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# A Holistic Examination of The Relationship Between Greek Textbooks and Real Life

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**Abstract**

*The ability to relate mathematics teaching to real life is the common goal of many countries' mathematics curriculum National Society for Experiential Education's (NSEE) [2011] "Eight Principles of Good Practice for All Experiential Learning Activities." (intention, originality, planning, clarity, monitoring and evaluation, reflection, evaluation, and acknowledgement) recommend that students' experiences and the meaning and learning they derive from those experiences should be consolidated. Students' ability to develop mathematical skills is directly linked to their ability to relate, which includes skills such as "problem solving, reasoning, communication.". Bringing real-world contexts to mathematics lessons can affect students' attitudes towards mathematics and also support their mathematical association skills. In this context, it is important to analyze how the activities in the textbooks, which are the first resources in the classroom, are prepared and to what extent they connect the student with real life. In this regard, the focus is on the activities in the primary school mathematics textbook. In this study, the relationship of the activities in the Greek Primary School 3rd- grade textbook with real life was analyzed based on Gainsburg's (2008) classification. The document analysis method was used in the study, which was conducted on the basis of qualitative research. The data source of the research is the Greek Primary School 3rd grade mathematics textbook. The data obtained was analyzed using the descriptive analysis method. As a result of analyzing a total of 147 activities, it was determined that the activities were collected in the type of classical word problems and partially included activity types associated with real life.*

***Keywords**:* Primary school textbooks, mathematics teaching, connecting to real life

## Introduction

Mathematics, an abstract language of life with symbols and icons, can be defined as a science that enables the individual to understand the world and reach the truth. The teaching of mathematics, whose context can be nature, humans, and encompassing any aspect of life, is still a contested topic that educators debate how to best convey to learners. Mathematics, which exists in every aspect of daily life, has made it necessary for the individual to use this science in his practical life. In this regard, it has been revealed that the teaching of mathematics, which is not separate from life, should also be shaped by the reality of life. Providing students with real-life examples and interpreting real situations in mathematics teaching will improve their reasoning, association, and meaning skills and positively affect their attitudes toward mathematics (Lesh & Doerr, 2003). In this regard, the fact that mathematics activities consist of real-life problems helps students to transfer information quickly, ensure its permanence, and enjoy mathematics (Carpenter & Lehrer, 1999).

Relating mathematics teaching to real life can be based on the constructivist approach and the learning principles of realistic mathematics education theory. The theory created by the Dutch mathematician Freudental centers on "realistic" problem situations in mathematics teaching (Van den Heuvel-Panhuizen & Drijvers, 2020). According to this theory, the student learns mathematics by creating a close connection between the daily events he experiences and mathematical concepts. The student's daily life and the connection he/she establishes with mathematical concepts are presented in the form of drawings, calculations or graphics in the reality he /she created. In this respect, this theory aims to integrate students' minds into the mathematical structure by integrating them with reality. The teacher can create realistic problems with techniques such as stories, fairy tales, and games and transform an abstract mental process into a mathematical structure compatible that is transferable with real life (Van den Heuvel-Panhuize, 1996). Activities enriched with didactic phenomenological studies are the essence of this approach. For example, addition and subtraction, included in the 1st-grade learning outcomes, were presented to children in the form of the "municipality bus" problem in a real-life context. Students think of themselves as bus drivers. At each stop, signs state how many people get on and off the bus, and students are asked how many people get on and off the bus at these stops (Barnes, 2005; Alacacı, 2016).

According to the Realistic Mathematics Education Theory, the activity should encourage the students to think realistically and meaningfully. Planning activities where students can benefit from

their prior knowledge and experiences in daily life and make connections support the acquisition of targeted mathematical concepts and skills. Finally, activities should be shaped based on students doing and creating their mathematics (Topbaş-Tat, 2020).

Association skills, one of the most important skills when learning and teaching mathematics, should be taught to students from a very young age.The child internalizes concepts and can evaluate events from different dimensions thanks to the association skill,. In addition, it affects the student's interest and attitude towards the course and activates the skills of establishing cause-effect relationships and connecting with different courses or real life, thanks to the development of different perspectives (Narlı, 2016). In this context, having the association skill, one of the mathematical skills, at the desired level in primary school will improve students' ability to associate it with real life, which is a type of association. In studies in the literature, Pepin and Haggarty (2007) in their studies examining the mathematical connections in textbooks in England, France and Germany, concluded that the mathematical activities in the country's textbooks offer children limited connections in establishing mathematics and the real world. In his study, Gainsburg (2008) concluded that the activities in secondary school textbooks are sufficient to provide students with mathematical thinking skills. However, the activities that enable them to connect with the real world are limited. In the study conducted by Yılmaz and Özyiğit (2016), the activities in high school textbooks were examined in a historical process. As a result of the research, it was concluded that mathematical activities could also be presented with real-life problems. In the study conducted by Dilegelen (2018), the activities in the primary school 5th-grade mathematics textbook were analyzed, and the findings revealed that the association skill was not comprehensively included in the textbooks. Gueudet et al. (2018) concluded that 10th- grade e-textbooks should be supported with real-world connections.

