EXAMINATION OF CORE VALUES IN THE MIDDLE AND HIGH SCHOOL MATHEMATICS TEXTBOOKS

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ABSTRACT

EXAMINATION OF CORE VALUES IN THE MIDDLE AND HIGH SCHOOL MATHEMATICS TEXTBOOKS

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The aim of this study was to examine the depth of ten core values (justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and helpfulness) in middle and high school mathematics textbooks. The data sources were 5th-12th grade mathematics textbooks published by the Ministry of National Education in 2022. In the study, the case study was used as a qualitative research method. The method of document analysis was used to analyze data. The results of the study showed that the percentages of content containing core values in the 5th-8th grade mathematics textbooks were 12.22%, 8.43%, 6.45%, and 4.95%, respectively. The most mentioned value was patriotism, and the least mentioned value was honesty. The most addressed value was in “Numbers and Operations”, and the least in “Probability” and “Algebra” learning areas. The most value was included in the Explore section and the least in the End-of-the-chapter questions section. The values were mostly at the 0th level, and there was no value at the 5th level. The percentages of content containing core values in the 9th-12th grade mathematics textbooks were 4.71%, 3.75%, 3.69%, and 1.64%, respectively. The most mentioned value was patriotism, and the least mentioned value was

patience. The most addressed value was in “Numbers and Algebra”, and the least in “Data, Counting and Probability” learning areas. The most value was included in the Explore section and the least in the Launch section. The values were mostly at the 0th level, and there was no value at the 5th level.

Keywords: Core Values, Values Education, Mathematics Textbook, Mathematics Curriculum

ÖZ

ORTAOKUL VE LİSE MATEMATİK DERS KİTAPLARINDA KÖK DEĞERLERİN İNCELENMESİ

Aydın Malkoç, Şeyma
Yüksek Lisans, Matematik Eğitimi, Matematik ve Fen Bilimleri Eğitimi
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Bu çalışmanın amacı, ortaokul ve lise matematik ders kitaplarında yer alan on kök değerin (adalet, sabır, vatanseverlik, dostluk, saygı, yardımseverlik, dürüstlük, sevgi, sorumluluk ve özdenetim) derinlemesine incelemesidir. Çalışmanın veri kaynaklarını, Milli Eğitim Bakanlığı'nın 2022 yılında yayınladığı 5-12. sınıf seviyelerindeki ortaokul ve lise matematik ders kitapları oluşturmaktadır. Nitel araştırma desenlerinden durum çalışma kullanılmıştır. Verileri analiz etmek için doküman inceleme yöntemi kullanılmıştır. Ortaokul matematik ders kitaplarının sırasıyla %12,22, %8,43, %6,45 ve %4,95 oranlarında kök değerleri içerdiği saptanmıştır. Ortaokul kitaplarında en çok vatanseverlik, en az dürüstlük değerine yer verildiği tespit edilmiştir. En fazla değere "Sayılar ve İşlemler", en az değere "Olasılık" ve "Cebir" öğrenme alanlarında yer verildiği belirlenmiştir. Ortaokul kitaplarında değerlere en fazla Keşfet bölümünde, en az Ünite sonu soruları bölümünde yer verildiği saptanmıştır. Ortaokul matematik ders kitaplarında değerlerin en fazla seviye 0 düzeyinde bahsedildiği ve seviye 5 düzeyinde örnek bulunmadığı belirlenmiştir. Lise matematik ders kitaplarının sırasıyla %4,71, %3,75, %3,69 ve %1,64 oranlarında kök değerleri içerdiği saptanmıştır. Lise kitaplarında en çok vatanseverlik, en az sabır değerine yer verildiği tespit

edilmiştir. En fazla değere “Sayılar ve Cebir”, en az değere “Veri, Sayma ve Olasılık” öğrenme alanlarında yer verildiği belirlenmiştir. Lise kitaplarında değerlere en fazla Keşfet bölümünde, en az Giriş bölümünde yer verildiği saptanmıştır. Lise matematik ders kitaplarında değerlerin en fazla seviye 0 düzeyinde bahsedildiği ve seviye 5 düzeyinde örnek bulunmadığı belirlenmiştir.

Anahtar Kelimeler: Kök Değerler, Değerler Eğitimi, Matematik Ders Kitabı, Matematik Dersi Öğretim Programı

To my husband

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LIST OF ABBREVIATIONS

ABBREVIATIONS	
Ministry of National Education	MoNE
Turkish Language Association	TLA

CHAPTER 1

INTRODUCTION

Values are the set of standards that shape and direct the behaviors of individuals and their life philosophies and shape their goals, ideals, and thinking styles throughout their lives (Egin et al., 2023). Akçay and Tunagür (2017) identified values as the criteria that tell us what is right and wrong in determining our goals and behaviors or shared abstract ideas about what we socially desire. According to Seah (2008), the identification, development, evaluation, and enforcement of values in an individual's value system does not only contain a cognitive or affective dimension; the sociocultural environment in which the individual lives is also effective in how values are internalized and how they act. Values are considered a bridge that can connect the relationship between society and the individuals living there. A mutual transfer exists between society and individuals (Alıcı, 2019). According to Yılmaz and Kıran (2023), each individual is affected by society's values and creates their own value judgments by adopting what suits them.

In today's age, crucial developments and changes have occurred in many fields, particularly in science and technology. While these developments and changes provide positive results, such as raising the living standards of societies, they can also create negative results. One of the most important negative results is the degeneration of social values and even the danger of extinction (Yaman, 2016). For example, with the increase in the usage of social media, people's sharing of every action they do in such environments causes people to think only of themselves, to become selfish, and to decrease feelings such as helping each other, respect, and empathy (Deniz, 2018). When values disappear in a society, it is obvious that the

peaceful environment and social relationships of the people in the society will be damaged. Arslanoğlu (2005) stated that society must protect its values to preserve and sustain its existence; otherwise, national identities may be lost along with values. Therefore, societies want to satisfy the continuity of their culture by stopping the degeneration of values, preserving their value systems, which are an important component of their culture, and transferring their values to new generations (Köksal, 2021).

According to Özel (2015), values education is needed to raise individuals with social values, protect them, and transfer them to the new generation. Topkaya (2016) defines values education as, directly or indirectly, instilling the skills that individuals need to improve their understanding of values and help them survive under the rules of their society. Values education starts with family and continues with school (Bishop et al., 2006). Each individual who starts school life may come with different values since the individual learns values from family, peers, media, and playgroups at an early age (Halstead & Taylor, 2000). A systematic education is necessary for individuals from different families and cultures to have society's common values (Akçay & Tunagür, 2017; Teker & Ellez, 2022). Atweh and Seah (2007) defined education as "the primary institution where the young are entrusted for their socialization, is one that is intrinsically laden with values" (p.1).

Studies conducted in recent years show that schools have a more effective role in values education because they are places where more efforts are made on the previous achievements of the individual and new ones are built and where the necessary confidence and self-efficacy for values are provided (Cummings, 2009). Schools are believed to shape the values, habits and social behaviors of the new generation, and provide students opportunities to make good choices in undesirable situations brought by the time and context they are in (Meydan, 2014). According to Meydan (2014), Berkowitz and Bier examined the results of various values education programs implemented between 1997 and 2003 and concluded that thanks to these programs, violence between students, risky behaviors, and substance use decreased, and schools became safer places. This means that values

education has a role in changing and transforming people's behavior. In addition, according to the theorists of critical theory, teachers not only affect the changes in themselves, they also affect the changes in the students, and they can also affect the changes in society as a natural result (Demirtaş & Özer, 2015). From the critical theory perspective, educators are seen as part of society, not separate from social influences (Demirtaş & Özer, 2015). Furthermore, Carleheden (2006) stated that, from the perspective of Habermasian, one of the representatives of critical theory, the political history of societies causes that taught values to change historically.

Mathematics, one of the most important subjects taught in schools, helps people discover their talents and makes their lives meaningful (Güney et al., 2016). In mathematics teaching, cognitive field teaching is seen as more prominent than affective field teaching. In studies on the affective field teaching of mathematics, dimensions of attitudes, beliefs, and motivation towards mathematics are generally considered, and values teaching are neglected (Seah & Bishop, 2000). The most important reason for the mentioned situation is the belief that mathematics is considered a field that does not contain values (Dede, 2007). Clarkson and others (1999) stated that besides students, teachers, parents, and others in society think that social values are not included in mathematics. However, mathematics also contains values (Bishop, 1999), which are the most critical element in improving the quality of mathematics learning and teaching (Seah, 2002).

According to Yazıcı (2006), it is important to prepare a curriculum so that students can acquire the values targeted in the vision of educational documents. In Türkiye, one of the ultimate goals of the mathematics curriculum is to provide students with knowledge and skills integrated with national and sentimental values (MoNE, 2018a). Students can gain values directly or indirectly through teaching programs (Akbaş, 2008). Values and values education were mentioned for the first time in 2017 in mathematics with the title of “Values Education in the Curriculum,” and values were listed as justice and sharing, respect, patience, flexibility, equality, thriftless, freedom, aesthetics, responsibility, and scientificity (MoNE, 2017a). With the revisions in the curriculum in 2018, justice, patience, patriotism,

friendship, respect, helpfulness, honesty, love, self-control, and responsibility were expressed as ten core values under the title of "Our Values" in the middle and high school mathematics curriculum in 2018 (MoNE, 2018a, 2018b).

Textbooks are one of the most important materials used in fulfilling the objectives of the curriculum (Şahin & Başgül, 2018), so they are considered an important tool when teaching values to students (Sanchez, 1998). Dökme and Tunçer (2019) indicated that textbooks should be prepared in accordance with the level of the students, including the values and behaviors that are desired to be acquired by students. While authors of the textbooks prepare the contents, MoNE (2022) stated that some of the statements given below should be taken into account (p.18):

1. While creating the content, compliance with the core values should be considered, and items that would conflict with the values should not be included.

2. While the values are stated in the content, they should be prepared in relation to the curriculum of the course and given in relation to the sub-learning areas, skills, objectives, and explanations of the curriculum at the relevant grade level.

3. In the content, the core values should be considered alone and with the associated sub-values and other core values.

4. Values in the content should be handled in a way that students can make sense of, considering the developmental characteristics of the grade and age level.

As it can be understood from the items mentioned earlier, the content should reflect the core values in accordance with the national and sentimental values included in the curriculum (MoNE, 2022). Therefore, values can be placed in the mathematics that students encounter in daily life by bringing together values education with the objectives of the mathematics curriculum (Yücedağ, 2010). In this way, Egin et al.

(2023) explained that, instead of giving values education directly, values can be gained by considering daily life events and numerical operations together.

An extensive examination of literature showed that the most of research studies related to values education are conducted in the fields of Türkiye, life science and social science (Canbulat et al., 2022; Dilek, 2017; Dilekçi, 2022; Dökme & Tunçer, 2019; Ersoy & Şahin, 2012; Kaliyeva, 2015; Köksal et al., 2022; Özel, 2015; Şen, 2007; Tarakcı & Kalenderoğlu, 2022; Toraman & Memişoğlu, 2022; Yalçın, 2023). It is observed that the research studies that examined core values in mathematics textbooks (Çetin et al., 2021; Horzum & Yıldız, 2023; Karaca & Uzunkol, 2019; Kılcan, 2020; Köksal, 2021; Mutlubaş, 2021; Özkaya & Duru, 2020; Sayın et al., 2019; Teker & Ellez, 2022; Yıldız, 2019) are less than the studies on the social field textbooks. Also, among the studies mentioned above in mathematics, only a few focus on mathematics textbooks at the high school level. I did not encounter research examining the levels of core values in mathematics textbooks in detail. Therefore, this study aims to investigate the depth of the core values in each grade level of middle and high school mathematics textbooks of MoNE publications in the 2022-2023 academic year in Türkiye. It is important to examine mathematics textbooks in terms of values education, and the study's results would offer some suggestions that can guide the revision and improvement of mathematics textbooks. Thus, this study would contribute to the efforts of mathematics teachers, textbook authors, and curriculum developers in integrating values in teaching mathematics education.

1.1 Purpose of the Study

The primary purpose of this study is to investigate how the ten core values (i.e., justice, patience, patriotism, friendship, respect, helpfulness, honesty, love, self-control, and responsibility emphasized in the renewed mathematics curriculum in 2018) are addressed in each grade level of middle and high school mathematics textbooks published by MoNE publications in 2022-2023 academic year. More

specifically, the first goal of the current study is to investigate the frequencies of each of the ten core values included in middle and high school mathematics textbooks, the related sections, and the learning areas of the textbooks where these values are touched on. The second goal of the current study is to investigate the extent to which core values are included in middle and high school mathematics textbooks to understand "the depth of the values under consideration".

1.2 Research Questions of the Study

The research questions of this study are given below:

1. How is each core value (i.e., justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism and helpfulness), emphasized in the revised mathematics curriculum, reflected in the middle school and high school mathematics textbooks published by the MoNE in the 2022-2023 academic year?
    - How often is each core value included in middle and high school mathematics textbooks?
    - How often is each core value included in the learning areas of middle and high school mathematics textbooks?
    - How often is each core value included in the different sections (launch, explore, exercises/assessment, and end of the chapter questions) of middle and high school mathematics textbooks?
    - At what levels are the depth of the core values included in middle school and high school mathematics textbooks?
2. What are the differences and similarities of core values emphasized in the mathematics curriculum in the middle and high school mathematics textbooks of the MoNE publications?

1.3 Significance of the Study

Values education is a dynamic process that starts with family, continues with school, and lasts throughout life (Sayın et al., 2019). The values education given in schools aims to educate students as individuals who can adapt to social life, form a balanced and healthy personality, and be good citizens. For this purpose, curriculum documents emphasize the attainment of certain values that society and culture should have (ACARA, 2013; MoNE, 2017a; Ministry of Education Malaysia, 2012). All of the lessons that students encounter at school contain some values (Durmuş, 2004). Although values education is not given enough importance in mathematics education, values can also occur in mathematics (Dede, 2007, p.13). Mathematics also contains values within itself, and the acquisition of values has an important place in mathematics education (Bishop, 2008; Dede, 2007). The renewed Türkiye Elementary and Middle School Mathematics Curriculum (MoNE, 2018a, 2018b) includes core values under a separate section, showing the importance given to the values education in the curriculum. Mathematics textbooks are a general tool used to gain core values. Since these textbooks to be used in schools are prepared according to the curriculum's vision, mission, and goals, the textbooks must encompass the core values emphasized in these sections of the curriculum. One of the purposes of textbooks is to transfer culture to the new generation (Ersoy & Şahin, 2012). This purpose shows why textbooks have an essential place in values education. Moreover, since textbooks are delivered to people from all segments of society, regardless of social differences, it can be accepted that their impact and contribution to society in general will be significant.

Based on the literature, it is striking that there is a limited number of studies dealing with the research of core values in middle and high school mathematics textbooks (Kılcan, 2020; Köksal, 2021; Mutlubaş, 2021; Özkaya & Duru, 2020; Sayın et al., 2019; Teker & Ellez, 2022; Yıldız, 2019). These studies focused on and documented the frequencies of core values included in middle and high school mathematics textbooks, the related sections and learning areas where these values

were discussed, and the distribution of values according to grade levels. These studies did not report the quality of integrating these core values into textbooks. In a recent study, Çetin et al. (2021) investigated to what extent the core values listed in the curriculum were contained in two ninth-grade textbooks at the high school level. In this study, the levels of inclusion of core values are grouped under three categories: low, medium, and high. The study concluded that the quality of inclusion of core values in the 9th-grade mathematics textbooks was low.

A comprehensive review of the research studies indicated that no study has dealt with the quality of incorporating the core values in middle school mathematics textbooks and 10th-12th grade mathematics textbooks. Therefore, the present study aims to investigate the depth of core values, which are emphasized in the renewed curriculum in 2018, included in eight mathematics textbooks at the middle school and high school levels. This study is important as it aims to examine mathematics textbooks in terms of values education, and it would propose some suggestions that can guide the revisions and refinements of the textbooks. The contribution of this study to the revisions of textbooks can be considered important in conveying the culture of the society to the new generations. In this respect, it is thought that it would give a perspective to mathematics teachers, textbook authors, and experts who develop curricula. It will help experts prepare a book on how values education and our core values are associated with mathematics. The research is important because it will contribute to the preparation of conscious publications by including multi-purpose mathematics problems that include important values and critical mathematical ideas.

1.4 Definition of the Important Terms

The definitions of the important terms involved in the research are given by making use of the literature:

Justice: Justice is defined as the state of harmony between the rights of one person and the rights of others, the state of complying with the right and law, and the state of establishing a fair balance between different people (Cevizci, 1999). The indicators of justice in this study are being fair, equal treatment, and sharing.

Friendship: TLA (2019) defined friendship as the state of being a friend and behavior befitting a friend. The indicators of friendship in this study are altruism, trust, understanding, solidarity, being faithful to, being loyal, and helping each other.

Honesty: According to TLA (2019), honesty is defined as truthfulness, the agreement of thought with reality, and the consistency of judgments and propositions with the truth. The indicators of honesty in this study are being clear and understandable, being truthful, ethical behavior, being reliable, and keep your word.

Self-control: Controlling one's own behavior and limiting oneself according to one's purpose is self-control (TLA, 2019). The indicators of self-control in this study are controlling their behavior, taking responsibility for their behavior, self-confidence, and apologizing when necessary.

Patience: TLA (2019) defined patience as waiting for bad and unhappy situations like pain, poverty, and injustice to pass quietly and firmly. The indicators of patience in this study are being determined, enduring, knowing how to wait, being resilient, and being assiduous.

Respect: Respect is defined as making obeisance to a person and loving a person according to that person's status, age, and supremacy (TLA, 2019). The indicators of respect in this study are being humble, treating others the way you would like to be treated, and valuing other people's personalities.

Love: Love has been defined as a feeling that leads a person to show interest and loyalty towards someone (TLA, 2019). The indicators of love in this study are to

give importance to the family unit, make a sacrifice, be merciful to others (people, animals etc.), trust, and express love appropriately.

Responsibility: Responsibility is defined as undertaking people's own behavior or the situations caused by events over which it is under its jurisdiction (TLA, 2019). The indicators of responsibility in this study are to be responsible to yourself, your environment, your country, and your family.

Patriotism: Patriotism is defined as loving the place of birth, home, village, and country within the borders of an independent state (TLA, 2019). The indicators of patriotism in this study are considered as being hardworking, solidarity, compliance with rules and laws, caring about society and culture, and being sensitive to historical and natural heritage.

Helpfulness: Helpfulness is defined as a feeling that increases the relationship between individuals in society and strengthens the bond between individuals. The value of helpfulness is classified as being altruistic and merciful, social responsibility, collaboration, sharing, volunteering, and being generous (Aktepe, 2015). The indicators of helpfulness in this study are considered being generous, altruistic, collaborating, merciful, hospitable, and sharing.

Value: Values form basic characteristics of people, and values are defined as the power that allows us to cope with the problems we face in our daily lives (MoNE, 2018a).

Values Education: Values education is defined as lifelong education to transform individuals' values into behaviors by assimilating them into personalities (Yaman, 2012).

Value Fidelity: In this study, value fidelity refers to the conformity of a situation to value accuracy. Also, it is defined as the fidelity of the value mentioned in the content in reflecting the characteristics and meaning of the value according to the definition of values in mathematics education.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the literature related to the focus of the study is reviewed. The chapter begins with the conception of values. Next, the values education is explained in detail under two different contexts, the Turkish mathematics curricula and Turkish mathematics textbooks. Finally, the research studies that are relevant to this study are summarized.

2.1 Conception of Value

The value is an abstract concept that makes its definition difficult (Kaliyeva, 2015). In the related literature, there are different definitions of the word "value" (Bishop, 1996; Dede, 2007; MoNE, 2018a; Seah & Bishop, 2000; Swadener & Soedjadi, 1988; TLA, 2019). Seah and Bishop (2000) gave examples of using the concept with different meanings such as "the value of an unknown in an equation, the value of listening to a speech, and the (moral) value of an individual*"* (p. 3).

In one of the definitions given in the field of social sciences, Dede (2007) defines value in the most general sense as personal choices made by considering the importance of a behavior or thought, or general aims adopted and followed by an individual as a member of society (p. 12). Therefore, values reflect a preference or an opinion about something and can be classified into two categories: aesthetic and ethical. While aesthetic values are related to the concept of beauty, ethical values are related to the concepts that are identified as good or bad. Ethical values are concerned with good or bad behavior and they allow the formation of society by forming integrity with education (Swadener & Soedjadi, 1988).

Bishop (1996) defined value in mathematics learning and teaching as:

> Values in mathematics education are the deep affective qualities which education aims to foster through the school subject of mathematics. They appear to survive longer in people's memories than does conceptual and procedural knowledge, which unless it is regularly used tends to fade (p. 19).

According to Seah and Bishop (2000), at the core of this definition is that the formation of value systems in students has been influenced by educational institutions and systems, relatively socio-cultural and political entities.

Value is defined in the online form of the dictionary created by the Turkish Language Association (TLA, 2020) as an abstract measure that provides support to people by establishing the importance of something, the equivalent of something, worth. In the Türkiye Elementary and Middle School Mathematics Curriculum (MoNE, 2018a, p.15), it is defined that values, which form basic characteristics of people, are the power that allows us to cope with the problems we face in our daily lives. Values are seen as one of the most important elements of improving the quality of mathematics learning and teaching (Seah, 2002).

2.2 Values Education

Even though the values change with the development and change in life, those that are generally adopted by society are transferred to the new generations (Altun, 2003). When values are internalized and accepted by individuals in society, they are transferred to the next generation over time and their continuity is ensured (Gudmunsdottir, 1990). Şahin and Başgül (2018) stated that values are gained by individuals through values education. Values education, which is carried out to convey these values to individuals, starts in the family first, and school is also included in the process (Bishop et al., 2006). Atweh and Seah (2007) explained that schools should not be thought of only as places where values are passed down from one generation to the next; schools should also be institutions where values are discussed. Yaman (2012) expressed the values education as a lifelong education to

transform individuals' values into behaviors by assimilating them into their personalities. MoNE (2017a) stated that enabling students to develop a consistent, healthy, and balanced personality in the school environment is an aim of values education. Values contribute to the healthy and balanced development of students because of its important role in shaping people's attitudes and behaviors.

