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Ethnomathematics Approaches at Middle School Textbooks

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Abstract. In this research, Middle School Mathematics Curriculum and Middle School Mathematics Textbooks were examined in terms of ethnomathematics approach. Answers were sought to the questions of 'how is it related to culture?' within the subject of acquisitions, content (lecture), learning-teaching process (activities) and evaluation (questions) in the books prepared within the scope of the Middle School Mathematics Curriculum implemented in Türkiye. In this study, document analysis -which is a qualitative research method, was conducted. Examples of mathematical tasks suitable for these achievements were examined in the textbooks of all Middle school grades (5-8th grades) published by the Ministry of National Education, which were prepared in accordance with the Mathematics Curriculum (5-8th Grade) published in 2018 and the curriculum. The examinations were made in the context of the relationship between acquisitions, content, learning-teaching process and evaluation with culture. Considering these four titles, only two acquisitions were associated with culture in the Mathematics Middle School Curriculum, which includes a total of 52 acquisitions in the sources examined. When the textbooks are examined in terms of content, activity and evaluation, it is seen that culture is emphasized in subjects such as Numbers and Operations, Geometry and Measurement, Algebra, Data Processing as a field of learning. The emphasis on culture in terms of content and learning-teaching process is equal when examined of these two titles. Association with culture is rare (with 6 question) in the evaluation part.

Keywords. Ethnomathematics, mathematics education, culture, curriculum.

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Many concretizing objects, especially technology-supported materials, are used and new approaches are being discovered in the field of mathematics education every day (Akkaya, 2016). Although it has not been newly discovered, one of the approaches whose field of study has increased recently in today's mathematics education is 'ethnomathematics' (François & Kerkhove, 2010).

Ethnomathematics was first introduced to the world of mathematics in 1985 by Ubiratan D'Ambrosio, a mathematics educator and historian. According to Brazilian mathematics educator D'Ambrosio (1985), ethnomathematics is a step towards revealing different mathematical ideas by creating a bridge between anthropologists, cultural historians and mathematicians. At the same time, he defined ethnomathematics as the examination of the relationship between culture and mathematics and the emergence of the mathematical thought in different cultures (D'Ambrosio, 2001). At the first sight, culture and mathematics can be seen as two separate disciplines. However, contrary to what is thought, they are in a close relationship with each other.

Ethnomathematics, which proposes to do today's mathematics education with the help of culture, has an important place in the world of mathematics. According to D'Ambrosio (1985), the reason for the failure in mathematics is that mathematics applications modified from their original form are taught to students under the name of mathematics. When this expression is considered, it is advocated that a mathematics education should be built by adding each country's own culture to the base of mathematics. Gerdes (1995) lists the main features of ethnomathematics as follows: First, ethnomathematics considers mathematics as a broad concept that includes activities such as counting, measuring, designing, playing games, and explanation. Second, he emphasizes and analyzes the influence of sociocultural factors of ethnomathematics on learning, teaching and the development of mathematics. Thirdly, it treats mathematics as a cultural product, and lastly, each person, each culture and subculture creates its own mathematics. Mathematics, which is a cultural product, has a history and mathematics is an activity that all people do all over the world (Bahadır, 2021).

Although mathematics as a science has a history that is equal to the history of humanity, it has a long history of events and ups and downs. In the first years of known history, there is no precise information about whether the word "math" was used. This although it is not known when and where the word took shape and came into use, it has always been. It is a fact that it has always been used by people (Nasibov, Kaçar, 2005). One of the research topics in the philosophy of mathematics is the original starting point of mathematics. If mathematics is explained to students with this starting point, it may be easier for them to learn mathematics. The mathematical examples around each student are

different. This difference is determined by the culture and nature they live in. Let us first examine the two accepted views of the starting point of mathematics: Is mathematics a science discovered by humans using nature or is it a science created in a virtual environment? Let's examine the answer to this question, which is studied as a research subject by researchers, with a few examples: For example, considering numbers, the equation 1+1=2 is an abstract operation. If we want to embody this process, that we take one apple in our right hand and one apple in our left hand and we have 2 apples in total. The number 2 is defined as two objects of the same type. When you look at the apples in your hand, it would not be correct to say that they look exactly alike. One can be red and the other green, or one can be light in tone and the other dark. Maybe one is spotted and the other is not. In other words, we cannot find objects that are exactly alike in the universe. As can be understood from these examples, mathematics is a very abstract science. If we apply this idea to geometry: For example, when looking at the sky, it is quite common for a middle school student to think that the Sun sees as a circle and it is. However, when examined with a telescope, it is seen that there are chemical reactions and explosions on the Sun, and that it is in a constant state of change. When we look at all the examples given, we can see that mathematics is not a purely abstract science, but that mathematics takes place in nature in a concrete form. All research on the starting point of mathematics contributes to mathematics education. Mathematics teaching can be facilitated by giving examples from nature, which is also the starting point of students in mathematics teaching. However, these examples should be specific to the society. The examples used in each society may be different. A student living in the Amazon should be given an example related to his/her own culture, while a student living in Asia should be given an example that he/she may encounter in Asia. This literature has woven a rich mosaic of conceptions of the nature of mathematics, ranging from axiomatic structures to generalized heuristics for solving problems. These diverse views of the nature of mathematics also have a pronounced impact on the ways in which our society conceives of mathematics and reacts to its ever-widening influence on our daily lives (Dossey, 1992).