Altay, Erhan, and Batı (2020) found that 68.4% of the activities in the 6th grade secondary school textbooks contained weak real-life connections. In the study of Bingölbali and Özdiner (2022), in the study conducted by Yerek and Özgeldi (2019), they examined the association of the introduction section of secondary school mathematics textbooks with real life, and the findings pointed out that it was partially associated with real life. Bingölbali and Özdiner (2022) their study 1-8. Mathematics textbooks at all grade levels were examined and it was seen that the activities did not require the use of higher order thinking skills such as effective problem solving and mathematical modeling. In their study where Bekiroğlu and Ütkür-Güllühan (2023) comparatively examined the activities in

German and Turkish mathematics textbooks in the context of real life, they concluded that the number of activities related to real life in the German mathematics textbooks was higher than the number of activities related to real life in the Turkish primary school mathematics textbooks. Mathematics is associated with real life through various subjects and classifications. However, it is noteworthy that the studies primarly focused on secondary school level textbooks. Textbooks, which are important sources of mathematics teaching in primary school, are designed to support students' association skills thanks to the qualified activities they contain. In their study where Bekiroğlu and Ütkür-Güllühan (2023) comparatively examined the activities in German and Turkish mathematics textbooks in the context of real life, they concluded that the number of activities related to real life in the German mathematics textbooks was higher than the number of activities related to real life in the Turkish primary school mathematics textbooks. As can be seen, it is seen that mathematics is associated with real life through various subjects and classifications. However, it is noteworthy that the studies mostly focused on secondary school level textbooks. Textbooks, which are essential sources of mathematics teaching in primary school, are designed to support students' association skills thanks to the qualified activities they contain. It has been seen that the number of studies on associating the activities in primary school mathematics textbooks with real life is limited (Bekiroğlu and Ütkür-Güllühan, 2023; Bingölbali and Özdiner, 2022), and accordingly, the current study examined the nature of associating the activities in primary school mathematics textbooks with real life. The focus group of the research is primary school mathematics textbooks taught in Greece. The reason for focusing on Greece in the current research is the increase in PISA exam results as of 2019 compared to the exams held in previous years (OECD, 2019). According to the 2019 PISA results, approximately 64% of students in Greece achieved level 2 or higher in mathematics (OECD average: 76%). At the very least, these students can, without direct instruction, represent (simple) problem situations mathematically (e.g. comparing the total distance between two alternative routes or converting prices into a different currency) (OECD, 2019). In this sense, the rationale for the research can be expressed as follows: In recent years, a scientific curiosity has arisen to analyze the quality of the activities offered in primary school mathematics classes in Greece, which has been trying to increase the average mathematical skill score in the international arena and whose PISA exam results are close to those of Turkey. Another justification for the research is that it is hoped that the results of the current study will encourage comparative analysis studies of Turkey or other countries in the literature. In this respect, the study is thought to be

necessary.

The main purpose of this research is to analyze the relationship between Greek primary school 3rd grade mathematics textbook activities and real life in the light of Gainsburg's (2008) classification. For this purpose, the question sought to be answered in the research is as follows: "How do the activities in the Greek primary school 3rd grade mathematics textbook relate to real life?"

## Method

### Research Design

In this research, document analysis method was used based on qualitative research. Document analysis is a qualitative research method used to meticulously and systematically analyze the content of written documents (Wach & Ward, 2013). Document analysis is a systematic method used to examine and evaluate all documents, including printed and electronic materials. Like other methods used in qualitative research, document analysis requires examining and interpreting data to derive meaning, create an understanding of the relevant subject, and develop empirical knowledge (Corbin & Strauss, 2008).

### Data Source / Data Collection Process

The data source of this research is the 2021-2022 academic year Greek primary school 3rd grade Μαθηματικά της Φύσης και της Ζωής (Nature and life mathematics) mathematics textbook. Purposeful sampling was taken as basis in selecting the data source. The textbook, which is the data source of the research, was determined as a mathematics textbook in primary school in the Alexandropolis region. Researchers used purposeful sampling because one of them had the opportunity to examine course materials used in a primary school in the Alexandropolis region of Greece in 2020. The data source was accessed from the official website of the Greek Ministry of Education, Research and Religious Affairs. The primary school mathematics textbook, presented as an e-book by the Ministry of Education, Research and Religious Affairs of Greece, can be accessed from the website https://www.minedu.gov.gr/

### Data Analysis

Descriptive analysis was used in the data analysis of the research. The relationship between the activities in the unit included in the research and real life was examined according to the classification made by Gainsburg (2008). The reason why units 1 - 9 were included in the research is

that they include topics that describe basic mathematics skills, and the reason why the last two units (units 10-11-12) were not included is that they are units in which the topics are repeated. Gainsburg (2008) classified the relationship between mathematical activities and real life as shown in Figure 1.