Slater (2002) defined the values education as:

> This is a relatively new umbrella term for a range of common curriculum experiences: spiritual, moral, social, and cultural education; personal and social education; religious education; multicultural/antiracist education; cross-curricular themes, especially citizenship, environment and health, pastoral care; school ethos; extra-curricular activities; wider community links; collective worship/assembly; the life of the school as a learning community (p.44).

The definition given above is really important and emphasizes that the concept of values education includes previous definitions and practices (Keskin, 2008). Keskin also explained that values education is quite comprehensive and is not just an activity included in the curriculum. In other words, the values education association requires being supported by all circles and being carried out in a way that covers all fields of activity (2008).

Akbaş (2008) stated that values education discipline students by the determined rules, contribute to their morals, and affect their characters positively both implicitly and in a planned way with various methods and techniques. Mutlubaş and Şahin (2022) defined values education as a type of education that is needed to bring individuals who have positive emotions, can make healthy decisions, and exhibit healthy behaviors in society. According to Özkaya and Duru (2020), values education refers to the process of doing what needs to be done for people to learn values at a basic level, to know the basic rules in their relations with each other, and to provide students with the basic principles about values in schools. This education aims to reveal the innate qualities of the individual and to ensure the individual's development of the personality (Mutlubaş, 2021). Also, values education aims to provide individuals with values such as justice, respect,

responsibility, tolerance, and love and to establish a holistic relationship between these values (Sayın et al., 2019).

2.2.1 Values Education in Turkish Elementary and Middle School Mathematics Curriculum and Turkish High School Mathematics Curriculum

The curriculum is a basic resource that guides the conduct of educational activities to raise students mentally, physically, and emotionally in a healthy way (Çetin et al., 2021). Values education in schools is realized through teaching programs (Sayın et al., 2019). For this reason, Yazıcı (2006) emphasized that it is of great importance to prepare an effective teaching program to expose values to students. Curriculums are prepared considering the needs of the era and society. The values found in these programs are also shaped in line with the needs and requirements mentioned above (Kılcan, 2020).

The Turkish Elementary and Middle School Mathematics Curriculums did not promote the values explicitly in mathematics education until 2017. However, for the first time, in the mathematics curriculum designed in 2017, the values were addressed under a separate heading, and they were connected to the learning objectives (Deniz, 2018). Values education began to take place in the programs in 2017 with the title of "Values Education in the Curriculum" and there were 10 values, namely justice and sharing, scientificity, flexibility, aesthetics, equality, thriftless, freedom, patience, respect, and responsibility (MoNE, 2017a). In addition, some examples of how these ten core values would be linked to mathematical outcomes were documented in the curriculum. For example, the mathematics curriculum stated that mathematical sharing and the sharing relationship in social relations would be emphasized in fraction and division concepts.

In 2018, the middle and high school mathematics curriculum was updated, and some revisions have been made regarding the values education in the curriculum. With these revisions, a heading called “Our Values” was created in the curricula, and ten core values (justice, patience, patriotism, friendship, respect, helpfulness, honesty, love, self-control, and responsibility) were listed under this heading. At the stage of gaining ten core values, MoNE stated that “values will come to life by considering them both on their own, with the associated sub-values and with other core values in the learning-teaching process”, and what was aimed for the education of the core values has been revealed (2018a, 2018b).

Moreover, teachers who provide the teaching of mathematics objectives in the school environment be aware of values education and besides, they should have sufficient knowledge and skills about values education (MoNE, 2017a). Teachers are a guide in the process of acquiring values, therefore they should be able to present what is good and right as a model and through activities, as well as teaching the objectives included in the curriculum. However, if the teacher does not have core values to be applied in the teaching process and know how to teach these values to students; the teacher may not be a good model for students and this may cause the values existing in students to become atrophied or completely erased (Yazıcı, 2006).

2.2.2 Mathematics Textbooks and Values Education

Curriculums come to life through learning and teaching activities organized at the school (Şahin & Ersoy, 2012), and the textbooks are one of the important educational tools in gaining students the values in the program (Cao et al., 2006; Kılcan, 2020; Sayın et al., 2019; Şahin & Başgül, 2018). The MoNE distributes textbooks freely to all teachers and students at the beginning of the school year. Thus, it is plausible to think that it is the most easily accessible tool that enables teachers to transfer values to students in lessons (Horzum & Yıldız, 2023). In Türkiye, at least two books, one from the MoNE and the other from private

publications, are used as mathematics textbooks at each level of middle and high school, prepared the textbook to be taught in schools by the MoNE Board of Education. Textbooks are defined as “the works that are designed according to the curriculum of the courses included in the weekly course schedules of the formal and non-formal education institutions affiliated to the Ministry of National Education and are found suitable to be taught” (MoNE, 2019).

It is reasonable to think that textbooks only helps determine the applied mathematics curriculum in some countries because teacher’ opinions are more dominant the using textbooks as an aid for the teacher. On the contrary, textbooks are the main determinant of the curriculum, and it is considered as the part of intended curriculum (Cao et al., 1999). Ersoy and Şahin (2012) emphasized that textbooks are a significant component in learning and teaching mathematics, and they are used not only to provide individuals with knowledge and skills but also to transfer values to new generations. Textbooks, which are an important element in the implementation of curricula, should be also sufficient in terms of values education (Sayın et al., 2019).

2.3 Research about Values Education in Mathematics Textbooks

In this part, studies related to values in mathematics textbooks, the frequencies of core values included in mathematics textbooks in the schools, the related sections and learning areas of the book where these values were discussed, the distribution of values according to grade levels will be presented as a review of the literature.

Sayın et al. (2019) investigated the 5th-grade mathematics textbooks in terms of the values in the mathematics curriculum such as justice, patience, patriotism, friendship, respect, helpfulness, honesty, love, self-control, and responsibility. In the research study, a qualitative research method was adopted and data were analyzed by document analysis. The researchers used the descriptive analysis technique to analyze the data. The result of the study showed that responsibility,

justice, self-control, and helpfulness values are the most mentioned values, and friendship, love, honesty, patriotism, and respect values are the least mentioned values. Sayın et al. (2019) observed that there is an irregularity in the distribution of the values to units. However, this study was limited to one 5th-grade mathematics textbook published by the MoNE. The researchers only investigated the frequencies of the values in the textbooks according to their distribution in the chapters. No data has been reported on which sections of the textbooks are included in the values and to what extent these values are included.

Similarly, Mutlubaş (2021) investigated the reflection of the core values in mathematics textbooks. She used qualitative research methodology and analyzed the data by document analysis. The data sources were one official and one private publishing company 5th-grade mathematics textbooks which were selected by the homogeneous sampling technique. Descriptive analysis was used in the data analysis process, and she examined the elements in the mathematics textbooks like text, visuals, exercises, and questions. According to the findings, both mathematics textbooks included all core values, and patriotism and responsibility values were the most frequently mentioned values while honesty was the least mentioned value. In addition, frequencies of representation of core values in both textbooks were found to be similar. Based on the findings, Mutlubaş (2021) suggested the necessity that teachers should take more responsibility for bringing the less-mentioned values to the forefront, and the new editions of textbooks must include more core values. This study was only limited to the 5th-grade level, and the researcher only investigated the frequencies of the values in two 5th-grade mathematics textbooks. Furthermore, the values were not examined in relation to the chapters of the textbooks, learning areas, and sections in the textbooks.

Yıldız (2019) investigated the texts and images in middle school mathematics textbooks for all grade levels in terms of values. The data were collected from mathematics textbooks by examining values such as justice, self-control, friendship, patriotism, respect, honesty, love, responsibility, patience, helpfulness, scientificity, aesthetics, flexibility, sharing, equality, freedom, thriftlessness,

rationalism, communication, and connection. The qualitative research study was used and the data were analyzed by document analysis. According to the result of the study, the value of patriotism is found to be the most frequently-used value in the 5th-grade mathematics textbooks but there is no mention of mathematical values. In 6th-grade mathematics textbooks, the most frequently mentioned value is "connection", one of the mathematics values. Honesty, responsibility, and helpfulness were mostly taken part in the 7th grade mathematics textbooks while no mathematical values were included in it. In the 8th grade, connection, equality, and helpfulness were most mentioned. This study was limited to middle school mathematics. This thesis study did not report any results on the distribution of values in learning areas, and parts of the textbooks, and it did not examine the qualities of the values.

Özkaya and Duru (2020) investigated the values that were emphasized in Turkish Elementary and Middle School Mathematics Curricula renewed in 2017 in the middle school mathematics textbooks. The qualitative research study was used and the data were analyzed by document analysis. The researchers examined the values of justice and sharing, aesthetics, scientificity, equality, flexibility, and thriftlessness. They found that the value of equality was the most mentioned in the mathematics textbooks, the value of justice and sharing, thriftlessness, and aesthetics were mentioned at least. According to the result of the study, Özkaya and Duru (2020) recommend that book authors should think about the values education as well as mathematical skills while preparing the mathematics textbooks. This research was limited to all grade-level middle school mathematics textbooks in the 2018-2019 and 2019-2020 academic years. Also, it was limited to the core values of justice and sharing, aesthetics, scientificity, equality, flexibility, and thriftlessness. The sections in which the core values are included in the mathematics textbooks have not been examined and no research has been done on the depth of the core values in the textbooks.

Köksal (2021) investigated how much, in which chapter, and how the core values are included in all grade-level of middle school mathematics textbooks. The

qualitative research study was used and the data were analyzed by document analysis. The researcher examined the values of justice, patience, patriotism, friendship, respect, helpfulness, honesty, love, self-control and responsibility. She found the values in 12.01% of the fifth-grade mathematics textbook. There were 189 values and the most used value was love, which was mentioned 63 times in the textbook. Numbers and Operations chapters in the fifth-grade textbooks included the most values (n=87), while the Geometry and Measurement chapter included the least values (n=3). Also, she found the values in 18.59% of the sixth-grade mathematics textbook. There were 297 values and the most used value was respect, which was mentioned 116 times in the textbook. Integers; Operation with Fractions chapter in the sixth-grade textbooks included the most values (n=67), while the Angles; Area Measurement chapter included the least values (n=26). In addition, she found the values in 8.96% of the seventh-grade mathematics textbook. There were 79 values and the most used value was love, which was mentioned 39 times in the textbook. Ratio and Proportion; Percentage chapter, which included the most value (n=26), while Lines and Angles; Polygons; Circle and Circle Region chapter, which included the least values (n=6). Finally, she found the values in 6.46% of the eighth-grade mathematics textbook. There were 74 values and the most used value was love, which was mentioned 45 times in the textbook. Square Root Expressions and Data Processing chapter and Equation and Disequilibrium chapter, which included the most value, each containing 19 values, while Geometry and Measurement chapter, which included the least values(n=6). However, this research was limited to the middle school mathematics textbooks in the 2020-2021 academic year. Also, the study fell short because the sections in which the core values are included in the middle school mathematics textbooks and the qualities of the values were not examined.

Kılcan (2020) investigated the core values in 5th-8th grade mathematics textbooks for middle school and imam hatip middle school. The qualitative research study was used and the data were analyzed by document analysis. The result of the study showed that responsibility (34 times) was the most mentioned core value in the

mathematics textbooks and the values of honesty (2 times) and respect (2 times) were the least mentioned values in the textbooks. According to the result of this study, the researcher suggested that a balanced distribution of core values should be realized in the revised versions of mathematics textbooks. However, this study was limited to the frequencies of core values in middle school mathematics textbooks. In the examination of the content in the textbooks about the core values, the study fell short as the exercises, unit evaluation tests, and the questions under the title of "you have the solution" were excluded, and the researcher examined only the parts in the textbooks where the subject was explained and examples were given. Furthermore, this study did not examine core values in middle school mathematics textbooks with regard to the learning areas and qualifications.

Horzum and Yıldız (2023) investigated the extent of ten core values in ten middle school mathematics textbooks. Two fifth-grade level, three sixth-grade level, two seventh-grade level, and three eighth-grade level mathematics textbooks were within the scope of this research study. The data were analyzed by content analysis in qualitative research. The researchers examined the occurrence of ten core values in the mathematics curriculum according to their first meaning in the mathematics textbooks. The explanations and definitions in the TLA were coded as the first meaning in this research study. Horzum and Yıldız (2023) reported that although the values of friendship, patriotism, helpfulness, self-control, and responsibility were related to their first meaning, the values of respect, justice, love, and honesty were generally stated outside of their first meaning in the textbooks. This study differs from previous research studies as they investigated the meaning of core values. On. the other hand, the researchers only examined the context with regard to the first meaning in middle school mathematics textbooks. Their study did not include high school mathematics textbooks, and they did not focus on the learning areas or sections.

Çetin et al. (2021) investigated to what frequencies and extent the core values emphasized in the mathematics curriculum included in the 9th-grade mathematics textbooks. The document analysis technique was used to analyze the data collected

from two 9th-grade secondary school mathematics textbooks. The researcher investigated the ten core values listed in the 2018 high school mathematics curriculum. In conclusion, the values of helpfulness and responsibility were the most mentioned in the 9th-grade mathematics textbooks, and the values of patience, self-control, honesty, and love were the least mentioned values in the textbooks. Sections under the Numbers and Algebra learning areas included the most values while the sections under the Geometry learning area included the least values. In this study, the levels of inclusion of core values are grouped under three categories: low, medium, and high. The study concluded that the quality of inclusion of core values in the 9th-grade mathematics textbooks was at a low level. Nevertheless, the research study was limited to two 9th-grade mathematics textbooks.

Teker and Ellez (2022) investigated each grade level of high school mathematics textbooks in the light of values education. The data was analyzed by document analysis. The result showed that the values were used in the 9th-12th-grade mathematics textbooks at the rates of 1.53%, 2.45%, 2.12%, and 1.03%, respectively. While values were found most in the solved examples at the rate of 66.67% in the 9th-grade mathematics textbook, 50% in the 10th-grade mathematics textbook, and 71.43% in the 12th-grade mathematics textbook, values were found most in the Measurement and Evaluation section at the rate of 50% in the 11^{th}-grade mathematics textbook. Values in high school mathematics textbooks were not homogeneously distributed. Teker and Ellez (2022) found the value of helpfulness the highest and the value of responsibility the least in high school mathematics textbooks. This study focused on high school mathematics textbooks and did not examine the qualities of the values in the textbooks.

Sam and Ernest (1997) aimed to investigate the values in the mathematics curriculum of the Malaysian Ministry of Education and to compare the perceptions of mathematics teachers of which values are suitable for teaching mathematics. The researchers investigated the 16 moral values, *"compassion, self-reliance, humility, respect, love, justice, freedom, courage, physical and mental cleanliness, honesty,*

diligence, co-operation, moderation, gratitude, rationality, and public-spiritedness" (Sam & Ernest, 1997, p. 38). Firstly, by examining the mathematics curriculum, the values that are explicitly and implicitly included in it have been determined, and a questionnaire about the subject was applied to the teachers. As a result, they concluded that the subject of values handled by the ministry was partially perceived by the teachers, but on the contrary, most of the values in the mathematics curriculum, which are explained explicitly and implicitly, were supported by the teachers.

Moreover, Seah and Bishop (2000) examined the mathematical values and mathematics educational values for the first two grades of secondary school mathematics textbooks in two regions of Australia, Singapore, and Victoria. The data were analyzed by content analysis. In terms of mathematical values, they found that objectivity, control, and mystery were more emphasized than the complementary value pairs in both regions of Australia. Also, mathematics educational values which are formalistic view, evaluating, theoretical knowledge, instrumental understanding, and specialism were emphasized more than their complementary value pairs in both first-grade secondary mathematics textbooks of Singapore and Victoria. Mathematical values were defined as three pairs of complementary pairs by Bishop (1988), which are rationalism and objectivity, control and progress, and openness and mystery.

Cao, Seah and Bishop (2006) investigated to compare the mathematical values in Chinese and Australian mathematics textbooks. While textbooks in Australia are chosen more freely by the teachers, in China standard textbooks are used by teachers in their mathematics teaching. The data were analyzed by content analysis, and they focused on two topics, *"rate, ratio, and percentage,"* and *"area, perimeter, and volume".* In general, the research concluded that objectivity, control, and mystery were more emphasized than their complementary value pairs in both Chinese and Australian textbooks. In detail, objectivity in Chinese textbooks was found more than in Australian textbooks while other mathematical values like rationalism, control, mystery, and openness were found in Australian

textbooks more than in Chinese textbooks. The researchers suggested that when all mathematical values which are rationalism, objectivism, progress, control, openness, and mystery are balanced well in mathematics curriculum and mathematics lessons, the interest of students in mathematics can be awakened and supported.

To sum up, there are a few studies on values education in middle and high school mathematics textbooks in Türkiye. These studies generally examined the frequency and status of the ten core values given in the mathematics curriculum in the mathematics textbooks. For example, Sayın et al. (2019) examined one 5th-grade mathematics textbook according to frequencies of core values, and they found the most mentioned values as self-control, justice, helpfulness, and responsibility and the least mentioned values as friendship, honesty, patriotism, respect, and love. Also, the result showed that the unit one has the maximum value. Similarly, Mutlubaş (2021) examined the two 5th-grade level mathematics textbooks in terms of frequencies of core values and found patriotism and responsibility as the most mentioned values and honesty as the least mentioned value. In these two studies, there was no detailed study since they did not examine in which parts of the textbooks the values are mentioned and the qualities of the values in the textbooks. On the contrary, Yıldız (2019) expanded his work a little by examining the frequencies of core values in 5th-8th grade mathematics textbooks. In his study, he only investigated which value was more or less according to grade levels and he found that the value of patriotism was mentioned the most in the 5th-grade mathematics textbooks, as in Mutlubaş's research study. Similar to this study, Kılcan (2020) also examined the frequencies of core values in all grade levels in middle school mathematics textbooks. She found a similar result with other researchers that responsibility was mentioned the most in textbooks, and honesty and respect were mentioned the least in textbooks. However, in the research studies of Mutlubaş (2021) and Kılcan (2020), the core values in the textbooks were not analyzed according to learning areas, sections, and levels. As a broader study, Köksal (2021) investigated the core values in all grade-level middle school

mathematics textbooks with regard to frequencies and units, but the qualities of core values were not examined in the study. As it is understood from these studies, there are no studies on the qualities of values in mathematics textbooks at the middle school level.

In high school, there were two research studies about core values in mathematics textbooks. Çetin et al. (2021) investigated frequencies and to what extent the core values included in two 9th-grade level mathematics textbooks. They found helpfulness and responsibility as the most mentioned values, and patience, self-control, honesty, and love as the least mentioned values. The 9th-grade level mathematics textbooks had core values at a low level. On the contrary, Teker and Ellez (2022) expanded their study a little by examining the frequencies and sections of core values in every grade level high school mathematics textbooks but they did not investigate the qualities of core values in textbooks. While helpfulness was the most mentioned value in the previous study, responsibility was the least mentioned value in the textbooks, unlike the previous study. In general, there are no in-depth studies of values in high school mathematics textbooks covering all grade levels.

CHAPTER 3

METHODOLOGY

In this chapter, the methodology of the study will be explained. Firstly, the research design, the data sources, and the data analysis will be explained. Then, the trustworthiness of the research and the researcher's role will be discussed.

3.1 Research Design

In the present study, the main goal was to investigate the depth of core values, emphasized in the renewed curriculum in 2018, included in the middle and high school mathematics textbooks. For this aim, the researcher used the qualitative research design. Denzin and Lincoln (1988) defined qualitative research as an effort to examine an event in its own nature, to make sense of the phenomenon, and to interpret it. That means researchers examine events in the qualitative research study by taking into account their own natural settings, and they try to interpret or make sense of phenomena to which people attach meaning (Denzin & Lincoln, 2005).

The case study design among the design of qualitative research was used. According to Creswell (2013), a case study is a detailed examination of a real-life situation or situations, a single event, a single document, or an event with multiple data sources. Cases in the case study design can be books, curricula, behaviors, or events as well as individuals and groups (Creswell, 2012). "A bounded system" is analyzed with multiple sources of information like observations, reports, interviews, documents, and audio-visual (Creswell, 2013). The current research is a case study since core values emphasized in the renewed curriculum in 2018 included in the four middle school textbooks and four high school mathematics

textbooks were investigated in depth. The values in the middle and high school mathematics textbooks of MoNE constitute the case of this research.

3.2 Data Sources

In Türkiye, at least two books, one from the MoNE and the other from private publications, are used as mathematics textbooks at each level of middle and high school, prepared the textbook to be taught in schools by the MoNE Board of Education and Discipline. The data sources of this study are 5th-12th-grade mathematics textbooks published by the MoNE to be taught in the 2022-2023 academic year were selected. The reason for choosing MoNE publications is that there are every grade level of middle and high school mathematics textbooks of MoNE publications, to examine the frequencies and qualities of core values in mathematics textbooks from every grade level, and also to make comparisons between grade levels on the same publication. Board of Education (2022) explains that values in the content should be handled in a way that students can make sense of, taking into account the developmental characteristics of the grade level and age level. In this sense, the results of the current study will provide important information, as the textbooks at eight different grade levels will be analyzed. The identifiers of the examined textbooks are given below and in Table 3.1. The textbooks were obtained from the schools by the researcher, and the researcher downloaded the electronic copies of the books from the MoNE's website www.eba.gov.tr, which offers online content to teachers and students.

Table 3.1 General Information about Textbooks

Code of the Textbooks*	**Grade Level**	**Number of pages**	**Author(s)**	**Publisher**
5	5th-grade	320	Hayriye Cırıtcı İlker Gönen Dilara Araç Murat Özarslan Neşe Pekcan Meltem Şahin	MoNE
6	6th-grade	240	Neziha Çağlayan Aybike Dağıstan Betül Korkmaz	MoNE
7	7th-grade	296	Arzu Keskin Oğan Soner Öztürk	MoNE
8	8th-grade	238	Hadi Böge Ramazan Akıllı	MoNE
9	9th-grade	370	Mehmet Maviş Güral Gül Himmet Solaklıoğlu Hakan Tarku Fatih Bulut Mahmut Gökşen	MoNE
10	10th-grade	350	Mehmet Maviş Güral Gül Himmet Solaklıoğlu Hakan Tarku Fatih Bulut Mahmut Gökşen	MoNE

Table 3.1 (cont'd)

11	11th-grade	288	Emel Seymen Gencer Gazioğlu Sultan Yıldırım Yılmaz Meral	MoNE
12	12th-grade	405	Ahmet Emin Ahmet Gerboğa Gökhan Güneş Mehmet Kayacıer	MoNE

*: The textbooks were coded as 5, 6, 7, 8, 9, 10, 11, and 12 to indicate the grade levels and to shorten the names of the mathematics textbooks.