One of the biggest difficulties experienced in mathematics education systems result of this abstractness of mathematics. Visualization approaches are frequently used to overcome this difficulty and to provide students with permanent learning. Visualization has been defined as the process of transforming the visual model into a mental structure (Schnot et al., 1991). One of the most effective of these visualizations is examples from daily life. In mathematics education, it is aimed to achieve a permanent learning by associating the knowledge learned by the student with the schemes. They have by giving examples from daily life. Visualization, as a different perspective, has been expressed as a

bridge between the world of experimentation and the world of thinking and reasoning (Konyalıoğlu, 2003). In general, visualization has an important place in mathematics education. These objects should be chosen correctly. They should be supportive in teaching the subject. Cultural learning can be used in this subject. Visual elements have an important place in the cultures of societies. Examples such as carpet patterns, figures used in architecture, patterns on clothes... These visual materials can be used with the visualization approach in mathematics. These visuals can contain many educational materials for mathematics. With this understanding, each society can adopt a unique mathematics teaching approach. An educational approach should be adopted without societies losing their core values. The basic principle of this educational approach should be to raise individuals who can think multidimensional, evaluate subjects from different perspectives, conduct interdisciplinary studies, and develop logical, different, creative and effective solution strategies for the problem situations they encounter (Çalık & Sezgin, 2005).

Mathematics education that does not include cultural elements and nature can be challenging for students. When the part we call pure mathematics is only given, students develop learning difficulties and prejudice about what they cannot do against the lesson. Predominantly Greek-based, Eurocentric mathematics has become the standard way of understanding the mathematical world (Ascher & D'Ambrosio, 1994). Due to this restrictive attitude towards mathematics, it started to be known with a bad reputation. In order to get rid of this perception, the parameters of school mathematics should be expanded and made more inclusive. One of the ways to achieve this aim is ethnomathematics. As each country attaches importance to the uniqueness of mathematics education, it is thought that the efficiency of mathematics education given to students will increase.

When the studies conducted within the scope of mathematics education and culture are examined, mathematics is frequently used in Turkish Culture and Architecture (Öztürk & Türkoğlu, 2016). While giving mathematics education to students who grow up in this geography, it is important for students to provide this education by integrating it with the culture we have. It will both facilitate the education served to students and provide them with information about their own culture (Dambrosio, 2011; Rosa & Orey, 2011).

According to Öztürk and Türkoğlu (2016), we can categorize geometric motifs in Anatolian architecture as interlacing, geometric compositions developed from the line system, and geometric compositions consisting of closed shape interlacing. In other words, it is not possible to separate architecture in Türkiye from mathematics. Using our cultural structures, which are so related to

mathematics, in mathematics teaching both facilitates the mathematics education given to the students and can prevent them from being ignorant of the culture.

According to D'ambrosio (2001), values, traditions, beliefs, language and habits that reflect the culture of students are ignored in mathematics education. In such situations, the ways in which children invent personally meaningful conceptualizations are not expected. Children are expected to memorize predetermined procedures without having to gain a deeper and conceptually meaningful understanding of the mathematics they are studying. This may lead to the training of students with a low success profile in mathematics.

In Rosa & Orey's (2011) study, it is stated that this association to be made in the curriculum and the textbook will help educators and teachers develop students' imaginations and critical thinking and analysis skills by incorporating the ethnomathematics perspective into the mathematics curriculum. In other words, mathematics education may be more meaningful for a student who has an ethnomathematics perspective.

