

FORMATION OF MATHEMATICAL CONCEPTS IN SECOND-GRADE STUDENTS WITH DELAYED MENTAL DEVELOPMENT IN INCLUSIVE EDUCATION

<https://doi.org/10.5281/zenodo.19870697>

Iroda Khamrayeva

Associate Professor at Nizami Tashkent State Pedagogical University, PhD

Tel.: +998 87 034 36 38

e-mail: xamraevairoda111@gmail.com

Annotation

The scientific article examines the content of forming mathematical concepts in primary school students, their pedagogical and psychological characteristics, as well as the relevance of improving methodological support for technology-based instructional approaches grounded in collaboration. From this perspective, the issues of developing mathematical concepts in second-grade students with delayed mental development in the context of inclusive education are discussed.

Key words

inclusive education, primary education, children with special educational needs, delayed mental development, mathematics lessons, mathematical concepts.

Аннотация

В научной статье рассматривается содержание формирования математических представлений у учащихся начальных классов, их педагогико-психологические особенности, а также актуальность совершенствования методического обеспечения технологических подходов к обучению, основанных на сотрудничестве. С этой точки зрения освещаются вопросы формирования математических представлений у учащихся 2 класса с задержкой психического развития в условиях инклюзивного образования.

Ключевые слова

инклюзивное образование, начальное образование, дети с особыми образовательными потребностями, задержка психического развития, уроки математики, математические понятия.

The Salamanca Statement and Framework for Action is an international document on inclusive education. It was adopted in 1994 by UNESCO to promote

the idea of “Education for All,” aimed at organizing education for individuals with special needs. At the conference held in Salamanca, political, organizational, legal, and methodological changes necessary for the development of the concept of inclusive education were considered. On this basis, the education system and its content were fundamentally revised, and legal and regulatory frameworks were established to ensure that children with special needs could receive education within the general education system.⁸³

In the speech of the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, at the 46th session of the United Nations Human Rights Council, special attention was given to strategic directions, including the ratification of the Convention on the Rights of Persons with Disabilities. Considering that nearly one billion people worldwide live with disabilities, this initiative is of great importance. Therefore, the Ministry of Justice of the Republic of Uzbekistan has developed theoretical and methodological guidelines on organizing inclusive education in general secondary education institutions, aiming to introduce a unified legal practice and present this process to the public in a simple and understandable way.⁸⁴

It is essential to systematically organize awareness-raising activities regarding the essence of this initiative and to strengthen parliamentary oversight in protecting the rights of persons with disabilities. The protection of the rights and interests of persons with disabilities is a complex and multifaceted field. Therefore, we will focus specifically on one of its directions—namely, inclusive education. Inclusive education is a broader concept than formal education, focusing particularly on children with special educational needs.

Inclusive education plays an important role in enabling children with special educational needs to study under the same conditions as their peers, develop friendly relationships with them, and facilitate their social adaptation. The concept of inclusive education is interpreted differently in general education schools; however, for the continuous education system, the following interpretation is more appropriate.

Inclusive education—derived from the English words “inclusive” and “inclusion,” meaning integration, involvement, and comprehensiveness, and from the Latin “includere,” meaning to include—refers to eliminating barriers between

⁸³ Шомахмудова Р. Инклюзив таълимнинг назарий ва амалий асослари. Ўқув-методик қўлланма. Т., 2007. Осиё ва Тинч океани минтақаси ЮНЕСКО маданий маркази ва ЮНЕСКО Осиё ва Тинч океани минтақасининг ҳамкорликдаги “Барқарор ривожланиш таълими” инновацион дастури доирасида нашр этилган.

⁸⁴ Умумий ўрта таълим ташкилотларида инклюзив таълимни ташкил этиш тартиби бўйича услубий қўлланма. Т., 2024. LexUz_7086554.pdf

children with special educational needs and typically developing children, providing them with equal opportunities for education and upbringing.

Inclusive education has become a matter of state policy. It represents an education system aimed at involving children with special educational needs, regardless of developmental challenges or economic difficulties, in the learning process and integrating them into social life.

The goal of inclusive education implemented in general education schools is to ensure that children with special educational needs study under the same conditions as their peers, have equal rights and opportunities, develop friendly relationships, and adapt socially. It also involves creating necessary pedagogical, psychological, and corrective conditions for learning. Just as all typically developing children attend general schools, children with special educational needs should also be included.

In implementing integrated education, the importance of mathematics and various approaches to teaching it becomes especially evident. Educating a worthy younger generation inspired by great scholars such as Muhammad al-Khwarizmi, Ahmad al-Fergani, Abu Rayhan Beruni, and Mirzo Ulugbek, and providing students with modern knowledge while enabling them to appreciate the beauty of mathematics, is both a duty and a responsibility.⁸⁵

Mathematics is the foundation of understanding the world. It reveals the patterns underlying events and phenomena and plays a crucial role in the development of production, science, and technology. Mathematics sharpens the human mind, develops attention, fosters determination and perseverance, teaches discipline and algorithmic thinking, and most importantly, encourages reasoning and broadens thinking. As President Shavkat Mirziyoyev emphasized, "Mathematics is the foundation of all sciences. A child who knows this subject well grows up intelligent, broad-minded, and succeeds in any field." In Uzbekistan, mathematics was identified as one of the priority areas for the development of science in 2020, and several systemic measures have been implemented to elevate mathematical science and education to a new qualitative level. These include presidential decrees and resolutions aimed at improving mathematics education and research, as well as the Concept for the Development of Public Education until 2030.

