

# **Role of Practical Examples in Teaching Mathematics: Textbook Analysis**

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#### 1. Introduction

Teaching mathematics has always been a significant challenge for teachers, due to the abstract nature of many of the concepts involved. For many students, understanding mathematics can be a difficult experience, especially when learning materials fail to make clear connections between theory and practical applications (Engaging Maths, 2023). In this context, the practical examples included in mathematics textbooks play a critical role, serving as a bridge connecting theoretical concepts to real situations. The use of practical examples is essential to help students develop a deeper understanding of mathematical topics and to foster their ability to apply the knowledge gained in solving everyday problems.

Practical examples help flesh out abstract ideas by providing real-world scenarios that make complex concepts easier to understand. They may include estimating costs, analyzing data, or modeling situations in other contexts such as economics, science, engineering, and technology. Through these examples, students come to understand not only how mathematics works, but also why it is important

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in their daily lives. This approach also helps to increase their motivation and engagement during the learning process, making mathematics learning more relevant and engaging. The use of practical examples in teaching mathematics has received special attention in scientific literature due to their effectiveness in engaging students (Myers et al., 2022; Jitendra et al., 2021; Powell et al., 2021; Schumacher et al., 2020; Stevens et al., 2018; Drijvers et al., 2019; Laurens et al., 2017; Yuanita et al., 2018). Active learning strategies that include practical and real-life related tasks help students get more out of the learning process. This approach not only increases students' interest in mathematics but also helps them develop problem-solving and critical thinking skills, engaging them intellectually, socially, and physically while solving complex tasks (Vale and Barbosa, 2021).

Despite the importance of practical examples, the way they are integrated and presented in textbooks often varies. Some texts try to provide examples that are simple but do not involve complex real-life situations. Others may include examples related to advanced scenarios, which sometimes become difficult for students who need the basics. This diversity of approaches creates a need to analyze and evaluate the effectiveness of practical examples in textbooks, to determine which methods are most successful in helping students understand and apply mathematical concepts. Students have a deeper involvement in the subject when they are engaged through activities related to scenarios from their daily lives, leading to a better understanding of how mathematics works in different everyday practices (Webster et al., 2015). Also, one of the most successful strategies for engaging students in meaningful learning experiences is the integration of projects based on real problems, where students solve challenges related to practical situations, such as managing family budgets or analyzing data from the local environment. This form of learning enhances critical thinking skills and creates a sense of belonging and importance for students (Phillips, 2023; Benson-O'Connor et al., 2019; Calculate, 2023).

Another example of using real connections is the integration of mathematics with other school activities and different fields, including science, art, and even literature. For example, students can learn about phrases and fractions by analyzing the ingredients of cooking recipes or study geometric shapes by designing building plans. These approaches make concepts more tangible and help students see how math is used in different contexts, increasing their interest in learning (Accelerate Learning, 2023; STEM Math, 2023).

In conclusion, this paper aims to contribute to the improvement of the quality of mathematics teaching by highlighting the importance of practical examples and proposing strategies for a better integration of them into textbooks. Such an approach will help not only in increasing the academic results of students but also in developing their skills to apply mathematics in different everyday situations, giving them a stronger foundation for the future.

## 1.1. Importance of the study

This paper is of special importance for several main reasons related to the improvement of the quality of education and the development of students' skills in mathematics. First, grappling with abstract math concepts is often a challenge for students, and many of them experience difficulty understanding how and why those concepts are important. Using practical examples that relate theory to real situations makes teaching more understandable and engaging. This study aims to analyze and evaluate how these examples are included in textbooks, providing valuable insights for improving mathematics teaching materials. Second, examining how practical examples contribute to student understanding and problem-solving can help teachers and curriculum designers identify best practices and develop materials that are more effective and appropriate for student needs. This is especially important in a world that requires deep analytical skills and complex problem-solving, where an understanding of mathematics is a necessary component for success in fields as diverse as science, technology, engineering, and economics. Third, through the content analysis of textbooks, this study provides a basis for suggesting specific improvements in the structure and content of mathematics textbooks. The proposed improvements aim to increase student engagement and motivation, making practical examples clearer, more relevant to real-life situations, and more suitable for different levels of

understanding. These recommendations will help textbook developers create more effective materials that can improve learning outcomes and reduce the mathematics comprehension gap among students. Overall, the importance of this paper lies in the fact that it addresses an essential aspect of mathematics teaching, providing an approach to understanding and improving the role of practical examples in education. By improving the way these examples are used in textbooks, the paper contributes to creating a more effective and inclusive learning environment that helps students develop sustainable and applicable skills for the future.

## 1.2. Problem Identification

Effective mathematics teaching faces several significant challenges, which often affect students' understanding and academic performance. One of the biggest challenges is the abstract nature of mathematical concepts, which requires students to have a high level of logical thinking and the ability to understand ideas that are not always directly related to their everyday experiences (Drijvers et al., 2019; Yuanita et al., 2018; Stevens and Thomas, 2018). This becomes especially difficult when concepts are presented in isolation, without context or examples that help students connect theory to practical applications. As a result, many students feel demotivated and develop negative attitudes towards mathematics, seeing it as incomprehensible and unnecessary to their daily lives.

