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An Examination of the Core Values in Fifth Grade Mathematics Textbooks

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Abstract

A textbook is of a proper medium for conveying curricular values to students. The aim of this study is to examine how math textbooks reflect the core values stated in the curriculum. Selected by homogeneous sampling technique, the data sources of this qualitative study consisted of two (one official and one private) fifth-grade math textbooks. All elements (e.g., text, visuals, exercises, questions) in the textbooks were analyzed through content analysis technique, employing the core values as a preliminary outline. Findings revealed that the both textbooks included all the core values in the curriculum with varying frequencies across values. The most frequently reflected values were patriotism and responsibility while the least was honesty. The values of friendship, patience, justice, love, helpfulness, and respect were represented in moderate frequencies in both textbooks. The frequencies of representations regarding values were mostly parallel in official and private publications. Teachers must play a complementary role for the underrepresented values during teaching.

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

1. Introduction

Value is a concept with a wide range of meanings depending on the context in which it is used. Commonly, it is defined as an abstract measure that helps to determine the importance of something (TDK, 1998). As the general executive of the human attitude and movement (Dönmezer, 1982), values become explicit through common views of people on what is good, right, or desirable (Dilmaç et al., 2009; Güngör, 2010). As a criterion, it includes the distinction between what something “is” and what something “should be” (Cevizci, 1999, p. 201). Likewise, the field of education has completely been surrounded by moral questions, concerns, and practices since ancient ages. Especially before the modernity, educational practice was mainly on character and moral formation of the learner. As Cevizci (2014) emphasized, all the great educators of antiquity, starting with Socrates and Confucius, were also moral teachers. In modern times, Cevizci added, this situation has changed to a certain extent with the fact that many have received a purely vocational education instead of moral education. Yet moral education and character formation still continue to occupy an important place in education today through the practice of value education. As a crucial component of a curriculum design and implementation, values are the essential affective

qualities aimed to foster through the school subjects and practices. In short, values are viewed as the curriculum of moral education (Tomlinson, 1997) relating to the affective domain of curricular aims. The integration of values education in curricula has been viewed as an integral step toward the aim of shaping the holistic development of learners (Gabatbat & Santander, 2021).

Values are delivered to students through various school subjects, interpersonal activities, and curricular materials. The presumption that mathematics is of the same objective knowledge everywhere in the world, and the fact that mathematical knowledge is indeed context-free both foster the commonly-held belief that mathematics is culture- and value-free (Seah & Bishop, 2000). Despite this perception, attempts have been made to establish a link between values and math in the past few decades (*e.g.*, Bishop, 1996; Bishop et al., 1999; Dede, 2006; Seah & Bishop, 2003). For instance, Bishop (1996) attempted to classify values into three categories: mathematical, mathematics educational, and general educational. Mathematical values were about the worth and importance attributed to the qualities of the discipline of mathematics, including complementary pairs such as rationalism and objectivism, control and progress, and mystery and openness. Mathematics educational values are the ones related to the institutional norms by which math is formally taught, namely the norms and practices (*e.g.*, clarity, accuracy, consistency, flexibility) in the classrooms of mathematics. The general educational values (*e.g.*, responsibility, communication) were associated with the general educational and socializing demands of society (Bishop, 1996). Not mathematical in nature, general educational values are described as qualities that teachers, schools and/or the society/culture attempt to inculcate in their students. Crucial for the maintenance and enhancement of the social fabric, these values often reflect a moral character (Bishop et al., 1999).

A general educational value becomes explicit when a mathematics teacher uses, for instance, the context of a global warming issue to discuss the graphs pertaining to the increasing temperature over the years along with the social responsibilities to deal with it (value of responsibility) or when pupils are engaged in solving a problem about equally (or fairly) sharing the harvested grains among shareholders (value of justice). General educational values are indeed the core values, guiding light routing people's behavior and attitude towards others. In the statement published by the Board of Training and Education of Turkish Educational Ministry on July 18, 2017, ten core values were explicitly stated for the purpose of values education. Named as *root values*, these values were "justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and helpfulness" (Topal, 2019, s. 248). Those are the basic values that are of primary importance among the values and taught jointly with other disciplines including math.