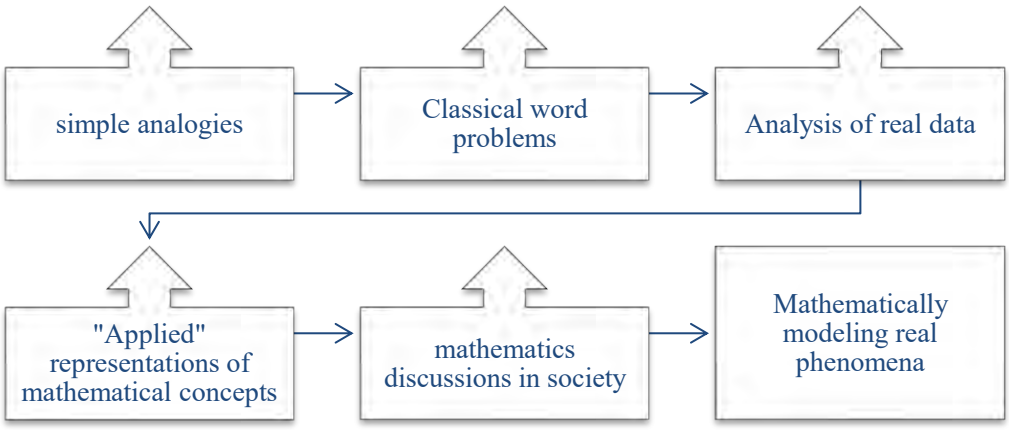


**Figure 1.** *Real-World Connection Sequences of Mathematics Activities (Gainsburg, 2008).*

As seen in Figure 1, "simple analogies" were at the lowest level in the classification of real-world connection sequences of mathematical activities. An example of an activity associated with simple analogies is “associating negative numbers with temperatures below zero.” At the second level, "classical word problems" were included. For example, events such as “two trains leaving the same station…” may belong to this category. In third place, it came in the genre of “analysis of real data”. For example, measuring the average height of classmates is one such activity. In fourth place were activities such as "application representations of mathematical concepts". For example, Modeling of normal solid objects is this type of activity. Fifth place; There was a high-level activity type of “mathematics discussions in society”. For example, the media's misuse of statistics to influence public opinion falls into this type of activity. At the last and highest level, they are active in the type of "mathematically modeling real phenomena". For example, the activity of writing a formula to express temperature as an approximate function of the day of the year is in this category. In the data analysis part of the research, the activities in each unit were classified according to their content and the category they are related to, and the results were presented as frequencies.

### Validity and Reliability

In this research, the "inter-coder reliability" formula developed by Miles and Huberman, which is frequently used to increase credibility in qualitative studies, was used. Regarding the reliability of the research, help was received from a classroom teacher who continued his teaching career in the 2021-2022 academic year at a public school in the Beylikdüzü region of Istanbul. The field specialist received his doctorate in classroom education and teaches basic and advanced mathematics courses in primary school. The types of activities discussed in consensus between the researchers and the coder are those belonging to the category of "real data analysis and classical word problems". For example, it has been discussed by researchers and coders whether a problem situation involving the results of "municipal elections", which is a situation related to daily life, belongs to a classical problem situation or real data analysis. Based on Gainsburg's (2008) classification, the criterion was to present the real data analysis directly or as an example context that would make the child feel its reality. A consensus was reached to include fictional activities that meet this criterion and integrate daily and real life with the problem in the real data analysis category. As a result of the final examination of the activities in the research, the reliability of the study was calculated as 0.93.

## Connecting to the "Numbers up to 1000, Four Operations, Geometric Shapes" Unit of the Greece Primary School 3rd Grade Mathematics Textbook to Real Life

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the unit "Numbers up to 1000, four operations, geometric shapes" with real life are shown in Table 1.

**Table 1.** *Connecting the Activities of the "Numbers up to 1000, four operations, geometric shapes" Unit to Real Life*

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 17 |
| "Applied" representations of mathematical concepts | 3 |
| Simple Analogies | 2 |

| | |
|---|---|
| Real data analysis | - |
| Basic level “mathematical modeling” | - |
| Total | 22 |

As seen in Table 1, "classical word problems" (f=17) come first in associating the activities of the "Numbers up to 1000, four operations, geometric shapes" unit of the Greek primary school 3rd grade mathematics textbook with real life. "Applied representations of mathematical concepts” came in second place (f = 3), and "simple analogies" (f = 2) came in third place. It is seen that there are no activities related to the "real data analysis and mathematical modeling" categories of the relevant unit. Figures 2, 3 and 4 give examples of the "simple analogies, classical word problems and applied representations of mathematical concepts" categories related to the relevant unit.


**Figure 2.** *A Sample Activity for the Classical Word Problems Category (pp.18-19)*

As seen in Figure 2, in the example belonging to the "classical word problems category" visual wild examples are depicted flying in flocks. Since there are 5 wild ducks in each flock, they were asked how many wild ducks there were in 3 flocks, and at the end, the students were asked to write how they reached this conclusion.