Every society, in order to ensure its continuity, tries to teach and adopt its own culture to its citizens on the one hand, and on the other hand, to provide them with behaviors that will enable them to keep up with the advances in the world society of which they are a member. For this purpose, it is stated in the curricula which behaviors are desired to raise people who have acquired these behaviors. Education and training activities to be given for all courses, these objectives is tried to be done by taking into account (Çilenti, 1988). The Middle education program published by the Ministry of National Education (MEB) was examined. There are 13 items in the Specific Objectives of the Mathematics Curriculum. Some of the examples of specific objectives that can be considered appropriate for the ethnomathematics approach are as follows: 'Will be able to use the meaning and language of mathematics to make sense of the relationships between people and objects and the relationships of objects with each other' in Article 5 and 'Will be able to recognize the relationship between mathematics and art and aesthetics' in Article 12. When these specific objectives are examined, it is seen that they can be related to the connection between mathematics and culture.

In this study, the Mathematics Curriculum implemented in schools in Turkey was examined in terms of content. The 5th, 6th, 7th and 8th grade achievements in the program and the explanations of these achievements were examined. In this examination, attention was paid to whether cultural elements were included or not. In the second stage of the research, the Middle School Mathematics Curriculum and Middle School mathematics textbooks implemented in Turkey were examined in

terms of ethnomathematical approach. In line with this purpose, answers were sought to the questions of how the relationship between culture and acquisitions, content (lecture), activities in the learning and teaching process, and evaluation (questions) in the books prepared according to different grade levels within the scope of the Middle School Mathematics Curriculum implemented in Turkiye.

Method

Research Model

This study is an example of qualitative research. Qualitative research can be defined as "research in which qualitative data collection techniques such as observation, interview and document analysis are used and a qualitative process is followed to reveal perceptions and events in a realistic and holistic way in a natural environment" (Yıldırım & Şimşek, 2008, p. 39). Document analysis model was used in this research. Document analysis is a scientific research method that can be defined as collecting, reviewing, questioning and analyzing various documents as the primary source of research data (Sak et al., 2021). In this study, the Middle School Mathematics Curriculum and textbooks were examined to see whether they contain traditional motifs, concepts and visuals belonging to Turkish society. The documents were examined with these criteria.

Documents Used in the Research

In this research, Middle School Mathematics Curriculum and textbooks prepared by two different publishers were selected as documents. The first source is the Mathematics Education Program published by the Board of Education (5-8th Grades) in 2018, and the second source is the Middle school mathematics textbooks prepared on the basis of the Primary Education Mathematics Curriculum used in Turkey. The textbooks used in this and other grades do not come out of a single publisher. There are textbooks belonging to private publishers. In this study, at least one textbook prepared by private publishers for each grade and textbooks published in 2021 prepared by the Ministry of National Education were used. The publications related to the examined books are presented in Table 1.

Table 1.

Publisher and Publication Year of the Reviewed Books

Grade Level	Publishers	Publication Year
Grade 5	MEB	2021
	Koza	2021-2022
Grade 6	MEB	2021
	Koza	2019
Grade 7	MEB	2021
	Koza	2019-2020
Grade 8	MEB	2021
	Koza	2019-2020

According to Table 1, two different publications (MEB, Koza) were analyzed at each grade level. A total of 8 books were analyzed.

Data Analysis

In this study, data were collected by document analysis. Document review is a research method that can be defined as the collection, review, questioning and analysis of various documents as the primary source of research data (Sak et al., 2021). The relationship between acquisitions, content, learning-teaching process and evaluation with culture was chosen as document review criteria. While analyzing the obtained data, descriptive analysis technique was used. One of the strengths of document analysis is long-term and time-spanning data analysis (Yıldırım & Şimşek, 2021). Document analysis was carried out in five stages: accessing the documents, checking their authenticity, understanding the documents, analyzing the data and using the data. (Foster, 1995, akt.Yıldırım & Şimşek, 2021).

Validity and Reliability

The concept of credibility and transferability was adopted to ensure internal validity and external authenticity (Lincoln & Guba, 1985). Accordingly, for internal validity, the data were interacted with for a long time and expert review was utilized. For external validity, the research process was described in detail. In order to ensure the internal and external reliability of the study, answers were sought to some questions related to validity and reliability put forward by Miles and Huberman (1994). For internal reliability, the research questions were determined in a detailed and purposeful manner, and the data were analyzed by more than one researcher. At this point, consensus

was achieved between the researchers on the codes obtained in the research. For external reliability, the researchers tried to explain all stages of the research clearly and in detail. The results were associated with the data. The data obtained in this context were supported with sample quotations.

Results

The data obtained in this section were analyzed and presented in line with the purpose of the research. The findings regarding the relationship between the acquisitions, content (lecture), activities in the learning and teaching process, and evaluation (questions) in the books prepared for different grade levels within the scope of the Middle School Mathematics Curriculum implemented in Türkiye are given below.