Mathematics textbooks play a key role in shaping students' learning experience (Jitendra et al., 2021; Attard and Holmes, 2020; Drijvers et al., 2019). They serve as the primary tools for introducing concepts, providing examples, and helping to solve problems. However, not all texts manage to use practical examples that are clear, related to real situations, and useful for developing problem-solving skills. In many cases, the examples in the textbooks are either too simple and disconnected from the practical context or too complex and difficult to understand without a good framework of background knowledge (Schumacher et al., 2020; Powell et al., 2021; Stevens and Thomas, 2018). This often leads to a gap between theory and practice, making it difficult for students to see the value and applicability of mathematics in real life.

The main problem that this study addresses is the lack of practical and well-structured examples of mathematics textbooks in the curriculum of the Republic of Kosovo, which can hinder the development of students' analytical and problem-solving skills. Without a well-thought-out approach to practical examples, mathematics teaching often remains limited to the mechanical acquisition of rules and algorithms, failing to prepare students for more complex and useful applications outside the classroom (Burns, 2022; Laurens et al., 2017; Yuanita et al., 2018; Attard and Holmes, 2020). This issue is especially important in an era when analytical skills and solving complex problems are required not only in scientific and technical professions but also in other areas of life and work.

## 1.3. Purpose of the Study

The purpose of this paper is to examine and analyze how practical examples are used in mathematics textbooks for lower secondary education in Kosovo, focusing on their effectiveness in improving understanding of concepts and students' ability to solve problems. This study aims to conduct a content analysis of the main mathematics texts for grades 6, 7, 8, and 9 from the Kosovo curriculum, to evaluate the types of examples used, the way they are presented, and the impact they have on the process of learning. Specifically, the research will analyze how practical examples help to concretize abstract concepts and develop problem-solving skills, examining whether these examples are related to real-life situations and other fields of knowledge such as economics. , science, and technology. Also, it will be evaluated how many examples the students prepare to apply mathematics in different contexts outside the classroom. Furthermore, based on the findings of the analysis, the study aims to provide recommendations for the improvement of mathematics textbooks, suggesting more structured and well-thought-out approaches to the design of practical examples. The goal is to create more effective teaching that includes practical situations and real-life applications, helping students not only better understand mathematical concepts, but also develop skills that are useful and applicable to everyday challenges.

#### 1.4. Research Objectives

This study aims to achieve the following objectives:

- Analyzing the use of practical examples in mathematics textbooks: To examine how mathematics textbooks for lower secondary education in Kosovo integrate practical examples and to identify the types of examples used to illustrate mathematical concepts.

- Evaluating the effectiveness of practical examples for improving understanding of concepts: To assess how well these examples help students understand and internalize abstract concepts by making connections between theory and real-world applications.

- Identifying the connection of practical examples to real-life situations: To determine whether the practical examples used in the textbooks include real situations and other fields of knowledge such as economics, science, and technology, to develop students' skills for practical applications outside the classroom.

- Proposing strategies for improving the content of textbooks: Based on the analysis and findings of the study, provide recommendations on how textbooks can integrate practical examples in a more clear, structured, and related way to practical situations, to create more effective teaching.

- Enhancing students' motivation and problem-solving skills: To analyze how practical examples influence students' motivation and engagement during the learning process and to assess how well they help develop their skills to solve complex problems.

By achieving these objectives, the study aims to contribute to the improvement of mathematics teaching and the development of students' practical skills through the use of well-structured and real-life related examples.

## 2. Literature Review

The use of practical examples in teaching mathematics has received much attention in scientific literature due to their important role in the development of problem-solving skills and the acquisition of abstract concepts. Numerous studies have shown that when math is related to real situations, students are more engaged and develop a deeper understanding of the material. Recent studies point out that the use of practical examples helps develop analytical skills by creating a direct link between theory and real applications. For example, a systematic review of mathematics interventions in primary education found that students benefit most from lessons that include clear and structured practical examples related to everyday life (Myers et al., 2022; Jitendra et al., 2021). Linking practical examples to problem-solving skills is another important topic in literature. A 2022 review shows that approaches that include practical scenarios increase students' ability to solve complex problems by helping them transfer theoretical knowledge to real situations. This is also supported by Powell et al. (2021), who point out that interventions that use examples linked to practical scenarios help develop critical problem-solving skills, especially in students who struggle academically (Powell et al., 2021). One of the main findings from the literature is that pedagogical approaches that integrate practical examples should be structured and related to the student's everyday experiences. Some recent studies have suggested that learners respond better when examples are related to familiar contexts, such as financial situations or everyday technologies (Schumacher et al., 2020; Stevens et al., 2018).

The literature also suggests that incorporating practical examples into the curriculum should be systematic and ongoing, providing a way for students to practice and understand concepts in depth. This approach is important to create an inclusive and effective learning environment that addresses the diverse needs of students (Svane et al., 2023).

A well-established instructional model that operationalizes these principles is Realistic Mathematics Education (RME), which systematically integrates real-life contexts into mathematics instruction to make abstract concepts more accessible and meaningful. RME emphasizes the use of real contexts to help students understand and apply mathematical concepts. According to Drijvers et al. (2019) and

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Laurens et al. (2017), students who engage in activities that connect abstract concepts to practical situations manage to better develop their math skills. This type of approach creates a bridge between theory and practice, facilitating the transition from basic concepts to more complicated and sophisticated applications (Drijvers et al., 2019; Laurens et al., 2017). Moreover, a study by Yuanita et al. (2018) showed that approaches that include examples related to real situations help develop communication and critical thinking skills, strengthening students' confidence in solving problems (Yuanita et al., 2018). Another approach that has shown success is integrated mathematics in different educational contexts, where issues from other fields such as science and economics are included in the mathematics curriculum. Recent studies suggest that students benefit when they have the opportunity to solve problems that are relevant to them and that they can see applied to their daily lives (Schumacher et al., 2020; Powell et al., 2021). This gives them a broader and more applicable understanding of mathematics.