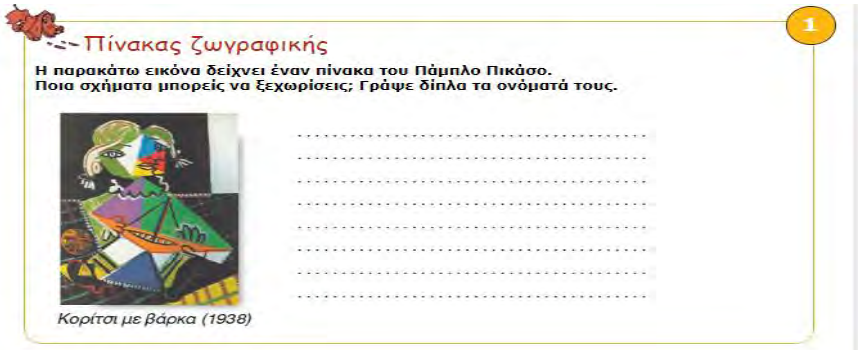

**Figure 3.** ***A*** *Sample Activity Related to the Simple Analogies Category (pp.18-19)*

As seen in Figure 3, Picasso's painting is shown in the example of the simple analogies category. Students were asked to find the geometric shapes seen in Picasso's painting and write them on the lines.

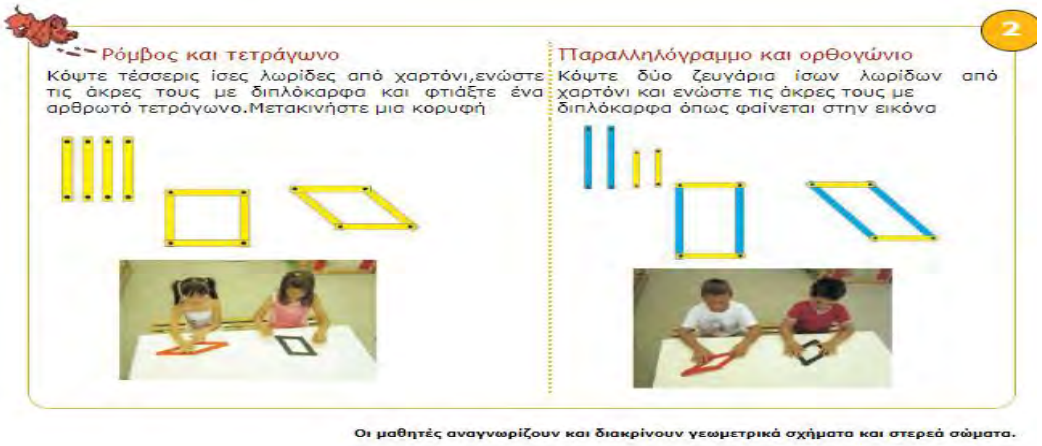


**Figure 4.** *A Sample of the "Applied Representations" Category of mathematical concepts (pp. 22-23).*

As seen in Figure 4, in the example related to the category of application representations of mathematical concepts, the stages of making squares, rectangles and parallelograms from cardboard are given respectively and the students are asked to create these geometric shapes.

In general, in the analyzes aimed at associating the activities of the "Numbers up to 1000, Four Operations, Geometric Shapes" unit with real life, it was seen that the relevant unit included activities in the classical word problem category and application type activities.

**Connecting to the activities of the unit "Length Measurements, Subtraction and Multiplication, Solids" to Real Life in Greece Primary School 3rd Grade Mathematics Textbook**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "Length measurements, subtraction and multiplication operations, solids" unit with real life are shown in Table 2.

**Table 2.** *Connecting the Activities of the "Length Measurements, Subtraction and Multiplication Operations, Solids" Unit to Real Life*

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 15 |
| "Applied" representations of mathematical concepts | 3 |
| Simple Analogies | 2 |
| Real data analysis | 1 |
| Basic level "mathematical modeling" | 1 |
| Total | 22 |

As seen in Table 2, "classical word problems" (f = 15) come first in associating the Greek primary school 3rd grade mathematics textbook "Length measurements, subtraction and multiplication operations, solids" with real life. "Applied" representations of mathematical concepts came in second place (f = 3), and "simple analogies" (f = 2) came in third place. In last place, activities related to the categories of "mathematical modeling" (f = 1) and "real data analysis" (f = 1) at the basic level came. Figures 5, 6 and 7 give examples of the "simple analogies, real data analysis, classical word problems and modeling" categories related to the relevant unit.

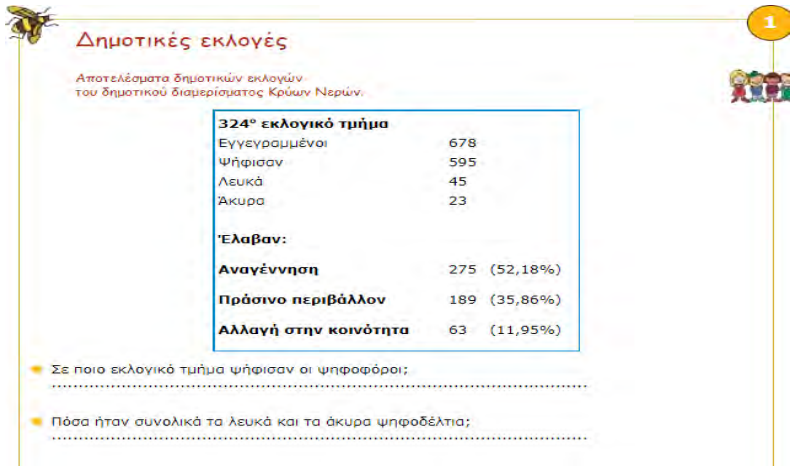


**Figure 5.** *An Activity Example for Classical Word Problems (pp.28-29).*

As seen in Figure 5, in the activity belonging to the classical word problems category, a table about the election results of the Kryon Nera region was given and the students were asked to answer questions about which constituency the voters voted in, how many total blank and invalid ballots there were, and which combination came first.