Many studies have recently been conducted to examine values education from a different perspective. Some of those perspectives are the values in children's literature (Kurtde Fidan & Ulu, 2021), fostering values through authentic storytelling (Gunawardena & Brown, 2021), teachers' views on values education (Thornberg & Oğuz, 2013), and postgraduate students' views on values education (Dinçer & Aksoy, 2021). Several studies have been conducted on the representation of values in textbooks from different disciplines. For instance, after investigating Turkish (namely, Language Arts) textbooks, Deniz and Karagöl (2018) found the lack of a balanced representation in the distribution of values in the examined course and activity books. Upon conducting a study to compare social studies textbooks in Türkiye, the United States, and France (Kafadar et al., 2021), it was found that there are both similarities and differences from one country to another in terms of value representations and instructional approaches adopted. Ersoy and Şahin (2012) examined social studies textbooks in terms of approaches to values education and revealed that *value analysis* and *suggestion* took place in the examined books but *moral reasoning*, *explanation of value*, *observation/learning through modeling* did not.

Math textbooks constitute an important medium for inculcating the core values in students. Even though the mathematical knowledge is supposed to be value-free (Seah & Bishop, 2000), the textbooks might still represent mathematical content with value-laden ways (Dede, 2006). The textbooks of math were often studied from a mathematical values perspective. Upon analyzing lower secondary mathematics textbooks in Singapore and Australia, Seah and Bishop (2000) revealed an unbalanced portrayal of each of the eight identified pairs of complementary values. After analyzing 6th and 7th grade mathematics textbooks, Dede (2006) found that rationalism, control, and openness values among mathematical values were emphasized more often than complementary pairs of formalistic view, theoretical knowledge, instrumental understanding, accessibility, and

evaluation in both textbooks. Özkaya and Duru (2020) studied middle school mathematics textbooks (5th, 6th, 7th, 8th grades) for the representations of the justice and sharing, scientificity, flexibility, aesthetics, equality, and savings values, as determined by National Education Ministry (NEM). Their study demonstrated that the values of justice and sharing, savings, and aesthetics were represented the least while the equality value was the most in all textbooks. After examining the values in middle-school level math textbooks, Yıldız (2019) discovered that the most repeating value at the fifth-grade level was patriotism while mathematical values were not addressed. The most repeating value at the sixth-grade level was connecting as a mathematical value. At the seventh-grade level; honesty, responsibility, and helpfulness values came forefront while mathematical values were not represented. At the eighth-grade level, the most repeating values were connection, equality, and helpfulness.

As in other disciplines, core values were given place in the mathematics curriculum too. Mathematics textbooks are written in line with the guidelines in the curriculum. Although the extent to which core values are included in the mathematics textbook has a special importance, this subject is not well-explained by previous studies. In the 2020-2021 academic year at Turkish schools, two types of mathematics textbooks were used for the fifth-grade of middle schools, one of which was published by the National Educational Publications and the other one was printed by a private publishing house. The aim of this study is to investigate the core values represented in the 5th-grade mathematics textbooks used in Turkish middle schools and to compare the frequencies of the representations based on the publishing house (official and private). To this end, following specific questions were answered: (1) How often are the core values included in the fifth-grade mathematics textbook of National Education Publications? (2) How often are the core values represented in the fifth-grade mathematics textbook of the private publishing house? (3) What are the frequency relations of the core values in the representations between the fifth-grade mathematics textbook belonging to the official publishing house and the private publications?

2. Method

2.1 Research Design

This qualitative study involves an analysis of math textbooks in terms of whether the content of the books reflects the representations of 10 core values identified by Turkish Educational Ministry. Therefore, the study is based on document analysis, which is a form of qualitative research in which the researcher interprets the identified documents to give voice and meaning depending on an assessment topic (Bowen, 2009). Analysis of documents includes coding the studied content into themes, which is similar to how interview transcripts are analyzed. Like all the qualitative studies, the study seems to be descriptive in nature, yet the design of the study actually falls into *basic qualitative research* category. In conducting a basic qualitative research, according to Merriam (2002), a researcher seeks to uncover and understand a process, a phenomenon, the perspectives and worldviews of the individuals involved, or a combination of these. Gathered through observations, interviews, or documents, the data are analyzed to reveal the repeating patterns or common themes emerging from the data. A rich, descriptive account of the findings is presented and discussed through referring to the literature framing the study.