Examining in Terms of Acquisitions

First of all, the achievements given in the curriculum were separated according to learning areas and grade levels and their relationship with culture was examined. The Ministry of National Education has specially determined achievements for each grade. The table 2 below shows what these achievements are.

Table 2.

Acquisitions with Cultural Emphasis in Learning Areas

Grade Level	Learning Area	Acquisition
5th Grade	Numbers and Operations	Acquisition number M.5.1.1.3. Explanation of the acquisition: b) Examples of our historical and cultural artifacts (architectural structures, carpet decorations, rugs, etc.) are given to the figure patterns.
8th Grade	Geometry and Measurement	Acquisition number M.8.3.2.3. Explanations of the acquisition: b) Studies to determine translation or reflection transformations in patterns, motifs and similar images are included. c)Examples of our traditional arts (tile, ceramics, weaving, etc.) are also taken into account.

When the acquisitions with the emphasis on culture in the learning areas in the 5th grades are examined, it is seen that only an acquisition in the learning area of Numbers and Operations is associated with culture (Table 2). In other learning areas, an acquisition or an explanation under the acquisition related to this subject has not been found. There are 56 acquisitions in total in the 5th grade mathematics course.

When the **acquisitions** with cultural emphasis in the learning areas in the 8th grades are examined, it is seen that there are 5 learning areas and only one acquisition in the Geometry and Measurement section is associated with culture (Table 2). There is only one acquisition in this section. the 3-item explanation section under these acquisitions is given in table 2. In the table, the acquisition is not given, the explanation part is included. Since transformation geometry is a very suitable field to be discussed together with art, it is seen that it is also included in the Curriculum. In the learning and teaching process, attention has been drawn to the fact that teachers manage this process by making use of our culture related to the given subject. It is suggested to be presented by combining it with the culture-art relationship in the lecture or evaluation part. In the curriculum, there are a total of 52 acquisitions in Grade 8.

In other grades (6th and 7th grade), there are no acquisition associated with culture. Explanations of the acquisitions are given in Table 2. The acquisition in the curriculum are given below. In the explanation part of the acquisition numbered M.5.1.1.3: The rule creates the desired steps of the given number and shape patterns.), which belongs to the learning field of Numbers and Operations in the 5th grade and in the item b ((Examples of our historical and cultural artifacts (architectural structures, carpet decorations, rugs, etc.) are given to the figure patterns.)), there is a suggestion to use the works of our culture. At the 8th grade level, there are suggestions related to the use of our cultural elements while giving lectures or exemplifications, considering the parts in M.8.3.2.3 (M.8.3.2.3 It creates the image of polygons resulting from translations and reflections.), item b (Studies to determine translation or reflection transformations in patterns, motifs and similar images are included.) and c (Examples of our traditional arts (tile, ceramics, weaving, etc.) are also taken into account.) in the field of geometry and measurement learning (Table 2).

Content Review

In the Curriculum, there are topics and explanations that are aimed to be acquired by the students in the course content. The way this curriculum is implemented is in the textbooks. The data obtained as a result of the examination of the middle school (5th-8th grade) mathematics textbooks

approved by National Education and belonging to two different publishers at each grade level are given below. The textbooks that are used in mathematics education belongs to two different publications (MEB, Koza) when examined according to context obtained results given at Table 3.

Table 3.

Examining Textbooks in Terms of Content

Grade Level	Publisher	Learning Area	Chapter	Subject	Frequency of Example
5th Grade	MEB	Numbers and Operations	Chapter 1	Natural Numbers	2
	Koza	Numbers and Operations	Chapter 1	Natural Numbers	1
6th Grade	MEB	Numbers and Operations	Chapter 3	End of Chapter	1
		Algebra	Chapter 4	End of Chapter	1
	Koza	-	-	-	-
7th Grade	MEB	Numbers and Operations	Chapter 1	Multiplication by Integers	1
		Numbers and Operations	Chapter 4	Ratio and Proportion	2
		Geometry and Measurement	Chapter 5	Lines and Angles	1
		Geometry and Measurement	Chapter 5	Polygons	1
	Koza	Numbers and Operations	Chapter 1	Operations with Integers	1
8th Grade	MEB	Algebra	Chapter 3	Algebraic Expressions and Identity	1
		Algebra	Chapter 4	Equations with a First Order Unknown	1
		Geometry and Measurement	Chapter 5	Median, Bisector, and Elevation in a Triangle	1
	Koza	-	-	-	-

Considering the content of the textbooks at all grades, when the 5th grade level MEB and Koza publishers are examined, an emphasis on culture was found in the first chapter in the area of learning Numbers and Operations (Table 3). In the 5th grade textbook (MEB), before the subject is explained, *'In historical buildings, rug patterns, paving stones and tiles, geometric shapes are generally used in*

a certain order and number. Especially in historical artifacts, the presence of these shapes is clearly seen." Then carpet patterns and tiles are shown as examples. A similar example related to the same topic is given in the other textbook.