**Figure 6.** *An Activity Example for Real Data Analysis (pp.30-31).*

As seen in Figure 6, in the activity belonging to the real data analysis category, students were asked to measure their own height and write it in the blanks. They were then asked to measure their friends' heights and write them in the blanks.


**Figure 7.** *A Sample Activity for Analysis of Applied Representations of Mathematical Concepts (pp.33-34)*

As seen in Figure 7, in the activity related to the category of applied representations of mathematical concepts, "The figure below shows Peter's school. "Which of the options could be Peter's school when viewed from above?" By asking the question, students were asked to predict the formation and appearance of solid objects.

In general, in the analyzes aimed at associating the activities of the "Length measurements, subtraction and multiplication operations, solids" unit with real life, it was seen that the activities belonging to the classical words problem category of the relevant unit were in majority, but there were also application type activities.

**Connecting to the Activities of the Unit "Numbers up to 3,000, four operations, right angles" to Life in Greece Primary School 3rd Grade Mathematics Textbook**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the unit "Numbers up to 3,000, four operations, right angles" with real life are shown in Table 3.

**Table 3.** Connecting to the Activities of the Unit “Numbers up to 3000, four operations, right angles” to Real Life

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 12 |
| “Applied” representations of mathematical concepts | 5 |
| Simple Analogies | 1 |
| Real data analysis | 1 |
| Basic level “mathematical modeling” | 1 |
| Total | 20 |

As seen in Table 3, "classic word problems" (f=12) come first in associating the 3rd unit of the Greek primary school 3rd grade mathematics textbook "Numbers up to 3,000, four operations, right angles" with real life. "Applied" representations of mathematical concepts (f = 5) came in second place. In the last row, activities related to the basic level "mathematical modeling" (f=1), "real data analysis" (f=1), simple analogy" (f=1) categories are included. Figures 8, 9 and 10 give examples of the categories "simple analogies, real data analysis, classical word problems and applied representations of mathematical concepts" related to the relevant unit.


**Figure 8.** A *Sample Activity for the Simple Analogy Category (pp.42-43)*

As shown in Figure 8, in the activity related to the simple analogies category, the logo of the Olympic Games was shown, and questions were asked about what shapes it consisted of, what color they were and what they represented. Students were asked to discuss these in class. This activity focuses on drawing circles.

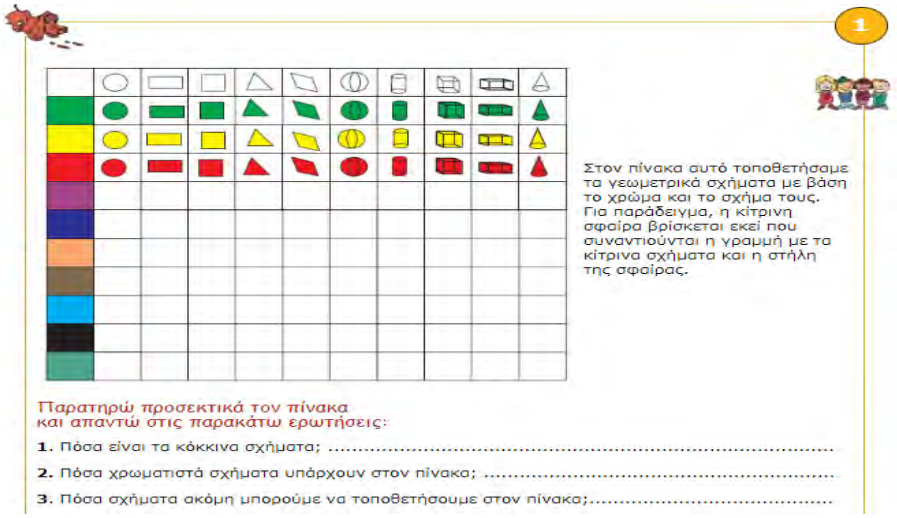


**Figure 9.** *A sample of Applied Representations of Mathematical Concepts (pp.44-45).*

As seen in Figure 9, the categories of applied representations of mathematical concepts. Geometric shapes are arranged according to color and shape. Students were asked to fill in the desks in the same way and answer the questions according to the table.

