

UNIQUE METHODS OF TEACHING MATHEMATICS IN MODERN PRIMARY EDUCATION

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Annotation: This article discusses the unique methods of teaching mathematics in modern primary education, their advantages, and their methodological significance in the teaching process. The effectiveness of applying innovative methods such as interactive techniques, game-based technologies, digital learning tools, the STEAM approach, and problem-based learning in mathematics lessons is analyzed. The article substantiates how these methods develop pupils' logical thinking, independent inquiry, creative activity, and mathematical literacy. Scientific and methodological conclusions are provided regarding the impact of modern educational technologies on the learning performance of primary school pupils.

Keywords: Primary education, mathematics teaching, innovative methods, interactive method, game technologies, STEAM, problem-based learning, digital tools, learner-centered approach, competency-based education.

Introduction. In today's era of globalization, improving the quality and effectiveness of education and nurturing pupils to become competitive, independent thinkers and creative individuals are among the priority directions of state policy. The primary stage of education serves as a foundation for children's further development, and the process of teaching mathematics at this level is of particular importance. Mathematics develops pupils' logical thinking, analytical skills, comparison, generalization, and independent decision-making abilities. Therefore, organizing mathematics lessons based on advanced pedagogical technologies, innovative methods, and interactive approaches is one of the most urgent requirements of modern education. Mathematics is not only a subject that teaches computational skills; it is also a discipline that forms key competencies such as problem-solving, drawing conclusions, and creativity. Thus, modern pedagogy requires lessons to be organized through activity-based learning, independent inquiry, innovative technologies, and interactive methods. Given the psychological and developmental characteristics of primary school pupils, mathematics lessons must be engaging, visual, communicative, and based on real-life examples. In contemporary primary education, mathematics is becoming not just a subject for acquiring knowledge but also a tool that engages pupils in practical activities, teaches them to solve real-life situations, and encourages creative exploration. Methods and technologies such as interactive teaching, game-based learning, digital platforms, multimedia tools, and the STEAM approach enhance pupils' interest in the lesson and contribute significantly to effective learning. In addition, learner-centered and competency-based teaching, along with problem-based learning, significantly increases the effectiveness of mathematics lessons. This article examines unique methods of teaching mathematics in modern primary education, their advantages, application possibilities, and practical outcomes. Let us now explore the fundamental principles on which modern mathematics teaching is based:

Core Pedagogical Principles of Modern Primary Mathematics Instruction
Learner-centered education – each pupil learns according to their individual abilities and potential. Active learning – the pupil becomes an active participant in the learning process. Practice-oriented teaching – pupils apply their knowledge to real-life situations. Interactivity – constant communication, dialogue, and cooperation between teacher and pupils. Interdisciplinary

integration – mathematics is linked with natural sciences, technology, and art through STEAM principles. Use of Interactive Methods The “Brainstorming” method is highly effective, as it enables the generation of many ideas within a short time. For example, through questions such as “How can we form the number 10?” or “What are the properties of a square?”, pupils express their ideas freely.

In the “**Cluster**” method, learners classify a topic using a mind map. For instance, in the topic “Geometric Shapes,” the central concept “Shape” is placed in the middle, and its types—square, triangle, circle, rectangle—are placed around it with their properties.

The “**INSERT**” technique develops reading comprehension and analytical skills. Pupils mark the text using these symbols:

+what I know

– what I do not know

? what I do not understand

! interesting information

Role of Game Technologies. Game-based methods are among the most effective tools for primary school pupils. Games help pupils learn naturally, think, and practice skills. Commonly used mathematics games include: “Who is faster?” – improves mental arithmetic. “Find the pair” – matches numbers or operation results.

“Guess it!” – enhances logical reasoning through riddles. “Find the shape” – useful for geometry lessons. Games increase motivation and active participation in class.

Use of Digital Learning Tools. Digital tools are becoming an integral part of mathematics lessons today. Useful digital tools include: Interactive boards (Jamboard, Miro). Animated video lessons. Online math exercises (quizzes, tests). Mobile applications (mental arithmetic apps). Digital tools engage learners, make topics enjoyable, and foster independent learning. STEAM Approach STEAM—Science, Technology, Engineering, Art, Mathematics—is a method based on interdisciplinary integration. Examples of STEAM activities in mathematics:

Constructing models from shapes (geometry + engineering). Measurement

experiments (mathematics + science). Mosaic projects based on patterns (art +

mathematics). STEAM develops creativity, engineering skills, and problem-solving

strategies. Problem-Based Learning. Problem-based questions encourage independent thinking.