An emphasis on culture was found at the end of the Chapter 3 in the area of learning Numbers and Operations in the MEB publisher and at the end of the chapter 4 in the learning area of Algebra, at the 6th grade level. In grade 6 there is only culture-related content at the end of the chapter (Table 3). In this section at the end of Unit 3, Miniatürk in Istanbul is mentioned. Several different places that have an important place in Turkish History are introduced. At the end of the 4th unit, famous mathematicians related to the subject are mentioned. On this page there is 10 turkish lira. One of our important mathematicians Cahit Arf is also mentioned on the back of this money.

When looking at the 7th grade level, there are content found related to culture in the chapter 1 and 4 of the Numbers and Operations learning area, and the chapter 5 belonging to the Geometry and Measurement learning area in the MEB publications. Information about important Turkish mathematician such as Cahit Arf is given. Mathematical data on factors related to our culture such as the golden ratio in the most current symbol of the Turkish currency, the inclination of the minaret of the Great Mosque in Elazığ, and the ratio in the Turkish Flag are given in the related topic. In Koza publications, there is a place for cultural association during the lecture in the first chapter in the learning area of Numbers and Operations. When we look at the books of the two publishers, it is seen that the association related to the given content is in the areas of Numbers and Operations and Geometric Measurement.

In the field of learning Algebra, Geometry and Measurement at the 8th grade level, there are parts that help explain the subject related to culture. There is culture related part in Algebraic Expressions and Identity and First Order Equations in the learning area of Algebra. In one of the examples given on these topics, a map of Turkey was placed on the coordinate plane. Some provinces were marked on the map and the coordinate plane was explained to the students with an example they were familiar with. Also, in the Triangles that in area of Geometry and Measurement learning, there is a section where this association is made. In the introduction of the unit, 'Many civilizations in the past have used triangles in their works of art and structures. Especially in Seljuk and Islamic architecture, triangles have been a frequently used geometric element." explanations were made. Pupporting architectural visuals were used next to the explanation. In the textbook prepared by the 8th grade Koza publisher, there is no part of the content related to culture. In general, it has been

concluded that the sections prepared by making use of culture in the lecture, pre-topic preparation or end-of-topic sections are very inadequate or even absent in some classes.

Investigation in terms of Learning and Teaching Process

The events in the textbooks of the MEB and Koza publications regarding the learning and teaching process were examined with the ethnomathematics approach. The data obtained are given in Table 4.

Table 4.

Activities Related to Culture in Textbooks

Grade Level	Publisher	Learning Area	Chapter	Subject	Event Name	*f*
5th Grade	MEB	Geometry and Measurement	Chapter 3	Area Measurement	Cities on the Map	1
		Numbers and Operations	Chapter 3	Decimal Notation	Aircraft Mechanics	1
	Koza	Geometry and Measurement	Chapter 4	Triangles and Quadrilaterals	Motivation	1
6th Grade	MEB	Numbers and Operations	Chapter 1	Natural Numbers	Let's Learn Together	2
		Numbers and Operations	Chapter 2	Division by Fractions	Let's Learn Together	1
		Geometry and Measurement	Chapter 5	Land Measurement Units	Let's Learn Together	1
	Koza	Geometry and Measurement	Chapter 6	Volume Measurement Units	The Keban Dam	1
7th Grade	MEB	Algebra	Chapter 3	Equations with a First Order Unknown	Ministry of Justice Logo	1
		Geometry and Measurement	Chapter 5	Angles Made by Two Parallel Lines with an Intersect	Turkish Equivalents of Geometry Terms	1
	Koza	Numbers and Operations	Chapter 1	Operations with Integers	Holiday Allowance	1
8th Grade	MEB	Algebra	Chapter 3	Algebraic Expressions and Identities	Let's Explore Let’s Think	1
		Geometry and Measurement	Chapter 6	Transformation Geometry	Let's Do It Together 3	1
	Koza	Geometry and Measurement	Chapter 6	Transformation Geometry	Example 6	1

**f*: Frequency

At the 5th grade level, in the MEB publisher, in the chapter 3 in the area of Geometry and Measurement learning, there was a culture emphasis in the cities on the map activity on area measurement, and in the aircraft mechanics activity in the decimal representation in the Chapter 3 in the Numbers and Operations learning area while at Koza Publisher, there is an event in which cultural relations are held on triangles and quadrilaterals in the third chapter of the Geometry and Measurement learning area. Under the motivation title, there is a section where ethnic carpet patterns are found and the student wants to comment on it (Figure 1).