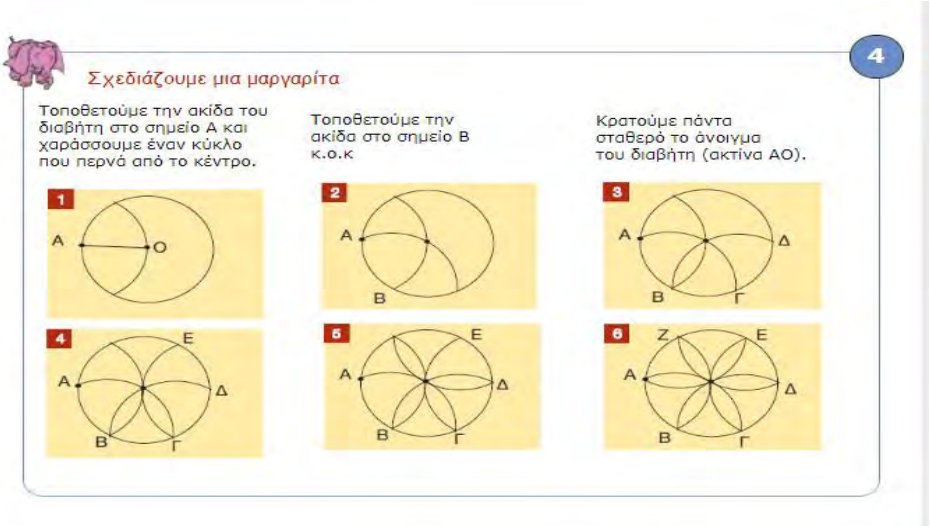


**Figure 10.** *A sample of Applied Representations of Mathematical Concepts (P.46).*

As seen in Figure 10, the steps of students drawing a daisy by drawing circles and semicircles with compasses were followed. The aim of this activity is focused on modeling real objects.


**Figure 11.** *A Sample Activity for the Classical Word Problems Category (Pp.46-47).*

As seen in Figure 11, sample water and electricity bills and rent expenses are included in the example of the classical word problems category. Students were asked to calculate their water, electricity, rent and electricity expenses and finally their total expenses.

In general, in the analyzes aimed at associating the activities of the unit "Numbers up to 3,000, four operations, right angles" with real life, it was seen that the activities belonging to the classical word problem category of the relevant unit were in majority, but also included activities in the application type, as in the previous unit.

**Connecting to the Activities of the "Introduction to Simple Fractions" Unit of Greece Primary School 3rd Grade Mathematics Textbook to Real Life**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "introduction to simple fractions" unit with real life are shown in Table 4.

**Table 9.** *Relating the Activities of the "Introduction to Simple Fractions" Unit to Real Life*

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 4 |
| “Applied” representations of mathematical concepts | 8 |
| Real data analysis | 2 |

| | |
|---|---|
| Total | 14 |

As seen in Table 4, "applied" representations of mathematical concepts (f = 8) come first in associating the 4th unit of the Greek primary school 3rd grade mathematics textbook "Introduction to Simple Fractions" with real life. "Classical word problems" (f=4) came second. In the last row, activities related to the "real data analysis" (f=1) category are included. Figures 12 and 13 give examples of the "real data analysis and applied representations of mathematical concepts" categories for the relevant unit.


**Figure 12.** *A Sample Activity for The Real Data Category (P.60).*

In Figure 12, the activity belonging to the real data category asked to cut a whole tomato into halves and quarters, as shown in the figure. It is aimed for students to express the results with fractions.


**Figure 13.** *A Sample Activity for Application Representations of Mathematical Concepts (p.62*).

In the activity in Figure 13, students were asked to write fractions on pizza pieces. In the activity, "three equal-sized pizzas were cut in different ways, and the students were asked to color half of each

pizza and indicate it with a fraction." The activity, which belongs to the category of practical representations of mathematical concepts, aims to make students realize that half a pizza can be represented differently through fractions.

In general, it was seen that the analysis of associating the activities of the "Simple Fractions" unit with real life also included application type activities. It has been observed that applications related to real data analysis are partially included.

**Connecting to the Activities of the "Addition-Subtraction and Multiplication Algorithm" Unit of Greece Primary School 3rd Grade Mathematics Textbook to Real Life**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "Introduction to Decimals" unit with real life are shown in Table 6.

**Table 6.** *Relating the Activities of the "Introduction to Decimals" Unit to Real Life*

| Real Life Relationship Categories f | f |
|---|---|
| Classical word problems | 8 |
| "Applied" representations of mathematical concepts | 2 |
| Real data analysis | 1 |
| Total | 11 |

As seen in Table 6, in the 6th unit "Introduction to decimals" of the Greek primary school 3rd grade mathematics textbook, "classical word problems" (f = 8) came first in associating it with real life. In the second place, activities related to the category of "Applied representations of mathematical concepts" (f = 2) are included. "Real data analysis (f=1) came last. Figure 16 shows an example of the "classical word problems" category for the relevant unit.


**Figure 16.** *A Sample for the Classical Word Problem Category (p. 95).*

As seen in Figure 16, a menu was shown to the students. And regarding this menu, "Which is the most expensive appetizer on the menu?" What is the cheapest appetizer? How much does a plate of eggplant salad and a plate of olives cost in total? How much more expensive are stuffed vegetables than other appetizers? By asking questions like this, the activity of addition with decimal numbers was aimed.

In general, in the analyzes regarding associating the activities of the "Addition-subtraction and multiplication algorithm" unit with real life, it was seen that the activities in the classical word problem category of the relevant unit were in the majority, but also included activities in the real data type.