2.2 Data Sources

Data source of the study was comprised of two (one official and one private publications) fifth-grade mathematics textbooks. The Ministry of National Education offers more than one choice of textbooks, including private publications prepared in line with the math curriculum. In qualitative studies purposeful sampling techniques are given place in order to select the best data sources for a study (Patton, 1990). Since merely the fifth-grade math textbooks were investigated, the used sampling technique is *homogeneous sampling*. In fact, homogeneous sampling is preferred when the goal of the study is to provide an in-depth understanding and description of a particular sample. The sample was also kept focused due to the fact that the fifth-grade math textbooks were ignored in previous studies on values education. Upon investigating the previous studies analyzing values in textbooks, Kandemir and Yıldız (2019) revealed that the least studied level was the fifth-grade textbooks. Therefore, two textbooks were selected: the fifth-grade mathematics textbook published by the National Education Publications (NEP) and the fifth-grade mathematics textbook published by private Tuna Printing Press (TPP). Both textbooks were approved by the Ministry of National Education, Board of Training and Education, dated

April 18, 2019, for the use for next five years from 2019-2020 academic year. The images of those textbooks were given below in Figure 1.



Figure 1: The Cover Images of the Selected Textbooks

The both textbooks contained six units as the following:

- 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-rectangles)
- Unit 5: Data processing and Measurement (Data collection and evaluation, length and time measurement)
- Unit 6: Geometry and Measurement (Measuring area, geometric objects)

2.3 Data Collection Procedures

Documents are divided into two categories: official and personal documents. Johnson and Christensen (2014) define official documents as data written, photographed, or recorded by an organization. Journals, newspapers, research reports, books, annual study reports, advertisements, news, surveys and many more records can be regarded as examples of official documents. Since the selected textbooks, even though one is produced by a private publishing company, are officially approved and used by the National Education Ministry, they might be viewed in the category of official documents. Since the contents of two fifth-grade mathematics textbooks were taken as the data of the study, the printed copies as well as the digital version (as PDF file) of the books were obtained. The digital versions of the books were received from the Education Information Network (called EBA) of the Ministry of National Education, to easily transfer the visual data in the process of writing the findings. The official publication textbook (NEP) contains 320 pages with six units, each including activities, exercises, visuals, assessment questions and so on. Private publication textbook (TPP) contains 304 pages with six units, each including activities, exercises, visuals, assessment questions and so on.

2.4 Data Analysis

Document analysis studies include the collection and analysis of written and visual materials. According to Yıldırım and Şimşek (2018), the content analysis might also be conducted deductively through having some predetermined themes as the guiding frame for analysis, and the data are interpreted in line with these themes. To this end, the core values formed the predetermined themes for analysis. In particular, behaviors characterizing each core value have been tabulated by using the behavior list by NEM (2017) in order to have a detailed analysis of the data. Presented in Table 1, those behaviors are used as a frame to assign each particular content to a specific value.

Table 1: Behaviors characterizing each core value

Core Values	Behaviors characterizing the related value
Justice	being fair, equal treatment, sharing something fairly
Friendship	altruism, trust, loyalty, solidarity
Honesty	being clear and understandable, being truthful, ethical behavior, being reliable, keeping the promises
Self-control	controlling the behavior of their own, taking responsibility for their behavior, self-confidence
Patience	to endure, to be persistent, to be in tolerance
Respect	being humble, treating others the way you would like to be treated, valuing other people's personalities
Love	giving importance to family unity, devotion
Responsibility	being responsible to oneself, to one's environment, to one's country, to one's family
Patriotism	hardworking, solidarity, compliance with rules and laws, being sensitive to historical and natural heritage, caring about society
Helpfulness	being generous, being altruistic, being cooperative, being merciful, being hospitable, sharing

The contents of the textbooks—comprised of textual information, activities, exercises, graphs, tables, images, assessment questions etc.—were initially coded based on the above behavior list, and then, the frequencies were obtained by separating the coded representations depending on the core values. Both textbooks were examined by four more experts in the field and their coding experiences revealed a consensus that some of the representations included more than one value. Hence, all the values included in a single representation were taken into consideration as separate values. However, the images were not considered as a separate representation if they were used as a supporting element to the textual information. Finally, the qualitative data were quantified and presented in tables with frequencies and percentages in order to allow comparisons among core values and between two textbooks. Additionally, the qualitative findings were presented in order to support the quantitative data. For the validity and reliability of the results, the textbooks belonging to two different publishing houses were examined, and 10 core values along with the behaviors revealing those values were identified as criteria in the analysis process. In the analysis process, the agreement rate between independent coders was found to be 92 percent, which is well above the accepted minimum value of 70 percent (Miles & Huberman, 1994).