Figure 1. Geometric Objects on a Carpet Pattern.

In the textbook prepared by the MEB publisher at the 6th grade level, there are activities related to culture in the learning areas of Numbers and Operations and Geometry and Measurement. MEB publications offer an integrated activity with two cultures in the Let's Learn Together section on Natural Numbers in the first chapter. The question blended with our culture is presented in Figure 2. The other example includes a section that takes into account locally produced cereals in Turkey, an agricultural country. In the second Chapter, an activity related to culture was given in the Let's Learn Together section on division by fractions. In this example, hospitality in Turkish culture is touched upon. There is a section on Turkish coffee, which is served to guests who come to the house. There is an activity that emphasizes culture in the Let's Learn Together section in the sub-topic of Land Measurement units of the Geometry and Measurement learning area. In the 6th grade textbook prepared by Koza publications, there is an activity related to the Keban dam under the sub-topic of volume measurement units belonging to the Geometry and Measurement learning area. Keban dam is located in Elazığ and is the 2nd largest dam in Turkey. There is a section prepared on this subject.

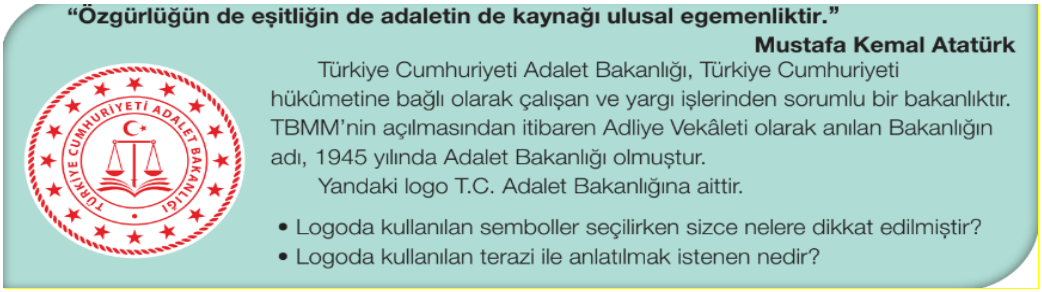

1272 yılında Kırşehir'de yapımı tamamlanan Anadolu Selçuklu Dönemi eseri olan Cacabey Medresesi, o dönemde astronomi araştırmalarının yapıldığı gökbilim merkezidir. Mimarisinde kullanılan kabartmalar dünyanın şeklini, küreler ise Güneş ve Ay'ı simgelemektedir. Füzeye benzeyen sütunlar ve bugün minare olarak kullanılan gözlem kulesi dikkat çekicidir. Ayrıca bilim adamlarının 2005 yılında dünyaya duyurduğu Güneş sisteminin 10. gezegeninin izleri yaklaşık 750 yıl önce medresedeki sütunlarda yerini almıştır.

Cacabey Medresesi'ni görmek isteyen bir grup öğrenci İstanbul'dan Kırşehir'e araçla yola çıkmış, 300 dakikada 450 km yol aldıktan sonra mola vermiştir. Moladan sonra aynı hızla devam eden bu aracın gideceği yere ulaşması için 180 km yolu kalmıştır. Buna göre aracın İstanbul-Kırşehir arasındaki mesafeyi kaç saatte tamamladığını bulalım.

Figure 2. Question Content is Culturally Appropriate.

The content in figure 2 is not included in the evaluation section. The reason is that it is a question that is presented to teach the subject and has solution steps underneath.

There are activities related to culture in the activities given in the area of learning Algebra and Geometry and Measurement in the MEB publisher, which is one of the publishers examined at the 7th grade level. In the field of learning Algebra, an activity was given over the logo of the Ministry of Justice on the subject of Equations with a First Order Unknown in the third chapter. An example of the data is shown in figure 3. The angles made by two parallel lines with an intersect, one of the sub-topics of the field of geometry and measurement learning, are included in the fifth chapter. In this topic, an activity with a content related to the Geometry book written by Atatürk is given. In this section, the Geometry book written by Atatürk is mentioned. There are words suggested by Atatürk in response to the geometry terms used in Ottoman Turkish. An activity has been prepared on the subject of operations with integers, which belongs to the field of Numbers and operations in Koza publisher and takes place in Chapter 1, by using one of our religious values, our holiday.


"Özgürlüğün de eşitliğin de adaletin de kaynağı ulusal egemenliktir."

