

THE DIDACTIC SIGNIFICANCE OF USING REAL-LIFE PROBLEMS IN MATHEMATICS LESSONS**Boltaboyev Ixtiyorjon Baxtiyorovich**

Mathematics Teacher, Department of Exact Sciences,
Academic Lyceum of Fergana State University, Uzbekistan.

<https://doi.org/10.5281/zenodo.18206956>

Abstract. This scientific and methodological article provides an in-depth analysis of the theoretical and practical aspects of using problems based on real-life situations in the process of mathematics education, substantiating the role of such problems in developing students' mathematical thinking, logical reasoning, problem analysis skills, mathematical modeling abilities, and competencies in evaluating results from a real-life perspective. In addition, the article highlights, from the viewpoint of an experienced educator, the opportunities created by the use of real-life problems in classroom practice for revealing the practical significance of mathematics, increasing students' learning motivation, strengthening interdisciplinary integration, and improving the overall quality of education.

Keywords: mathematics education, real-life problems, didactic effectiveness, mathematical literacy, competency-based approach, problem-based learning, mathematical modeling, academic lyceum.

Introduction

In the current context of globalization and rapid information exchange, the process of teaching mathematics requires fundamentally new content and methodological approaches, since mathematical knowledge and logical thinking serve as core foundations across all areas of societal development, demanding from individuals not only theoretical understanding but also the ability to apply this knowledge in real-life situations [1]. Particularly in academic lyceums, where mathematics education is tasked with preparing students for future professional activity, higher education, and independent life, the practical orientation of the teaching process becomes especially significant. From this perspective, the use of real-life problems in mathematics lessons emerges as an effective didactic tool that positively transforms students' attitudes toward the subject, encourages active thinking, and facilitates the conscious and meaningful acquisition of knowledge.

Main Part**The Concept of Real-Life Problems and Their Role in Education**

In pedagogical and methodological literature, real-life problems are understood as mathematical tasks constructed on the basis of situations directly related to students' everyday life, social relations, economic activities, and technical or industrial processes. Such problems move learners beyond abstract formulas, enabling them to perceive real situations as mathematical models, analyze given data, and evaluate obtained results from a practical, real-life standpoint [2]. Experience shows that when these problems are incorporated into classroom instruction, students begin to recognize the intrinsic connection between mathematics and real life, making the subject matter more meaningful and comprehensible.

Didactic Importance in Shaping Learning Motivation

A decline in students' interest in mathematics is often associated with the presentation of topics in a purely theoretical manner, detached from real life. The inclusion of real-life problems in lesson content significantly mitigates this issue, as students encountering familiar situations

within problem statements feel an intrinsic motivation to solve them and actively engage in the learning process [5]. For instance, problems related to family budgeting, loans and interest rates, traffic flow, energy consumption, and production efficiency not only enhance students' mathematical knowledge but also enrich their life experience, fostering skills of responsible and informed decision-making.

Role in Developing Mathematical Competencies

In modern educational concepts, the notion of mathematical competence occupies a central position, encompassing students' ability to apply mathematical knowledge in real situations, analyze problems, construct models, perform calculations, and evaluate results [7].

Real-life problems serve as a crucial means of developing these competencies, guiding students away from rote memorization of algorithms toward independent thinking, creative approaches, and solution-finding in problem situations. This approach aligns closely with the requirements of international assessment programs, particularly PISA, which emphasize mathematical literacy.

Interdisciplinary Integration and Practical Orientation

Real-life problems enable the integration of mathematics with subjects such as physics, economics, geography, and informatics, thereby contributing to the formation of systematic and holistic knowledge among students [10]. For example, problems involving speed, distance, and time are closely connected to physics; economic calculations relate to economics; and the analysis of statistical data is linked with geography and informatics. In the context of academic lyceums, such an integrated approach lays a solid foundation for students' future professional activities and expands opportunities for applying knowledge in real-life contexts.

