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MODERN APPROACHES TO TEACHING MATHEMATICS TO PRIMARY SCHOOL STUDENTS IN A DIGITAL LEARNING ENVIRONMENT

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Abstract. *This article examines modern approaches to teaching mathematics to primary school students in a digital learning environment, focusing on interdisciplinary integration. The study uses theoretical analysis, comparative analysis, and generalization of pedagogical literature to explore how digital resources can support mathematics instruction. The analysis suggests that interactive exercises, electronic textbooks, visual materials, and educational software offer opportunities to explain mathematical concepts, support independent practice, and provide feedback. Connecting mathematics with language, natural sciences, technology, and everyday situations may help students apply mathematical knowledge in practical contexts. Effective implementation requires teachers to align digital resources with lesson objectives, students' developmental characteristics, and available technical facilities. The article concludes that combining digital tools with integrated teaching offers pedagogical opportunities for primary mathematics education, while empirical research is needed to assess its effects on students' learning outcomes.*

Keywords: *primary education, mathematics teaching, digital learning environment, interdisciplinary integration, digital resources, pedagogical approaches.*

INTRODUCTION

The use of modern pedagogical approaches in teaching mathematics in primary school makes it possible to present learning materials to students in an understandable and engaging way. By teaching mathematics in connection with the native language, natural sciences, technology, and other subjects, students develop the ability to perceive their acquired knowledge as an interconnected whole. Integrated learning helps students connect knowledge gained from different subjects, analyze problem-solving situations, and draw independent conclusions. In this regard, interdisciplinary integration is one of the important means of enriching the content of primary school mathematics lessons and improving educational effectiveness.

The development of a digital learning environment is creating new opportunities for teaching mathematics. The use of electronic educational resources, interactive assignments, educational software, and online platforms helps increase students'

engagement in lessons, explain topics visually, and reinforce learning materials. These tools make it possible to connect mathematical concepts with real-life examples, take students' individual characteristics into account, and assess their knowledge regularly. At the same time, the purposeful use of digital technologies requires teachers to have appropriate methodological training and to select educational tools correctly.

The use of digital technologies is particularly important in organizing mathematics lessons through an integrated approach. For example, interactive exercises can be used to connect mathematical operations with natural phenomena, everyday calculations, and topics related to other subjects. This helps students combine theoretical knowledge with practical activities, develop logical and critical thinking skills, and increase their interest in the topics being studied. As a result, mathematics lessons are aimed not only at providing knowledge but also at developing students' intellectual and creative potential.

The relevance of this topic is determined by the need to expand the opportunities for using digital technologies in primary education, improve mathematics teaching methods, and establish effective interdisciplinary connections. The consistent integration of digital tools into the educational process enables teachers to organize lessons in accordance with modern requirements, assess students' knowledge levels, and manage the learning process more effectively. Therefore, combining traditional teaching methods with modern pedagogical approaches and digital learning resources is essential when teaching mathematics to primary school students. The aim of this study is to examine modern approaches to teaching mathematics to primary school students in a digital learning environment, identify the opportunities offered by integrated learning, and explore pedagogical methods that contribute to improving educational effectiveness. To achieve this aim, the study seeks to explain the importance of interdisciplinary integration in mathematics education, analyze the opportunities for using digital learning resources, and develop recommendations for applying modern pedagogical methods in primary education.

The practical significance of this study lies in identifying methodological approaches that can help primary school teachers use digital technologies and integrated learning methods effectively when organizing mathematics lessons. Applying these approaches in educational practice can contribute to the development of students' mathematical literacy, their understanding of interdisciplinary connections, and their independent thinking skills. Furthermore, the findings of this study may help improve the use of

modern pedagogical technologies in primary education and expand the opportunities offered by the digital learning environment.