Mustafa Kemal Atatürk

Türkiye Cumhuriyeti Adalet Bakanlığı, Türkiye Cumhuriyeti hükûmetine bağlı olarak çalışan ve yargı işlerinden sorumlu bir bakanlıktır. TBMM'nin açılmasından itibaren Adliye Vekâleti olarak anılan Bakanlığın adı, 1945 yılında Adalet Bakanlığı olmuştur.

Yandaki logo T.C. Adalet Bakanlığına aittir.

- Logoda kullanılan semboller seçilirken sizce nelere dikkat edilmiştir?
- Logoda kullanılan terazi ile anlatılmak istenen nedir?

Figure 3. Logo of the Ministry of Justice

There are activities related to culture in the activities given in the area of learning Algebra and Geometry and Measurement in the MEB publisher, which is one of the publisher examined at the 8th grade level. Ömer Hayyam was mentioned in the Let's Research and Learn section of the MEB

publications on algebraic expressions and identity in the 3rd chapter in the area of learning algebra. He has an important place in Islamic culture. Although he is not a Turk, he has a place in history as one of our religious values. In the field of geometry and measurement learning, there is an activity in which tile patterns are given in the section Let's do it together on Transformation Geometry in the Chapter 6. In Koza publisher, on the subject of Transformation Geometry in the Chapter 6 in the area of learning geometry and measurement, a relationship was made with culture in the activity whose title was prepared as Example 6. Considering the acquisitions of this subject in the Curriculum, there is an explanation that the motif/pattern to be associated with culture can be given. Accordingly, sample designs from our culture are shown in the questions given in the geometry section.

The activities in the textbooks of the MEB and Koza publications on the learning and teaching process have been examined with the ethnomathematics approach, but it is seen that there are not many cultural activities in all grade levels.

Examining it in Terms of Evaluation

The lecture and questions asked for evaluation at the end of the subject were examined at all grade levels and given in Table 5.

Table 5.

Examining the Questions Given in the Textbooks

Grade Level	Publisher	Learning Area	Chapter	Subject	Page/Test or Question Number	*f*
5th Grade	MEB	Numbers and Operations	Chapter 1	Natural Numbers	27	1
	Koza	Numbers and Operations	Chapter 1	Natural Numbers	54	1
6th Grade	MEB	-	-	-	-	-
	Koza	-	-	-	-	-
7th Grade	MEB	Numbers and Operations	Chapter 2	Addition and Subtraction with Rational Numbers	77	1
	Koza	-	-	-	-	-
8th Grade	MEB	Numbers and Operations	Chapter 1	Factors and Multiples	21	1
		Numbers and Operations	Chapter 1	Exponential Expressions	27	1
		Data Processing	Chapter 2	Data Analysis	67	1
	Koza	-	-	-	-	-

**f*: Frequency

A cultural element is encountered in the question on page 27 of the natural numbers topic in the first chapter in the learning area of numbers and operations at the 5th grade level of the MEB publisher. In this section, a pattern of ethnic patterned hexagons is given. The student was asked to find the other steps of this pattern. In the question on page 54 of the same learning area, chapter and subject in Koza publisher, the element of culture is encountered. (Table 5). In this section, an image about our culture is shared. The image shared to support the question belongs to Cappadocia in Nevşehir province.

At the 6th grade level, there is no evaluation section associated with culture in either publisher.

It's given the Rational Numbers subject in the 2nd Chapter in the area of learning numbers and operations in the textbook of the 7th Grade MEB publications, by integrating Ashura (Aşure), which belongs to the Turkish-Islamic culture and is cooked only in a certain time period, into the Rational Numbers subject. On the other hand, at Koza publisher does not have any evaluation section associated with culture.

In the MEB publisher, which is one of the publishers examined at the 8th grade level, there are activities related to culture in the questions given in the field of learning numbers and operations and data processing. In the learning area of numbers and operations of MEB publications, cultural elements were found in the question on page 21 of the multipliers and their multiples in the 1st chapter, and in the question on page 27 of exponential numbers. In the first one, April 23rd National Sovereignty and Children's Day was used as the context of the question. A question related to this was asked. In the other, Aşık Veysel was used as the context of the question. There is a cultural element in the question on page 67 about data analysis in Chapter 2 in the Data Processing learning area. March 18 Çanakkale Victory and Martyrs' Remembrance Day was used as the context for this question. However, there is no cultural integration that can be evaluated at a meaningful level for the student. In the 8th grade textbook prepared by Koza publisher, there is no part of the content related to culture.

Cultural relations were established in some of the questions prepared for evaluation purposes. However, this is not a relationship established by every publisher at every grade. A small number of questions were prepared for evaluation purposes. For a mathematics education that can be considered meaningful for students, the questions given should be more.