2.5 Ethical Considerations

Since the data sources were printed documents, ethical concerns about individuals did not apply in this study. As analyzing the data and writing the final report, still, a particular attention was given to focus on the studied concepts rather than the persons or institutions. Statements that accuse individuals or institutions were avoided. Since values are abstract concepts, a scale and more than one coder were given place in order to reach objective findings.

3. Results

Findings were presented under three major headings: the representations of the core values in the official publication textbook (NEP), the representations of the core values in the private publication textbook (TPP), and the comparison of the values in official and private textbooks. Firstly, the findings about the values in the official publication textbook were presented below.

3.1 Core Values in the Official Publication Textbook

The analysis of the official fifth-grade mathematics textbook (National Education Publications, 320 pages with six units) revealed that a total of 189 core-value representations took place in the book, though the frequencies varied from one value to another. A summary of the distribution of 189 representations in the official textbook to ten core values is shown in Table 2 below.

Table 2: Core Values in the Official Publication Math Textbook

	<i>Core Values</i>	<i>f</i>	<i>%</i>
1	Justice	12	6,35
2	Friendship	14	7,41
3	Honesty	5	2,65
4	Self-control	21	11,11
5	Patience	17	8,99
6	Respect	7	3,70
7	Love	9	4,76
8	Responsibility	38	20,11
9	Patriotism	57	30,16
10	Helpfulness	9	4,76
Total		189	100

As seen in Table 2, an examination of core values in the official textbook by *National Education Publications* revealed that all of the core values were represented at least once, though the representations were not distributed equally or nearly equally among ten core values. Findings in the table demonstrated that the most represented value in the book was patriotism (n=57; 30,16%). After patriotism comes the values of responsibility (n=38; 20,11%) and self-control (n=21; 11,11%). The values of patience (n=17; 8,99%), friendship (n=14; 7,41%), justice (n=12; 6,35%), love (n=9; 4,76%), helpfulness (n=9; 4,76%), and respect (n=7; 3,70%) were represented with moderate frequencies in the examined textbook. The least represented value among all others was honesty (n=5; 2,65%). The average of the representations is 18.9. In the following section, findings from the private publishing textbook (Tuna Printing Press) were presented.

3.2 Core Values in the Private Publication Textbook

The analysis procedures of the private publication fifth-grade mathematics textbook (Tuna Printing Press, 304 pages with six units) demonstrated that a total of 224 core-values were given place, though the frequencies of the representations varied from one value to another. A summary of the distribution of 224 representations in the private publication textbook to ten core values is shown in Table 3 below.

Table 3: Core Values in the Private Publication Math Textbook

	<i>Core Values</i>	<i>f</i>	<i>%</i>
1	Justice	9	4,02
2	Friendship	8	3,57
3	Honesty	2	0,89
4	Self-control	22	9,82
5	Patience	35	15,63
6	Respect	10	4,46
7	Love	12	5,36
8	Responsibility	41	18,31
9	Patriotism	66	29,46
10	Helpfulness	19	8,48
Total		224	100

As presented in Table 3, an analysis of core values in the private publication textbook by Tuna Printing Press uncovered that all of the core values proposed in the curriculum were represented at least once, though the representations were not distributed equally or nearly equally among ten core values. Findings in Table 2 demonstrated that the most represented two values in the textbook were patriotism (n=66; 29,46%) and responsibility (n=41; 18,31%), as in the official textbook by the National Education Publications. After those comes the value of patience (n=35; 15,63%). The values of self-control (n=22; 9,82%), helpfulness (n=19; 8,48%),

love (n=12; 5,36%), respect (n=10; 4,46%), justice (n=9; 4,02%), and friendship (n=8; 3,57%) were represented with moderate frequencies in the examined textbook. As in the official textbook by the National Education Publications, the least represented value among all others was honesty (n=2, 0,89%). The average of the representations is 22.4.

Examples associating with the core values from both textbooks were presented and explained below. The first representation is an example associating to the *justice*, *friendship*, and *helpfulness* values.

“EXAMPLE-1 Bekir will share 312 walnuts equally to 11 of his friends. How many walnuts will fall for each?” (TPP, p. 45).

There are three joint values in Example-1 above. Bekir’s equal distribution of nuts involves *justice* value, sharing with his friends involves *friendship* value, and sharing behavior alone includes *helpfulness* value. It must, however, be noted that sharing equally does not always mean justice, particularly for the cases that have preexisting inequalities. Special adverse cases might then be discussed by students to widen their perspective about the contradictions between equality and justice (namely, equity). The next example is an exercise question reflecting *friendship* value.