Structurally, middle and high school mathematics textbooks include sections such as questions that make connections to daily life, questions asked to remind previous knowledge, solved questions where the subject is explained, questions that encourage students to think and research, questions asked at the end of the subject, and end-of-unit questions. In order to have a common analysis among the mathematics textbooks, the researcher grouped and examined the sections of middle and high school mathematics textbooks under the four headings; launch, explore, exercises/assessment, and end-of-the-chapter questions. The heading of the Launch includes the sections of "Introductions/Motivation", "Are we ready? /Are you ready?" and "Preparatory work". The "Launch" is the section where the learning area or subject entries are made, daily life contexts are established, and the questions are asked to guide students' attention. It is also a place where the questions that will reveal preliminary information about the subject are asked and interesting information about the topic is revealed. The heading of Explore includes "Example", "I'm thinking", "Let's research and think" and "Let's do together" sections. The "Explore" is the section where the solved examples on the subject are presented, and the questions are asked that make students research and think. The heading of Exercises/Assessment includes "It's your turn", "You have the solution"

and “Exercises” sections. The “Exercises/Assessment” is the section where the questions are asked that help reinforce learning after the lecture or at the end of the topic. The heading of End-of-the-chapter questions includes the section of “Unit evaluation”. This section is at the end of the unit where the questions and problems to which the learned information can be applied.

3.3 Data Analysis

In this research, the document analysis method was used to analyze the core values in the middle and high school mathematics textbooks in the 2022-2023 academic year. Document analysis encompasses the analysis of written material containing information about the phenomenon or phenomena, which the researchers intend to investigate (Yıldırım & Şimşek, 2011). McMillian and Schumacher (2010) stated that written, oral, and visual materials that allow data to be obtained in line with the purpose can be used in the document analysis technique.

The first goal of the study was to investigate the frequencies of core values included in middle school and high school mathematics textbooks, the related sections, and the learning areas of the textbooks where these values were discussed. The core values to be examined are justice, patience, patriotism, friendship, respect, helpfulness, honesty, love, self-control, and responsibility (MoNE, 2018a). To analyze the core values in the textbooks, firstly, the researcher created “The Value Analysis Table” (see Table 3.2) by analyzing the explanations in the national mathematics curriculum, the codes obtained by the preliminary examination of the textbooks, and the studies in the relevant literature (Çetin et al., 2021; Köksal, 2021; Mutlubaş, 2021; Teker & Ellez, 2022; Yıldız, 2019). In the preliminary examination process, statements containing values in the eight mathematics textbooks were reviewed for each ten core values. For example, the core value of justice was encountered in 5th-grade mathematics textbooks as “176 defter 12 öğrenciye eşit olarak paylaştırılacaktır. Her öğrenciye kaç defter düşeceğini bulalım.” (p. 65). The question states “176 notebooks will be shared equally to 12

students. Let's find how many notebooks each student will receive?" In this example, the core value of justice was mentioned as sharing equally. So, sharing was coded in the value analysis table. As in the example given above, codes were created for each value and were added to the Value Analysis Table. Then, the core values and related indicators were used to analyze the "Launch", "Explore", "Exercises/ Assessment" and "End of the chapter questions" sections of the middle school and high school mathematics textbooks.

Table 3.2 The Value Analysis Table

Core Values	**Indicators of the Core Values**
Justice	Being fair, equal treatment, sharing
Friendship	Altruism, trust, understanding, solidarity, being faithful to, being loyal, helping each other
Honesty	Being clear and understandable, ethical behavior, keeping your word, being truthful, being reliable
Self-control	Controlling their behavior, taking responsibility for their behavior, apologizing, self-confident
Patience	Being determined, enduring, being resilient, being assiduous, knowing how to wait
Respect	Being humble, valuing people's personalities, treating others the way you would like to be treated
Love	Giving importance to own family unit, making a sacrifice, being merciful to others (people, animals etc.), trusting, expressing love appropriately
Responsibility	Being responsible to yourself, to your environment, to your country, and to your family

Table 3.2 (cont'd)

Patriotism	Being hardworking, compliance with rules and laws, being sensitive to historical, cultural and natural heritage, solidarity, caring about society
Helpfulness	Being generous, being altruistic, collaborating, being merciful, being hospitable, sharing

The study's second aim was to investigate the extent to which the core values were involved in mathematics textbooks at the middle and high school levels. To do this, an analysis framework was constructed (see Table 3.3). Then, by using the framework, the parts of textbooks that contain the core values were re-examined, and the levels of the core values in the textbooks were identified. The framework is related to the "allowance of the task for understanding the depth of the values under consideration". This framework was adapted from the Dynamic Geometry Task Analysis Framework which was created by Trocki and Hollebrands in 2018. Trocki and Hollebrands constituted the framework by using Smith and Stein's level of cognitive demands framework, which includes two levels, lower-level demands, and higher-level demands. The lower-level demands contain two sub-levels; memorization and procedures without connections, and the higher-level demands involve two sub-levels, procedures with connections and doing mathematics (Smith & Stein, 1998). In the framework of Trocki and Hollebrands, the first and second codes were adapted by the category of Smith and Stein's lower-level demands tasks. The remaining codes were constituted by considering the procedures with connections and doing mathematics levels of higher-level demands.

Table 3.3 Allowance of the Task for Understanding the Depth of the Values under Consideration

Levels	**Descriptions**
N/A	Level requires a mathematical task with no focus on values.
Level 0	Level refers to a mathematical issue that does not have value fidelity.
Level 1	Level requires students to recall a value, or definition of a value.
Level 2	Level requires students to report some values from the text or visuals. No explanation is expected from the students.
Level 3	Level requires students to consider the values in the text or visuals.
Level 4	Level requires students to explain the values in the text or visuals.
Level 5	Level requires students to go beyond the current value and generalize it in other situations.

To better understand the framework, examples related to the value of justice for each level are produced and presented in Table 3.4.

Table 3.4 Examples of Level of the Depth of the Values under Consideration

Level	**Examples of each level**	**Aim in the question**
Level 5	Three siblings share a birthday cake among themselves. Big brother gets 1/3 of the cake, middle brother gets 1/4, and younger brother gets 1/5. The rest of the cake is shared equally by his parents. Accordingly, find how many of the cakes fell to the parents. Do you think this sharing was fair? How would you share this cake with your family? Explain why. Give examples of the equal distribution of work in your family.	Students have to make sense of the value of justice in the question and they need to generalize this value in other situations by giving different examples.
Level 4	Three siblings share a birthday cake among themselves. Big brother gets 1/3 of the cake, middle brother gets 1/4, and younger brother gets 1/5. The rest of the cake is shared equally by his parents. Accordingly, find out how much of the cake is left to the parents. Do you think this sharing was fair? Explain why.	Students have to explain whether the sharing in the question is fair by presenting their rationale.
Level 3	Three siblings aged 2, 3 and 4 share a birthday cake in proportion to their age. The older brother realizes that the younger brother's cake is very small and wants the cake to be shared equally among the siblings. How is this cake most easily shared equally between siblings, as the slices cannot be put together again and again? Please explain.	Students are asked to consider the conditions of equality and inequality together and explain their ways of thinking.

Table 3.4 (cont'd)

Level 2	The triplets share a birthday cake among themselves fairly. What fraction of the cake did each sibling get?	Students are asked to solve the question by considering the concept of justice. No explanation is requested.
Level 1	Write T for true and F for false statement. A greengrocer who shared 9 kg of oranges equally among 3 people gave 3 kg of oranges to each person.	Students are asked to solve the question by remembering the concept of justice.

The final analysis was presented in tables (and graphs) by reporting frequencies and percentages of core values per grade level, learning areas, sections, and the level of the core values. Additionally, to support the results of the study, several excerpts related to each core value with different grade levels, sections, learning areas, and levels were presented.

3.4 The Trustworthiness of the Research

Validity and reliability are the two main criteria for evaluating the quality of research in both quantitative and qualitative research, and these two main criteria should be considered in data collection, data analysis, data interpretation, and presentation of data results (Merriam & Tisdell, 2015). These two main criteria are generally used as internal validity, external validity and reliability in the quantitative research. However, the researchers cannot explain the quality of qualitative research studies using terms of validity and reliability due to the difference in the nature of qualitative and quantitative studies. According to

Lincoln and Guba (1985), the trustworthiness of the research is provided by credibility, transferability, dependability, and confirmability instead of internal validity, external validity, reliability and objectivity, respectively.

In qualitative research, credibility which is the first criterion to provide trustworthiness is related to internal validity. Internal validity is about the consistency of research findings with reality (Merriam & Tisdell, 2015). To ensure credibility in this study, the research problem was determined within the framework of the relevant literature. The data obtained in the research were evaluated as a result of the literature review and the accuracy of the results was ensured. The parts of the middle and high school mathematics textbooks, which are seen as the place where the core values are mentioned in the research, have been tried to increase their credibility by quoting directly. Moreover, triangulation was used to ensure credibility in this study by examining many articles and theses related to the core values in mathematics textbooks at different levels. The results of this current study were contrasted with the results of the previous similar research studies. Thus, the triangulation was satisfied by examining the previous studies.

The second criterion in qualitative research is transferability which is related to external validity. External validity indicates that the result of the current study may or may not be applicable to similar situations in different studies (Merriam & Tisdell, 2015). According to Merriam and Tisdell (2015), the strategy of rich and thick description is commonly used to satisfy the transferability of qualitative research studies. To ensure transferability, the research design, sample of the research, data collection tools, data collection process, data analysis and the result of the study were described in detail. Although the current study aimed to investigate the depth of the core values in the middle and high school mathematics textbooks of MoNE publications, the study can be transferred to different grade levels or private publications mathematics textbooks.

In qualitative research, dependability which is the third criterion to provide trustworthiness is related to reliability. The aim of the dependability is not to obtain the same results from the study. When the research is repeated, the aim of dependability is to provide consistency with the findings of the study (Merriam & Tisdell, 2015). The researcher used triangulation and the researcher's role to provide the dependability of the current study.

In qualitative research, the fourth criterion is confirmability which refers to objectivity. Although objectivity is not possible in qualitative research, the researcher must create an objective point of view away from subjective judgments and assumptions (Yıldırım & Şimşek, 2013). To ensure the objectivity of the current study, the researcher's role was explained in detail to reduce the bias of the researcher.

Moreover, there is a second researcher in the data analysis to investigate the depth of the core values in middle and high school mathematics textbooks and also to satisfy the reliability of the current research. This researcher is an assistant and Ph.D. student in mathematics education. She examined Numbers and Operation learning area in the 6th and Numbers and Algebra learning area in 10th-grade level mathematics textbooks. After, the results of both researchers were discussed to determine the common and different ideas, and have been tried to reach a consensus on the different ideas.

In qualitative studies, the percentage of reliability is checked to ensure the reliability of the research. The reliability of the research was calculated by using the reliability formula stated by Miles and Huberman (1994).

Reliability = number of agreements / (number of agreements + number of disagreements)

Reliability = 116 / (116+ 16) = 0.88 = 88%

For the research to be reliable, the percentage of reliability must be above 70% (Miles & Huberman, 1994). In the current study, the percentage of reliability was

calculated as 88%. This means that the data were collected and analyzed reliably from the textbooks while examining the core values in the mathematics textbooks.

3.5 The Researcher's Role

In qualitative research design, the role of the researcher is important to conduct and analyze the research study. While examining the documents, the researchers should approach critically, be objective, and report the result of the research study without interpreting it according to their own views (Creswell, 2007; Kıral, 2020). In the current research study, a female mathematics teacher who was a teacher in the middle school conducted and analyzed the study. The researcher was familiar with each level of middle school mathematics textbooks but she was not familiar with the four high school mathematics textbooks. The researcher collected the data from each level of middle and high school mathematics textbooks respectively. Also, the researcher examined and analyzed each level of books more than once at different times, and she compared the results to avoid mistakes. Therefore, the objectivity of the research study was tried to increase by the researcher. Also, the values that are important for the researcher are patience, honesty and respect.

CHAPTER 4

RESULTS

In this chapter, the results of this study are presented. The main purpose of the study was to investigate to what extent the core values emphasized in the mathematics curriculum in each grade level of middle school and high school mathematics textbooks published by MoNE in the 2022-2023 academic year. The results of the study is presented under three main sections: (i) core values in middle school mathematics textbooks, (ii) core values in high school mathematics textbooks, and (iii) similarities and differences of core values in the mathematics textbooks in terms of school levels.

4.1 Core Values in Middle School Mathematics Textbooks

The results in this part are reported under four sub-sections: the frequencies of core values in middle school mathematics textbooks, the frequencies of core values in the learning areas of middle school mathematics textbooks, the frequencies of core values in the related sections of middle school mathematics textbooks and the level of the core values in the middle school mathematics textbooks. After the fourth sub-section, examples of core values in the middle school mathematics textbooks are given.

4.1.1 The Frequencies of Core Values in Middle School Mathematics Textbooks

There are six units at each grade level in each middle school mathematics textbooks. The names of these chapters are presented in detail below according to

each grade level. Also, the number and percentage of content that has core values for each grade level are reported.

In the fifth-grade mathematics textbook, there are six units: Unit 1: Numbers and Operations (Natural Numbers, Operations with Natural Numbers), Unit 2: Numbers and Operations (Fractions, Operations with Fractions), Unit 3: Numbers and Operations (Decimal Notation, Percentages), Unit 4: Geometry and Measurement (Basic Concepts of Geometry, Triangles and Quadrilaterals), Unit 5: Data Processing (Data Collection and Evaluation, Length and Time Measurement), Unit 6: Geometry and Measurement (Measuring Area, Geometric Objects). There are a total of 794 contents in the fifth-grade mathematics textbook, and 97 of these contents include values. This means that 12.22% of the fifth-grade mathematics textbook contains values.

In the sixth-grade mathematics textbook, there are six chapters: Unit 1: Numbers and Operations (Operations with Natural Numbers, Factors and Multiples, Cluster), Unit 2: Numbers and Operations (Integers, Operations with Fractions), Unit 3: Numbers and Operations (Decimal Notation, Ratio), Unit 4: Algebra and Data Processing (Algebraic Expression, Data collection and evaluation, Data analysis), Unit 5: Geometry and Measurement (Angles, Area Measurement), Unit 6: Geometry and Measurement (Circle, Geometric Objects, Liquid Measure). There are a total of 1032 contents in the sixth-grade mathematics textbook, and 87 of these contents include values. This means that 8.43% of sixth-grade mathematics textbook contains values.

In the seventh-grade mathematics textbook, there are six chapters: Unit 1: Numbers and Operations (Operations with Integers), Unit 2: Numbers and Operations (Rational Numbers, Operations with Rational Numbers), Unit 3: Algebra (Algebraic Expression, Equality, and Equation), Unit 4: Numbers and Operations (Ratio and Proportion, Percentages), Unit 5: Geometry and Measurement (Lines and Angles, Polygons, Circle and Circular region), Unit 6: Data Processing and Geometry and Measurement (Data Analysis, View of Objects from Different

Directions). There are a total of 837 contents in the seventh-grade mathematics textbook, and 54 of these contents include values. This means that 6.45% of seventh-grade mathematics textbook contains values.

In the eighth-grade mathematics textbook, there are six chapters: Unit 1: Numbers and Operations (Factors and Multiples, Exponential Numbers), Unit 2: Numbers and Operations and Data Processing (Square Root Expressions, Data Analysis), Unit 3: Probability (Probability, Algebraic Expressions and Identities), Unit 4: Algebra (Linear Equations, Inequalities), Unit 5: Geometry and Measurement (Triangles, Congruence and Similarity), Unit 6: Geometry and Measurement (Transformation Geometry, Geometric Objects). There are a total of 950 contents in the eighth-grade mathematics textbook, and 47 of these contents include values. This means that 4.95% of eighth-grade mathematics textbook contains values. The percentage of the number of contents with core values in the middle school mathematics textbooks are given below in Table 4.1.

Table 4.1 The Percentage of Number of Contents with Core Values in Middle School Mathematics Textbooks

Grade Level	**Number of Contents**	**Number of Contents with Core Values**	**Percentage of Number of Contents with Core Values**
5th-grade	794	97	12.22%
6th-grade	1032	87	8.43%
7th-grade	837	54	6.45%
8th-grade	950	47	4.95%
Total	3613	285	7.88%

As seen in Table 4.1, 7.88% of the content includes core values in the middle school mathematics textbooks. The percentage of content covering values is highest (12.22%) in the 5th-grade mathematics textbook and it is the lowest (4.95%) in the 8th-grade mathematics textbook. The values regarding each core values are given in Table 4.2.

Table 4.2 The Frequencies and Percentages of the Core Values in Middle School Mathematics Textbooks

Core Values	**5th-Grade**	**6th-Grade**	**7th-Grade**	**8th-Grade**	**Total**
	f (%)	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Justice	13 (8.96)	15 (11.28)	11 (13.41)	7 (8.23)	46 (10.34)
Friendship	8 (5.52)	11 (8.27)	5 (6.10)	4 (4.70)	28 (6.29)
Honesty	1 (0.69)	0 (0)	0 (0)	1 (1.18)	2 (0.45)
Self-control	20 (13.79)	35 (26.31)	16 (19.51)	17 (20.00)	88 (19.78)
Patience	4 (2.76)	0 (0)	1 (1.22)	1 (1.18)	6 (1.35)
Respect	9 (6.21)	1 (0.75)	2 (2.44)	5 (5.88)	17 (3.82)
Love	11 (7.59)	14 (10.53)	13 (15.85)	12 (14.12)	50 (11.24)
Responsibility	30 (20.69)	26 (19.55)	11 (13.42)	14 (16.47)	81 (18.20)
Patriotism	39 (26.90)	21 (15.79)	19 (23.17)	15 (17.65)	94 (21.12)
Helpfulness	10 (6.90)	10 (7.52)	4 (4.88)	9 (10.59)	33 (7.42)
Total	145 (100)	133 (100)	82 (100)	85 (100)	445 (100)

Table 4.2 shows that the least addressed core value in middle school textbooks is honesty (n=2; 0.45), and the most addressed core value is patriotism (n=94; 21.12%). According to Table 4.2, all of the ten core values are observed in the fifth-grade mathematics textbook. The distribution of these ten core values in the fifth-grade mathematics textbook is as follows: justice (n=13; 8.96%), friendship (n=8; 5.52%), honesty (n=1; 0.69%), self-control (n=20; 13.79%), patience (n=4; 2.76%), respect (n=9; 6.21%), love (n=11; 7.59%), responsibility (n=30; 20.69%), patriotism (n=39; 26.89%) and helpfulness (n=10; 6.90%). The most mentioned

value in this textbook is patriotism (n=39), and the least mentioned value in the textbook is honesty (n=1).

Table 4.2 shows that two of the ten core values (honesty and patience) are not addressed in the sixth-grade mathematics textbook. The distribution of core values in the sixth-grade mathematics textbook is as follows: justice (n=15; 11.28%), friendship (n=11; 8.27%), self-control (n=35; 26.31%), respect (n=1; 0.75%), love (n=14; 10.53%), responsibility (n=26; 19.55%), patriotism (n=21; 15.79%) and helpfulness (n=10; 7.52%). The most mentioned core value in this textbook is self-control (n=35), and the least mentioned core value in the textbook is respect (n=1).

Table 4.2 shows that one of the ten core values (honesty) is not found in the seventh-grade mathematics textbook. The distribution of core values in the seventh-grade mathematics textbook is as follows: justice (n=11; 13.41%), friendship (n=5; 6.10%), self-control (n=16; 19.51%), patience (n=1; 1.22%), respect (n=2; 2.44%), love (n=13; 15.85%), responsibility (n=11; 13.42%), patriotism (n=19; 23.17%) and helpfulness (n=4; 4.88%). The most mentioned value in this textbook is patriotism (n=19), and the least mentioned value in the textbook is patience (n=1).

According to Table 4.2, all of the ten core values are included in the eighth-grade mathematics textbook. The distribution of core values in the eighth-grade mathematics textbook was is as follows: justice (n=7; 8.23%), friendship (n=4; 4.70%), honesty (n=1; 1.18%), self-control (n=17; 20.00%), patience (n=1; 1.18%), respect (n=5; 5.88%), love (n=12; 14.12%), responsibility (n=14; 16.47%), patriotism (n=15; 17.65%) and helpfulness (n=9; 10.59%). The most mentioned value in this textbook is self-control (n=17), and the least mentioned values in this textbook are patience and honesty (n=1).

The data in Table 4.1 and Table 4.2 shows although the number of content covering core values is lowest in the 8^{th} grade level, the number of core values addressed in 7^{th} grade level is lower than it is in the 8^{th} grade level. This is because there are multiple core values in the same content.

When the middle school mathematics textbooks at each grade level are examined together in terms of containing core values, the most common core value addressed in the mathematics textbooks is patriotism (n=94; 21.12%), and the least common addressed core value in the mathematics textbooks is honesty (n=2; 0.45%). Also, it is the fifth-grade mathematics textbook with the highest number of core values and the seventh-grade mathematics textbook with the least number of core values at middle school grade levels. According to the result obtained from Table 4.2, it is observed that the core values at each grade level mathematics textbook are not distributed in a balanced and homogeneous way.

4.1.2 The Frequencies of Core Values in the Learning Areas of Middle School Mathematics Textbooks

The middle school mathematics textbooks are examined to determine the frequencies of core values concerning to the learning areas. Learning areas in the fifth-grade mathematics textbook consist of three parts, “Numbers and Operations”, “Geometry and Measurement” and “Data Processing, in the sixth-grade mathematics textbook consist of four parts, “Numbers and Operations”, “Algebra”, “Geometry and Measurement” and “Data Processing”, in the seventh-grade mathematics textbook consist of four parts, “Numbers and Operations”, “Algebra”, “Geometry and Measurement” and “Data Processing”, and in the eighth-grade mathematics textbook consist of five parts, “Numbers and Operations”, “Algebra”, “Geometry and Measurement”, “Data Processing” and “Probability”.