The "Uncovering the Curriculum" approach is a newer approach that aims to overcome traditional teaching methods where concepts are treated in isolation. According to Marilyn Burns (2022), this approach aims to help teachers move from "covering" material to "unpacking" it in ways that promote conceptual understanding. It involves the use of activities and practical examples that are related to students' interests and that require them to make connections between different concepts, thus making learning more engaging and deeper (Attard and Holmes, 2020).

Finally, the impact of technology on teaching mathematics is also important. During the period of the COVID-19 pandemic, many teachers have experimented with digital resources to help incorporate practical examples into virtual lessons. These experiences have demonstrated that technology can serve as a bridge between theory and practice, providing new tools to make mathematics more accessible and tangible for students (Attard and Holmes, 2020; Engaging Maths, 2023). The results of the study by Orhani (2023) served as a basis for further research in the field of education and technology, aspiring to contribute to the development of a comprehensive teaching approach that matches the needs of our rapidly advancing technological age (Orhani, 2023).

These studies emphasize that to improve the quality of mathematics teaching, it is essential to integrate practical examples that are clear, structured, and related to the real experiences of students. This helps not only in developing problem-solving skills but also in fostering students' motivation and engagement in mathematics.

## 3. Methodology

This study used a qualitative approach to analyze the use of practical examples in mathematics textbooks and their effectiveness in improving student engagement and understanding. The qualitative approach was chosen to enable an in-depth examination of the content of the texts and to understand how practical examples help the acquisition of mathematical concepts through a detailed evaluation of existing educational materials.

## 3.1. Study Design

The study design includes content analysis of mathematics textbooks for lower secondary education. This component involved reviewing the teaching materials to identify and evaluate the practical examples used. Mathematics textbooks from grades 6 to 9 were analyzed to see the types of practical examples used, how they were presented, and how they related to everyday real-life situations.

## 3.2. Document Selection Process

The study sample included textbooks widely used in lower secondary schools in Kosovo for grades 6 to 9. The selection was made to represent a wide range of materials used for teaching mathematics at the national level.

#### 3.3. Data Collection and Analysis

Content analysis of data obtains from text analysis included identification of practical examples and evaluation of their structure. The study analyzed how examples helped explain mathematical concepts and how they related to real-life situations. For each example, clarity, appropriateness for the level of students, and connection to practical applications were evaluated.

For the analysis of the data obtained from the texts, thematic analysis was used, identifying the main themes that appeared in the content, as well as the types of practical examples used.

#### 4. Results

4.1. Analysis of the Use of Practical Examples in the Textbook "Mathematics 6"

Based on the chosen methodology, which includes content analysis and assessment of the impact of practical examples, several chapters of the text "Mathematics 6 Basic" (Zejnullahu, 2024) were examined. This analysis focuses on identifying examples that aim to connect abstract concepts with practical applications and evaluate their effectiveness in improving student understanding and engagement.

The text "Math 6" contains examples that are used to illustrate mathematical concepts, especially in the chapters dealing with natural numbers, fractions, and decimals. For example, the first chapter contains examples that help students understand the concept of natural numbers and their place value through practical activities such as comparing numbers and rounding them. One of the approaches used in the text is to include examples related to everyday situations, such as using numbers when shopping or comparing quantities. These types of examples allow students to transfer their learned skills to everyday contexts, helping them see the importance of mathematics outside of the school environment.

The examples given in the Maths 6 text are generally well structured, allowing students to follow a simple approach to problem-solving. For example, when learning arithmetic operations such as addition and multiplication, practical examples are accompanied by detailed explanations and clear steps for solving problems. This structure helps students better understand procedures and develop the confidence to apply mathematics in other contexts.

In the text "Mathematics 6", the author has considered the importance of teaching methodology, presenting examples that explain the concepts clearly and logically. However, it has been observed that some examples remain too focused on traditional and theoretical solutions without directly relating to more complex practical situations that can be encountered in real life. To further improve the effectiveness of these examples, it is recommended to include more activities that require students to solve problems based on real scenarios, such as managing simple budgets or calculating travel expenses, which will offer students a more practical and tangible experience.

Based on the thematic analysis of the content of the text "Mathematics 6", some important aspects have been identified that help in the understanding and development of students' skills, as well as some shortcomings that require improvement to increase the effectiveness of teaching. Currently, the text tries to relate to everyday situations, but these connections are limited and usually based on simple scenarios. For example, dividing a cake into equal parts is a classic illustration of fractions, but examples related to more complex everyday scenarios such as calculating percentages on purchases, calculating discounts, or dividing costs between people are missing. This limits students' ability to apply learned knowledge to real situations, reducing the relevance of the learned concept to their daily lives. The exercises included in the text provide opportunities for students to practice concepts and reinforce learned knowledge. However, most of them are exercises based on traditional descriptions and algorithms, without much room for collaboration or related projects. In the chapters covering basic arithmetic operations (addition, subtraction, multiplication, division), most examples and exercises are focused on simple exercises and mechanical algorithms without involving real-life situations. Although these exercises help to master arithmetic operations, they do not provide students with the opportunity to see how these operations can be used in solving real-world problems, such as managing a budget or