“6) Murat lent 3/11 of his salary to his friend. If the amount he lent is 900 liras, how much is Murat’s salary?” (NEP, p. 110)

The sixth question in the “Your Turn” section of the textbook includes a person named Murat who helps his friend by lending a portion of his salary. Murat’s behavior indeed reflects trust and loyalty, as the behaviors characterizing the value of *friendship*.



Figure 2: A representation about friendship value

In Figure 2 (TPP, p. 151) there is a problem supported by a visual. It stated that Ms. Lütfiye distributed 4/5 of the ashura, a traditional dessert, she made to her neighbors. Then students were asked to express the fraction 4/5 as decimal notation and as a percentage. It is seen that Ms. Lütfiye distributes a significant amount of Ashura to her neighbors while keeping a small portion for herself. Her altruistic behavior involves the value of *friendship*. The next is a representation involving the value of *honesty*.

Üzüm üreticisi olan Ahmet Bey, çevresinde dürüstlüğü ile tanınan ve çok sevilen biridir. Ahmet Bey her yıl olduğu gibi öncelikle bağından topladığı üzümlerin çürük ve eziklerini ayırıyor. Daha sonra üzümleri her birinde 11 salkım olacak şekilde 29 kasaya dolduruyor. Buna göre Ahmet Bey’in toplam kaç salkım üzümü kasalara koyduğunu nasıl tahmin edebilirsiniz?

Ahmet Bey, topladığı üzümleri her birinde 18 salkım olacak şekilde 102 kasaya doldurmuştu. Ahmet Bey’in toplam kaç salkım üzümü kasalara koyduğunu nasıl tahmin edebilirsiniz? Tartışınız.



Figure 3: Representation about honesty value

“Mr. Ahmet, a grape producer, is known for his honesty and loved by many. As every year, Mr. Ahmet first separates the rotten and smashed ones he collects from his vineyard from the good ones. He then packs the grapes into 29 crates with 11 bunches in each.

According to this, how can you estimate how many bunches of grapes Mr. Ahmet put in the crates? If Mr. Ahmet had packed the grapes he collected into 102 crates with 18 bunches in each, how can you estimate how many bunches of grapes Mr. Ahmet put in the crates? Please discuss.” (TPP, p. 48).

In the example in Figure 3, the *honesty* of Mr. Ahmet is stated overtly and praised by the statement that he is “loved by many”. This example involves learning values through models, through social learning principles. Since Mr. Ahmet is indeed reliable and truthful, the example involves the value of *honesty*. The next example involves *patience* and *self-control* values.

13) Her hafta harçlığından 20 TL biriktiren Sedat, 6 hafta sonra biriktirdiği paranın tamamıyla bir spor ayakkabı almıştır. Ayakkabının fiyatı kaç liradır?

- A) 110 B) 120
C) 130 D) 140



Figure 4: Representation about patience and self-control values

The question states, “Sedat, who saved 20 TL from his pocket money every week, bought a sneaker at the end of the sixth week with all the money he saved. How much is the price of the shoes?”

In Figure 4 (TPP, p. 83), it is stated that a boy named Sedat saves money in order to buy the shoes he wants. In this problem, an individual who saves money determinedly to buy the shoes and who can control his own behavior are presented. Behavior of being determined relates to the value of patience while controlling his behavior links to the value of self-control. Considering that consumption is on the rise and spending is encouraged by many instruments, the importance of those values is better understood. Sedat presents a self-controlled, and frugal character rather than a consumption-oriented personality as capitalism encourages. He aimed to postpone the instant access to shoes, save money with determination and get what he wants. The coming example is about the value of *respect*.

“EXAMPLE-2 Kadir wants to do a research to determine what hobbies his classmates spend most of their time on. Let’s write a research question for Kadir’s research. Let’s prepare a survey where Kadir can collect data for research.”

In Example-2 (TPP, p. 226), a student named Kadir is trying to learn what his friends do as hobbies. Kadir’s valuing the personalities and preferences of other people reflects the value of respect. The next example is about *love* and *helpfulness* values.

Emekli maaşı %6 artırılan Selim dede, artış miktarı kadar parayla torununa bir bisiklet almıştır.

Sizce %6 gösterimindeki “%” sembolü neyi ifade eder? Günlük hayatta “%” sembolünün kullanıldığı gösterimlere örnekler veriniz.