When looking at the general total according to grade levels, it was observed that a total of 26 culture-mathematics relations were established in the MEB publications and a total of 8 in

Koza publications. More culture-mathematics relations were found in MEB publications than in Koza publications.

Discussion and Conclusion

The results regarding the relationship between the acquisitions, content (lecture), activities in the learning and teaching process, and evaluation (questions) in the books prepared according to different grade levels within the scope of the Middle School Mathematics Curriculum implemented in Türkiye are presented in this section.

When the relationship between the acquisitions and culture is examined, it is seen that this association is made in the acquisitions of the 5th and 8th grade levels from the Middle school levels. At the other two grade levels, there are no acquisitions associated with culture. When all of the acquisitions given at these two grade levels are examined, it is seen that there is no different acquisition that encourages cultural learning in other acquisitions. Considering the total number of acquisitions, it can be said that the presence of an ethnomathematical approach in only two objectives in the Middle School Mathematics Curriculum is not sufficient for a meaningful mathematics education. The emphasis on the use of cultural relations in the acquisitions was made very little. It is very possible that the emphasis on culture is low in the textbooks prepared with reference to these acquisitions.

When the results regarding the relationship between content (lecturing) and culture are examined, the connection established with culture in the 5th grades is made only in the learning area of Numbers and Operations. In this learning area, it was done on only one subject. It can be seen as a facilitating factor for students when teaching mathematics that starting with an example from our culture while giving lectures, and that the objects used in the solved examples in the later parts of the subject are made up of cultural elements. However, when the whole subject is considered, these parts are not sufficient for the student to understand and assimilate the subject. In the 6th grade level, there is no cultural expression in the subject or in the introduction of the subject. However, in the information sections given at the end of the unit, there are parts related to the subject of our culture. While teaching the subject in two learning areas in the 7th grades, it is seen that the culture is reconciled. In the 8th grades, there are sections on Algebra and Geometry, 'Why should we learn?', during the lecture. In these parts, attention was drawn to our architecture and art. However, a meaningful cultural integration in these parts is not sufficient for mathematics education. In general,

during the lecture, some subjects were associated with culture at all levels. However, although these are not many in number, the association made is not instructive.

When the results regarding the relationship between the learning and teaching process (activities) and culture are examined, it is seen that the parts associated with culture in terms of the learning and teaching process at all levels consist of the learning fields of Geometry and Measurement, Numbers and Operations, and Algebra. In particular, activities that can attract the attention of students and appeal to their interests have been prepared. However, the prepared events are very few compared to the general number of events. When all grade levels are examined, it has been determined that there are activities integrated with our culture at every grade level, but they are few in number. For the ethnomathematical approach, more than a few examples given in the subject matter are needed. Achor and Uloko (2009) found in their study that the success of education using the ethnomathematical approach was higher. Educational materials prepared by adopting this approach can be even more effective.

When the results regarding the relationship between the evaluation (questions) and culture are examined, the use of cultural elements in the evaluation part is less preferred than the other titles. There is no evaluation section based on this association in Koza publications, which are publishers in other grade levels except for the 5th grade. In the 6th grade level, no cultural association was made in the evaluation part of the two publishers. Cultural elements are included in the subjects that are suitable for associating with culture. However, it is not sufficient. In the examples used, it can be said that the explanation of cultural elements in the Middle school curriculum is effective. However, these do not constitute an assessment scope that will be meaningful for the student. The section where the association with culture is the least with a total of 6 questions is the part where the evaluation is made. When examined in terms of content and process (activity), the emphasis on culture made under the two headings is equal.

Considering the whole grade level, it is seen that there are sections prepared with the ethnomathematics approach in every publisher at every grade. The class with the most relationships is 7th Grade. When looking at the general total according to grade levels, it was observed that a total of 26 culture-mathematics relations were established in the MEB publications and a total of 8 in Koza publications. However, these are not at a level to provide facilitators in mathematics learning for the student.

This research is limited to the 5th, 6th, 7th and 8th grade books published by MEB and Koza publishers within the scope of the Middle School Mathematics Curriculum implemented in Türkiye. In addition, the research is limited in terms of examining the books with the ethnomathematics approach within the scope of the sub-objectives (the relationship of the acquisitions, content, learning and teaching process and evaluation in the program with culture).

Recommendations

In this study, it is suggested that the objectives, content (lecturing), activities used in the learning and teaching process and assessment (questions) elements in the books prepared according to different grade levels within the scope of the Middle School Mathematics Curriculum implemented in Turkey should be reviewed, enriched and diversified in terms of cultural elements. In addition, this study was analyzed in terms of mathematics textbooks. The emphasis on ethnomathematics in other courses can also be examined.

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