Methodology of Using Real-Life Problems in Teachers' Practice

From the perspective of an experienced educator, it should be emphasized that the successful incorporation of real-life problems into mathematics lessons requires a high level of methodological competence, creativity, and careful planning on the part of the teacher. The selected problems must correspond to students' age characteristics, knowledge level, and interests, clearly reveal the content of the topic, and serve specific didactic objectives. Therefore, special attention should be paid to the educational, developmental, and practical value of real-life problems during their selection and design.

Conclusion

In conclusion, the use of real-life problems in mathematics lessons represents a significant didactic factor that enhances the effectiveness of the educational process, helps students understand the practical value of mathematical knowledge, and develops their logical and critical thinking skills. Through such problems, students gain a deeper awareness that mathematics is not merely a theoretical discipline but an essential practical tool required in everyday life. Consequently, expanding the use of real-life problems, developing them methodically, and systematically integrating them into the teaching process remain among the most pressing tasks of modern mathematics education.

References:

Main literature

1. Alimuhamedov A. Matematika o'qitish metodikasi. – Toshkent: O'qituvchi, 2018. – 320 b.
2. Xodjayev B.X. Umumiy pedagogika. – Toshkent: Fan va texnologiya, 2017. – 412 b.

3. Yo'ldoshev J.G., Usmonov S.A. Pedagogik texnologiya asoslari. – Toshkent: O'qituvchi, 2019. – 368 b.
 4. Qodirov R.Q. Matematika ta'limida kompetensiyaviy yondashuv. – Toshkent: Fan, 2020. – 256 b.
 5. Abduqodirov A.A. Ta'limda muammoli o'qitish texnologiyalari. – Toshkent: Sharq, 2016. – 280 b.
 6. Karimov I.A. Yuksak ma'naviyat – yengilmas kuch. – Toshkent: Ma'naviyat, 2008. – 176 b.
 7. Ismoilov S.S. Matematik savodxonlik va uni rivojlantirish yo'llari. – Toshkent: Fan, 2021. – 198 b.
 8. Raxmonov D.Sh. Akademik litseylarda matematika ta'limi. – Toshkent: O'qituvchi, 2019. – 304 b.
 9. To'xtayev A.X. Ta'limda integratsion yondashuvlar. – Toshkent: Fan va texnologiya, 2018. – 244 b.
 10. Madumarov T.M. Didaktika asoslari. – Toshkent: O'zbekiston, 2015. – 350 b.
- Foreign literature
11. Polya G. How to Solve It. – Princeton: Princeton University Press, 2004. – 253 p.
 12. Schoenfeld A.H. Mathematical Problem Solving. – Orlando: Academic Press, 2016. – 312 p.
 13. Skemp R.R. The Psychology of Learning Mathematics. – London: Routledge, 2006. – 228 p.
 14. Niss M. Mathematical Competencies and the Learning of Mathematics. – Roskilde: IMFUFA, 2015. – 186 p.
 15. Blum W., Niss M. Applied Mathematical Problem Solving. – New York: Springer, 2014. – 295 p.
- Scopus articles:
16. OECD. PISA 2018 Results: What Students Know and Can Do. – Paris: OECD Publishing, 2019.
 17. Stillman G. et al. Applications and Modelling in Mathematics Education. – Educational Studies in Mathematics, 2017.
 18. Kaiser G. Mathematical Modelling and Applications. – ZDM Mathematics Education, 2018.
 19. Hiebert J. Teaching Mathematics for Understanding. – Journal for Research in Mathematics Education, 2016.
 20. Lesh R., Doerr H. Beyond Constructivism. – Educational Researcher, 2017.
- Local sites:
21. www.edu.uz
 22. www.ziyonet.uz
 23. www.lex.uz
 24. www.metodist.uz
 25. Foreign sites:
 26. www.oecd.org/pisa
 27. www.unesco.org