Figure 5: Representation about the value of love and helpfulness

“Grandfather Selim, whose retired pay was increased by 6%, bought a bicycle for his grandson with the same amount of money as the increase. What do you think the “%” symbol in %6 represents? Give examples of representations in which the “%” symbol is used in daily life.”

As seen in Figure 6 (TPP, p. 147) in this section, a happy grandfather and a bicycle-riding grandchild are portrayed. Here, the grandfather was generous and bought a bicycle for his grandson with a certain part of his salary and aimed to express his love for him/her. Helpfulness value was presented through the behaviors of being generous and sharing, and the love values was represented by the behaviors of giving importance to family unity and making sacrifices for others. The next example is about the value of *responsibility*.

“Brushing his teeth 3 times a day, Ali saves 30% of the amount of water he consumes in a week because he does not keep the faucet open till he finishes. How many liters of water does Ali, who consumes 700 liters of water a week, save in a week?”

In the 9th question (NEP, p. 188) in the “Unit Evaluation” section, brushing teeth, as a health care activity, and saving water themes are attached to the problem. Taking care of one’s health is an indication of his *responsibility* towards himself. In addition, performing mathematical operations linked to prevent water waste also instills a sense of *responsibility towards the environment*. The rapid decrease in water resources, which is one of the global problems, and the fact that scientists have scenarios such as “water wars” in the future also increase the importance of this example. The next one is about *patriotism* and *responsibility* values.



Figure 6: Representation about patriotism and responsibility values

“In our country, we lose 743 million tons of soil annually as a result of erosion. In a tree planting project to prevent soil loss, a total of 52468 trees were planted in 1 year. Since 37,893 trees were planted in the first 7 months, let’s find out how many trees were planted in the remaining time.”

In the activity “Let’s Do It Together: 7” (NEP, p. 37), the damage of erosion and the importance of planting trees to prevent erosion are mentioned. In this example, which is also supported by a visual, protecting the natural heritage and fulfilling responsibilities towards the environment were emphasized, therefore, the values of *patriotism* and *responsibility* were identified. The next example reflects the values of *helpfulness* and *responsibility*.



Figure 7: Representation about the value of helpfulness and responsibility

“Problem: Fifth and sixth graders donated $\frac{5}{12}$ of the books collected in a school participating in a book collection campaign, seventh graders donated one-fourth of the books, and 8th graders donated the remaining books. According to this, how many of the collected books did the 8th graders donate?”

In Figure 7 (TPP, p. 118), there is a problem situation supported by a visual. In this problem, the value of *helpfulness* is overtly represented through the emphasis on “book collection campaign” and “donating books for the campaign.” It also includes the value of *responsibility* as the students participating in the campaign will show responsibility towards their social environment.

3.3 Comparison of the Official and Private Publications

The findings revealed no remarkable difference between two textbooks in terms of the frequency and distribution of the core values. In fact, the frequencies for core values in two separate textbooks demonstrated a similar trend: value representations with low frequencies in one book were often with low frequencies in the other, moderate ones were moderate in the other, and those with high frequencies were with high frequencies in the other (Figure 8).