calculating travel time. The text tries to explain concepts simply and logically, following a clear structure of didactic methods but could include more teaching strategies to support independent exploration of concepts. Chapters dealing with more complex concepts such as replicating numerical models and data collection lack detailed examples that would help students better understand the practical applications of these concepts. For example, when it comes to data collection and analysis, the text could include examples from sports (analysis of match results) or science (measuring temperatures over a month), but these are currently few or completely absent. This makes it difficult for students to see how these concepts work outside of textbook theory. The structure of some practical examples does not help to build knowledge progressively. Examples are sometimes presented without clear context or logical connections that help the learner move from basic concepts to more complex ones. This often creates confusion and makes it difficult for students to build a consistent understanding of the concepts. The way the examples are presented could be improved by adding clear steps that explain how the concept is developed and its practical applications. Another shortcoming observed is that the practical examples are too generalized and do not reflect the cultural and social diversity of the students. For example, the examples used in the texts do not include scenarios related to local traditions or customs, which can help strengthen students' connection to the learning material. The use of examples that are diversified and adapted to different social and cultural contexts would help create more inclusive teaching and more connected to the student's everyday experiences.

Main topic	Description	Examples from the textbook	Suggestions for improvements	
Use of practical examples	The text includes practical examples to illustrate basic math concepts, using situations students may encounter in everyday life.	In the chapter on natural numbers, examples are given related to quantity comparison and rounding of numbers when shopping.	Add more examples involving other practical contexts, and examples that relate to other KKK areas such as managing personal budgets or travel calculations and reading and comparing the population numbers of countries. This would help students connect abstract concepts with everyday applications, improving their understanding.	
Clarity of structure	The examples are structured with detailed steps, making it easy for students to follow the solution methods.	In arithmetic operations, examples for addition and subtraction are broken down into clear steps, illustrating each procedure.	Make sure that each example always includes clear and complete problem-solving steps, especially for more complex topics such as fractions and decimals. Include practice questions that allow students to reinforce their knowledge in real-world situations.	
Connection to real situations	Some examples in the text try to relate to everyday activities, but the connections are limited and often based on simple scenarios.	Examples of fractions include dividing quantities into equal parts, such as dividing cakes into equal parts.	To improve this aspect, it is important to integrate more complex scenarios and critical thinking, such as calculating travel time, using metrics in cooking, or analyzing simple financial data. These examples will help students see the applications of mathematics in different areas of their daily lives and develop problem-solving skills.	
Inclusion of student activity	The text includes exercises for students that help reinforce the concept learned, allowing them to practice what they have learned. To provide models of projects that can be realized with different activities	Numerous practice exercises are included after each chapter, including problems related to basic arithmetic operations.	To improve student engagement, adding interactive activities involving group work or project-based problem-solving is recommended. For example, students can work together to create simple budgets or build models using concepts learned in class.	
Didactic aspect	The text tries to explain concepts simply and logically, following a clear structure of didactic methods.	An example is introducing basic concepts such as multiplication and division through visualized activities.	To improve the didactic aspect, it is necessary to include more teaching strategies that allow students to discover concepts independently through educational games and inquiry-based projects. This would encourage critical thinking and strengthen conceptual understanding.	

Table 1. Table of thematic analysis from the textbook "Mathematics 6"

## 4.2. Analysis of the Use of Practical Examples in the Textbook "Mathematics 7"

Examining the chapters of the text "Mathematics 7 Basic" (Zejnullahu and Baxhaku, 2024), several aspects of the use of practical examples in the teaching of mathematical concepts have been identified. Here is an analysis of their advantages and disadvantages, structured around several main themes. The text contains examples that help master basic mathematical concepts such as powers, roots, the Pythagorean theorem, and polygons. For example, when dealing with powers and roots, simple illustrations and applications are used that explain the basic definitions and how to use them. Using powers to explain how like factors are multiplied by representing the process through prime numbers.

Examples often remain at an abstract level and fail to relate to everyday situations that students may experience outside of school. This can create a disconnect between theory and practical application, causing students to not see the benefits of mathematical concepts. On the other hand, the examples are presented in clear and orderly steps, helping students to follow and understand the problem-solving process. This kind of clarity is especially useful when dealing with compound operations or complex equations, ensuring a good understanding of the methods. The chapter on adding and subtracting signed numbers uses a number line to show how negative and positive numbers are positioned and compared. This visualization makes it easier for students to understand the rules of operations. For more complicated topics, such as equations involving multiplication and division of signed numbers, it is suggested to add more visual illustrations that show step-by-step how the solution is achieved. Also, to maintain students' interest, examples related to practical challenges can be included.