The results regarding the frequencies and percentage of the core values in learning areas of middle school mathematics textbooks are given in Table 4.3.

Table 4.3 The Frequencies and Percentage of Core Values in the Learning Areas of Middle School Mathematics Textbooks

Learning Areas	**5th-grade** **f (%)**	**6th-grade** **f (%)**	**7th-grade** **f (%)**	**8th-grade** **f (%)**	**Total** **f (%)**
Numbers and Operation	108 (74.48)	88 (66.17)	52 (63.41)	33 (38.82)	281 (63.15)
Algebra	N/A	5 (3.76)	13 (15.85)	21 (24.71)	39 (8.76)
Geometry and Measurement	8 (5.52)	24 (18.05)	12 (14.63)	6 (7.06)	50 (11.24)
Data Processing	29 (20)	16 (12.03)	5 (6.10)	14 (16.47)	64 (14.38)
Probability	N/A	N/A	N/A	11 (12.94)	11 (2.47)
Total	145 (100)	133 (100)	82 (100)	85 (100)	445 (100)

Table 4.3 shows that there are a total of 445 core values distributed among different learning areas of the middle school mathematics textbooks. The highest number of core values is in the Numbers and Operation learning area (n=281; 63.15%). As seen in Table 4.3, among the learning areas covered in the fifth-grade mathematics textbook, the highest number of core values is in the Numbers and Operations learning area (n=108; 74.48%), and the lowest number of core values is in the Geometry and Measurement learning area (n=8; 5.52%). Furthermore, among the learning areas covered in the sixth-grade mathematics textbook, the highest number of core values is in the Numbers and Operations learning area (n=88; 66.17%), and the lowest number of core values is in the Algebra learning area (n=5; 3.76%). In the seventh-grade mathematics textbook, the highest number of core values is again in the Numbers and Operations learning area (n=52; 63.41%), and the lowest number of core values is in the Data Processing learning area (n=5; 6.10%). In the eighth-grade mathematics textbook, the Numbers and Operations learning area has

the highest number of core values (n=33; 38.82%), and the Geometry and Measurement learning area (n=6; 7.06%) has the lowest number of core values.

4.1.3 The Frequencies of Core Values in the Related Sections of Middle School Mathematics Textbooks

The sections of middle school mathematics textbooks are analyzed under four groups; launch, explore, exercises/assessments, and end-of-the-chapter questions. In middle school mathematics textbooks, there are core values in 285 sections, and every section of middle school mathematics textbooks, which includes launch, explore, exercises/assessments, and end-of-the-chapter questions, contains values. 64 of the 285 related sections of the core values in the middle school mathematics textbooks are in the launch section, 110 in the explore section, 88 in the exercises/assessments section, and 23 in the end of the chapter questions section. In terms of grade level, core values are included in 97 sections of the fifth-grade mathematics textbook, 87 sections of the sixth-grade mathematics textbook, 54 sections of the seventh-grade mathematics textbook, and 47 sections of the eighth-grade mathematics textbook.

The numbers of related sections containing core values in mathematics textbooks of the middle school level are given in Table 4.4.

Table 4.4 The Numbers of Related Sections Containing Core Values in Middle School Mathematics Textbooks

Sections	**5th-grade**	**6th-grade**	**7th-grade**	**8th-grade**	**Total**
Launch	25	9	19	11	64
Explore	39	47	19	5	110
Exercises/ Assessment	27	26	9	26	88
End of the Chapter Questions	6	5	7	5	23
Total	97	87	54	47	285

According to Table 4.4, there are core values in 97 sections of the fifth-grade mathematics textbook. In detail, core values are found in 25 launch sections, 39 explore sections, 27 exercises/assessment sections, and 6 end-of-the-chapter questions sections. The sixth-grade mathematics textbook contains 87 sections on core values, including 9 launch sections, 47 explore sections, 26 exercises/assessments, and 5 end-of-the-chapter questions. The seventh-grade mathematics textbook contains 54 sections on core values, including 19 launch sections, 19 explore sections, 9 exercises/assessment sections, and 7 end-of-the-chapter questions. Lastly, the eighth-grade mathematics textbook contains 47 sections on core values, including 11 launch sections, 5 explore sections, 26 exercises/assessments sections, and 5 end-of-the-chapter questions.

The results regarding the frequencies and percentage of the core values in related sections of middle school mathematics textbooks are given in Table 4.5.

Table 4.5 The Frequencies and Percentage of Core Values in the Related Sections of Middle School Mathematics Textbooks

Sections	**5th-grade f (%)**	**6th-grade f (%)**	**7th-grade f (%)**	**8th-grade f (%)**	**Total f (%)**
Launch	36 (24.83)	14 (10.53)	29 (35.37)	19 (22.35)	98 (22.02)
Explore	58 (40.00)	71 (53.38)	25 (30.49)	8 (9.41)	162 (36.41)
Exercises/ Assessment	41 (28.27)	39 (29.32)	16 (19.51)	50 (58.83)	146 (32.81)
End of the Chapter Questions	10 (6.90)	9 (6.77)	12 (14.63)	8 (9.41)	39 (8.76)
Total	145 (100)	133 (100)	82 (100)	85 (100)	445 (100)

As seen in Table 4.5, in the fifth and sixth-grade mathematics textbook, the core values are mostly included in the explore section (n=58; 40.00%, and n=71; 53.38%, respectively), and they are covered at least in the end-of-the-chapter questions section (n=10; 6.90%, and n=9; 6.77%, respectively). For seventh grade, the core values are mostly included in the launch section (n=29; 35.37%), and they are covered at least in the end of the chapter questions section (n=12; 14.63%). Finally, in the eighth grade, the core values are mostly included in the exercises/assessment section (n=50; 58.83%), and they are covered at least in the explore and the end of the chapter questions sections (n=8; 9.41%).

When the distribution of core values in the related sections of middle school mathematics textbooks is examined, it is seen that content containing a total of 445 values are found. Besides, findings demonstrated that the section containing the most values is the Explore section with 162 values (36.41%), and the section

containing the least values is the End of the chapter questions section with 39 values (8.76%). Moreover, the results indicated that the core values are not distributed equally into the four sections in the textbooks at each grade level.

4.1.4 The Level of Core Values in Middle School Mathematics Textbooks

The middle school mathematics textbooks are analyzed to determine the level of core values by using the framework of "allowance of the task for understanding the depth of the values under consideration". Table 4.6 demonstrates at what level the core values in the middle school mathematics textbooks are included.

Table 4.6 The Level of Core Values in Middle School Mathematics Textbooks

Levels	**5th-grade**	**6th-grade**	**7th-grade**	**8th-grade**	**Total**
Level 0	77	82	47	49	255
Level 1	46	33	25	31	135
Level 2	15	11	8	4	38
Level 3	5	2	0	0	7
Level 4	2	5	2	1	10
Level 5	0	0	0	0	0
Total	145	133	82	85	445

According to Table 4.6, no core values are addressed at level 5 in the middle school mathematics textbooks. The core values in the middle school mathematics textbooks are generally at level 0, and only a few core values are observed at levels 3 and 4. As seen in Table 4.6, the distribution of the level of core values in the 5th-grade mathematics textbook is as follows: level 0 (n=77), level 1 (n=46), level 2 (n=15), level 3 (n=5), level 4 (n=2) and level 5 (n=0). In this grade level, most of

the core values are covered at level 0 (n=77), and only two examples are found at level 4. In the sixth-grade mathematics textbook, the distribution of the level of core values is as follows: level 0 (n=82), level 1 (n=33), level 2 (n=11), level 3 (n=2), level 4 (n=5) and level 5 (n=0). In this grade level, most of the core values are covered at level 0 (n=82), and only two examples are found at level 3. In the seventh and eighth grades mathematics textbook, the core values are at levels 0-2, no core values are available at level 3, and only three examples are found at level 4. The distribution of the level of core values in the 7th and 8th-grade mathematics textbooks is as follows: level 0 (n=47), level 1 (n=25), level 2 (n=8), level 3 (n=0), level 4 (n=2) and level 5 (n=0) for 7th-grade level; and level 0 (n=49), level 1 (n=31), level 2 (n=4), level 3 (n=0), level 4 (n=1) and level 5 (n=0) for 8th-grade level.

Examples of core values observed in the middle school mathematics textbooks are presented below, along with explanations of core values and their levels, learning areas, and sections in the textbooks. While the examples in the textbooks contain a single core value, sometimes they can simultaneously contain several different core values at the same time. Below, at least two examples are presented for each level, starting from level 0 up to level 4.

The first example is related to the value of responsibility with level 0.

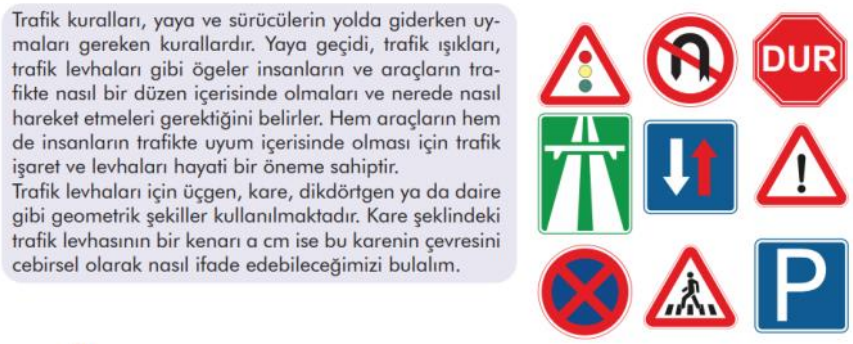


Figure 4. 1 A sample content about the core value of responsibility with level 0 (published in 6th-grade mathematics textbook (MoNE, 2021, p. 136))

The translation of the question is:

> “Traffic rules are rules that pedestrians and drivers must follow. Elements such as pedestrian crossings, traffic lights, and traffic signs determine how people and vehicles should be in traffic and how they should move. Traffic signs and plates are of vital importance for both vehicles and people to be in harmony in traffic. Geometric shapes such as triangles, squares, rectangles, or circles are used for traffic signs. If one side of a square traffic sign is a cm, let's find out how we can express the perimeter of this square algebraically.”

The example includes the values of patriotism and responsibility in the Explore section of the Algebra learning areas of the 6th-grade mathematics textbook. The responsibility value was found to be at level 0. An expression of the responsibility value was not explicitly stated in the question, however, since obeying the traffic rules is a responsibility to society and the environment, this content is accepted a as an example of responsibility value. The fact that both drivers and pedestrians must comply with traffic rules shows such a responsibility of people, and thus it was found that the question contained the value of responsibility at level 0.

The next example is related to the value of patience at level 0.

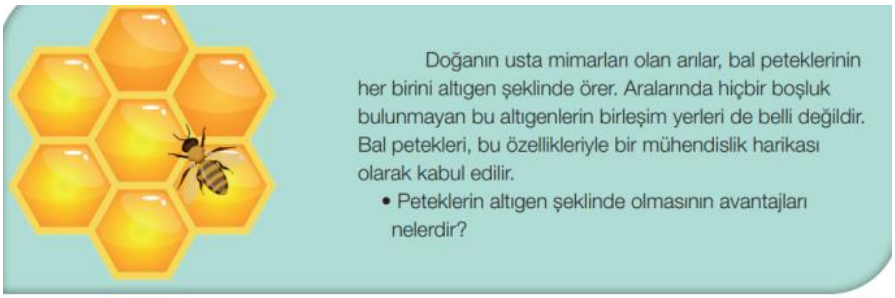


Figure 4. 2 A sample content about the core value of patience with level 0 (published in 7th-grade mathematics textbook (MoNE, 2021, p. 203))

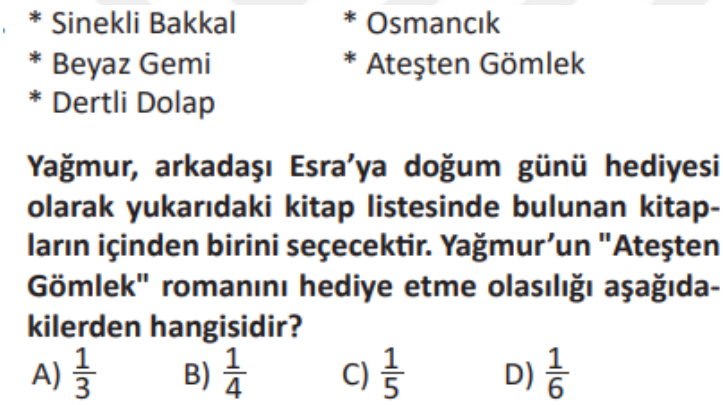
The translation of the question is:

> “Bees, the master architects of nature, weave each of their honeycombs in a hexagonal shape. The joints of these hexagons, which have no spaces

between them, are also unknown. With these features, honeycombs are considered an engineering marvel. What are the advantages of honeycombs being hexagonal?"

This example includes the values of patience at level 0 in the Launch section of the Geometry learning areas of the 7th-grade mathematics textbook. In the question, for bees working with great devotion and determination while making honeycombs and creating an engineering marvel shows that it includes the value of patience. Although it does not explicitly include the value of patience in the question, the bees' making their honeycombs with devotion and determination shows that it includes the value of patience at level 0.

The next example is related to the value of friendship at level 1.


* Sinekli Bakkal
* Beyaz Gemi
* Dertli Dolap
* Osmancık
* Ateşten Gömlek

Yağmur, arkadaşı Esra'ya doğum günü hediyesi olarak yukarıdaki kitap listesinde bulunan kitapların içinden birini seçecektir. Yağmur'un "Ateşten Gömlek" romanını hediye etme olasılığı aşağıdakilerden hangisidir?

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{5}$ D) $\frac{1}{6}$

Figure 4. 3 A sample content about the core value of friendship with level 1 (published in 8th-grade mathematics textbook (MoNE, 2021, p. 106))

The question asks:

"Yağmur will choose one of the books in the book list above as a birthday gift for her friend Esra. What is the probability that Yağmur will present the novel "The Shirt of Flame" as a gift?"

The example includes the values of love and friendship in the End-of-the-chapter question section of the Probability learning areas of the 8th-grade mathematics textbook. Yağmur's gift to her friend on her birthday shows that it is an example of

friendship value. Also, the word friend, which is written in the example, shows that it includes the value of friendship. Buying a gift for a friend is an example of level 1 as it only reminds us of the value of friendship.

The next example is related to respect value at level 1.

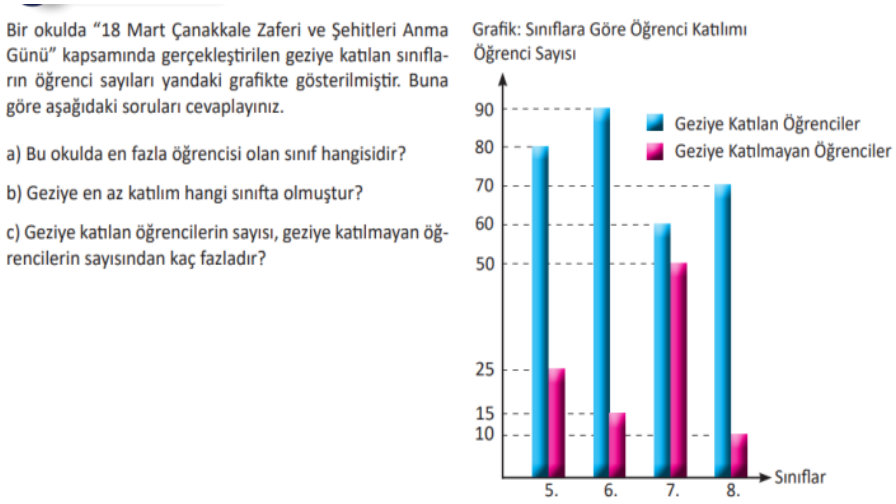


Figure 4. 4 A sample content about the core value of respect with level 1 (published in 8th-grade mathematics textbook (MoNE, 2021, p. 67))

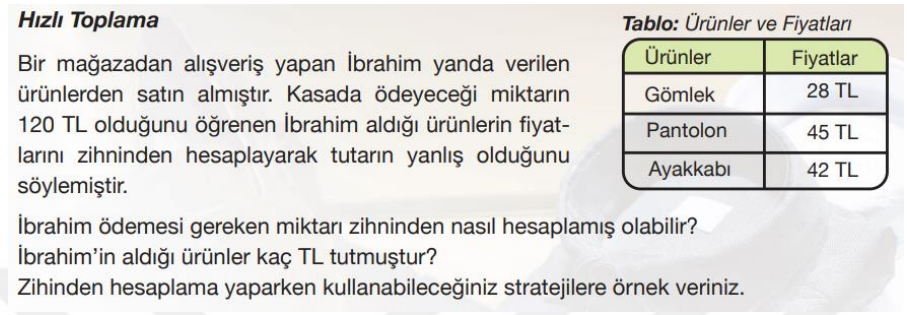
The question asks:

> "The number of students of the classes that participated in the tour held in a school within the scope of "18 March Çanakkale Victory and Martyrs' Day" is shown in the chart above. Accordingly, answer the following questions. A) Which class has the most students in this school? B) In which class was the least participation in the trip? C) By how many times is the number of students participating in the trip greater than the number of students not participating in the trip?"

The example includes the values of patriotism and respect in the Exercises/Assessments section of the Data Processing learning areas of the 8th-grade mathematics textbook. Organizing the Çanakkale Victory and Martyrs' Day program in a school and the participation of the students in the tour shows respect for the martyrs. The respect and patriotism value is determined to be at level 1, as it

reminds the value of respect that students participate in this activity by making a trip within the scope of the Çanakkale Victory and Martyrs' Commemoration Program.

The next example is related to the value of honesty at level 2.



Hızlı Toplama

Bir mağazadan alışveriş yapan İbrahim yanda verilen ürünlerden satın almıştır. Kasada ödeyeceği miktarın 120 TL olduğunu öğrenen İbrahim aldığı ürünlerin fiyatlarını zihninden hesaplayarak tutarın yanlış olduğunu söylemiştir.

Tablo: *Ürünler ve Fiyatları*

Ürünler	Fiyatlar
Gömlek	28 TL
Pantolon	45 TL
Ayakkabı	42 TL

İbrahim ödemesi gereken miktarı zihninden nasıl hesaplamış olabilir?
İbrahim'in aldığı ürünler kaç TL tutmuştur?
Zihinden hesaplama yaparken kullanabileceğiniz stratejilere örnek veriniz.

Figure 4. 5 A sample content about the core value of honesty with level 2 (published in 5th-grade mathematics textbook (MoNE, 2021, p. 40))

The translation of question is:

> "İbrahim, who was shopping in a store, bought the products given in the table above. Learning that the amount he would pay at the cash desk was 120 Turkish liras, İbrahim calculated the prices of the products he bought in his mind and said that the amount was wrong. How could İbrahim have mentally calculated the amount he had to pay? How much did the products İbrahim bought cost? Give examples of strategies you can use when calculating mentally."

The example includes the values of self-control and honesty in the Launch section of the Numbers and Operation learning areas of the 5th-grade mathematics textbook. İbrahim's being truthful to the cashier by noticing the mistake made at the cashier while shopping is an example of the value of honesty. The honesty value was found to be at level 2, as it makes the students think about the value of honesty without expecting an explanation.

The next example is also related to level 2 of the helpfulness value.

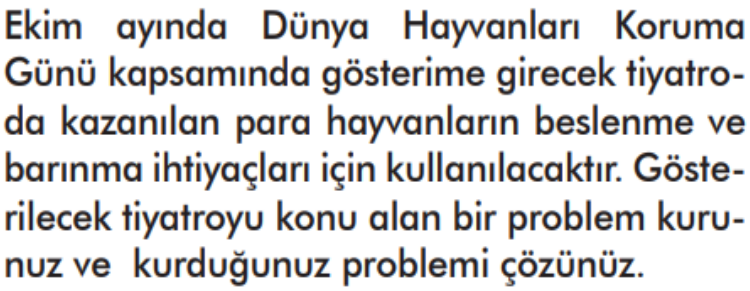


Figure 4. 6 A sample about the core value of helpfulness with level 2 (published in 6th-grade mathematics textbook (MoNE, 2021, p. 26))

The question asks:

> "The money earned in the theater, which will be released in October as part of World Animal Day, will be used for the feeding and sheltering needs of the animals. Pose a problem about the theater to be shown and solve the problem."

The example includes the values of justice, friendship, and helpfulness in the Exercises/Assessment section of the Numbers and Operation learning areas of the 6th-grade mathematics textbook. This is an example of helpfulness value as it addresses the issue of meeting the needs of animals with the money collected from the theater that will be released on World Animal Protection Day. The helpfulness value is assessed to be at level 2 as the example asks the students to solve the question by considering the value of helpfulness without an explanation.

The next example is related to the value of patriotism at level 3.

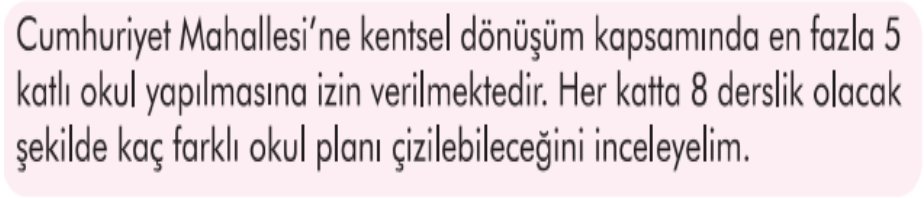


Figure 4. 7 A sample content about the core value of patriotism with level 3 (published in 6th-grade mathematics textbook (MoNE, 2021, p. 30))

The question asks:

> "It is allowed to build a school with a maximum of 5 floors within the scope of the urban transformation in the Cumhuriyet District. Let's examine how many different school plans can be drawn with 8 classrooms on each floor."

This example includes the value of patriotism with level 3 in the Explore section of the Numbers and Operation learning areas of the 6th-grade mathematics textbook. In the example given above, it has been stated that there are some rules for building a school in the Cumhuriyet District and that the desired buildings must be built in accordance with these rules. Thus, the construction of a school by the laws and rules shows that it contains the value of patriotism. This example fits in level 3 as it requires building a school by thinking in terms of obeying the rules and laws as an indicator of patriotism.

Another example is also related to the value of love at level 3.