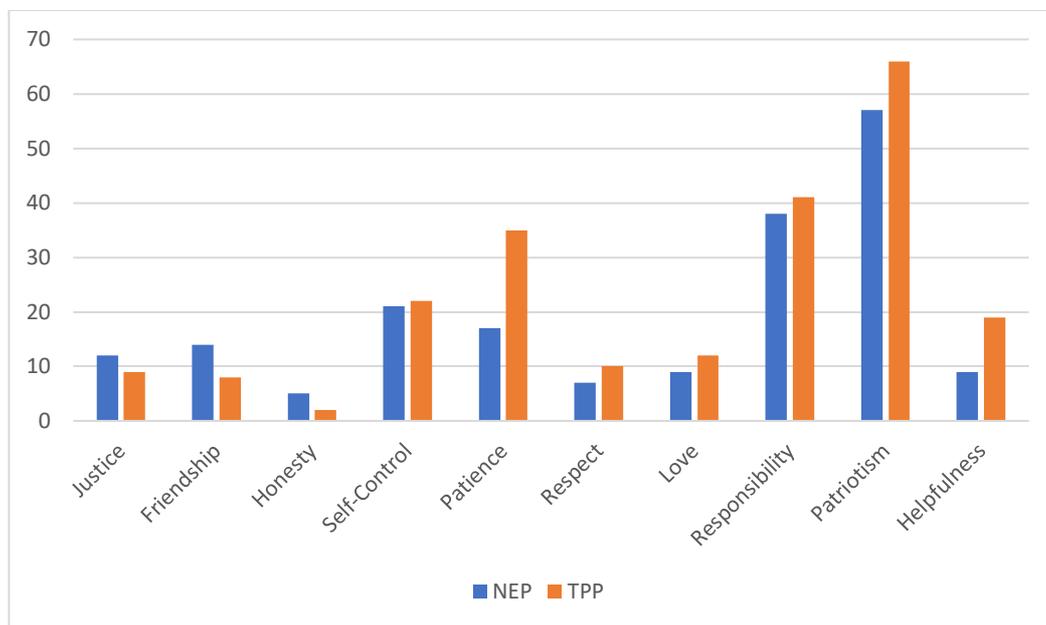


Figure 8: Comparison of Official and Private Publications

Figure 8 demonstrated that the values of *patriotism* and *responsibility* stood out while the value of *honesty* was portrayed the least in both textbooks. The private publication textbook had relatively more representation of the values of *patience*, *helpfulness*, and *patriotism* than that of official publication. Despite those, both textbooks were alike in terms of representation of core values. Since the textbooks are written based on the curriculum, the main reason for this similarity may be the guiding effect of the curriculum in the process in which textbooks are written. The distribution of values to the units in both textbooks were presented in Figure 9.

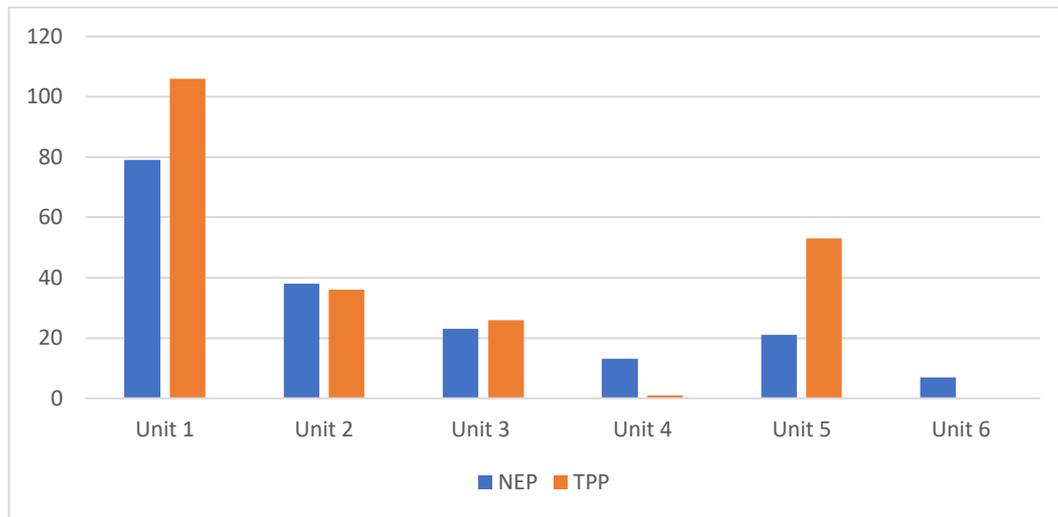


Figure 9: Distribution of Values to the Units

The investigation of the textbooks for the distribution of values to the units revealed that units other than geometry reflected the most of the values. The geometry units in private publication textbook (TPP) hardly reflected any value while the official publication (NEP) demonstrated a better distribution of values among six units.

4. Discussion and Recommendations

This study aimed to reveal whether the core values were represented in one officially- and one privately-published mathematics textbooks for fifth-grade. Findings overall revealed that all the core values were included in the content of the both textbooks, even though with varying frequencies among values. The findings presented above might be discussed in three different points: (1) the distribution of representations to ten core values, (2) relating the values to the topics in mathematics, and (3) the comparison of state-private publications in terms of value integration. The first is about how the value-laden representations are distributed to ten core values stated in the curricula.