MAIN PART

Literature review

Teaching mathematics in primary education is one of the important areas of modern pedagogy. Today, particular attention is being paid to the introduction of digital technologies into the educational process. These technologies make it possible to organize engaging lessons and reinforce students' knowledge. Teaching mathematics in connection with other subjects also contributes to improving educational effectiveness. Interdisciplinary integration helps students understand the relationships between different topics. The work of Drake and Reid discusses integrated learning (Drake & Reid, 2018). This approach enables students to study knowledge in an interconnected way. As a result, students learn to apply the knowledge they acquire in different situations.

The use of digital technologies has also been examined in numerous scientific studies. Mishra and Koehler proposed the Technological Pedagogical Content Knowledge (TPACK) model, which combines technological, pedagogical, and content knowledge. This model emphasizes the importance of selecting technologies according to specific educational objectives. It highlights the relationship between subject content, pedagogical methods, and technological tools (Mishra & Koehler, 2006).

This model can also serve as a theoretical foundation for planning primary school mathematics lessons. Research conducted by Voogt and colleagues also examined the role of the TPACK model in education. Their studies focused on teachers' use of technology for pedagogical purposes (Voogt et al., 2013). The effective use of digital tools is closely related to teachers' methodological preparation. Therefore, developing teachers' digital competencies is an important task (Ertmer & Ottenbreit-Leftwich, 2010).

The ideas of Piaget are also significant in the study of the psychological foundations of education. He paid particular attention to the development of children's thinking and cognitive processes. His views demonstrate the importance of organizing education in accordance with students' developmental characteristics and age-related needs (Piaget, 1973). Vygotsky, in turn, emphasized the importance of the social environment and collaboration in the learning process. His ideas support the use of group activities and methods that encourage students to exchange ideas (Vygotsky, 1978).

Visual aids play an important role in organizing mathematics lessons in primary school. Digital images help present mathematical concepts to students in an understandable way. Interactive tasks can encourage students to participate actively in lessons. Electronic resources also expand opportunities for reviewing and reinforcing learning materials. However, the use of technology must correspond to the pedagogical objectives of the lesson. Digital tools are intended not to replace traditional teaching methods entirely, but to enrich them. When selecting educational resources, teachers should also take students' existing knowledge levels into account.

Interdisciplinary integration helps connect mathematics with everyday life. For example, activities involving telling time and measuring distances demonstrate the practical significance of mathematical knowledge. Through such activities, students learn to apply theoretical concepts to real-life situations. The scientific perspectives reviewed indicate that combining digital technologies with modern pedagogical methods is an important condition for educational development. Therefore, the integrated application of these approaches in primary school mathematics teaching requires further in-depth study.

Research methodology

This study focuses on examining modern approaches to teaching mathematics to primary school students in a digital learning environment. The main aim of the research is to explore the pedagogical potential of digital technologies and interdisciplinary integration. To achieve this aim, the method of scientific and theoretical analysis was used. This method involved reviewing pedagogical and methodological literature related to the topic. In addition, scientific perspectives on the use of digital tools in mathematics education were analyzed. The main ideas presented in the reviewed sources were also compared.

The study also employed the method of comparative analysis. This method made it possible to examine the characteristics of traditional teaching methods and digital approaches. In traditional lessons, teacher explanations and practical exercises play an important role. In digital learning, electronic resources and interactive tasks are also used. Combining the advantages of both approaches can enrich the educational process.

The method of theoretical generalization was also applied in the study. Through this method, general conclusions were formulated based on the information examined.

A systematic approach was used to consider the different components of mathematics education in relation to one another. These components included lesson objectives, learning materials, teaching methods, and digital tools. Students' age-related characteristics were also considered an important methodological factor, as primary school students have specific ways of acquiring and understanding knowledge.

One of the theoretical foundations of the study is the constructivist approach, which emphasizes students' active participation in the process of acquiring knowledge. The activity-based approach is also important for this research, as it involves learning mathematical concepts through practical exercises and tasks. The competency-based approach focuses on applying acquired knowledge in practical situations. These approaches are associated with developing students' independent thinking and problem-solving skills.