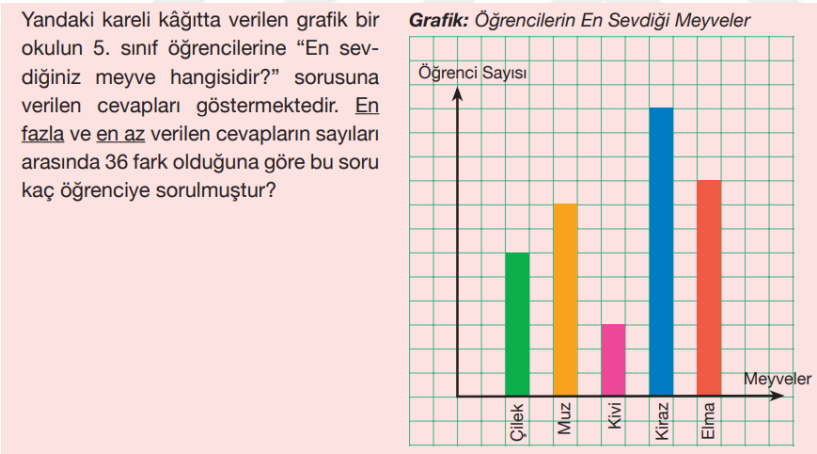


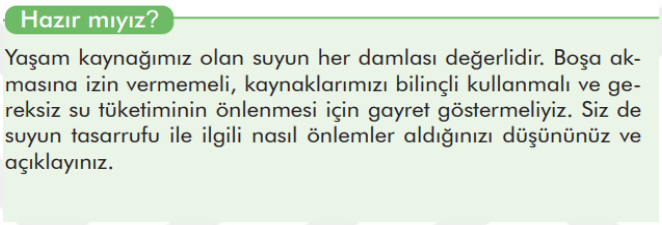
Figure 4. 8 A sample content about the core value of love with level 3 (published in 5th-grade mathematics textbook (MoNE, 2021, p. 288))

The question asks:

> "The graphic given on the squared paper on the right asks 5th-graders of a school, "What is your favorite fruit?" shows the answers to the question. How many students were asked this question since there was a difference of 36 between the maximum and the least number of answers?"

The example includes the value of love with level 3 at the End of the chapter question section of the Data Processing learning areas of the 5th-grade mathematics textbook. Asking fifth-grade students what their favorite fruit is in the question is a clear example of the value of love. Students gave their answers to their favorite fruits and a column chart was created accordingly. From the column chart, it is seen which fruit is liked more or less. Trying to find the desired number of students in the fifth grade by considering the most liked and least liked fruits together is an example of level 3 of the love value.

The next example is related to the value of self-control at level 4.


Hazır mıyız?

Yaşam kaynağımız olan suyun her damlası değerlidir. Boşa akmasına izin vermemeli, kaynaklarımızı bilinçli kullanmalı ve gereksiz su tüketiminin önlenmesi için gayret göstermeliyiz. Siz de suyun tasarrufu ile ilgili nasıl önlemler aldığınızı düşününüz ve açıklayınız.

Figure 4. 9 A sample content about the core value of self-control with level 4 (published in 6th-grade mathematics textbook (MoNE, 2021, p. 229))

The question asks:

> "Every drop of water, which is our source of life, is precious. We should not let it flow to waste; we should use our resources consciously and strive to prevent unnecessary water consumption. Think about and explain how you take measures to save water."

The example includes the values of responsibility, patriotism, and self-control in the Launch section of the Geometry and Measurement learning areas of the 6th-grade mathematics textbook. The self-control value was found to be at level 4. Asking a student to think about the kind of precautions to take regarding water use includes the expression of self-control value to control their behavior. In addition, mentioning the measures taken regarding the use of water in response, that is, talking about how the behaviors are and how they make changes in their behaviors, shows that the value of self-control falls under level 4.

The next example is also related to justice value at level 4.

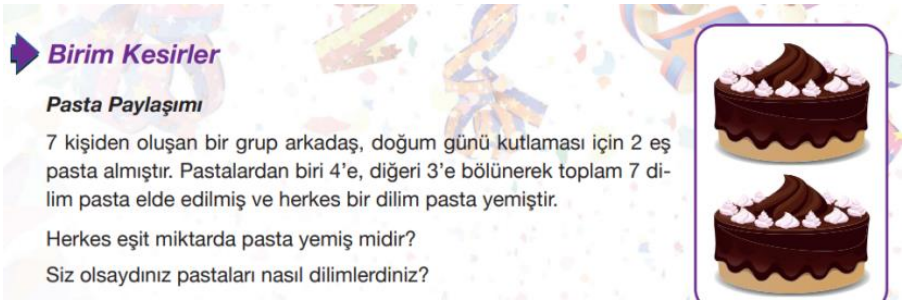


Figure 4. 10 A sample content about the core value of justice with level 4 (published in 5th-grade mathematics textbook (MoNE, 2021, p. 87))

The question asks:

> "A group of 7 friends bought 2 equal cakes for a birthday celebration. By dividing one of the cakes into 4 and the other into 3, a total of 7 slices of cake were obtained and everyone ate a slice of cake. Did everyone eat the same amount of cake? How would you slice the cakes?"

The example includes the values of love, friendship, and justice in the Launch section of the Numbers and Operation learning areas of the 5th-grade mathematics textbook. In the example, the sharing of 2 equal cakes among seven friends and asking whether everyone ate an equal amount of cake includes the equal treatment part of the justice value. The fact that the task asks whether the cakes eaten together are in equal amounts and that requests an explanation indicates that the value of justice is at level 4.

4.2 Core Values in High School Mathematics Textbooks

In this part, the extent to which the core values are included in each grade level of high school mathematics textbooks is reported. The results are presented in four sub-sections: the frequencies of core values in high school mathematics textbooks, the frequencies of core values in the learning areas of high school mathematics textbooks, the frequencies of core values in the related sections of high school mathematics textbooks, and the level of the core values in the high school

mathematics textbooks. After the fourth sub-section, examples of core values in the content of high school mathematics textbooks are given.

4.2.1 The Frequencies of Core Values in High School Mathematics Textbooks

The units in the high school mathematics textbooks are explained in detail below according to each grade level. Also, it is stated how much of the content in the mathematics textbooks at each grade level has core values and what percentage of the textbooks contain values.

In the ninth-grade mathematics textbook, there are five units: Unit 1: Numbers and Algebra (Logic), Unit 2: Numbers and Algebra (Cluster), Unit 3: Numbers and Algebra (Equations and Inequalities), Unit 4: Geometry (Triangles), Unit 5: Data, Counting and Probability (Data). There are a total of 1103 contents in the ninth-grade mathematics textbook, and 52 of these contents include values. This means that 4.71% of ninth-grade mathematics textbook contains values.

In the tenth-grade mathematics textbook, there are six units: Unit 1: Data, Counting and Probability (Counting and Probability), Unit 2: Numbers and Algebra (Functions), Unit 3: Numbers and Algebra (Polynomials), Unit 4: Numbers and Algebra (Quadratic Equation), Unit 5: Geometry (Quadrilaterals and Polygons), Unit 6: Geometry (Solid Geometry). There are a total of 1013 contents in the tenth-grade mathematics textbook, and 38 of these contents include values. This means that 3.75% of tenth-grade mathematics textbook contains values.

In the eleventh-grade mathematics textbook, there are seven units: Unit 1: Geometry (Trigonometry), Unit 2: Geometry (Analytic Geometry), Unit 3: Numbers and Algebra (Applications in Functions), Unit 4: Numbers and Algebra (Equation and Inequalities Systems), Unit 5: Geometry (Circle and Circular Region), Unit 6: Geometry (Solid Geometry). Unit 7: Data, Counting, and Probability (Probability). There are a total of 705 contents in the eleventh-grade

mathematics textbook, and 26 of these contents include values. This means that 3.69% of eleventh-grade mathematics textbook contains values.

In the twelfth-grade mathematics textbook, there are seven units: Unit 1: Numbers and Algebra (Exponential and Logarithmic Functions), Unit 2: Numbers and Algebra (Sequences), Unit 3: Geometry (Trigonometry), Unit 4: Geometry (Transformations), Unit 5: Numbers and Algebra (Derivative), Unit 6: Numbers and Algebra (Integral). Unit 7: Geometry (Analytic Geometry). There are a total of 1157 contents in the twelfth-grade mathematics textbook, and 19 of these contents include values. This means that 1.64% of the twelfth-grade mathematics textbook contain values. The percentage of the number contents with core values in the high school mathematics textbooks are given below in Table 4.7.

Table 4.7 The Percentage of Number of Contents with Core Values in High School Mathematics Textbooks

Grade Level	**Number of Contents**	**Number of Contents with Core Values**	**Percentage of Number of Contents with Core Values**
9th-grade	1103	52	4.71%
10th-grade	1013	38	3.75%
11th-grade	705	26	3.69%
12th-grade	1157	19	1.64%
Total	3978	135	3.39%

As seen in Table 4.7., 3.39% of the content includes core values in the high school mathematics textbooks. The percentage of content covering values is highest (4.71%) in the 9th-grade mathematics textbook and it is the lowest (1.64%) in the

12th-grade mathematics textbook. The values regarding each core values are given in Table 4.8.

Table 4.8 The Frequencies and Percentage of the Core Values in High School Mathematics Textbooks

	9th-grade	**10th-grade**	**11th-grade**	**12th-grade**	**Total**
Core Values	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Justice	5 (6.17)	3 (5.26)	3 (9.10)	2 (4.44)	13 (6.02)
Friendship	6 (7.41)	4 (7.02)	0 (0)	1 (2.22)	11 (5.10)
Honesty	3 (3.70)	1 (1.76)	1 (3.03)	1 (2.22)	6 (2.78)
Self-control	17 (20.99)	3 (5.26)	6 (18.18)	8 (17.78)	34 (15.74)
Patience	1 (1.23)	0 (0)	0 (0)	1 (2.22)	2 (0.92)
Respect	4 (4.94)	5 (8.77)	4 (12.12)	5 (11.11)	18 (8.33)
Love	11 (13.58)	11 (19.30)	2 (6.06)	4 (8.89)	28 (12.96)
Responsibility	11 (13.58)	10 (17.54)	5 (15.15)	8 (17.78)	34 (15.74)
Patriotism	17 (20.99)	11 (19.30)	10 (30.30)	8 (17.78)	46 (21.30)
Helpfulness	6 (7.41)	9 (15.75)	2 (6.06)	7 (15.56)	24 (11.11)
Total	81 (100)	57 (100)	33 (100)	45 (100)	216 (100)

Table 4.8 shows that the least addressed core value in high school textbooks is patience (n=2; 0.92), and the most addressed core value is patriotism (n=46; 21.30%). According to Table 4.8, all of the ten core values are observed in the ninth-grade mathematics textbook. The distribution of these ten core values in the ninth-grade mathematics textbook is as follows: justice (n=5; 6.17%), friendship (n=6; 7.41%), honesty (n=3; 3.70%), self-control (n=17; 20.99%), patience (n=1;

1.23%), respect (n=4; 4.94%), love (n=11; 13.58%), responsibility (n=11; 13.58%), patriotism (n=17; 20.99%) and helpfulness (n=6; 7.41%). The most mentioned value in this textbook is self-control and patriotism (n=17), and the least mentioned value in the textbook is patience (n=1).

Table 4.8 shows that one of the ten core values (patience) are not addressed in the tenth-grade mathematics textbook. The distribution of core values in the tenth-grade mathematics textbook is as follows: justice (n=3; 5.26%), friendship (n=4; 7.02%), honesty (n=1; 1.76%), self-control (n=3; 5.26%), respect (n=5; 8.77%), love (n=11; 19.30%), responsibility (n=10; 17.54%), patriotism (n=11; 19.30%) and helpfulness (n=9; 15.79%). The most mentioned value in this textbook is love and patriotism (n=11), and the least mentioned value in the textbook is honesty (n=1).

Table 4.8 shows that two of the ten core values (friendship and patience) are not addressed in the eleventh-grade mathematics textbook. The distribution of core values in the eleventh-grade mathematics textbook is as follows: justice (n=3; 9.10%), honesty (n=1; 3.03%), self-control (n=6; 18.18%), respect (n=4; 12.12%), love (n=2; 6.06%), responsibility (n=5; 15.15%), patriotism (n=10; 30.30%) and helpfulness (n=2; 6.06%). The most mentioned value in this textbook is patriotism (n=10), and the least mentioned value in the textbook is honesty (n=1).

According to Table 4.8, all of the ten core values are included in the twelfth-grade mathematics textbook. The distribution of core values in the twelfth-grade mathematics textbook is as follows: justice (n=2; 4.44%), friendship (n=1; 2.22%), honesty (n=1; 2.22%), self-control (n=8; 17.78%), patience (n=1; 2.22%), respect (n=5; 11.11%), love (n=4; 8.89%), responsibility (n=8; 17.78%), patriotism (n=8; 17.78%) and helpfulness (n=7; 15.56%). The most mentioned values in this textbook are self-control, responsibility, and patriotism (n=8), and the least mentioned values in the textbook are friendship, honesty, and patience (n=1).

The data in Table 4.7 and Table 4.8 shows although the number of content covering core values is lowest in the 12^{th} grade level, the number of core values

addressed in 11th grade level is lower than it is in the 12th grade level. This is because there are multiple core values in the same content.

When the high school mathematics textbooks at each grade level are examined together in terms of containing core values, the most common core value addressed in the mathematics textbooks is patriotism (n=46; 21.30%), and the least common addressed core value in the mathematics textbooks is patience (n=2; 0.92%). Also, it is the ninth-grade mathematics textbook with the highest number of core values and the eleventh-grade mathematics textbook with the least number of core values at high school grade levels. According to Table 4.8, it is observed that the core values at each grade level mathematics textbook are not distributed in a balanced and homogeneous way.

4.2.2 The Frequencies of Core Values in the Learning Areas of High School Mathematics Textbooks

High school mathematics textbooks of MoNE are examined to identify the frequencies of core values with respect to the learning areas. Three learning areas are included in the 9th-11th-grade mathematics textbook, “Numbers and Algebra”, “Geometry”, and “Data, Counting and Probability”, and the twelfth-grade mathematics textbook consists of two learning areas, “Numbers and Algebra” and “Geometry”.

The results regarding the frequencies of the core values in learning areas of high school mathematics textbooks are given in Table 4.9.

Table 4.9 The Frequencies of Core Values in the Learning Areas of High School Mathematics Textbooks

Learning Areas	**9th-grade**	**10th-grade**	**11th-grade**	**12th-grade**	**Total**
	f (%)	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Numbers and Algebra	65 (80.25)	29 (50.88)	12 (36.36)	35 (77.78)	141 (65.28)
Data, Counting and Probability	12 (14.81)	19 (33.33)	5 (15.15)	N/A	36 (16.67)
Geometry	4 (4.94)	9 (15.79)	16 (48.48)	10 (22.22)	39 (18.05)
Total	81 (100)	57 (100)	33 (100)	45 (100)	216 (100)

Table 4.9 shows that there are a total of 216 core values distributed among different learning areas of the high school mathematics textbooks. The highest number of core values is in the Numbers and Algebra learning area (n=141; 65.28%). As seen in Table 4.11, among the learning areas covered in the ninth-grade mathematics textbook, the highest number of core values is in the Numbers and Algebra learning area (n=65; 80.25%), and the lowest number of core values is in the Geometry learning area (n=4; 4.94%). Furthermore, among the learning areas covered in the tenth-grade mathematics textbook, the highest number of core values is in the Numbers and Algebra learning area (n=29; 50.88%), and the lowest number of core values is in the Geometry learning area (n=9; 15.79%). In the eleventh-grade mathematics textbook, the highest number of core values is in the Geometry learning area (n=16; 48.48%), and the lowest number of core values is in the Data, Counting and Probability learning area (n=5; 15.15%). In the twelfth-grade mathematics textbook, the Numbers and Algebra learning area has the highest number of core values (n=35; 77.78%), and the Geometry learning area (n=10; 22.22%) has the lowest number of core values.

4.2.3 The Frequencies of Core Values in the Related Sections of High School Mathematics Textbooks

The sections of the high school mathematics textbooks are analyzed in four groups; launch, explore, exercises/assessment, and end-of-the-chapter questions. There is no section of launch in the ninth-grade mathematics textbook. In high school mathematics textbooks, there are core values in 135 sections. The launch, explore, exercises/assessments, and end of the chapter questions sections of high school mathematics textbooks contain values except for the launch section in the 12th-grade mathematics textbook. 7 of the 135 related sections of the core values in the high school mathematics textbooks are in the launch section, 77 in the explore section, 22 in the exercises/assessments section, and 29 in the end of the chapter questions section. In terms of grade level, core values are included in 52 sections of the ninth-grade mathematics textbook, 38 sections of the tenth-grade mathematics textbook, 26 sections of the eleventh-grade mathematics textbook, and 19 sections of the twelfth-grade mathematics textbook.

The numbers of related sections containing core values in mathematics textbooks of the high school level are given in Table 4.10.

Table 4.10 The Distribution of Core Values for Each Section of the High School Mathematics Textbooks

Sections	**9th-grade**	**10th-grade**	**11th-grade**	**12th-grade**	**Total**
Launch	N/A	4	3	0	7
Explore	34	21	8	14	77
Exercises/Assessment	10	5	4	3	22
End-of-the-Chapter Questions	8	8	11	2	29
Total	52	38	26	19	135

According to Table 4.10, there are core values in 52 sections of the ninth-grade mathematics textbook. In detail, core values are found in 34 explore sections, 10 exercises/assessment sections, and 8 end-of-the-chapter questions. The tenth-grade mathematics textbook contains 38 sections on core values, including 4 launch sections, 21 explore sections, 5 exercises/assessments sections, and 8 end-of-the-chapter questions. The eleventh-grade mathematics textbook contains 26 sections on core values, including 3 launch sections, 8 explore sections, 4 exercises/assessments sections, and 11 end of the chapter questions sections. Lastly, the twelfth-grade mathematics textbook contains 19 sections on core values, including 0 launch sections, 14 explore sections, 3 exercises/assessments sections, and 2 end-of-the-chapter questions sections.

The results regarding the frequencies and percentage of the core values in related sections of high school mathematics textbooks are given in Table 4.11.

Table 4.11 The Frequencies and Percentage of Core Values in the Related Sections of High School Mathematics Textbooks

	9th-grade	**10th-grade**	**11th-grade**	**12th-grade**	**Total**
Sections	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Launch	N/A	6 (10.53)	3 (9.09)	0 (0)	9 (4.17)
Explore	54 (66.67)	34 (59.65)	10 (30.30)	35 (77.78)	133 (61.57)
Exercises/ Assessment	15 (18.52)	8 (14.03)	5 (15.15)	7 (15.55)	35 (16.20)
End of the Chapter Questions	12 (14.81)	9 (15.79)	15 (45.46)	3 (6.67)	39 (18.06)
Total	81 (100)	57 (100)	33 (100)	45 (100)	216 (100)

As seen in Table 4.11, the core values are mostly included in the explore section (n=54; 66.67%), and they are covered at least in the end of the chapter questions section (n=12; 14.81%) in the ninth grade mathematics textbook. Furthermore, in the tenth grade, the core values are mostly included in the explore section (n=34; 59.65%), and they are covered at least in the launch section (n=6; 10.53%). For eleventh-grade, the core values are mostly included in the end of the chapter questions section (n=15; 45.46%), and they are covered at least in the launch section (n=3; 9.09%). Finally, in twelfth grade, the core values are mostly included in the explore section (n=35; 77.78%), and they are covered at least in the end of the chapter questions section (n=3; 6.67%).

When the distribution of core values in the related sections of high school mathematics textbooks is examined, it is seen that content containing a total of 216 values are found. Besides, findings demonstrated that the section containing the most valued content is the Explore section with 133 values (61.57%), and the section containing the least valued content is the Launch section with 9 values (4.17%). Moreover, the results indicated that the core values are not distributed equally into the four sections in the textbooks at each grade level.

4.2.4 The Level of Core Values in High School Mathematics Textbooks

The high school level mathematics textbooks are analyzed to determine the level of core values by using the framework of "allowance of the task for understanding the depth of the values under consideration". Table 4.12 demonstrates at what level the core values in the high school mathematics textbooks are included.

Table 4.12 The Level of Core Values in the High School Mathematics Textbooks

Levels	**9th-grade**	**10th-grade**	**11th-grade**	**12th-grade**	**Total**
Level 0	45	25	13	24	107
Level 1	28	29	12	17	86
Level 2	7	2	7	3	19
Level 3	0	1	1	1	3
Level 4	1	0	0	0	1
Level 5	0	0	0	0	0
Total	81	57	33	45	216

According to Table 4.12, no core values are addressed at level 5 in the high school mathematics textbooks. The core values in the high school mathematics textbooks are generally at level 0, and only a few core values are observed at levels 3 and 4.

As seen in Table 4.12, the distribution of the level of core values in the 9th-grade mathematics textbook is as follows: level 0 (n=45), level 1 (n=28), level 2 (n=7), level 3 (n=0), level 4 (n=1), and level 5 (n=0). In this grade level, most of the core values are covered at level 0 (n=45), and only one example is found at level 4. In the tenth-grade mathematics textbook, the distribution of the level of core values in the 10th-grade mathematics textbook is as follows: level 0 (n=25), level 1 (n=29), level 2 (n=2), level 3 (n=1), level 4 (n=0) and level 5 (n=0). In this grade level, most of the core values are covered at level 1 (n=29), and only one example is found at level 3. In the eleventh and twelfth grades mathematics textbook, the core values are at levels 0-2, only one example are found at level 3, and no core values are available at level 4. The distribution of the level of core values in the 11th and 12th-grade mathematics textbooks is as follows: level 0 (n=13), level 1 (n=12), level 2 (n=7), level 3 (n=1), level 4 (n=0) and level 5 (n=0) for 11th-grade level;

and level 0 (n=24), level 1 (n=17), level 2 (n=3), level 3 (n=1), level 4 (n=0) and level 5 (n=0) for 12th grade level.

Examples of core values observed in the high school mathematics textbooks are presented below, along with explanations of core values and their levels, learning areas, and sections in the textbooks. While the examples in the textbooks contain a single core value, sometimes they can simultaneously contain several different core values at the same time. Below, at least two examples are presented for each level, starting from level 0 up to level 4.