The study revealed that all the stated core values were linked to math topics and eventually represented in both textbooks. The good news with this is that learners, as reading the textbook, will encounter sometimes explicitly but often implicitly reflected core values, namely value-laden math contents. That is to say that both textbooks secured the representation and thus the contact of readers to each of ten identified values attached to math topics. Based on those findings, it might be said that values, as Cevizci (2014) noted, still comprise of the intrinsic part of educational practices as well as learning materials. The issue, however, is that the representations regarding values, as previous studies (Deniz & Karagöl, 2018; Seah & Bishop, 2000) similarly demonstrated the unbalanced portrayal of values in textbooks, were not distributed equally or nearly equally among ten core values. For example, representations of the values of *patriotism* and *responsibility* were well above the representations of other eight values in both textbooks. In the same way, the value of *honesty*, represented with the lowest frequency among all other values, was well below the representations of most values in the both textbooks. This rises the questions of how values are portrayed in similar textbooks and why some of the values are valued (or devalued) more than others. The findings indeed are in line with those of previous studies of Turkish context (Şahin & Başgöl, 2019; Yıldız, 2019) reporting that *patriotism* and *responsibility* values stood out in other math textbooks of middle school level while, similarly, *honesty* value fell to the bottom. Correspondingly, Topal's (2019) study affirmed that teachers perceive *patriotism* as the most taught value in lessons at middle schools. One possible reason for this imbalanced distribution of values is that the social touchpoints of some values might be wider than of others. Another reason might be the emphasis on educational aims to the concepts (independence, homeland, freedom, etc.) relating to the leading values in the textbooks. Still another possible reason is the context in which the public perception is shaped. In fact, the people living in Turkish context often witness incidents (*e.g.*, long-term wars in neighboring countries, unending proxy terrorism, coup attempts to overthrow legitimate governments, influx of immigrants, economic sanctions, etc.) stimulating the need to promote some particular core values over others. It

should, however, be noted that problems shaping the public mind cannot be disconnected from the values of *honesty, respect, love* or *justice* either. Therefore, it might be reasonable to increase the least represented values (*e.g., honesty, respect, justice*) in order to have a better balance among all core values and to have its resulting social outcomes.

Secondly, the findings might be discussed in relation to whether the core values can be integrated to math topics as writing textbooks. Researchers of previous studies (Bishop et al., 2000; Dede, 2006) often enunciated a prevalent perception among teachers, parents, university mathematicians, and employers that mathematics is the most value-free subject at schools. Opponents of this perception (Bishop et al., 2000; Clarkson et al., 2000, Seah, 2003) advocate that values might be integrated to mathematics topics implicitly. Findings, with an average of approximately 20 representation per each core value, demonstrated the possibility to integrate those values to math content through examples, problems, exercises, images, or other ways. In fact, linking the math topics to values was made possible by themes such as, health, water saving, erosion, book collection campaign, saving money, harvesting, packing products, etc. Difficulty, however, lay in geometry units, because few representations took place in geometry units as compared to, for instance, algebra units holding the most representations. Despite some weaknesses, such textbooks, as Gabatbat and Santander (2021) emphasized, might still enhance the holistic development of the learners. It is, however, important to note that the representations in the textbooks are often implicit. Therefore, teachers must pay a particular attention to elaborate on those values in classroom interactions in order for students to recognize and to internalize the linked value.

Thirdly, the comparison of the official and private publications in terms of value integration revealed that, despite the minimal differences, both of the textbooks are congruent for integrating core values. Previous studies did not make a comparative analysis of the official and private publication textbooks, even if several studies (*e.g., Özkaya & Duru, 2020; Yıldız, 2019*) examined books that are the products of private publishing companies. There might be several sound reasons for making such comparisons. One is the lack of evidence about the similarities and differences of the both. Most importantly, it is known from other media that commercial motivations are likely to influence the media content in a great deal (Şahin, 2021). The results, however, did not yield a vast gap between two types of publications. That is, when teachers choose one or the other, they will not encounter a great difference in the representation of values. The main reasons for this similarity might be the guiding influence of curricular standards along with the control procedures by the educational ministry before the books are published. Despite the similarities, the official publication demonstrated a stronger balance of both the distribution of values to the units and of the distribution of representations to ten root values. The private publishing textbook, however, gave place to the representation of core values more often than the official publication did.

While this research points to the necessity for textbook writers to better balance the representations of core values across the units in the book, it also points to the needs for a poised representation of core values as well as for a complimentary role of teachers towards the underrepresented values. Studying the representations of core values in math textbook helps practitioners understand how often core values take place in textbooks, how values are integrated to math topics, which themes are used in linking them, which values are ignored in textbooks, and the things that should be changed in the textbooks of tomorrow. The study also gives ways to further and deeper discussion of textbook quality in integrating core values. Would there be a different result if the same investigation was conducted in a different context? Would similar trends emerge in other countries, other cultures, and other teaching areas? And more importantly, how students change upon reading those books? Studies in the future might focus on the questions stated above as well as a meta-synthesis of the previous studies investigating the values in math textbooks.

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