Main topic	Description	Examples from the textbook	Suggestions for improvements
Use of practical examples	The text includes practical examples to illustrate basic mathematical concepts, but they often remain at an abstract level and are not well connected to real situations.	Examples of powers, roots, and percentages are explained through simple illustrations and basic applications.	Add more examples involving everyday situations, such as applying powers through the various examples when measuring large or very small distances with the help of scientific numbers, applying percentages in financial contexts, or sports statistics. This will help students see practical applications of mathematics in real life.
Clarity of structure	The examples are structured and presented with detailed steps, helping students follow the problem-solving process.	For signed number operations, number lines are used to show how addition and subtraction are performed.	For more complex topics, such as multiplication and division equations, it is helpful to add more visual illustrations and include step-by-step examples
Connection to real situations	The connection to real activities is limited and is often based on simple, uncomplicated scenarios that help solve real problems.	In the chapter on probability, simple examples such as flipping a coin or dice are mentioned.	To improve this aspect, it is important to include scenarios involving complex applications, such as managing budgets or analyzing data from sports. This will help students develop complex problem-solving skills.
Inclusion of student activity	The text contains numerous exercises to reinforce concepts, but most activities are structured as individual tasks.	Independent tasks for applying formulas, such as calculating the area of polygons.	To improve involvement, it is recommended to integrate activities that require group work or projects based on real situations, such as measuring the spatial surfaces of classrooms, at home, designing the floor plan, and models of the rooms of the house, such as creating budgets or data experiments. These activities will help reinforce collaboration and critical thinking.
Didactic aspect	The text follows a clear structure to explain concepts but does not include many strategies that encourage independent student exploration.	Illustrations for the Pythagorean theorem that prove and visually show the relationship between the hypotenuse and legs in right triangles	To help develop critical thinking, it is necessary to include educational games and investigative projects that encourage students to discover concepts independently. This will help them build a deeper and more lasting understanding of mathematics.

<b>Table 2.</b> Table of thematic analysis from the textbook "Mathematics 7"
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The text tries to relate to everyday activities, especially when dealing with the concepts of percentages, probability, and data processing. However, the connection to real situations is often limited and usually based on simple and not always realistic scenarios. In the probability chapter, simple examples are mentioned to calculate the probability of throwing a coin or a die. These examples help with the acquisition of basic concepts but do not carry over to more complex situations that students may experience in real life. To strengthen this aspect, it is necessary to include more complex and tangible scenarios, such as the calculation of sports statistics, the management of personal budgets, or the analysis of data in science. This would help students develop real problem-solving skills.

The text contains various activities to reinforce the concepts learned, allowing students to practice their skills. There are independent tasks that require calculations and problem-solving based on the acquired knowledge. After each chapter, some assignments require students to apply the formulas learned to solve specific problems, such as calculating the area of polygons. Most activities are structured as individualized tasks and do not offer many opportunities for group work or project-based problem-solving. Students need activities that stimulate critical thinking and collaborative work. To increase student involvement, it is recommended to integrate activities that require group solutions or projects related to daily challenges. For example, students can work in groups to analyze budgets or develop projects related to measuring data in scientific experiments.

The didactic structure of the text follows a clear approach to explaining concepts and building knowledge. Direct methods are used to explain procedures such as powers, roots, and the Pythagorean theorem. When introducing the Pythagorean theorem, the text uses clear illustrations that help students visualize the concept and relate it to practical applications such as measuring distances. The current didactic structure is effective for basic concepts but lacks strategies to support deeper, independent student exploration. To help students develop critical thinking skills, it is necessary to include more discovery-based activities, educational games, and investigative projects that encourage curiosity and complex problem-solving.

Analysis of the use of practical examples in Basic 7 Mathematics shows that while there is a solid structure and clear approaches to presenting concepts, there is still room for improvement. Relating mathematics to real situations and developing critical thinking and teamwork skills are some of the areas where significant improvements can be made to increase the involvement and effectiveness of learning for students.

This analysis shows that 7th-grade math textbooks have a good structure to explain basic concepts, but there is still room for improvement in connecting to real situations and developing activities that encourage teamwork and critical thinking. The integration of these elements will contribute to more effective and engaged teaching for students.

4.3. Analysis of the Use of Practical Examples in the Textbook "Mathematics 8"

Analyzing the chapters of the book "Mathematics 8 Basic" (Gjergji, Bllaca and Aliaga, 2024), several advantages and shortcomings in the use of practical examples have been identified that have a significant impact on the teaching and understanding of mathematical concepts by students. The text includes examples that help understand important concepts such as powers, square roots, the Pythagorean theorem, linear equations, and probability. The use of illustrations and practical applications makes it easier for students to understand basic concepts and ways to solve problems. For example, the chapter on powers includes examples showing how to write large numbers in short form, which is useful in the natural and technical sciences. While the examples explain the concepts well, most of them remain simple and do not directly relate to complex real-life situations. The connection to practical applications, such as calculating probabilities in games or calculating compound interest, is limited. To improve this aspect, it is important to include examples related to everyday challenges, such as calculating family budgets or analyzing data in more complex contexts.

The examples are structured with detailed steps, making it easy for students to follow the problemsolving process. This style helps especially with topics that involve more complex procedures, such as solving linear equations and working with powers. For more complicated topics, such as linear equations and square roots, it is recommended to add more visual illustrations that show clear solution steps and examples of applications in everyday situations. Using graphs or diagrams to explain concepts can help reinforce student understanding.

Main topic	Description	Examples from the textbook	Suggestions for improvements
Use of practical examples	The text includes practical examples to illustrate basic mathematical concepts, but they often remain at an abstract level and are not well connected to real situations.	Examples of powers and roots are explained through simple illustrations and basic applications	Add more examples involving everyday situations, such as calculating probabilities in games or calculating compound interest. This will help students see practical applications of mathematics in real life.
Clarity of structure	The examples are structured and presented with detailed steps, helping students follow the problem-solving process.	For signed number operations and linear equations, clear illustrations are used to show each solution step.	For more complex topics, such as solving equations and square roots, it is helpful to add more visual illustrations and include step-by-step examples.
Connection to real situations	The connection to real activities is limited and is often based on simple, uncomplicated scenarios that help solve real problems.	In the chapter on probability, simple examples such as flipping a coin or dice are mentioned.	To improve this aspect, it is important to include scenarios involving complex applications, such as managing budgets or analyzing data from real contexts. This will help students develop complex problem-solving skills.
Inclusion of student activity	The text contains numerous exercises to reinforce concepts, but most activities are structured as individual tasks.	Independent tasks for applying formulas, such as calculating square roots and solving equations.	To improve involvement, it is advisable to integrate activities that require group work or projects based on real situations, such as creating budgets or experiments with data. These activities will help reinforce collaboration and critical thinking.
Didactic aspect	The text follows a clear structure to explain concepts but does not include many strategies that encourage independent student exploration.	Illustrations for the Pythagorean theorem visually show the relationship between the hypotenuse and legs in right triangles.	To help develop critical thinking, it is necessary to include educational games and research projects that encourage students to discover concepts independently. This will help them build a deeper and more lasting understanding of mathematics.