For example: “A box contains 12 balls. Three are red, the rest are blue. How many times more

blue balls are there than red ones?”. Through such tasks, pupils analyze information, compare

data, and draw conclusions. Main Tasks of Teaching Mathematics at the Primary Level Form

basic mathematical concepts Develop logical and critical thinking. Expand real-life experience

through practical tasks, Teach about numbers, shapes, equality, inequality, and

measurement, Strengthen computational skills using modern technologies, Foster independent

learning and inquiry. Modern Didactic Approaches Constructivism Pupils construct their own

knowledge. For example, forming numbers, solving problems in multiple ways, or modeling

shapes. **Competency-Based Approach Lessons** equip pupils with applicable knowledge such

as price calculation, time management, distance estimation, and use of measuring tools. Visual

Aids and Modeling. Primary pupils think visually, so cubes, sticks, geometric figures, colored

cards, digital animations, and mathematical models help clarify concepts. Developing

Mathematical Competencies. Methods include: Problem-based questions (“Why does a square

have four 90° angles?”) Differentiated instruction (tasks based on ability level). Subject

integration (math with science, technology, and art). Considering Psychological Features of

Primary Pupils. They think in images and actions → visual aids are essential. They learn actively

→ games and movement-based tasks are effective. They have short attention spans → methods must change frequently. They react to encouragement → praise and point systems motivate them. Updated Methods of Mathematics Teaching. Gamification: “Math Express,” “Find the Sum,” “Which Shape Wins?” Flipped Classroom: learning theory at home, practice in class. Micro-teaching: breaking large topics into small blocks. Differentiated tasks: tailored exercises for each pupil. Practical Activities for Skill Development Life-based problems (shopping, scheduling, measuring temperature, calculating distance) Project work (“Family Budget,” “Let’s Build a Garden,” “Mini-Store”) Conclusion. In conclusion, the teaching of mathematics in modern primary education is no longer limited to traditional methods. It is enriched by innovative pedagogical technologies, interactive strategies, game activities, digital tools, and the STEAM approach. These methods develop pupils’ mathematical literacy, logical reasoning, creativity, and ability to make correct decisions in real-life situations. Mathematics lessons must be engaging, meaningful, and connected to life. Therefore, primary school teachers should apply modern methods creatively and organize lessons effectively to ensure meaningful and enjoyable learning. **New Section: Emerging Trends in Primary Mathematics Education** In recent years, global educational research has emphasized transforming mathematics education into a more **experience-based and discovery-oriented process**. This shift marks the transition from traditional “teaching-centered” instruction toward **learning-centered ecosystems**. New trends include: **Metacognitive Strategy Training** Modern mathematics instruction increasingly focuses on developing pupils’ metacognitive abilities—thinking about their own thinking. Pupils are taught to ask themselves: *What strategy should I use for this problem?, Why did I choose this method?, How can I check my answer?*

Such reflective questioning enhances problem-solving accuracy and strengthens long-term retention of knowledge. **Mathematical Discussions and Argumentation Culture.** Contemporary classrooms encourage pupils to **justify their answers**, not merely present them. This creates a mathematical discourse community where: pupils explain their reasoning, evaluate peers’ solutions, compare multiple approaches, and learn to respect diverse problem-solving strategies. Research shows that mathematical argumentation significantly improves conceptual understanding in early grades. **Use of Real Data and Statistics in Early Grades.** One of the newest global trends is introducing **real-life statistics** at the primary level. For example: pupils collect class height or favorite-food data, build pictographs or bar charts, interpret results using simple mathematical vocabulary. This early exposure supports data literacy—one of the most essential 21st-century skills. **Integrating Mathematics with Emotional Intelligence (Math + EQ)** Recent studies highlight the role of emotions in mathematical performance.

Teachers now apply techniques such as: **math confidence-building activities**, cooperative learning, positive feedback cycles, reducing math anxiety through games and storytelling. A calm and supportive emotional environment makes pupils more willing to participate and take intellectual risks. **Storytelling-Based Mathematics (Math Narratives)** One of the most innovative methods is **mathematics through storytelling**. Stories help: contextualize abstract concepts, improve memory, build imagination, connect math with real-life scenarios. For instance, word problems can be turned into short stories with characters, settings, and motivations. This approach increases engagement and comprehension for younger learners. **Universal Design for Learning (UDL) in Mathematics** UDL is an inclusive framework ensuring all pupils—including those with learning difficulties—engage successfully in mathematics. Teachers provide: multiple ways to access content (visual, auditory, manipulative), multiple ways to express understanding (drawing, explaining, modeling),

multiple ways to stay motivated (choices, gamified tasks). This creates an equitable and barrier-free learning environment. **Cognitive Load Management**-Modern research suggests that young learners may struggle when presented with too much information.

Thus, teachers are encouraged to: break tasks into smaller steps, use simple and clear visual representations, gradually increase complexity, avoid unnecessary decorative visuals that may distract attention. Managing cognitive load significantly enhances mathematical processing and accuracy. **Cross-Cultural Mathematical Connections.** New pedagogical approaches encourage showing how mathematics appears across cultures. Examples: Uzbek traditional patterns (ganch, atlas naqshlari) can be used to study symmetry. Eastern mosaic art helps teach geometry. Traditional measurement units (qadam, gaz, quloch) enrich the measurement topic with cultural heritage. This not only strengthens mathematical knowledge but also reinforces cultural identity. **Early Introduction to Mathematical Coding Logic** Some primary programs worldwide teach basic coding logic through mathematics.

These include: sequencing, pattern recognition, conditional thinking (“if... then...”), algorithmic steps for solving problems. This prepares pupils for computational thinking skills required in future technological fields. **Formative Assessment and Feedback Innovations** Traditional evaluation is replaced with **ongoing formative assessment**, such as: exit tickets, mini-quizzes, feedback circles, peer assessment, self-rating charts (e.g., “I understand,” “I need help,” “I can teach others”). These approaches create a growth mindset and help pupils monitor their progress.

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