öğrencilerin matematik dersinde verilen ev ödevlerine yönelik hislerinin bazen eğlendiklerini (f=11), iyi, güzel ve hoş duygular yaşadıklarını (f=6) ancak bazen de

sıkıldıklarını (f=11) ifade etmişlerdir. Diğer duygu ifadeleri olan ödev yapınca kendilerini başarılı çalışkan, azimli, özgüvenli, motive ve mutlu hissetme gibi olumlu duygular ifade edilirken, sinirli, kötü, huzursuz, mutsuz ve bunalmış duygu durumları her iki grupta da az da olsa yer almaktadır.

Çalışmada denel işlem sonrası deney grubuna, matematik dersinde verilen ev ödevlerine yönelik "Kendi seçtiğiniz ödevleri yapmak sizi nasıl hissettirdi?" sorusuna yönelik duygu öğrencilerin ifadeleri Grafik 2'de sunulmuştur.

Grafik 2.

Deney Grubu Öğrencilerinin Farklılaştırılmış Ev Ödevine Yönelik Duygu İfadeleri



Deney grubu öğrencileri kendilerine verilen farklılaştırılmış matematik ev ödevlerini yaparken daha çok iyi, güzel ve hoş duygu ifadelerinde (f=20) bulunmuşlardır. Bunun yanı sıra seçebilme özgürlüğü yaşadıklarının (f=8), anlamalarını kolaylaştırdığı (f=7), eğlenceli olduğu (f=6) daha çok hissedilen duygu ifadeleridir. Az da olsa öğrenciler bu ödevleri farklı buldukları, farklı sorularda kendilerini değerlendirme fırsatı buldukları, yararlı gördükleri ve yapamadıklarında diğer soruya geçebildiklerini, kendilerini başarılı ve bilgili hissettiklerini belirtmişlerdir.

Tartışma ve Sonuç

Bu araştırmada, ilkokul dördüncü sınıf öğrencilerine matematik dersinde verilen farklılaştırılmış ev ödevlerinin, öğrencilerin matematik dersine yönelik tutumlarına etkisi incelenmiştir. Bulgular, farklılaştırılmış ödevlerin öğrencilerin tutumlarını olumlu yönde etkilediğini, geleneksel ödevlerin ise olumsuz değişime yol açtığını göstermektedir. Öğrenciler, farklılaştırılmış ödevlerin anlamalarını kolaylaştırdığını, eğlenceli olduğunu ve başarı duygusunu artırdığını belirtmiştir (Jamal & Rizvi, 2021). Farklılaştırılmış ödevler, öğrencilere seviyelerine uygun sorular sunarak değerlendirme fırsatı vermekte, bilişsel ve duyuşsal gelişimlerini desteklemektedir. Öğretmen geri bildirimi, ebeveyn katılımı ve öğrencilerin içsel motivasyonlarının tutum geliştirmede önemli olduğu görülmüştür (Cooper vd., 2006; Moss & Brookhart, 2019).

Öğrencilerin yaş ve beceri seviyelerine uygun, ilgi çekici ve gerçek hayatla bağlantılı ödevler, olumlu tutum gelişiminde kritik rol oynamaktadır (Trautwein vd., 2006). Geleneksel ödevlerin sıkıcı ve tekrarlayıcı olması, öğrencilerde olumsuz tutumlara yol açabilir. Bu

araştırmada, geleneksel ödevlerin öğrenme sürecine katkısının sınırlı olduğu gözlemlenmiştir (Duru & Çöğmen, 2017). Sonuç olarak, farklılaştırılmış matematik ödevleri öğrencilerin tutumlarını olumlu yönde etkileyerek, öğrenme sürecine aktif katılımlarını artırmaktadır. Eğitimde bireysel farklılıkları dikkate alan bu yaklaşım, öğrencilerin ödevleri daha değerli bir öğrenme aracı olarak görmelerini sağlamaktadır.

Öneriler

Deney grubundaki güçlü olumlu tutum değişiklikleri, gelecekte farklı okullar ve eğitim sistemleri arasında müdahalelerin ölçeklendirilmesini ve etkinliklerinin çeşitli ortamlarda değerlendirilmesini gerektirmektedir. Ayrıca, tutumlardaki bu değişikliklerin zaman içindeki dayanıklılığını ve matematik performansıyla ilişkisini incelemek önemlidir. Eğitim politikası yapıcıları, bilişsel hedeflerin yanı sıra duygusal hedefleri de içeren bütünsel müfredatlar tasarlarken bu bulguları dikkate almalıdır.

Çalışma öncesinde grupların benzer tutumlara sahip olması, çalışma sonrası deney grubu lehine ortaya çıkan farklılığın ödevin kendisinden çok ödevin verilme biçimine bağlı olduğunu göstermektedir. Bu bağlamda kontrol grubundaki olumsuz yöndeki değişimlerin nedenleri derinlemesine incelenebilir.

Ayrıca öğretmen davranışı, veli katkısı ve ödev sonrası aktiviteler gibi daha geniş çerçevede faktörler bütüncül bir şekilde ele alınabilir ve mülakat yöntemiyle daha kapsamlı bulgular elde edilebilir.

Son olarak, öğrencilerin ilkokuldan ortaokula geçişte ev ödevine yönelik tutum ve deneyimlerindeki değişimler de incelenebilir.