Table 3. Table of thematic analysis from the textbook "Mathematics 8"

The text includes exercises to reinforce the knowledge learned, allowing students to practice what they have learned. The exercises are varied and help to master the basic concepts through repeated exercises. The text uses examples that show how to multiply and divide powers, including solving problems with large numbers presented compactly (eg,  $10^3 = 1000$ ). This type of example helps students understand the concept of powers and how they can speed up calculations. The text presents the application of the Pythagorean Theorem to find the length of a leg in a right triangle. Examples include simple situations of using the formula to calculate distances, such as finding the diagonal distance of a rectangular garden. However, most activities are structured as individual assignments and do not include group work projects or activities that encourage collaboration and critical thinking. Examples related to personal finance management, such as calculating compound interest on a bank account, are missing. This would be a practical example that students could use in real life to understand the concepts of interest and savings. While the Pythagorean Theorem is explained with basic examples, more complex applications such as calculating the distance between two points on a map or finding the length of diagonals in 3D objects such as a box are missing. These examples would help students see applications of the concept outside the classroom. To increase student engagement, it is recommended to add activities that require group work, such as projects based on real situations that students may encounter in everyday life. The practical examples included in the Math 8 text cover the basic concepts, but many of them remain simple and do not relate to complex applications that students would experience in real life.

The text follows a good structure to explain concepts and helps build knowledge gradually, introducing topics from the simplest to the most complex. For example, the chapter on the Pythagorean theorem begins by explaining the basic concept and then moves on to practical applications, providing numerous examples and exercises to reinforce knowledge. Although the didactic structure is clear and good, it is recommended to include more methods that encourage independent exploration of students. For example, adding research projects or activities that involve solving real-world problems will help develop students' critical and analytical thinking skills.

The Maths 8 Basic text provides a strong foundation for teaching, with clarity in the structure of examples and building knowledge. However, to increase its effectiveness, there is a need for a better connection with real applications and for the inclusion of activities that encourage critical thinking, collaboration, and independent exploration of concepts. Integrating these elements will help students develop a deeper and broader understanding of mathematics and its practical applications.

4.4. Analysis of the Use of Practical Examples in the Textbook "Mathematics 9"

Analyzing the text "Mathematics 9 Basic" (Zejnullahu, 2024), some practical examples have been identified that help in teaching mathematical concepts, as well as some cases where examples are missing that would be useful for a better understanding of the subject. The text "Mathematics 9" contains practical examples that help introduce key mathematical concepts, such as solving quadratic equations and using trigonometry in triangles. However, many of these examples remain simple and abstract, limiting opportunities for students to see applications of mathematics in more complex contexts relevant to their everyday lives. To improve this aspect, it is recommended to include examples related to real and practical situations, which are familiar to students and that they can later apply in fields such as economics, construction, or computer science. For example, using quadratic functions to calculate cost or maximum profits in a business scenario would help students understand the value of these concepts.

One of the strengths of the text is the clarity of the structure of the examples. These examples are presented in detailed and clear steps, which help students follow the problem-solving process. This structure is very useful for understanding more complicated topics, such as trigonometric operations and quadratic equations. For more complex topics, it is helpful to add more visual illustrations and stepby-step examples that help students better understand problem-solving. The use of clear graphs and visualizations would be especially helpful for trigonometric functions and equations involving complex solutions.

The text tries to connect mathematics to real situations, but this connection is often limited and based on simple scenarios. The examples are focused on familiar applications, such as using trigonometry to calculate heights, but lack more complex applications that would provide students with a broader and more detailed perspective. Examples are included that demonstrate the use of trigonometric functions to calculate the lengths of the sides of a right triangle, based on the given angles. These examples help students apply concepts to practical situations such as calculating the height of an object. The text also includes data processing examples where students learn to calculate the mean, median, and mode, as well as create tables and graphs. These examples provide a good foundation for students to understand how statistical data is analyzed and presented. To increase students' involvement and help them understand the applications of mathematics in different fields, it is important to include examples related to construction and architecture, such as calculating the slope of a roof or the length of structural elements. Using these examples will help students see the applications of mathematics in a wide range of practical contexts.