The first example is related to the value of love with level 0.



Güzelyalı Mahallesi sakinleri, sokak hayvanlarının içebilmesi için mahallelerinden geçen doğrusal bir yolun kaldırımına eşit aralıklarla noktalar belirleyip daha sonra bu noktalara su kapları koymuştur. Art arda belirlenen iki nokta arası mesafe, toplam kap sayısına eşit ve baştaki ile sondaki nokta arası uzaklık 110 metre olduğuna göre koyulan toplam kap sayısını bulunuz.

Figure 4. 11 A sample content about the core value of love with level 0 (published in 10th-grade mathematics textbook (MoNE, 2021, p. 208))

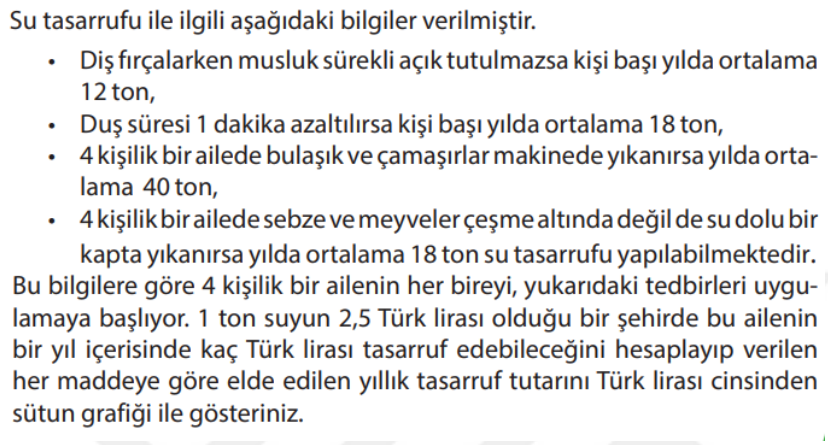
The question asks:

> "The residents of the Güzelyalı neighborhood determined spots at equal intervals on the sidewalk of a linear road passing through their neighborhood, and then placed water containers at these spots so that stray animals could drink. Since the distance between the beginning and the last point is 110 meters, find the total number of containers placed."

The example includes the values of responsibility, helpfulness, and love in the Explore section of the Numbers and Algebra learning areas of the 10th-grade mathematics textbook. In the question, placing water containers on the sidewalk under certain conditions so that stray animals can drink water shows that there is love for animals. An expression of the love value is not explicitly stated in the question, however, since placing water containers is a love for animals, this content

is accepted as an example of love value. Even though there is a love value at the root of the question, it is a suitable example for level 0 because there is no sentence or reminder in the question.

The next example is related to the value of self-control at level 0.



Su tasarrufu ile ilgili aşağıdaki bilgiler verilmiştir.

- Diş fırçalarken musluk sürekli açık tutulmazsa kişi başı yılda ortalama 12 ton,
- Duş süresi 1 dakika azaltılırsa kişi başı yılda ortalama 18 ton,
- 4 kişilik bir ailede bulaşık ve çamaşırlar makinede yıkanırsa yılda ortalama 40 ton,
- 4 kişilik bir ailede sebze ve meyveler çeşme altında değil de su dolu bir kapta yıkanırsa yılda ortalama 18 ton su tasarrufu yapılabilmektedir.

Bu bilgilere göre 4 kişilik bir ailenin her bireyi, yukarıdaki tedbirleri uygulamaya başlıyor. 1 ton suyun 2,5 Türk lirası olduğu bir şehirde bu ailenin bir yıl içerisinde kaç Türk lirası tasarruf edebileceğini hesaplayıp verilen her maddeye göre elde edilen yıllık tasarruf tutarını Türk lirası cinsinden sütun grafiği ile gösteriniz.

Figure 4. 12 A sample content about the core value of self-control with level 0 (published in 9th-grade mathematics textbook (MoNE, 2021, p. 360))

The question asks:

> "The following information about water saving is given.
>
> • If the tap is not kept open while brushing teeth, an average of 12 tons per person per year,
>
> • If the shower time is reduced by 1 minute, an average of 18 tons per person per year,
>
> • In a family of 4, if the dishes and laundry are washed in the machine, an average of 40 tons per year,
>
> • In a family of 4, if vegetables and fruits are washed in a bowl filled with water rather than under a tap, an average of 18 tons of water can be saved per year.
>
> According to this information, each member of a family of 4 begins to implement the above measures. Calculate how many Turkish liras this

family can save in a year in a city where 1 ton of water costs 2.5 Turkish liras, and show the annual savings in Turkish liras for each item given."

The example includes the values of responsibility, patriotism and self-control in the Exercises/Assessments section of the Data, Counting, and Probability learning areas of the 9th-grade mathematics textbook. It is an example of self-control value when people control their behavior with the information given about water saving and take necessary by making use of the information given above about water saving, and as a result, they ask how much a family of 4 can save at the end of a year. Although there is no explicit expression of self-control value in the question, the measures given to control the behaviors of people that can be done with water saving include the self-control value as at level 0.

The next example is related to the value of patience at level 1.



Figure 4. 13 A sample content of the core value of patience with level 1 (published in 12th-grade mathematics textbook (MoNE, 2021, p. 169))

The question asks:

> “Carpet weaving by hand has an important place in Turkish culture. These carpets are woven on ancestral carpet looms with patience and perseverance for months. Yağcıbedir carpets are handcrafted carpets in which centuries of accumulation are embroidered and stitched. The main feature of the motifs in these carpets is that they are symmetrical and geometric. Yağcıbedir carpets are intertwined with geometry because the motifs on them are created according to the golden ratio and contain various transformations. The women living in Yağcıbedir, who are sensitive to the historical and natural heritage with their carpets and social life, weave the Yağcıbedir carpet above to renew the historical fountain in their neighborhood. Find out which motifs the following transformations correspond to on the motifs mentioned in this Yağcıbedir carpet they have woven. Investigate if there are other transformations on the carpets.
>
> (a) Find which motif is symmetrical about the horizontal axis of motif A. (b) Find which motif is symmetrical with respect to the vertical axis of motif A. (c) Find which motif is symmetrical with respect to the intersection of the axes of motif A. (ç) Find which motif is the 180° rotated version of motif A with respect to the intersection point of the axes. (d) Find which motif is symmetric about the horizontal axis of motif C. (e) Find which motif is the translated version of the C motif according to the horizontal axis. f) After taking the symmetry of the E motif with respect to the horizontal axis, find out which motif is the horizontally twisted version.”

The example includes the values of self-control, patriotism, and patience in the Explore section of the Geometry learning areas of the 12th-grade mathematics textbook. In the example, the word patience is clearly stated and the fact that people talk about what they do with their determination and resilience shows that is includes the value of patience. They only reminded the value of patience in the

question. Solving the question only by remembering the patience value is a suitable example for level 1.

The next example is related to the value of respect at level 1.

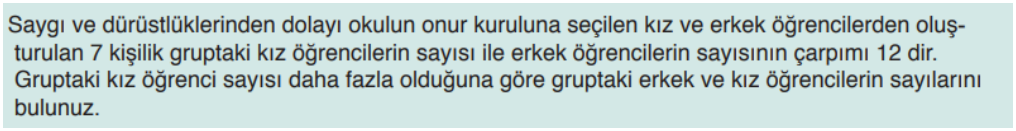

Saygı ve dürüstlüklerinden dolayı okulun onur kuruluna seçilen kız ve erkek öğrencilerden oluş-
turulan 7 kişilik gruptaki kız öğrencilerin sayısı ile erkek öğrencilerin sayısının çarpımı 12 dir.
Gruptaki kız öğrenci sayısı daha fazla olduğuna göre gruptaki erkek ve kız öğrencilerin sayılarını
bulunuz.

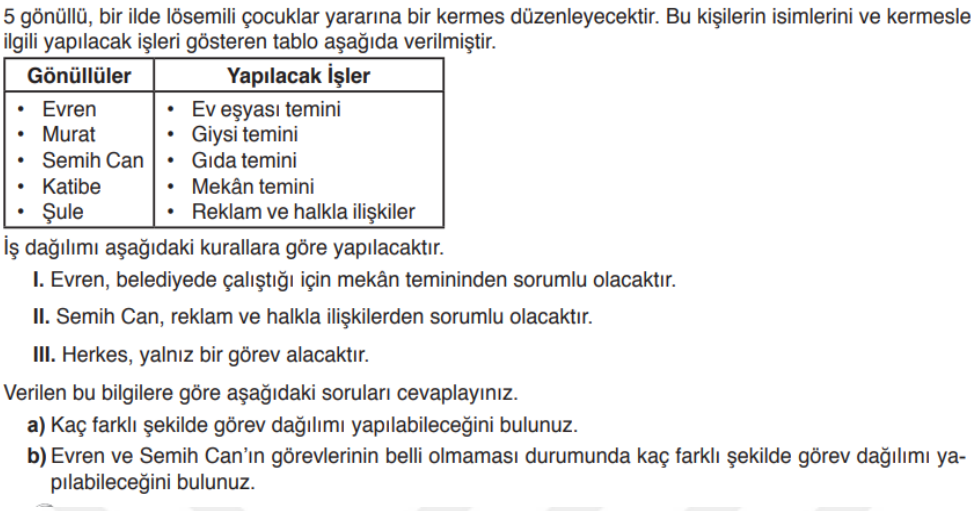
Figure 4. 14 A sample content about the core value of respect with level 1 (published in 10th-grade mathematics textbook (MoNE, 2021, p. 194))

The question asks:

> "The product of the number of female and male students in the 7-person group consisting of students elected to the honor council of the school due to their respect and honesty is 12. Since the number of female students in the group is higher, find the number of male and female students in the group."

The example includes the values of honesty and respect in the Launch section of the Numbers and Algebra learning areas of the 10th-grade mathematics textbook. Students must be respectful and honest to be selected by the honor council. The mention of students being respectful shows that the question includes the value of respect. It has been found to be a suitable example for level 1 since only mentioning the value of respect in the question reminds the value of respect.

The next example is related to the value of responsibility at level 1.



5 gönüllü, bir ilde lösemili çocuklar yararına bir kermes düzenleyecektir. Bu kişilerin isimlerini ve kermesle ilgili yapılacak işleri gösteren tablo aşağıda verilmiştir.

Gönüllüler	Yapılacak İşler
• Evren • Murat • Semih Can • Katibe • Şule	• Ev eşyası temini • Giysi temini • Gıda temini • Mekân temini • Reklam ve halkla ilişkiler

İş dağılımı aşağıdaki kurallara göre yapılacaktır.

I. Evren, belediyede çalıştığı için mekân temininden sorumlu olacaktır.

II. Semih Can, reklam ve halkla ilişkilerden sorumlu olacaktır.

III. Herkes, yalnız bir görev alacaktır.

Verilen bu bilgilere göre aşağıdaki soruları cevaplayınız.

a) Kaç farklı şekilde görev dağılımı yapılabileceğini bulunuz.

b) Evren ve Semih Can'ın görevlerinin belli olmaması durumunda kaç farklı şekilde görev dağılımı yapılabileceğini bulunuz.

Figure 4. 15 A sample content about the core value of responsibility with level 1 (published in 10th-grade mathematics textbook (MoNE, 2021, p. 93))

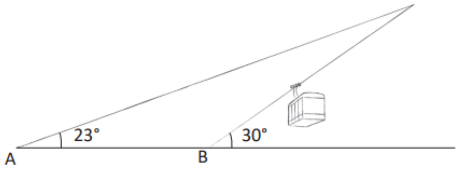
The question asks:

> "5 volunteers will organize a bazaar for the benefit of children with leukemia in a province. The table showing the names of these people and the work to be done about the bazaar is given above. Work distribution will be made according to the following rules. I. Evren works in the municipality; he will be responsible for the provision of space. II. Semih Can will be responsible for advertising and public relations. III. Everyone will receive only one task. Answer the questions based on the information given. a) Find how many different ways the task can be distributed. b) If the duties of Evren and Semih Can are not clear, find out how many different ways the task can be distributed."

The example includes the values of patriotism, helpfulness, and responsibility in the Explore section of the Numbers and Algebra learning areas of the 10th-grade mathematics textbook. The fact that everyone has a responsibility in this bazaar by holding a bazaar for the benefit of children with leukemia shows that it includes the value of responsibility. Fulfilling the assigned duties means fulfilling their responsibility towards themselves and their environment. It is an example of level 1

because the word responsibility is clearly stated in the question and it reminds the value of responsibility that people fulfill these responsibilities.

The next example is related to the value of patriotism with level 2.



Bir mühendis, teleferik tesisi için çizdiği projede teleferiğin başlangıç noktasını A, çelik halatın yatayda yaptığı açıyı 23° olarak alıyor. Öte yandan Anıtlar Yüksek Kurulu, kültürel mirasın tahrip olabileceği gerekçesiyle mühendisten projeyi değiştirmesini istiyor. Bunun üzerine projeyi değiştiren mühendis, A noktasını şekildeki gibi 60 metre sağa kaydırıp çelik halatın yatayda yaptığı açıyı bu defa 30° olarak alıyor. Mühendisin yaptığı değişikliğin ardından teleferiğin izleyeceği yolun kaç metre kısaldığını bulunuz.
(sin7° = 0,12 ve sin23° = 0,39 alınız.)

Figure 4. 16 A sample content about the core value of patriotism with level 2 (published in 11th-grade mathematics textbook (MoNE, 2021, p. 72))

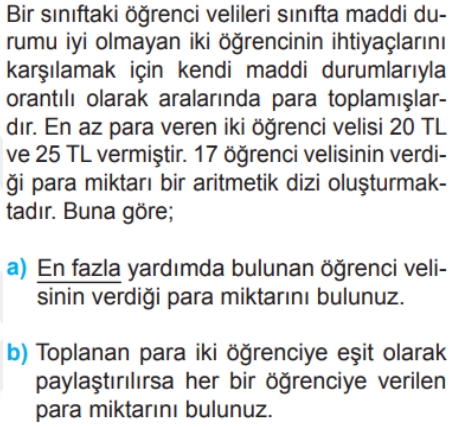
The question asks:

> "An engineer takes the starting point as A in the project he has drawn for the ropeway facility and the angle he makes with the horizontal of the steel halation as 23 degrees. On the other hand, the High Council of Monuments asks the engineer to change the project on the grounds that the cultural heritage may be destroyed. Thereupon, the engineer changed the project, shifted point A 60 meters to the right as in the figure, and took the angle made by steel rope horizontally as 30 degrees this time. After the engineer's change, find how many meters shortened the path to be followed by the cable car."

The example includes the values of responsibility and patriotism at the End of the chapter question section of the Geometry learning areas of the 11th-grade mathematics textbook. Demanding that the ropeway to be built by the engineer

should be changed because the cultural heritage may be destroyed shows being sensitive to the historical and natural heritage. It is an indicator of patriotism value, which indicates that the question includes the value of patriotism. To solve the question, considering being sensitive to the historical and natural heritage, that is, changing the project by considering the patriotism value has been an example suitable for level 2.

The next example is related to the values of helpfulness at level 2.



Bir sınıftaki öğrenci velileri sınıfta maddi durumu iyi olmayan iki öğrencinin ihtiyaçlarını karşılamak için kendi maddi durumlarıyla orantılı olarak aralarında para toplamışlardır. En az para veren iki öğrenci velisi 20 TL ve 25 TL vermiştir. 17 öğrenci velisinin verdiği para miktarı bir aritmetik dizi oluşturmaktadır. Buna göre;

a) En fazla yardımda bulunan öğrenci velisinin verdiği para miktarını bulunuz.

b) Toplanan para iki öğrenciye eşit olarak paylaştırılırsa her bir öğrenciye verilen para miktarını bulunuz.

Figure 4. 17 A sample content about the core value of helpfulness with level 2 (published in 12th-grade mathematics textbook (MoNE, 2021, p. 101))

The question asks:

> “The parents of the students in a class collected money in proportion to their financial situation to meet the needs of two students whose financial situation was not good in the class. The parents of the two students who paid the least gave 20 TL and 25 TL. The amount of money given by 17 students' parents forms one arithmetic series. According to this;
>
> a) Find the amount of money given by the student's parent who helped the most.
>
> b) If the money collected is shared equally between two students, find the amount of money given to each student.”

The example includes the values of justice and helpfulness in the Exercises/Assessments section of the Numbers and Algebra learning areas of the 12th-grade mathematics textbook. In the question, it is stated that helping students who have no financial situation and collecting money to meet their needs include the value of helpfulness. It means being merciful towards and helping underprivileged students by collaborating. Students solve the question by considering the value of helpfulness in order to find the amount of money given by the parents of the students who helped the most. This shows that the example of helpfulness value is at level 2.

The next example is related to the value of friendship at level 2.

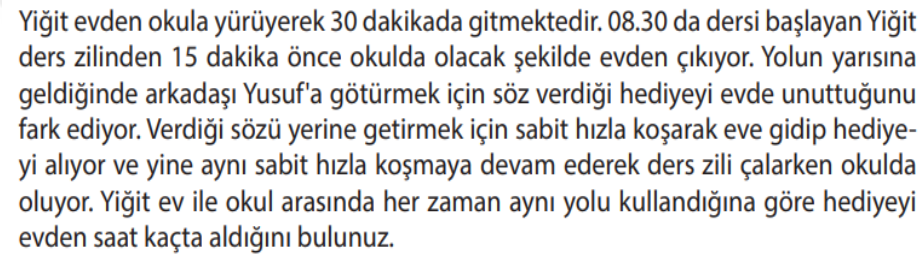

Yiğit evden okula yürüyerek 30 dakikada gitmektedir. 08.30 da dersi başlayan Yiğit ders zilinden 15 dakika önce okulda olacak şekilde evden çıkıyor. Yolun yarısına geldiğinde arkadaşı Yusuf'a götürmek için söz verdiği hediyeyi evde unuttuğunu fark ediyor. Verdiği sözü yerine getirmek için sabit hızla koşarak eve gidip hediye-yi alıyor ve yine aynı sabit hızla koşmaya devam ederek ders zili çalarken okulda oluyor. Yiğit ev ile okul arasında her zaman aynı yolu kullandığına göre hediyeyi evden saat kaçta aldığını bulunuz.

Figure 4. 18 A sample content about the core value of friendship with level 2 (published in 9th-grade mathematics textbook (MoNE, 2021, p. 177))

The question asks:

> "Yiğit walks from home to school in 30 minutes. Starting class at 8.30, Yiğit leaves the house to be at school 15 minutes before the class bell. Halfway through, he realized that he forgot the gift he promised to take to his friend Yusuf at home. To fulfill his promise, he runs home at a steady speed and picks up the gift, and continues to run at the same steady speed and is at school when the school bell rings. Since Yiğit always uses the same road between home and school, find out what time he received the gift from home."

The example includes the values of love, honesty, and friendship in the Explore section of the Numbers and Algebra learning areas of the 9th-grade mathematics textbook. Buying a gift for a friend is an example of friendship value. It is an

example of friendship value when Yiğit realizes that he forgot the gift he bought for his friend at home, and returns home to receive the gift. Going home again to get the gift he forgot is a suitable example for level 2, as it will enable him to solve the question by thinking about the value of friendship.

The next example is related to the value of honesty with level 3.

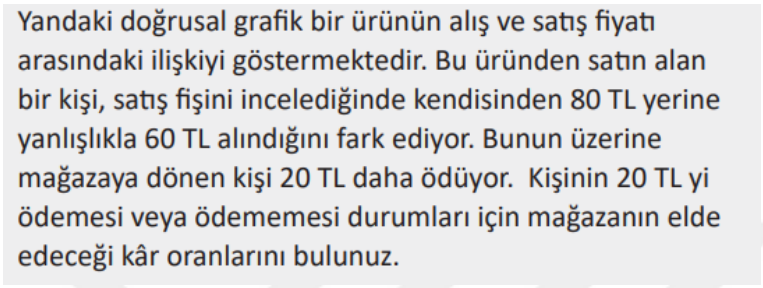

Yandaki doğrusal grafik bir ürünün alış ve satış fiyatı arasındaki ilişkiyi göstermektedir. Bu üründen satın alan bir kişi, satış fişini incelediğinde kendisinden 80 TL yerine yanlışlıkla 60 TL alındığını fark ediyor. Bunun üzerine mağazaya dönen kişi 20 TL daha ödüyor. Kişinin 20 TL yi ödemesi veya ödememesi durumları için mağazanın elde edeceği kâr oranlarını bulunuz.

Figure 4. 19 A sample content about the core value of honesty with level 3 (published in 11th-grade mathematics textbook (MoNE, 2021, p. 123))

The question asks:

> "The linear graph on the sides shows the relationship between the buying and selling price of a product. When a person who buys this product examines the sales receipt, he realizes that instead of 80 TL, he was mistakenly charged 60 TL. Then the person returning to the store pays another 20 TL. Find the profit rates of the store for the person to pay or not pay the 20 TL."

The example includes the value of honesty with level 3 in the Explore section of the Numbers and Algebra learning areas of the 11th-grade mathematics textbook. Noticing the mistake made at the cashier regarding the product that the person bought, returning to the store and correcting the mistake, and paying the necessary money shows that s/he is a truthful person. This behavior shows us that this person has an honesty behavior. Thus, the question has the value of honesty. Moreover, the question, asking us the profit rates in case of paying or not paying 20 TL is actually asking us to find profit rates in cases where the person is honest or not. This shows that the question is clearly a suitable example for level 3.

The next example is related to the value of justice at level 3.



Bir sınıfta 9 kişi arasından 6 kişilik bir ekip ve bu ekip içinden de bir başkan seçilecektir. Bu seçimin kaç farklı şekilde yapılabileceğini bulunuz.

Figure 4. 20 A sample content about the core value of justice with level 3 (published in 10th-grade mathematics textbook (MoNE, 2021, p. 40))

The question asks:

> "A team of 6 people will be selected from 9 people in a class and a president will be selected from this team. Find how many different ways this choice can be made."

The example includes the value of justice with level 3 in the Explore section of the Data, Counting, and Probability learning areas of the 10th-grade mathematics textbook. Choosing a team among the students in the class and choosing a president from this team shows that it includes the value of justice from being fair. To elect the president, a fair election must be held and the election must be done by treating everyone equally. Considering the conditions of whether this election to be made is fair or not, shows that it is an example for level 3.