Mathematics is a fundamental component of human culture. The formation of mathematical concepts is a purposeful pedagogical process aimed at preparing

⁸⁵ Umumiy o'rta ta'limning matematika fanidan milliy o'quv dasturi. T.: 2021 yil. Umumiy o'rta ta'limning milliy o'quv dasturi loyihasi.

individuals for life, guiding them toward professions, and helping them find their place in society. Currently, the problem of forming mathematical concepts in children is supported by a scientifically grounded methodological system. Its main elements—goals, content, methods, organizational forms, and tools—are interconnected. The primary objective is to form knowledge, representations, and concepts. Human thinking is extremely powerful, and its development largely depends on how knowledge is acquired in early childhood. According to psychologists and educators, by the age of seven, a child acquires 50–60% of human experience. Therefore, providing age-appropriate knowledge at an early stage is crucial. Mathematical knowledge is especially important, as it is encountered throughout life. If children are introduced to mathematics through engaging methods from an early age, they will achieve high academic results and find it easier to master professions in the future. Mathematical knowledge is essential in almost every field. Therefore, it is important to use various teaching methods, including games, poems, and riddles, to develop mathematical understanding appropriate to children's age.

The clarity and completeness of mathematical concepts ensure the development of logical thinking and reasoning skills. Mathematics teaches children to think logically, draw correct conclusions, and improve their speech. Teaching initial mathematical concepts in an engaging way appropriate to children's age leads to effective results. It also helps develop self-confidence, independent thinking, and the ability to express ideas clearly.

Stage 1: Empirical Development of the Method.

Mathematical concepts arise from distinguishing or generalizing objects and phenomena based on certain features. Concepts such as number, quantity, segment, and straight line serve as examples. Features indicate similarities, differences, or equality between objects. Objects possess essential and non-essential properties. Essential properties define the object, while non-essential ones do not affect its existence. A concept consists of content (essential properties) and scope (the set of objects sharing those properties). Mathematical concepts are formed through generalizing human experience and idealizing real objects.

Stage 2: Mathematics lessons in primary school represent the initial stage of forming mathematical concepts. B.V. Gnedenko⁸⁶ distinguishes two levels of mathematical ability: average ability (sufficient for mastering the primary course)

⁸⁶ Б.В.Гнеденко. Математика и жизнь. Москва, изд-во Ком Книга, 3-е изд, 2006.

and above-average ability (manifested in easily grasping mathematical knowledge and solving problems creatively).

Educational tasks in forming mathematical concepts include developing interest in mathematics, responsibility toward learning, positive attitudes, self-confidence, and understanding mathematics as a foundation for further education.

S.I. Shvartsburd identifies key components such as broad visualization, abstraction, analysis, deductive reasoning, and the ability to formulate new questions.

Stage 3: A scientifically grounded didactic system for forming mathematical concepts is based on developing mathematical representations. Knowledge acquisition is a human ability supported by skills and competencies. Skills reflect practical experience in solving problems.

I.A. Markushevich emphasizes that the main task of primary education is to form and develop mathematical concepts. He proposes a program including identifying the essence of problems, schematization, logical reasoning, analysis and synthesis, comparison, and generalization. All these knowledge and skills develop based on students' interest and creative thinking and must be continuously supported in school practice.

Today, special attention is paid to the quality of education as a key factor of sustainable development. The international education concept until 2030 highlights tasks such as building a strong knowledge base, developing creative and critical thinking, and fostering collaborative learning environments.

Conclusion:

The formation of mathematical concepts in students depends on several conditions: prior knowledge and skills, systematic and consistent presentation of content from simple to complex, and the development of independent and logical thinking skills.

REFERENCES:

1. Умумий ўрта таълим ташкилотларида инклюзив таълимни ташкил этиш тартиби бўйича услубий қўлланма. Т., 2024. LexUz_7086554.pdf
2. Iroda Saifullaevna Khamraeva. (2025). The Color Of The Soul: The Essence And History Of Art Therapy As A Method Of Psychological Care. *Stanford Database Library of International Journal of Pedagogics*, 5(12), 219–222. Retrieved from <https://oscarpubhouse.com/index.php/sdlijp/article/view/356>

3. Sayfullaevna, Khamraeva I. "Setting Educational Objectives In Study Lessons AS An Important Component Part Of Forming Learning Skills Of Mentally Disabled Students." *European Journal of Humanities and Educational Advancements*, vol. 4, no. 4, 8 Apr. 2023, pp. 41-45.

4. Khamrayeva Iroda Sayfullayevna. (2025). TECHNOLOGY FOR FORMING READING SKILLS IN MENTALLY DISABLED PRIMARY STUDENTS. *Pegem Journal of Education and Instruction*, 15(4), 179-186. Retrieved from <https://pegegog.net/index.php/pegegog/article/view/3972>

5. Sayfullayevna, K. I. "Moral education of students in specialized assistant school lessons." *Prospects and Main Trends in Modern Science* 2.14 (2024): 34-38.

6. Шомахмудова Р. Инклюзив таълимнинг назарий ва амалий асослари. Ўқув-методик қўлланма. Т., 2007. Осиё ва Тинч океани минтақаси ЮНЕСКО маданий маркази ва ЮНЕСКО Осиё ва Тинч океани минтақасининг ҳамкорликдаги “Барқарор ривожланиш таълими” инновацион дастури доирасида нашр этилган.

7. https://pedlib.ru/Books/5/0347/5_0347-4.shtml#book_page_top