Main topic	Description	Examples from the textbook	Suggestions for improvements
Use of practical examples	The text includes examples to illustrate key math concepts, such as quadratic equations and trigonometry, but often remains simple and abstract.	Examples of solving quadratic equations using the formula and factoring.	To improve this aspect, it is recommended to include scenarios more related to real life, such as calculating the maximum profits from an economic model or financial applications related to quadratic functions. These examples will help enhance understanding of practical applications of mathematical concepts.
Clarity of structure	The examples are structured and presented with detailed steps, helping students follow the problem-solving process.	In trigonometric functions, clear steps are used to show how to find the sides of a triangle depending on the angles.	For more complex topics, such as solving systems of equations or complex trigonometric functions, it is recommended to add more visual illustrations and step-by-step examples to help students better understand the solution process.
Connection to real situations	The connection to real activities is limited and is often based on simple, uncomplicated scenarios that help solve real problems.	In the trigonometry chapter, examples are given for calculating the height of objects using known angles.	To improve this aspect, it is necessary to include more complex scenarios related to construction and architecture, such as calculating the slope of a roof or the length of structural elements. This will help students see the applications of trigonometry in industry and other practical areas.
Inclusion of student activity	The text contains exercises to reinforce the knowledge learned, but most of the activities are structured as individual tasks.	The task of solving quadratic equations and trigonometric functions independently.	To improve the involvement of students, it is recommended to integrate activities that require group work or projects based on real situations, such as projects related to the calculation of statistical data or solving problems related to the demands of the labor market. These activities will help reinforce collaboration and critical thinking.
Didactic aspect	The text follows a clear structure to explain concepts but does not include many strategies that encourage independent student exploration.	Illustrations of quadratic equations and ways to solve them help students understand the process.	To help develop critical thinking, it is necessary to include educational games and investigative projects that encourage students to discover concepts independently. This will help them build a deeper and more consistent understanding of mathematics and its real- world applications.

Table 4.	Table of	thematic anal	vsis from	the textbook	"Mathematics 9'
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The text contains exercises that help students reinforce the concepts learned, but most of the activities are structured as individual tasks. This structure can limit opportunities to learn through collaboration and collaborative problem-solving, making students more dependent on traditional learning methods. Currently, there is a lack of examples demonstrating applications of quadratic functions in financial situations such as calculating various costs or estimating maximum profits. For example, examples showing how to calculate the maximum profits from an economic model would help students see the practical value of these functions. To improve student involvement and encourage the development of cooperative skills, it is useful to integrate activities that require group work or projects based on real situations. For example, students can work together to create simple budgets, analyze data, or develop projects that require accurate calculations and application of learned concepts.

The didactic aspect of the text is well structured and provides a clear way to introduce math concepts but does not include many strategies that encourage independent student exploration. This can limit opportunities for developing students' critical thinking and creativity. To further encourage critical thinking and independent exploration, it is helpful to include educational games and projects that allow students to explore concepts independently. For example, creating a project that requires developing a mathematical model for a real-world problem will help students better understand the applications of mathematics and strengthen their analytical skills. The analysis of the text "Mathematics 9" shows that while the didactic structure and the clarity of the practical examples are strong points of the book, there is a need for obvious improvements in the connection of concepts with real situations and in the development of activities that include group work and thinking. Critical. To enrich the learner's experience, it is important to add examples that better connect theory with practical applications in everyday and professional contexts. The integration of these elements will contribute to a more complete and engaged experience for students, making them better able to apply mathematics in different areas of everyday life and their future careers.

## 5. Discussion

Analysis of mathematics textbooks for grades 6-9 in the Kosovo curriculum showed that the use of practical examples is an important component of helping students understand and apply mathematical concepts. However, it has been observed that many of these examples remain at an abstract level or are simple and disconnected from complex real situations. This can limit opportunities for students to connect theory with practical applications.

The study showed that practical examples are essential to concrete abstract concepts. When students are exposed to examples that directly relate to real situations, they are more likely to understand concepts and develop problem-solving skills. This is supported by numerous scientific literature that emphasizes the importance of practical examples for the acquisition of abstract knowledge and the development of analytical skills. For example, Myers et al. (2022) point out that students benefit more when lessons include clear and structured scenarios related to everyday life (Myers et al., 2022).

Although some texts included well-structured examples, most remained simple and did not involve complex real-life situations, such as calculating household budgets or financial applications. Schumacher et al. (2020) and Stevens et al. (2018) show that approaches that include scenarios related to advanced situations help students develop critical thinking and problem-solving skills in everyday situations (Schumacher et al., 2020; Stevens et al., 2018).

Examples presented with clear steps help students follow the problem-solving process. This is especially important for complex concepts such as quadratic functions and trigonometric operations. In this context, Powell et al. (2021) point out that pedagogical interventions that use clear and structured steps increase students' ability to solve complex problems, helping them transfer theoretical knowledge to real situations (Powell et al., 2021).

The results of the study show that the connection with real situations is often limited and based on simple scenarios, which do not reflect the students' daily challenges. Recent studies point out that when students are faced with scenarios related to real-world applications, such as analyzing data from sports or managing personal finances, they develop a deeper and broader understanding of mathematics. Such an approach has been supported by researchers such as Drijvers et al. (2019) and Laurens et al. (2017), who show that using real contexts to explain mathematical concepts creates a stronger connection between theory and practice (Drijvers et al., 2019; Laurens et al., 2017).

Based on the results of the study and support from the literature, it is necessary to include more examples related to complex real-life applications in mathematics textbooks. The Realistic Mathematics Education (RME) approach has demonstrated success in this regard by emphasizing the use of real contexts to help students understand and apply mathematical concepts. In addition, the integration of interactive activities and group-based projects is essential to improve student engagement and develop critical thinking and complex problem-solving skills. Attard and Holmes (2020) suggest the use of educational games and discovery-based projects to support students' independent exploration (Attard and Holmes, 2020).

