

MATHEMATICS TEXTBOOKS AND TEACHING METHODOLOGY IN UZBEKISTAN: CHALLENGES, REFORMS, AND PERSPECTIVESH

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Abstract: Mathematics education is a key driver for developing logical reasoning, critical thinking, and problem-solving skills among students. In Uzbekistan, the government has taken several steps to modernize the education system, with particular focus on revising textbooks and adopting innovative teaching methodologies that meet global standards. This paper provides a comprehensive overview of the current status of mathematics textbooks and teaching methods in Uzbekistan's primary and secondary schools. It discusses historical influences, recent reforms, content analysis, teaching practices, and the challenges faced by educators. The study also highlights the alignment of textbooks with the national curriculum and their capacity to develop functional literacy. Through a review of recent literature, policy documents, and comparative analysis with international benchmarks, this paper identifies gaps and suggests practical recommendations for policymakers, curriculum developers, and teachers to improve the effectiveness of mathematics education. The paper argues that consistent teacher training, context-rich textbooks, and active learning methods are crucial for equipping students with 21st-century skills.

Key words: Mathematics education, Uzbekistan, textbooks, teaching methodology, functional literacy, curriculum reform, teacher training.

In an increasingly globalized and knowledge-driven world, mathematics literacy is recognized as an essential competency for all students. Uzbekistan, a country undergoing significant socioeconomic and educational transformations, has identified mathematics as a priority area in its national education development strategy. According to Karimov (2019), "Mathematics is not just a subject; it is a foundation for logical and scientific thinking which supports national progress."

Historically, mathematics teaching in Uzbekistan inherited the Soviet pedagogical system, which emphasized rigorous theory, rote learning, and standard algorithmic procedures. Although effective in developing procedural fluency, this approach often failed to nurture creative thinking and the application of knowledge to unfamiliar contexts (Akramov, 2017).

Since independence, Uzbekistan has launched a series of reforms aimed at modernizing education. Notably, the adoption of a competency-based curriculum and regular revision of textbooks have been central to these efforts. In recent years, international assessments such as PISA have highlighted gaps in Uzbek students' performance, particularly in applying knowledge to solve real-world problems (Kurbanova, 2020).

To address these issues, the government has prioritized developing high-quality textbooks and training teachers in innovative pedagogical strategies. The Ministry of Preschool and School



Education, along with national research institutes, continuously updates mathematics textbooks to align with global trends and local contexts. However, challenges such as insufficient teacher training, limited resources in rural areas, and traditional mindsets hinder the full implementation of these reforms.

This paper explores the evolution and current state of mathematics textbooks and teaching methodologies in Uzbekistan. It analyses how these elements contribute to students' mathematical literacy, identifies existing challenges, and offers recommendations for enhancing teaching and learning outcomes.

Literature Review: The foundation of mathematics education in Uzbekistan was laid during the Soviet era. Teaching was heavily influenced by Russian textbooks and methodologies, focusing on abstract algebra, geometry, and calculus (Nasriddinov, 1985). While these methods ensured strong computational skills, they left little room for contextual learning or problem-solving in everyday situations.

Post-independence reforms aimed to localize content and integrate modern pedagogical principles. As Sabirova (2015) notes, "The national curriculum has shifted towards competencies rather than rote memorization, reflecting the country's ambition to produce graduates who can think critically and innovatively."

Textbook Revisions:Textbooks remain the primary instructional material in Uzbek schools. Over the past two decades, multiple revisions have sought to make textbooks more student-friendly and relevant to real-life contexts. Ergashev and Toirova (2021) argue that "recent textbooks incorporate a variety of tasks, illustrations, and contextual problems that reflect daily life in Uzbekistan."

Nevertheless, some studies have pointed out inconsistencies in the depth of content and the sequencing of topics (Rustamova, 2019). For example, while textbooks cover fundamental concepts thoroughly, they sometimes lack tasks that promote reasoning and open-ended problem solving.

Pedagogical Approaches: Teaching methods are slowly transitioning from teacher-centered to learner-centered models. This shift is supported by the adoption of interactive activities, group work, and the use of ICT. Umarova (2022) observes that "many teachers still prefer traditional lecturing due to lack of training and fear of losing classroom control."

According to international comparative studies, active learning and formative assessment are key to enhancing students' understanding and retention of mathematical concepts (OECD, 2019). In Uzbekistan, however, the transition remains uneven, particularly in rural schools.

Teachers play a pivotal role in implementing curriculum reforms. Studies show that ongoing professional development, peer learning communities, and methodological training significantly impact teachers' capacity to apply innovative teaching methods (Abdullaeva, 2020).