**Connecting to the Activities of the "Numbers up to 7000, Measurement, Symmetry" Unit of Greece Primary School 3rd Grade Mathematics Textbook to Real Life**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "Numbers up to 7000, measurement, symmetry" unit with real life are shown in Table 7.

**Table 7.** *Relating the Activities of the "Numbers up to 7000, Measurement, Symmetry" Unit to Real Life*

| Real Life Relationship Categories | *f* |
|---|---|
| Classical word problems | 7 |
| "Applied" representations of mathematical concepts | 5 |

| | |
|---|---|
| Real data analysis | 2 |
| Simple Analogies | 2 |
| Total | 16 |

As seen in Table 7, in the 7th unit of the Greek primary school 3rd grade mathematics textbook "Numbers up to 7000, measurement, symmetry", classical word problems (f = 7) came first in associating it with real life. In the second place, "applied" representations of mathematical concepts (f = 5) and in the third place, activities related to the "real data analysis (f = 2)" category were included. "Simple analogies" (f=2) came in last place. Figure 17 gives an example of the "simple analogies" category for the relevant unit.


**Figure 17.** *A Sample Activity for Related to the Simple Analogies Category (p.103).*

As seen in the activity in Figure 17, a picture of traditional fabric weaving was shown to the students. They were asked to carefully examine this fabric pattern and find out which shapes were included. Finally, the students were asked to color the geometric shapes they saw in the order shown.

In general, in the analyzes regarding associating the activities of the unit "Numbers up to 7000, measurement, symmetry" with real life, it was seen that the activities in the classical word problem category of the relevant unit were in the majority, but also included activities in the type of applied representations.

**Connecting to the Activities of the "Multiplication-Division, Time and Place Measurement" Unit of Greece Primary School 3rd Grade Mathematics Textbook to Real Life**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "Multiplication-Division, time and place measurement" unit with real life are shown in Table 8.

**Tablo 8.** *Relating the Activities of the "Multiplication-Division, Time and Place Measurement" Unit to Real Life*

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 8 |
| "Applied" representations of mathematical concepts | 6 |
| Real data analysis | 3 |
| Total | 17 |

As seen in Table 8, in the 8th unit "Multiplication-Division, time and place measurement" of the Greek primary school 3rd grade mathematics textbook, classical word problems (f = 8) came first in associating it with real life. In the second place, activities related to the "applied" representations of mathematical concepts (f = 6) were included, and in the third place, activities related to the "real data analysis" category (f = 3). Figure 18 shows an example of the "real data analysis" category for the relevant unit.

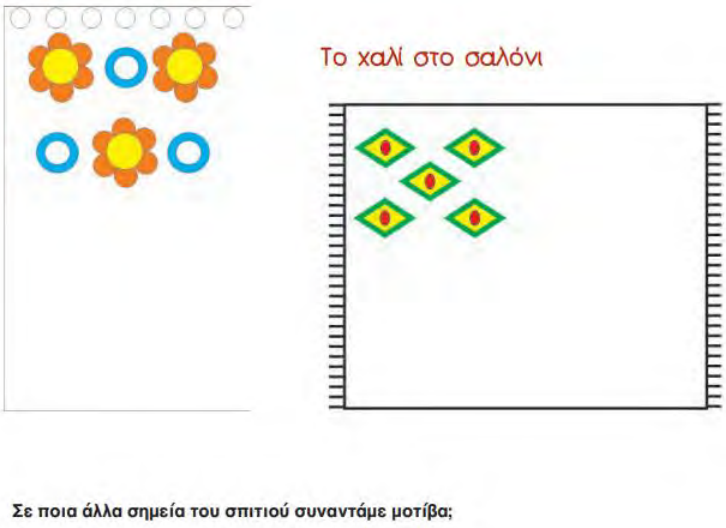


**Figure 18.** *A Sample Activity for Real Data Analysis Category (p.116).*

As seen in Figure 18, the students were asked to research the geometric shapes present in the objects in their homes and draw them as shown in the figure.

In general, in the analyzes regarding associating the activities of the unit "Multiplication-Division, time and place measurement" with real life, it was seen that the activities belonging to the classical word problem category of the relevant unit were in the majority, but also activities in the type of applied representations were included.

**Connecting to the Greece Primary School 3rd Grade Mathematics Textbook Relating the Activities of the "Numbers up to 10,000 - Fractions - Decimal Operations - Geometry" Unit to Real Life**

As a result of analyzing the activities in the textbook, the findings regarding the association of the activities of the "Numbers up to 10,000-fractions-decimal operations-geometry" unit with real life are shown in Table 9.

**Table 9**. *Relating the Activities of the "Numbers up to 10,000-fractions-decimal operations-geometry Unit to Real Life"*

| Real Life Relationship Categories | f |
|---|---|
| Classical word problems | 7 |
| "Applied" representations of mathematical concepts | 5 |
| Total | 12 |

As seen in Table 9, in the 9th unit "Numbers up to 10,000-fractions-decimal operations-geometry" of the Greek primary school 3rd grade mathematics textbook, "classical word problems" (f=7) came first in associating it with real life. In the second place, activities related to the category of "Applied representations of mathematical concepts" (f = 5) were included. Figure 19 shows an example of the "application representations of mathematical concepts" category for the relevant unit.