In the high school mathematics textbooks, there is one example with level 4. The next example is related to the value of honesty with level 4.

İki arkadaş izledikleri bir voleybol maçı dönüşünde Ali ile karşılaşıyor.

- Bir voleybol maçında iki farklı sonuç vardır.
- Ali bu arkadaşlardan birinin doğru bir davranış olmamasına rağmen daima yalan, diğerinin ise erdemli bir şekilde daima doğruyu söylediğini bilmektedir.
- Ali hangi arkadaşının doğru hangi arkadaşının yalan söylediğini unutmuştur.
- Ali bu arkadaşlarından yalnız birine sadece bir soru soracaktır.

Buna göre Ali'nin maçı hangi takımın kazandığını öğrenmesi için sorması gereken soruyu bulunuz.

Figure 4. 21 A sample content about the core value of honesty with level 4 (published in 9th-grade mathematics textbook (MoNE, 2021, p. 31))

The question asks:

> "Two friends meet Ali on the way back from a volleyball match they were watching.
>
> 1. There are two different outcomes in a volleyball match.
> 2. Ali knows that one of these friends always lies, even though it is not the right behavior, and the other always tells the truth in a virtuous way.
> 3. Ali has forgotten which of his friends is true and which of his friends is lying.
> 4. Ali will only ask one question to one of these friends.
>
> Accordingly, find the question that Ali should ask in order to find out which team won the match."

The example includes the values of love, friendship, and honesty in the Explore section of the Numbers and Algebra learning areas of the 9th-grade mathematics textbook. It has been determined that the question includes the value of honesty since the given example mentions the behavior of being truthful. Also, the fact that it is clearly stated in the question that lying is not a correct behavior shows that it includes the value of honesty. For Ali to find out which team won at the end of the match with the question he will ask, he needs to think in detail about the concept of honesty so that he can find the right person. The question was found to be a suitable example for level 4, as the students had to question and explain the honesty value in order to find out which one is true or which one is lying with the question they will ask.

4.3 The Similarities and Differences of Core Values in the Mathematics Textbooks in terms of School Levels

In this part, the similarities and differences of core values in the mathematics textbooks according to school levels are explained in detail. The percentage of the

number of contents with core values in mathematics textbooks, the frequencies and percentage of core values in mathematics textbooks, the frequencies of core values in the learning areas of mathematics textbooks, the frequencies of core values in the related sections of mathematics textbooks, and the level of core values in mathematics textbooks are explained according to school levels.

The analysis of data shows that the percentage of number of contents with core values in mathematics textbooks is higher in middle school (7.88%) than in high school (3.39%). Also, middle school mathematics textbooks in all grade levels contain more content with core values than high school mathematics textbooks. As the grade level increases, the number of content covering the core values decreases, with the highest value in the 5th-grade mathematics textbook at 12.22%, and the lowest value in the 12th-grade mathematics textbook at 1.64%.

Moreover, there are some similarities and differences in the frequencies and percentages of core values in middle and high school mathematics textbooks according to school levels. Firstly, the number of core values found in middle school mathematics textbooks (n=445) is higher than the number of values (n=216) found in high school mathematics textbooks. The most addressed core value is the same at both school levels, which is patriotism. In contrast, the core values with the lowest percentages in middle and high school mathematics textbooks differ. While the least mentioned value in middle school mathematics textbooks is honesty (n=2; 0.45%), the least mentioned value in high school mathematics textbooks is patience (n=2; 0.92%). Generally, the core values are not distributed evenly in mathematics textbooks at both school levels and some values are mentioned more than other values.

The frequencies of core values in the learning areas of Mathematics textbooks in terms of school levels could not be compared precisely because the learning areas in middle and high school mathematics textbooks are different. While the learning areas in middle school mathematics textbooks are Numbers and Operation, Algebra, Geometry and Measurement, Data Processing, and Probability, the

learning areas in high school mathematics textbooks are Numbers and Algebra, Geometry, and Data, Counting and Probability.

Moreover, some similar and different results are found in the number of core values contained in the related sections (Launch, Explore, Exercises/Assessments, End of the chapter questions) of mathematics textbooks. The section with the most core values at both school levels is the Explore section. 162 values are found in the Explore section at the middle school level and 133 values are found in the Explore section at the high school level. In contrast, the section with least core values differs between school levels. The lowest number of values is found in the End-of-the-chapter questions section at the middle school level (n=39), and in the Launch section at the high school level (n=9). As can be understood from the analysis for both school levels, the distribution of core values in the related sections of mathematics textbooks is not homogeneous. The number of core values varies considerably.

Finally, the analysis of data regarding the level of core values in the mathematics textbooks according to school levels shows that the depth of the values decreases as the grade-level increases in the mathematics textbooks at both school levels. From level 0 to level 5, content containing values decreased and even no content containing core values is available for level 5 at both school levels. In general, when examining the levels of core values in the mathematics textbooks, it is clearly seen in the table that there is no balanced distribution between levels. Also, it is found that the contents, which are in the sections of Launch, Explore, Exercises/assessments, and End-of-the-chapter questions, at low levels such as level 0, level 1, and level 2 are more common at both school levels. On the contrary, content at level 3, level 4, and level 5 are limited or not available in all grade-level mathematics textbook.

CHAPTER 5

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

The main purpose of this study was to investigate to what extent the core values emphasized in the mathematics curriculum were addressed in each grade level of middle and high school mathematics textbooks of MoNE publications in the 2022-2023 academic year. To this end, the frequencies and the level of core values, the frequencies of core values concerning learning areas and sections, and the level of core values in the middle and high school mathematics textbooks were examined. In this section, the results will be presented as a discussion of the previous studies in the literature. Finally, implications, recommendations, and limitations will be mentioned.

5.1 Core Values in the Middle School Mathematics Textbooks

The distribution of core values in the middle school mathematics textbooks was examined, and how much value the textbooks contained as a percentage was analyzed. According to the results, the 5th-grade textbook contains 12.22%, the 6th-grade textbook contains 8.43%, the 7th-grade textbook contains 6.45%, and the 8th-grade textbook contains 4.95%. Among the middle school mathematics textbooks examined, values were included at most in 5th grade and at least in 8th grade. Similarly, in the study of Köksal (2021), which examined middle school mathematics textbooks regarding values education, the textbook with the lowest value was at the 8th-grade level. However, the textbook with the highest number of values was at the 6th-grade level. The fact that textbooks contain less value as the grade level increases may be due to the idea of academic success. Students begin to prepare for the High School Transition System (LGS) exam starting from the 7th grade. Since the questions in the textbooks are questions prepared for

understanding the subject instead of being examples containing values, they may contain values less.

When the frequencies of core values in middle school mathematics textbooks were investigated, it was observed that the ten core values in the mathematics curriculum are not evenly distributed in the middle school mathematics textbooks. While some values are mentioned more, some are mentioned very little or not. The results in this study were compared one by one based on grade level. For example, the most mentioned value was patriotism, and the least mentioned value was honesty in the fifth-grade mathematics textbook. There were some similarities and differences between the studies in the literature. Mutlubaş (2021) reached the same conclusion in her study with fifth-grade textbooks. In addition, Yıldız (2019) also found the value of patriotism as the most mentioned value at the fifth-grade level in his analysis of middle school mathematics textbooks. In similar studies in the literature, honesty was found to be the least common value in 5th grades (Kılcan, 2020; Köksal, 2021; Mutlubaş, 2021; Sayın et al., 2019). As a different result, the self-control value in the study of Sayın et al. (2019), the responsibility value in the study of Kılcan (2020), and the love value in the study of Köksal (2021) were the values found the most.

In the 6th grade, the value of responsibility was the highest, the value of respect was the least, and even the values of patience and honesty had never been found in the textbook. Kılcan (2020) also found the value of respect the least and did not find the values of patience and honesty in the textbooks. Similarly, Yıldız (2019) reported no value of patience in the textbook and found only a single value of honesty. In another study in the literature, the value of honesty was found one time (Köksal, 2021). The findings of this study are compatible with the results of Yıldız (2019) and Köksal (2021). On the contrary, while we found the value of respect as the least mentioned value in the 6^{th}-grade mathematics textbook, Köksal (2021) found the value of respect as the most mentioned value in her study.

In the 7th grade, the value of patriotism was the highest, the value of patience was the least, and even the value of honesty had never been found in the textbook. Similarly, Kılcan (2020) also did not find the value of honesty in the seventh-grade textbook, and Köksal (2021) found the value of honesty and patience as the least mentioned value in the seventh-grade mathematics textbook. On the other hand, Köksal (2021) found the most mentioned value as love, and Kılcan (2020) found the most mentioned value as responsibility. While the value of honesty was not found in the current study, Yıldız (2019) stated that the values of honesty, responsibility, and helpfulness were found the most in his study. The reason for these differences may be the difference in the indicators of the values.

Finally, in eighth grade, the most mentioned value was patriotism, and the least mentioned values were honesty and patience. The results regarding the values of honesty and patience align with the results of other studies (e.g., Kılcan, 2020; Yıldız, 2019). As a difference, Köksal (2021) concluded that the eighth-grade textbook contains the value of love the most, Kılcan (2020) found the values of love and helpfulness the most, and Yıldız (2019) found the values of connection, equality, and helpfulness at most. As can be understood from the results, the studies investigating the same textbooks reported different numbers of core values. Even in the current study, there was a difference in the results, even though the publications of all the textbooks examined were the publications of the MoNE. This may be related to the analysis framework used in the studies. The differences in the root values in the frameworks used in various studies and the sections examined in the mathematics textbooks may cause differences in the data results. In order to ensure consistency between studies, it may be recommended to take the same or similar indicators of root values and to examine the same sections in mathematics textbooks.

The analysis of results shows that although all of the textbooks examined in the current study were published by MoNE, there are differences in the frequencies and levels of values among the textbooks. These differences among the textbooks may

be due to the different value perceptions of the authors of the textbooks, or some concepts addressed at different grade levels may be less relevant to the core values.

Moreover, the results regarding the frequencies of core values in the learning areas of middle school mathematics textbooks showed that the highest value was found in Numbers and Algebra, and the lowest value was found in Geometry and Measurement in the 5th-grade mathematics textbook. Similar results were obtained in studies conducted in the literature (Köksal, 2021; Mutlubaş, 2021; Sayın et al., 2019). In these studies, the first chapter was found to contain the most values, and chapter 4 was found to contain the least value. Since the first chapter is related to the learning area of Numbers and Operation and Chapter 4 is related to the learning area of Geometry and Measurement, a comparison has been made, and it has been determined that similar results have been obtained. In addition, Özkaya and Duru (2020) found the learning area of Numbers and Operations to have the most variety of values. However, they found the learning area of Data Processing to have the least number of values. This shows the difference between the two studies.

In the 6th-grade mathematics textbook, the Numbers and Operations learning area had the highest number of values, and the Algebra learning area had the lowest number of values. In the study of Özkaya and Duru (2020), the Numbers and Operations learning area had the highest value, and the Algebra learning area had the lowest value. In another study, Köksal (2021) found that Chapter 2, which is related to Numbers and Operations, contained the most value, while Chapter 5, in the Geometry learning area, contained the lowest number of values.

Furthermore, in the current study, the Numbers and Operations learning area was found to have the highest value, and the Data Processing learning area was found to have the lowest value in the 7th-grade mathematics textbook. In the studies of the literature, while the results of the learning area with the most values were the same, the learning area with the least number of values was different (Köksal, 2021; Özkaya & Duru, 2020). For example, these studies found the learning area of Geometry with the least value in the seventh-grade textbooks. In the 8th-grade

textbook, values were found mostly in the Numbers and Operations learning area and the least in the Geometry learning area. Again, the same conclusion was reached by Köksal (2021). Unlike these results, the Algebra learning area had the highest value, and the Probability learning area had the lowest value in Özkaya and Duru (2020).

Based on these results, the learning area with the most value has generally been the Numbers and Operation learning area, which is an expected result. Questions in the Numbers and Operation learning area are generally problem-oriented, contributing to the easy and better integration of values into the textbooks. On the other hand, the learning areas with the least value were generally found to be "Geometry and Measurement" and "Data Processing." Since the Geometry and Measurement learning areas consist mostly of visual questions, it might be challenging to include expressions containing values. In the learning area of Data Processing, the reason for less value might be due to the ordinary and result-oriented questions often asked to ensure understanding of the subject.

The study also examined the frequencies of core values in the related sections of the middle school mathematics textbooks. The analysis of the findings showed that the section containing the most value was the Explore section in the 5th grade and 6th grade, the Launch section in the 7th grade, and the Exercises/Assessments section in the 8th grade. On the other side, the section containing the least value was the End-of-the-chapter-questions section in all grade levels, and the Explore section also contained the least value in 8th grade. In the literature, Karaca and Uzunkol (2019) examined the frequency of the values in the 3rd and 4th-grade mathematics textbooks according to sections. They found the highest value in the study section and the lowest value in the activity section. The activity section was defined as short activities that enable students to think about the subject before starting the subject, and the study section as additional individual studies that students would do after the subject is learned and consolidated. In the current study, the study section corresponds with the exercises/assessments section, and the activity section corresponds with the launch section. Thus, it coincided with the

results in the 8th-grade textbook, in which the Exercises/Assessments section contained the most values. On the contrary, the fact that the Launch section contained the least value conflicted with the result in the 7th-grade textbook because the most value was found in the Launch section in that textbook.

The core values were not evenly distributed throughout the sections in the textbooks. While some sections contain more values, some contain fewer values, and some do not mention values. It has been determined that the values in the textbooks are mostly in the Explore section, where the examples are provided. The fact that the sample questions are mostly included in the textbooks can be shown as a reason for the examples to contain more value. The result is expected that mathematics would contain more values since it would be easier to place values into the problems and examples using daily life topics.

Eventually, in examining the levels of values in the mathematics textbooks of middle school level, the results were as follows, from highest to lowest, respectively: level 0 (n = 255), level 1 (n = 135), level 2 (n = 38), level 4 (n = 10), level 3 (n = 7) and level 5 (n = 0). As can be understood from these results, no examples were suitable for level 5 in the textbooks. Most examples were found from level 0, and the least from level 3. This means that the low-level examples, such as level 0 and level 1, were more common at each grade level, and high-level examples were rarely or absent. Similar to the findings of this study, Çetin et al. (2021) found that the values in the ninth-grade level mathematics textbooks were at low levels. The difficulty of integrating high-level values into textbooks may be related to the inexperience of the authors in connecting values education and mathematics, or it may be due to perceiving mathematics as a value-free course (Dede, 2007).

5.2 Core Values in the High School Mathematics Textbooks

The distribution of core values in the high school mathematics textbooks was examined in the study. Among the high school mathematics textbooks examined, values were included at most in the 9th grade and at least in the 12th grade. Similarly, in the study of Teker and Ellez (2022) examining mathematics textbooks of high school level in the light of values education, the textbook with the least value was at the 12th-grade level. However, the textbook with the highest value was at the 10th-grade level. The results of this study also showed that the values were addressed very little in high school mathematics textbooks. The reason for this may be that mathematics subjects become more and more abstract as the grade level increases.

When the frequencies of core values in the mathematics curriculum in high school mathematics textbooks were investigated, similar and different results were obtained with the studies in the literature. It has been determined that the core values were not distributed evenly in the textbooks. The results in this study were compared one by one based on grade level. Patriotism and self-control values were found at most, and patience was found the least in the 9th grade. Patience was also found to be the least mentioned value in the studies of Çetin et al. (2021) and Teker and Ellez (2022). Contrary to this similarity, the value of responsibility and helpfulness was found to be the most mentioned value in the literature (Çetin et al., 2021; Teker & Ellez, 2022). In the 10th grade, patriotism and love were found the most, and patience and honesty were found the least. In a similar study, Teker and Ellez (2022) also determined the values of patriotism, helpfulness, and responsibility as the highest, and the values of justice, patience, friendship, honesty, self-control, and love as the least. What makes the difference in these two studies is that while we found the value of love at the highest, Teker and Ellez (2022) found it to be the least.

Additionally, patriotism is the most common value in 11th-grade mathematics textbook, while patience, friendship, and honesty were the rarest values. While the

current study's findings are similar to those of Teker and Ellez (2022) for the least common values, they are in conflict with them for the values of patriotism, which they found to be the least common value. Finally, self-control, responsibility, and patriotism were found to be the highest in the 12th-grade mathematics textbooks, while friendship, honesty, and patience were found the least. In the study of Teker and Ellez (2022), while patriotism and helpfulness were the most common in the twelfth-grade textbook, the values of justice, friendship, honesty, patience, self-control, and love were the least.

Along with similar studies in the literature, this study showed that high school mathematics textbooks were insufficient in terms of containing values. High school mathematics textbooks contain less value, especially when compared with the middle school level. This may be because high school math subjects are perceived as more abstract, and some may even think that these subjects do not contain value. Also, the distribution of values in the textbooks is not even. Some values were mentioned more, some were mentioned less, and some were not mentioned. Regardless of whether the publications are the same or different, there was a difference in the results of the textbooks containing the core values. This shows how important the value perceptions and thoughts of the authors who develop the contents in the textbooks are.

In addition, the frequencies of core values in learning areas were analyzed and compared with similar studies in the related literature. In the 9th, 11th, and 12th grades, the highest value was found in the Numbers and Algebra learning area. The least value was found in the Geometry learning area. In contrast, in the 11th grade, the highest value was found in the Geometry learning area. The least value was found in the Data, Counting and Probability learning area. Some of these results were in line with the studies in the literature. In particular, the results of the current study are parallel to the related literature regarding the distribution of core values in the learning areas in the 9th and 12th grades (Çetin et al., 2021; Teker & Ellez, 2022). On the contrary, in the 10th-grade mathematics textbook, while Teker and Ellez (2022) similarly found that the learning area of Numbers and Algebra

contained the most value, they found the learning area of Data, Counting, and Probability contained the least value. Also, they found that Numbers and Algebra, and Geometry learning areas, which have the same number of values, contained the most values, and the learning area of Data, Counting, and Probability contained the least value in the 11th-grade textbook.

It was observed that the core values were not evenly distributed according to the learning areas. In general, it has been determined that the Numbers and Algebra learning area contained the most value, while the Geometry and Data learning areas contained less value. Similar results were obtained in high school mathematics textbooks and middle school mathematics textbooks. As mentioned before, values could be easily integrated because the learning area of Numbers and Algebra contains numerous tasks and problems connected to issues around these values. However, it may be more difficult to integrate values in the Geometry and Data learning areas, which contain questions involving more graphs and shapes but are not easily connected to values, particularly in Geometry.

Moreover, high school mathematics textbooks were also examined regarding the frequencies of the sections in which the values are included. As a result of the analysis, the section containing the most value in the 9th, 10th, and 12th grades was the Explore section, and the End-of-the-chapter questions section contained the most value in the 11th grade. The same conclusion was reached in Çetin et al. (2021)'s study. In addition, Teker and Ellez (2022) concluded the same result for the Example sections in the 9^{th}, 10^{th}, and 12^{th} grades, and they reported that the Measurement and Evaluation section in the 11th grade contained the value most. A comparison could be made in which the part used as an example under the Explore section in our study, and the part of Measurement and Evaluation was under the End-of-the-chapter questions. Since the textbooks contain too many sample questions, it is reasonable for the values to be in the Explore section, where the most examples are found.

The section containing the least value in the 10th, 11th, and 12th grades was the Launch section, and the End-of-the-chapter questions section was the section containing the least value in the 9th grade. In the study of Çetin et al. (2021), the information box was found to be the section with less value, but in this study, a comparison could not be made because the information box was not in the research area. In the study of Teker and Ellez (2022), the section with the lowest values in the 11th-grade textbook was found as the Preparatory work. Since the Preparatory work is related to the Launch section, the findings of this study are compatible with our study. However, the results of this study for the 12th-grade mathematics textbook differ from the results of Teker and Ellez (2022). The researchers found the Measurement and Evaluation sections to be the sections with the lowest number of values. Actually, an efficient comparison cannot be made with the work of Teker and Ellez (2022) because we grouped the content in the books differently, such as launch, explore, exercises/assessment, and the end-of-the-chapter questions. For example, although they took the "I'm thinking" section as a distinct section, it was considered under the Explore section in the current study.

Finally, in examining the levels of values in the mathematics textbooks at the high school level, the results were as follows, from highest to lowest: level 0 (n = 107), level 1 (n = 86), level 2 (n = 19), level 3 (n = 3), level 4 (n = 1) and level 5 (n = 0). As can be understood from these results, no examples were available for level 5 in the textbooks; most examples were found at level 0, and the least were found at level 4. This means that the low-level examples, such as level 0 and level 1, were more common at each grade level, and high-level examples were rarely or even absent. In a similar study to this study, Çetin et al. (2021) found that the values in the textbooks were generally at low levels, then at medium level, and the least at the strong level. Therefore, it has been observed that textbooks usually include expressions that may remind some values. However, the values usually are not mentioned in a context. There are no explanations related to the importance and usefulness of these values. The reason for this may be related to the perception that accepts mathematics as a value-free field, or it may be related to the difficulty of

including values in relevant contexts in high school mathematics subjects due to their nature. However, the values should be given in a more qualified way in the mathematics textbooks so that students can make sense of and internalize values.

5.3 Core Values in Mathematics Textbooks According to School Levels

The results regarding the distribution of core values in the mathematics textbooks according to school levels indicated that the mathematics textbooks in middle school contain the core values at the rate of 7.88%, and the mathematics textbooks in high school contain the core values at the rate of 3.39%. This means that middle school mathematics textbooks contain more core values than high school. This may be because the topics in mathematics textbooks include more abstract topics during the transition from middle school level to high school level. The textbook authors may have had difficulties incorporating core values in abstract topics.