Despite existing training programs, not all teachers have equal access, and some lack motivation



to adopt new strategies. Moreover, high teacher workload and limited classroom resources further restrict pedagogical innovations.

Methodology: This study adopts a qualitative descriptive approach, synthesizing data from government reports, national education policy documents, academic studies, and recent textbooks. Content analysis was conducted on primary and secondary school mathematics textbooks published between 2018 and 2023. Teacher perspectives were drawn from recent surveys and studies conducted by the Ministry of Education and independent researchers. Comparative data from international assessments such as PISA and TIMSS were also reviewed to contextualize Uzbekistan's progress relative to global standards.

Key questions guiding this study include:

How do current textbooks support the development of functional mathematical literacy?

To what extent are modern teaching methodologies implemented in classrooms?

What barriers hinder effective mathematics teaching and learning in Uzbekistan?

What improvements are necessary to align textbooks and teaching practices with international best practices.

Analysis shows that current mathematics textbooks in Uzbekistan are well-organized, visually engaging, and include practical exercises that connect mathematics to everyday life. For instance, primary school textbooks frequently feature word problems related to household budgeting, shopping, and local cultural contexts. This represents a significant improvement compared to earlier editions that focused mainly on abstract problems.

However, there is still a tendency to overemphasize mechanical procedures. Many tasks require straightforward application of formulas rather than encouraging students to explore multiple solution paths or justify their reasoning. As highlighted by Ergashev et al. (2021), "To foster deeper understanding, textbooks need to include more open-ended tasks and real-world projects."

The revised curriculum emphasizes critical thinking, reasoning, and communication. While textbooks reflect these goals in their introductions and some exercises, the overall implementation remains partial. Teachers often skip complex tasks to ensure completion of the syllabus within limited timeframes.

This misalignment between curriculum goals and classroom practice reflects the broader challenge of moving from policy to practice. Research indicates that without ongoing support, teachers revert to traditional methods, using textbooks mainly as a sequence of exercises rather than as a tool for inquiry-based learning.

Field studies show a gradual but uneven adoption of modern teaching approaches. Urban schools with better infrastructure and access to training demonstrate higher levels of interactive learning and student engagement. In contrast, rural schools face challenges such as large class sizes,



insufficient teaching aids, and limited internet connectivity, which impede the use of ICT and group-based activities.

Umarova (2022) observes, "While some teachers experiment with group work and student discussions, others strictly adhere to lecture-driven lessons, prioritizing exam preparation over skill development."

Interviews with teachers reveal that while they appreciate the value of modern pedagogy, they face practical barriers. Frequent curriculum updates require continuous adaptation, yet in-service training opportunities are irregular and sometimes theoretical rather than hands-on.

Furthermore, teachers report heavy administrative workloads and insufficient time for lesson planning. Some rural teachers teach multiple subjects, reducing their capacity to specialize in mathematics teaching.

Uzbekistan's performance in international assessments remains below the OECD average. The 2022 PISA results showed improvement in basic numeracy but persistent difficulties in solving complex, non-routine problems (OECD, 2022). Countries that excel in mathematics education, such as Singapore and Finland, integrate problem-based learning and place strong emphasis on teacher professional development.

These insights suggest that alongside improving textbooks, sustained investment in teacher training, resource provision, and monitoring is necessary for meaningful progress.

Conclusion and Recommendations: This paper has analyzed the current status of mathematics textbooks and teaching methodology in Uzbekistan. The findings indicate commendable progress in revising textbooks to include contextual tasks and practical applications. However, gaps persist in encouraging higher-order thinking and in aligning classroom practice with modern pedagogical principles.

To address these challenges, the following recommendations are proposed:

1. Develop Context-Rich Textbooks: Future textbook editions should increase the number of open-ended and inquiry-based tasks that encourage students to reason, discuss, and apply mathematics in novel situations.

2. Enhance Teacher Training: Continuous, practice-oriented professional development must be provided to all mathematics teachers, with a focus on active learning strategies, formative assessment, and use of technology.

3. Support Rural Schools: Equipping rural schools with adequate teaching aids, stable internet access, and smaller class sizes can help bridge the urban-rural divide in teaching quality.

4. Monitor Implementation: Regular monitoring and support should ensure that curriculum standards and textbook content are effectively translated into classroom practice.

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5. Encourage Collaborative Learning: Schools should create a culture of peer learning among teachers, enabling them to share successful practices and adapt them to their contexts.

In conclusion, the synergy of well-designed textbooks and skilled, motivated teachers is essential for developing students' mathematical literacy and preparing them for future challenges. Sustained commitment from policymakers, educators, and communities will help Uzbekistan advance towards its educational goals and produce a generation equipped with strong mathematical competencies.

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