**Figure 19.** *A Sample Activity for The Category of Applied Representations of Mathematical Concepts (P.130).*

As seen in Figure 19, in the activity belonging to the category of representations of applications of mathematical concepts, it was asked which of the shapes could be cubes or rectangles.

In general, in the analyzes regarding the association of activities related to "numbers up to 10,000 - fractions - decimal operations - geometry" with real life, it was seen that the activities belonging to the classical word problem category of the relevant unit were in the majority, but also activities in the type of applied representations were included.

**Discussion and Conclusion**

In this research, the relation of 1-9 units activities to real life in the Greece primary school 3rd-grade mathematics textbook was analyzed according to Gainsburg's (2008) classification. The research findings have concluded that in classifying the activities belonging to the unit "Numbers up to 1000, four operations, geometric shapes" and associating them with real life, "classic word problems" type activities are predominant. The possible reason why "word problems" type activities come first in this unit may be the grade level and the content of the subjects. However, it can be said that the activities in the current unit include "classical word problems" type activities with real-life connections. For example, activities for the four processing skills include a classical calculation. It has been observed that these classical four operations are expressed to the student with numbers and are visualized and presented by integrating them with contexts such as playing football, going to the movies, and eating regularly in the student's daily life. However, it was determined that activities belonging to the category of application representations of mathematical concepts were ranked second. The results for unit 1 show that activities need to be distributed homogeneously. This research finding supports the conclusion of Gainsburg (2008), one of the literature studies, that activities should be diversified in the type of mathematical association. The studies of Bingölbali and Özdiner (2022), Yekrek and Özgeldi (2019), primary and secondary school mathematics textbooks concentrate on the type of "classical words problems." consistent with the findings. The research finding is similar to the findings of Bingölbali and Özdiner (2022) in their study; activities corresponding to the categories of 'mathematical modeling of real phenomena' and 'discussion of mathematics in society' were omitted. Activities corresponding to the categories of superficial analogies, classical word problems, and analysis of real data were included in a small number. In addition, this study's finding is similar to the findings of Yekrek and Özgeldi (2019) that classical problems are frequently used in real-life connections in the introduction sections of secondary school mathematics textbooks. The difference between the current research and the related literature studies is that, although their numbers are not very large, real data and simple

analogies are used in the introduction to the subject. However, word problems came first in the unit "Length measurements, subtraction and multiplication operations, solids" activities. In particular, the presence of an activity in the "real data" analysis category in this unit is compatible with the content of the unit. Studies show that real data analysis-type activities are part of students' integration of mathematics with real life (Boaler & Humphreys, 2005; Cognition and Technology Group at Vanderbilt, 1990; Greeno & MMAP, 1997). In addition, it was concluded that basic-level modeling activities were also included.

It was observed that activities such as word problems came first in the activities of another unit, "Numbers up to 3000, four operations, right angles". It was determined that activities such as application representations of mathematical concepts came in second place. With the right-angle subject, the activity in the type of application representations is included. In this regard, such activities are the type of activities that will support real-life associations (Pepin & Haggarty, 2007). It has been observed that the activities in the 4th, 5th, 6th, 7th, 8th, and 9th units of the textbook are activities related to the "classical word problems" category. This finding of the research coincides with the findings of Bekiroğlu and Ütkür-Güllühan (2023) in their study of activities in Germany and Turkey primary school 4th-grade mathematics textbooks, where the textbooks of both countries concentrated on activities in the classical word problems type. However, as in the previous units, it has been observed that the contents of these activities for classical word problems include daily life and are presented with example events from the child's own life and the environment in which he lives. In this context, it has been determined that the activities of these units are collected in the category of classical word problems, and it can also be concluded that the structure of the problems has content related to real life.

Considering all the results obtained from the research, the Greek primary school 3rd-grade textbook unit 1-9 activities and word problems in the units according to their types are designed with situations that the child may encounter in daily life. Moreover, although some activities support mathematical association skills, increasing the number of real data analysis-type activities will strengthen students' association of mathematics with real life.

As a result, this study examines the 1st-9th grades in the Greek primary school 3rd-grade mathematics textbook. It has been determined that the activities in the inter-unit unit are presented as a combination of daily contexts in the form of word problems at the primary school level. Integrating a word problem with daily life and the child's ability to associate it with familiar words, games, or hobbies rather than attracting their attention is essential. The reflection of this situation on mathematical

activities is also complicated since the term does not have an established specification and is related to real life (Gainsburg, 2008). In this context, the prerequisite for students' ability to make connections with real life, which is one of the mathematical association skills, is the development of association skills. As a result, this research's findings are limited to those obtained from the 3rd-grade activities in the Greek primary school mathematics textbook. Based on these limitations, it is suggested that the activities in Greek primary school 3rd-grade mathematics textbooks are partially associated with real life, and in order to strengthen this relationship, the number of studies on real data analysis and modeling should be increased, especially in problem situations that require measurement and real calculation.

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