When the frequencies of core values in the mathematics curriculum in mathematics textbooks in terms of school level were investigated, it was determined that the core values were not distributed evenly in the textbooks at both middle and high school levels. Patriotism was found to be the most mentioned core values in mathematics textbooks of middle school and high school. In contrast, the least mentioned core values are different in both school levels. While the least mentioned core value is honesty in middle school, as found in other studies (e.g., Kılcan, 2020; Köksal, 2022), the least mentioned core value is patience in high school as also reported by Teker and Ellez (2022). The fact that the value of patriotism is the most mentioned value at both school levels may be because, according to Habermasian, one of the critical theory thinkers, the values taught in schools have changed historically, and the reason for this change is related to the political history of the society (Carleheden, 2006). Based on this thought, the fact that Türkiye has a long and deep-rooted historical past can be shown why the value of patriotism is mentioned more than other values in mathematics textbooks at both middle school and high school levels. Moreover, the reason why the values of

honesty and patience are rarely mentioned in mathematics textbooks may be due to the thoughts or beliefs of textbook authors (Demirtaş & Özer, 2015). As also reported in Deniz's (2018) study, teachers and probably textbook authors do not know how to incorporate these two values, patience and honesty, in mathematics classes. Thus, this may be why textbook authors mention values less in mathematics textbooks.

Moreover, the analysis of frequencies of core values for each learning area shows that at the middle school level, the highest number of values was given in the learning area of Numbers and Operations, and the least number of values was given in Probability and Algebra. In contrast, the highest number of values was given at the high school level in the learning area of Numbers and Algebra. The least number of values was given in the Data, Counting and Probability learning area. In the literature, similarly, Numbers and Operations was found to be the learning area with the most value at the middle school level (Köksal, 2022; Mutlubaş, 2021; Özkaya, 2020; Sayın, 2019), and Numbers and Algebra was found to be the learning area with most value in the high school level(Çetin et al., 2021; Teker & Ellez, 2022). The fact that the Number and Operations learning area is heavily included as a subject in mathematics textbooks at every grade level at the middle school level, and the Numbers and Algebra learning area is heavily included as a subject in the mathematics textbooks at every grade level at the high school level, may result in these learning areas to contain more core values.

The frequencies of core values in the learning areas of mathematics textbooks in terms of school levels could not be compared precisely because, as stated before, the learning areas in middle and high school mathematics textbooks are different. One of the conclusions that can be drawn from the research is that the most mentioned core values in mathematics textbooks at both school levels are generally in the learning areas involving numbers.

The analysis of results regarding the frequencies of core values in the related sections indicates that the Explore section contains more core values in

mathematics textbooks at both school levels. On the contrary, the section containing the least value was the End-of-the-chapter questions section in the middle school level and the Launch section at the high school level. As can be seen from here, the core values were not evenly distributed among the sections in the textbooks at both school levels, and even some sections were neglected. On the contrary, as stated in the high school mathematics curriculum, values should not be limited to only one unit/chapter of the textbooks (MoNE, 2018b).

Finally, the findings show that in both school levels, the level of core values decreases as the grade-level increases. Also, the questions in the textbooks were found mostly at the level 0 in both schools level, and there were no suitable examples at level 5 in middle and high school. In the literature, Çetin et al (2021) similarly found that the values are at the low level in ninth-grade mathematics textbooks. As can be understood from these results, the levels of core values included in the textbooks are inadequate. The absence of core values at higher levels would probably pose a challenge for teachers and students to embrace these values and generalize these values to other situations. On the contrary, MoNE (2017b) stated that rather than considering values only as expressions in the curriculum, students should be provided with appropriate opportunities to make sense of the values and to translate the values into practice inside and outside the school. For this reason, it is thought that rather than just mentioning values as words in mathematics textbooks, they should be mentioned at higher levels so that students can understand and internalize the values. In other words, mathematics textbooks should give more examples of core values suitable for levels 3, 4 and 5, and textbooks authors should take this into consideration. While textbook authors try to give examples of root values at the 3rd, 4th and 5th levels in mathematics textbooks, they can examine in detail the examples written at each level regarding the value of justice in Table 3.4 in this study, and they should give high-level examples using this table. This table prepared by the researcher will be useful for textbook authors.

5.4 Implications, Recommendations and Limitations

In line with the results gathered from the present research, there are various recommendations for researchers, curriculum developers, teachers, and textbook authors. Firstly, a balanced distribution of core values in mathematics textbooks can be achieved by including core values at similar frequencies in mathematics textbooks to realize an effective values education (Doğan & Gülüşen, 2011). Especially, attention should be paid to the values such as honesty and patience, which are rarely seen in mathematics textbooks. Care should be taken to ensure a balanced distribution when mentioning values according to learning areas and sections. In addition, there should not be such a difference in the frequency of values between the grade and school levels. It is suggested that the number of values in the examples in the mathematics textbooks at each grade level should be balanced.

Furthermore, mathematics textbook authors should pay attention to state values and include text or visuals that require students to consider, explain, and make sense of values. The qualities of the core values also need to be increased more in the mathematics textbooks. It is recommended that the researchers can investigate the mathematics teachers' perceptions about and their use of core values and the competencies of teachers in integrating core values into their teaching.

More research studies can be conducted to examine the sections where the core values take place in mathematics textbooks. The frequencies and nature of core values in many sections in the mathematics textbooks, such as "Are we ready?", "Let's do it together," "Examples," "Problems," "Exercises," "It's your turn," "Let's think and research," and "Information box" can be examined and compared.

Apart from our study, only one study was found in the literature examining the qualities of core values in mathematics textbooks (Çetin et al., 2021). More studies should be conducted to examine the qualities and levels of core values in primary, middle, and high school mathematics textbooks.

In future studies, cognitive demands of the mathematical tasks, along with the levels of core values, can be examined in mathematics textbooks. In more detail, it can be examined whether contents with high levels of core values in mathematics textbooks are also high or low in terms of the level of cognitive demands. How the levels of cognitive demands change according to the levels of core values can be investigated.

The research was limited to investigating the texts in the middle and high school mathematics textbooks.

Eventually, this research study was limited to middle and high school mathematics textbooks published by MoNE in the 2022-2023 academic year. Core values can be searched in mathematics textbooks of different years. Not only the MoNE publications but also the textbooks of private publications can be examined in terms of values education. Comparative analysis of middle and high school mathematics textbooks belonging to private publications can be conducted.

REFERENCES

Akbaş, O. (2008). Değer eğitimi akımlarına genel bir bakış. *Değerler Eğitimi Dergisi*, *6*(16), 9-27.

Akçay, A., & Tunagür, M. (2017). Türkiye'de değerlerin tespitine yönelik yapılmış yüksek lisans tezleri üzerine bir içerik analizi. *EKEV Akademi Dergisi, 71*, 53-72.

Aktepe, V. (2015). Etkinlik temelli değer eğitiminin öğrencilerin yardımseverlik tutumlarına etkisi. *Researcher: Social Science Studies Year, 2*(2), 17-49.

Alıcı, F. (2019). *İlkokul 2. sınıf Türkçe ders kitabı metinlerinin değerler eğitimi açısından incelenmesi* (Unpublished master's thesis). Necmettin Erbakan University, Konya.

Altun, S. A. (2003). Eğitim yönetimi ve değerler. *Değerler Eğitimi Dergisi, 1*(1), 7-17.

Arslanoğlu, İ. (2005). Türk değerleri üzerine bir değerlendirme. *Felsefe Dünyası Dergisi, 41*, 64-77.

Atweh, B., & Seah, W. T. (2008). Theorising values and their study in mathematics education. In P. L. Jeffery (Ed.), *Proceedings of the 2007 AARE Conference* (pp. 1-11). Association for Research in Education (AARE).

Australian Curriculum Assessment and Reporting Authority [ACARA]. (2013). *The Australian Curriculum v5.1: Mathematics.* Retrieved from http://www.australiancurriculum.edu.au/Mathematics/Content-structure

Bishop, A. J. (1996, June). How should mathematics teaching in modern societies relate to cultural values---some preliminary questions. Paper presented at the *Seventh Southeast Asian Conference on Mathematics Education, Hanoi, Vietnam* (Vol. 32).

Bishop, A., Clarke, B., Corrigan, D., & Gunstone, D. (2006). Values in mathematics and science education: Researchers' and teachers' views on the similarities and differences. *For the Learning of Mathematics*, *26*(1), 7-11.

Bishop, A. J. (2008). Mathematics teaching and values education an intersection in need of research. In P. Clarkson & N. Presmeg (Eds.), *Critical issues in mathematics education: Major contributions of Alan Bishop* (pp. 239-253). Springer US.

Canbulat, M., Asma, B., & Koparan, B. (2022). Türkçe ders kitaplarının metin ve metin önü-sonu sorularındaki düşünme türleri ve kök değerler. *Turkish Studies - Education, 17*(2), 215-232. https://dx.doi.org/10.7827/TurkishStudies.57962

Cevizci, A. (2011). *Felsefe sözlüğü.* Say yayınları.

Carleheden, M. (2006). Towards democratic foundations: A Habermasian perspective on the politics of education. *Journal of Curriculum Studies*, *38*(5), 521-543.

Cao, Z., Seah, W. T., & Bishop, A. J. (2006). A comparison of mathematical values conveyed in mathematics textbooks in China and Australia. In F. K. S. Leung, K. D. Graf & F. J. L. Real (Eds.), *Mathematics education in different cultural traditions-A comparative study of east Asia and the West: The 13th ICMI study* (pp. 483-493). Springer.

Clarkson, P. C., FitzSimons, G. E., & Seah, W. T. (1999). Values relevant to mathematics? I'd like to see that. In D. Tynam, N. Scott, K. Stacey, G. Asp, J. Dowsey, H. Hollingsworth, & B. McRae (Eds.), *Mathematics: Across the ages.* (pp. 129-132). Mathematics Association of Victoria.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson.

Creswell, J. W. (20013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Sage Publications.

Cummings, W. K. (2009). Globalization, social capital, and values: The case of the Pacific Basin. In J. Zajda & H. Daun (Eds.), *Global values education: Teaching democracy and peace*, (pp. 3-20). Springer.

Çetin, İ., Mutluoğlu, A., Yazlık, D. Ö. & Erdoğan, A. (2021). Ortaöğretim dokuzuncu sınıf matematik ders kitaplarının kök değerler çerçevesinde incelenmesi. *Yaşadıkça Eğitim, 35(*2), 715-732. doi:10.33308/26674874.2021352297

Dede, Y. (2007). Matematik öğretiminde değerlerin yeri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 7*(1), 12-25.

Demirtaş, H., & Özer, N. (2015). Education and educational administration from the perspective of critical theory. *Journal of Teacher Education and Educators, 4*(2), 206-227.

Deniz, D. (2018). Investigation of teachers' views on values education in mathematics curriculum. *OPUS International Journal of Society Researches, 9*(16), 678-705. doi: 10.26466/opus.476727

Denzin, N. K. & Lincoln, Y. S. (1998). Introduction: Entering the field of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research,* (pp. 1-17). Sage.

Denzin, N. K., & Lincoln, Y. S. (2018). *The Sage handbook of qualitative research* (5th ed.). Sage.

Dilek, A. (2017). Feridun Oral'ın resimli hikaye kitaplarındaki değerlerin incelenmesi. *Değerler Eğitimi Dergisi*, *15*(33), 61-86.

Dilekçi, A. (2022). Examination of theater texts in Turkish textbooks in terms of transfer of values, *Inonu University Journal of the Faculty of Education, 23*(1), 44-58. doi: 10.17679/inuefd.1024499

Doğan, B., & Gülüşen, A. (2011). Türkçe ders kitaplarındaki (6-8) metinlerin değerler bakımından incelenmesi. *Kilis 7 Aralık Üniversitesi Sosyal Bilimler Dergisi, 1*(2), 75-102.

Dökme, K., & Tunçer, B. K. (2019). İlkokul Türkçe ders kitaplarındaki öyküleyici metinlerin değerler yönünden incelenmesi. *Milli Eğitim Dergisi*, *51*(235), 2085-2106. doi:10.37669 milliegitim.880197

Durmuş, S. (2004). Matematik eğitiminde değerler üzerine bir deneme. *Değerler Eğitimi Dergisi, 2*(7-8), 65-79.

Egin, Ö. F., Budak, Y., Kurtoğlu, M. Ö., & Atay, Ö. (2023). Matematik eğitimi alanında yapılan değerler eğitimi tezlerinin incelenmesi. *Cihanşümul Akademi Sosyal Bilimler Dergisi*, *3*(5), 22-30.

Gudmundsdottir, S. (1990). Values in pedagogical content knowledge. *Journal of Teacher Education*, *41*(3), 44-52.

Güney, Z., Özkoç, M., & Korkmaz, N. (2016). Matematik felsefesi ve eğitimine dair. *Muğla Sıtkı Koçman Üniversitesi Eğitim Fakültesi Dergisi*, *3*(2), 54-71.

Halstead, J. M., & Taylor, M. J. (2000). Learning and teaching about values: A review of recent research. *Cambridge Journal of Education*, *30*(2), 169-202.

Horzum, T., & Yıldız, E. (2023). Examination of middle school mathematics textbooks in terms of values. *International Electronic Journal of Mathematics Education*, *18*(2), em0731. https://doi.org/10.29333/iejme/12908

Kaliyeva, A. (2015). *Türkçe ve İngilizce ders kitaplarında değerler eğitimi* (Unpublished master's thesis). Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir.

Karaca, D., & Uzunkol, E. (2019). İlkokul matematik ders kitaplarının içerdiği değerler bakımından incelenmesi [An examination of primary school math textbooks with regard to the values they involve]. *International Journal of Field Education, 5*(2), 55-71.

Keskin, Y. (2008). *Türkiye'de sosyal bilgiler öğretim programlarında değerler eğitimi: Tarihsel gelişim, 1998 ve 2004 programlarının etkililiğinin araştırılması* (Doctoral dissertation). Marmara Üniversitesi, İstanbul.

Kılcan, T. (2020). Ortaokul ve imam hatip ortaokulları matematik ders kitaplarında yer alan kök değerlerin incelenmesi. *Uluslararası Sosyal Bilgilerde Yeni Yaklaşımlar Dergisi*, *4*(2), 248-266. doi: 10.38015/sbyy.816641

Kıral, B. (2020). Nitel bir veri analizi yöntemi olarak doküman analizi. *Siirt Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *8*(15), 170-189.

Köksal, M. (2021). *Ortaokul matematik ders kitaplarının kök değerler açısından incelenmesi* (Unpublished master's thesis). Marmara University, İstanbul.

Köksal, K., Yaylacı Kılıç, Z., Yel, Ü., Erbaş, S., & Kılcan, B. (2022). Sosyal bilgiler ders kitaplarının kök değerler açısından incelenmesi. *Bayterek Uluslararası Akademik Araştırmalar Dergisi, 5*(2), 74-87. doi:10.48174/buaad.52.1

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (1th ed.). Sage.

Mcmillian, H. J., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry* (7th ed.). Pearson Education.

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation* (4th ed.). John Wiley & Sons.

Meydan, H. (2014). An evaluation on the role of values education in school and values education approaches. *Journal of Theology Faculty of Bülent Ecevit University*, *1*(1), 93-108.

Miles, M. B., & Huberman, A.M. (1994). *An expanded sourcebook qualitative data analysis* (2nd ed.). Sage.

Ministry of National Education [MoNE]. (2017a). *Matematik dersi öğretim programı (1, 2, 3, 4, 5, 6, 7 ve 8. sınıflar)*. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of National Education [MoNE]. (2017b). *Müfredatta yenileme ve değişiklik üzerine.* Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of National Education [MoNE]. (2018a). *Matematik dersi öğretim programı (ilkokul ve ortaokul 1, 2, 3, 4, 5, 6, 7 ve 8. sınıflar)*. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of National Education [MoNE]. (2018b). *Ortaöğretim matematik dersi (9, 10, 11 ve 12. Sınıflar) öğretim programı*. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of National Education [MoNE]. (2021). *Ders kitaplarını değerlendirme raporu (Öğretmen görüşleri)*. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of National Education [MoNE]. (2022). *Taslak ders kitabı ve eğitim araçları ile bunlara ait elektronik içeriklerin incelenmesinde değerlendirmeye esas olacak kriterler ve açıklamaları*. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

Ministry of Education Malaysia (2012). *High school integrated curriculum, form 4 mathematics curriculum specificatio*n. Curriculum Development Division.

Mutlubaş, S. Y. (2021). *Beşinci sınıf matematik ders kitaplarındaki temsillerin öğretim programındaki kök değerler bağlamında incelenmesi* (Master's thesis). Pamukkale Üniversitesi, Denizli.

Mutlubaş, S. Y., & Şahin, A. (2022). An examination of the core values in fifth grade mathematics textbooks. *Education Quarterly Reviews, 5*(3), 431-444. doi: 10.31014/aior.1993.05.03.557

Özel, A. (2015). *İlkokul 4. sınıf öğrencilerinin Türkçe ders kitaplarında yer alan metinlerdeki değerler ile ilgili algılarının incelenmesi* (Unpublished master's thesis). İnönü Üniversitesi Eğitim Bilimleri Enstitüsü, Malatya.

Özkaya, F., & Duru, A. (2020). Ortaokul matematik ders kitaplarında değerler eğitimi kapsamındaki değerlerin yer alma durumlarının incelenmesi. *Uşak Üniversitesi Eğitim Araştırmaları Dergisi*, *6*(3), 43-67.

Özkaya, F. (2021). Matematik dersi öğretim programında vurgulanan değerlerin ortaokul matematik dersi kitaplarında yer alma durumlarının incelenmesi. (Unpublished master's thesis). Uşak Üniversitesi, Uşak.

Sam, L. I. M. C., & Ernest, P. (1997). Values in mathematics education: What is planned and what is espoused? *BSRLM, 17*(1-2), 37-44

Sanchez, T. R. (1998). Using stories about heroes to teach values. ERIC Digest. Retrieved from https://eric.ed.gov/?id=ED424190

Sayın, V., Orbay, K., & Şam, E. A. (2019). 5. sınıf matematik ders kitabının değerlerimiz açısından incelenmesi. *IBAD Sosyal Bilimler Dergisi*, 161-171. doi:10.21733/ibad.605040

Seah, W. T., & Bishop, A. J. (2000). *Values in mathematics textbooks: A view through two Australasian regions.* Paper presented at the 81st annual meeting of the American Educational Research Association, New Orleans, LA.

Seah, W. T. (2002). Exploring teacher clarification of values relating to mathematics education. In C. Vale, J. Roumeliotis & J. Horwood (Eds.), *Valuing Mathematics in Society* (pp. 93–104). Mathematical Association of Victoria.

Seah, W. T. (2008). Valuing values in mathematics education. In P. Clarkson & N. Presmeg (Eds.), *Critical issues in mathematics education: Major contributions of Alan Bishop* (pp. 239-253). Springer.

Slater, F. (2002). Citizenship education through secondary geography: Value and values education in the geography curriculum in relation to concepts of citizenship. *Active Citizenship, Sustainable Development and Cultural Diversity, 3,* 124, 146.

Smith, M. S., & Stein, M. K. (1998). Reflections on practice: Selecting and creating mathematical tasks: From research to practice. *Mathematics, 3*(5), 344-350.

Swadener, M., & Soedjadi, R. (1988). Values, mathematics education, and the task of developing pupils' personalities: An Indonesian perspective. *Educational Studies in Mathematics, 19*(2), 193-208.

Şahin, Ö., & Başgül, M. (2018). Ortaokul matematik ders kitaplarında sosyal değerler. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, (34), 90-104. doi: 10.14582/DUZGEF.1890

Şahin, T., & Ersoy, F. (2012). Sosyal bilgiler ders kitaplarının değerler eğitimi yaklaşımları açısından incelenmesi. *Kuram ve Uygulamada Eğitim Bilimleri Dergisi, 12*(2), 1535-1558.

Şen, Ü. (2007). *Milli Eğitim Bakanlığı'nın 2005 yılında tavsiye ettiği 100 temel eser yoluyla Türkçe eğitiminde değerler öğretimi üzerine bir araştırma* (Unpublished master's thesis). Gazi Üniversitesi, Ankara.

Tarakcı, R. & Kalenderoğlu, İ. (2022). Kök değerler açısından ortaokul Türkçe ders kitaplarındaki öyküleyici metinler. *International Journal of Education and New Approaches, 5*(1), 139-157. https://doi.org/10.52974/jena.1133254

Teker, D., & Ellez, A. M. (2022). Ortaöğretim matematik ders kitaplarının değerler eğitimi açısından incelenmesi. *Batı Anadolu Eğitim Bilimleri Dergisi, 13*(2), 1083-1098.

Turkish Language Association [TLA]. (2019). Current Turkish dictionary. Retrieved from https://sozluk.gov.tr/

Topkaya, Y. (2016). Sosyal bilgiler öğretmenlerinin değer aktarım yaklaşımları hakkındaki görüşlerine ait nitel bir çalışma. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi, 17*(1), 637-652.

Toraman, K. D., & Memişoğlu, H. (2022). Sosyal bilgiler ders kitaplarındaki edebi ürün ve görsellerin değerler eğitimi açısından incelenmesi. *International Journal of Social Sciences and Education Research, 8*(2), 198-217. doi: 10.24289/ijsser.1081371

Trocki, A., & Hollebrands, K. (2018). The development of a framework for assessing dynamic geometry task quality. *Digital Experiences in Mathematics Education, 4*(2), 110-138. doi: 10.1007/s40751-018-0041-8

Yalçın, A. (2023). *Sosyal bilgiler dersi öğretim programı ve ders kitaplarında tarihi metinlerin değerler açısından incelenmesi* (Unpublished master's thesis). Bartın Üniversitesi, Bartın.

Yaman, E. (2012). *Değerler eğitimi: Eğitimde yeni ufuklar* (1st ed.). Akçağ Yayınları.

Yazıcı, K. (2006). Değerler eğitimine genel bir bakış. *Türklük Bilimi Araştırmaları, (19),* 499-522.

Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (8th ed.). Seçkin Yayıncılık.

Yıldırım A & Şimşek H (2013). *Sosyal bilimlerde nitel araştırma yöntemleri* (9th ed.). Seçkin Yayıncılık.

Yıldız, M. (2019). *Ortaokul matematik ders kitaplarındaki metin ve görsellerin değerler açısından incelenmesi* (Unpublished master's thesis). Bülent Ecevit Üniversitesi, Zonguldak.

Yılmaz, E., & Kıran, D. (2023). Examination of middle school science coursebooks in terms of values education. *Cumhuriyet International Journal of Education, 12*(1), 29-45. doi: 10.30703/cije.1117516

Yücadağ, T. (2010). *2000-2009 yılları arasında matematik eğitimi alanında Türkiye'de yapılan çalışmalarının bazı değişkenlere göre incelenmesi* (Unpublished master's thesis). Selçuk Üniversitesi, Konya.