The study also examined the didactic potential of digital learning resources. In particular, the role of electronic textbooks, interactive exercises, and educational software in the learning process was analyzed. The main purpose of using these tools is to present learning materials in an understandable and accessible format. When selecting digital resources, their relevance to the lesson topic should be taken into account. Teachers' methodological preparation also plays an important role in organizing effective learning.

When implementing interdisciplinary integration, mathematics is connected with other subjects through related content. The study examined opportunities to use practical examples and real-life situations to establish these connections. The selected methods supported a systematic analysis of the theoretical aspects of the topic. They also made it possible to identify the advantages of modern teaching approaches.

However, practical experimental studies are required to evaluate the research findings in real educational settings. Therefore, this study's methodology is primarily aimed at formulating conclusions based on theoretical analysis.

Results and discussion

The analysis of the scientific literature reviewed in this study highlights the importance of using modern approaches to teaching mathematics in primary school. Digital technologies make it possible to present learning materials in a visual and understandable format. In particular, interactive exercises and electronic assignments can be useful tools for organizing mathematics lessons. These tools allow students to

practise and reinforce various mathematical operations. The use of digital images also makes it easier to explain geometric shapes. Such methods can help maintain students' interest in the subject.

At the same time, teaching mathematics in connection with other subjects can also produce positive educational outcomes. Interdisciplinary integration helps students understand the relationships between different areas of knowledge. For example, measurement and calculation tasks can be incorporated into activities involving the observation of natural phenomena. Examples related to everyday shopping demonstrate the practical importance of mathematical calculations. Tasks involving time and distance can also reinforce students' practical knowledge. These activities make it possible to connect theoretical knowledge with real-life situations.

Digital resources help present these tasks in a visual format. For example, interactive presentations can be used to explain mathematical problems step by step. Electronic exercises provide students with opportunities to work independently. Some digital platforms also offer immediate feedback on completed tasks. This feature can help teachers identify the difficulties students encounter.

However, the availability of digital tools does not automatically guarantee an improvement in educational quality. Their effectiveness depends on the lesson objectives and the teaching methods selected. Therefore, teachers need to plan the resources they intend to use in advance. Students' age-related characteristics and levels of knowledge must also be taken into consideration. Tasks that are too complex may make it difficult for students to understand the subject matter. For this reason, presenting learning materials gradually and systematically is advisable.

The use of individual and group assignments during lessons is also beneficial. Such activities allow students to exchange ideas with one another. As a result, they may develop the ability to discuss mathematical problems and justify their solutions. Digital technologies also influence the role of the teacher in the educational process.

The teacher acts not only as a provider of information but also as a facilitator who guides students' learning activities. At the same time, access to technical resources may vary among educational institutions. This situation highlights the need to consider available facilities and conditions when planning lessons. Overall, the theoretical analysis indicates that combining digital technologies with interdisciplinary integration offers

important pedagogical opportunities. These approaches can help connect mathematical knowledge with practical applications and develop students' thinking skills. However, practical experimental studies are needed in the future to determine the actual effectiveness of these approaches.

CONCLUSION

The study of modern approaches to teaching mathematics to primary school students in a digital learning environment has led to several conclusions. Teaching mathematics through an integrated approach that connects it with other subjects helps reinforce students' knowledge, develop logical thinking, and build the skills needed to apply theoretical knowledge in practice. The use of digital technologies makes it possible to organize lessons in a visual, engaging, and understandable way. Electronic textbooks, interactive exercises, and educational software play an important role in increasing students' participation in lessons and reinforcing the knowledge they have acquired. At the same time, it is essential to consider lesson objectives and students' age-related characteristics when selecting digital tools.

Overall, combining digital learning with an integrated approach creates important opportunities to improve the quality of mathematics education in primary school. The purposeful use of these approaches helps develop students' independent thinking, creativity, and problem-solving skills. Therefore, the effective use of modern pedagogical methods and digital resources in mathematics lessons is highly advisable.

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