Referring to the objectives of the study defined in the paper, we analyze and provide answers for each objective based on the data and findings of the study:

In the analysis of the use of practical examples in mathematics textbooks for grades 6-9, it was observed that the use of practical examples is a component that helps to concretize abstract concepts but often remains limited to simple and not always related applications with complex real situations. For example, in the text "Mathematics 6 Basic", examples dealing with natural numbers and fractions are related to everyday activities such as comparing quantities while shopping, but scenarios involving more complex applications such as managing budgets or calculating time are missing of travel.

The study shows that the evaluation of the effectiveness of the practical examples for improving the understanding of the concepts is well structured and presented with clear steps help to improve the understanding of the concepts. The Math 7 text uses number lines to illustrate operations with signed numbers, which helps students understand the rules of operations and follow a clear method for solving problems. Other studies support this approach, emphasizing that the clear structuring of practical examples helps students acquire and apply mathematical concepts better (Powell et al., 2021; Stevens et al., 2018).

Texts analyzed Identifying the connection of practical examples to real-life situations include some examples that try to relate to real-life situations, but these connections are often limited to simple scenarios such as tossing a coin or dice for probability. Scenarios involving more complex daily challenges, such as calculating financial expenses or analyzing statistical data, are not present. This presents a gap in the way students see the practical application of mathematics in different areas of their lives.

Based on the findings of the analysis for the proposal of strategies for improving the content of the textbooks, some improvements are suggested for the content of the textbooks. Among the proposed strategies is the inclusion of more activities related to real and complex applications, such as budgeting, using measurements in cooking, or analyzing data from the sciences. Incorporating collaborative projects and educational games that encourage independent exploration would also help develop problem-solving and critical-thinking skills in students (Attard and Holmes, 2020).

The use of practical examples well connected to real contexts has been shown to help increase students' motivation and their ability to solve complex problems. The study suggests that to increase student engagement, it is necessary to include more projects that require group work or scenarios based on real applications. An analysis by Phillips (2023) supports this approach, showing that such projects help develop critical thinking skills and collaboration among students (Phillips, 2023).

Therefore, this analysis shows that, while mathematics textbooks for grades 6-9 include practical examples to help students understand concepts, there is still a need for significant improvement in relating to real-world situations and developing activities that encourage critical thinking and collaborative work. Support from the literature indicates that examples that are structured and related to students' real experiences help not only to acquire abstract concepts but also to develop complex problem-solving skills and increase engagement with mathematics. Integrating these elements into textbooks would contribute to more effective and comprehensive teaching, helping students develop a deep and consistent understanding of mathematics.

## 6. Conclusion

The study of the use of practical examples in mathematics textbooks for lower secondary education in Kosovo has revealed some key aspects that affect the quality and effectiveness of mathematics teaching. Based on the analysis of the texts of grades 6-9, the main advantages and shortcomings have been identified, which can serve as guidelines for future improvements.

The results showed that textbooks include practical examples that help to concretize mathematical concepts, but many of them remain simple and limited to abstract applications or situations familiar to students. While examples provide clear steps for solving problems, they often fall short of the need to make deeper connections to real-life situations that students may experience outside of the classroom.

Recent studies show that the use of practical examples well connected to real contexts helps to better acquire knowledge and develop complex problem-solving skills.

One of the strengths of the texts is the clarity of the structure of the examples. The presentation of detailed steps helps students follow and understand the problem-solving process, helping to build a solid foundation of fundamental knowledge. This is especially important for complex concepts, such as quadratic equations and trigonometric operations. However, to improve this aspect, it would be useful to add more visual illustrations and practical scenarios that show the applications of these concepts in everyday situations.

The results of the analysis show that while there are efforts to connect mathematics to real situations, these efforts often remain limited and do not extend to complex scenarios that would help students see the practical benefits of mathematics. Using examples such as rolling dice or cutting cakes is useful for teaching basic concepts but does not meet the need to prepare students for more complex challenges, such as managing family budgets or calculating percentages in real-world situations. This gap has also been identified by previous literature, which emphasizes the need for a more integrated and well-thought-out approach to the presentation of mathematical concepts.

Most of the activities and exercises in the reviewed texts are structured as individual tasks, offering limited opportunities for collaboration and solving complex group problems. To improve student engagement and encourage the development of critical thinking skills, the addition of interactive activities that require group work and problem-solving based on real-life projects is recommended. The integration of methods that include educational projects and games is effective in teaching mathematics, increasing student engagement and motivation.

In conclusion, this study highlights the importance of integrating well-thought-out and real-life practical examples into mathematics textbooks. This will contribute to improving the learning experience for students, helping them develop a broader and more applicable understanding of mathematics and be better prepared for everyday challenges. The proposed improvements have the potential to increase the effectiveness of mathematics teaching, helping students connect theory with practice and develop sustainable and applicable skills for the future.

## 7. Recommendations for Improvement of Textbooks

Based on the results of the analysis, some recommendations for improving textbooks include:

Including more examples related to complex real-world situations, such as financial costing, data analysis, and projects that require critical thinking.

Developing activities involving collaborative work that would help students reinforce their knowledge through sharing ideas and solving complex problems in groups.

Using visual methods and technology to reinforce understanding of abstract concepts and make them more tangible and comprehensible to students.

Integrating more examples based on real and complex situations, such examples not only help the acquisition of theoretical knowledge but also create strong connections between mathematics and the everyday challenges students face.

Using scenarios that reflect social and cultural diversity will help students feel more represented and understand the importance of mathematics in their communities and the wider world.

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