



IMPLEMENTATION OF MODERN METHODS OF TEACHING MATHEMATICS IN EDUCATION

Gulomova Vasila Dilmurodovna

Teacher of mathematics at the Presidential School in Nurafshan

<https://doi.org/10.5281/zenodo.10052266>

ANNOTATION

Teaching Mathematics is taking place in rapidly changing conditions. It is necessary to look for optimal didactic and educational solutions encompassing goals and contents as well as forms and teaching methods allowing for preparing students to face the challenges of the contemporary world. The most significant role of educational system in terms of teaching Mathematics and Natural Sciences is developing and promoting subject competences as an important factor fostering student's personal development and the development of society. Well organised mathematical and natural sciences education facilitates logical thinking and expressing ideas, organizing own work, planning and organizing the learning process, collaboration and responsibility; it prepares for life in a modern world and enables to perform many jobs.

Key words: *students' awareness, learning skill, analysing problem, predicting solution, study habit, modern teaching;*

The teacher is required to pay more attention to students' awareness of developing learning skills and study habits, recognizing and analysing problems and predicting solutions to them. Undeniably, the implementation of modern teaching methods and techniques enhances students' curiosity about Mathematics and Natural Sciences and increases their understanding of the basis of mathematical and scientific knowledge. In accordance with the trends teaching Mathematics and Natural Sciences is supposed to help students understand and solve everyday problems.

In modern education, there is a shift from the teacher's subjectivity to that of the student. Teachers now focus on transmitting subject knowledge while also fostering students' creative and critical thinking skills, enabling them to develop self-development abilities. The role of the teacher is to facilitate students' acquisition of knowledge and skills in new contexts. The learning and self-improvement process should involve an understanding of the brain's structure, functions, and integration, sensory preferences, differences in brain hemisphere functioning, brain dominance profiles, learning styles, stress management, and different types of memory.

New educational approaches prioritize learning strategies that facilitate the acquisition of knowledge through problem-solving, both in theoretical and practical contexts. These strategies encompass practical and intellectual actions, as well as those that promote emotional development. Examples include learning by doing (situation-based learning), learning through communication and collaboration (problem-based learning), and experiential learning (such as simulations, creative thinking techniques, critical thinking facilitation, and encouraging questioning).

They include:

1. **Situation-based learning.** Situation-based learning relies on context and refers to particular situations that require acting, decision-making and communicating. Teaching is treated as a social process, during which knowledge is built collectively by a student and a teacher. Knowledge must be contextual and refer to particular situations, whereas learning must take place in a particular social environment.

2. **Problem-based Learning** Modern problem-based learning neither rely on arranging problem situations, so called pseudo problems (after all each difficulty is a problem), nor on tasks which do not require creative thinking, asking questions, answers to which can be found in a course book as well as wrongly formulated questions, unclear or including the answer. If this were the case, the teacher would seem to be the only person in the class who has a problem to solve, while students would easily get accustomed to apparent participation in a lesson. Problem-based Learning relies on the following: organizing problem situations, depicting problems, providing students with indispensable assistance in solving problems and in this way checking solutions, managing the process of systematizing and reinforcing the required knowledge. A problem situation occurs when we know what we want to achieve, but we do not know how to do it. In turn, a problem task appears if there is no algorithm (an explicit and reliable instruction composed of the finite sequence of operations, that is necessary to be performed to achieve a particular goal).

A discovery method is used by teachers while solving mathematical and scientific subject problems. It involves actions which aim at revealing and naming relations between phenomena by means of laws and rules. While solving problems by a discovery method, students develop learning skills and learn to apply acquired knowledge by analysing real situations.

Action planning method is used for solving technological, production, economic and structural problems. It follows the subsequent stages: becoming aware of necessary actions in a particular situation, identifying the main task, needed to carry out to achieve the objective, a detailed analysis of the present and desired situation, developing a solution and valuing different projects, preparing and implementing a new action plan.

3. **Learning by doing, experiencing and communicating** The choice of a teaching strategy depends on whether we want students to come up with their own new ideas (learning by doing) and confront them with their experience or a situation (experiential learning) or to accept a controversial idea (learning by communicating).

Engaging in hands-on activities, experiencing real-world situations, and promoting communication form the foundation for fostering a research-oriented mindset among students and developing essential skills. This approach encompasses activities such as formulating and testing hypotheses related to natural phenomena, applying theoretical knowledge in practical contexts, conducting observations, measurements, and experiments, and expanding understanding of the methodology of natural sciences. These competences serve as the educational objectives and goals.

Learning by doing, experiencing, and communicating can be implemented in various everyday situations, allowing students to tackle their own tasks and projects. The notable advantages of this practical approach include providing students with opportunities to face real-life



challenges that individuals encounter and promoting the development of social skills and adaptability to change.

Within this strategy, the cultivation of scientific thinking, reasoning, and competences assumes a pivotal role in the learning process.

Scientific thinking is an ability of applying scientific knowledge to identify and solve problems as well as drawing conclusions based on empirical observations of nature and society. Scientific reasoning refers to understanding characteristic scientific procedures (a sort of mental activity), methods and tools thanks to which scientific research is conducted and conclusions are drawn, e.g. distinguishing between information based on facts or scientific evidence and information including opinions or assumptions. Induction (inferring general conclusions on the basis of observations) and deduction (inferring the specific from the general) constitute the starting point for reasoning. Scientific competences refer to abilities and willingness to employ knowledge and methodology for explaining phenomena in order to formulate questions and draw evidencebased conclusions.

4. Action teaching The overall aim of this method is to gain operational knowledge by a student through a well-planned set of actions. Students construct their knowledge integrating it with materials and various tasks through the prism of their experience.

Action teaching is a strategy of a teaching-learning process rooted in Piaget's theory of cognitive development, applied mainly in teaching Mathematics. It aims at gaining operational knowledge not merely by means of chaotic attempts of solving mathematical problems, but via pre-planned by a teacher student's actions. The tasks shall be selected in such a way that enables students' transition from concrete operations, through symbolic to abstract ones. A thorough analysis of operations within concepts, which must be acquired by students, is the starting point for planning and selecting tasks.

5. Anticipating education.

Anticipating education relies on the assumptions of constructivist learning theory: from references to students' prior knowledge (most often common-sense knowledge, but also semantic one) or external sources, through processing to systematization so as to finally with the assistance of the teacher build learner's system of categories.

In conclusion, Traditional teaching methods relied heavily on repetition and memorization, which often hindered the development of critical thinking, problem-solving, and decision-making skills in students. In contrast, modern learning approaches emphasize collaboration and promote greater productivity. It is important to note that both traditional and modern teaching methods have their own effectiveness and utility in today's education landscape. As Sarah Wright, a blogger for TES, advises, finding the right balance is key. Recognizing when a traditional method is most suitable and when it's appropriate to explore new and innovative approaches is crucial for effective education.

References:

1. Teaching Methods: Traditional Vs Modern - Stephen Perse Foundation
<https://sixthform.stephenperse.com/blog/?pid=458&nid=45&storyid=4728>
2. TEACHING MATHEMATICS - COMPARATIVE METHODS AND ...
<https://osf.io/qyvj6/download>

3.Modern Teaching Methods Inmathematics

<https://literature.academicjournal.io/index.php/literature/article/download/77/83>

4.Traditional vs Modern Teaching Methods - IndiaStudyChannel

<https://www.indiastudychannel.com/resources/182423-traditional-vs-modern-teaching-methods>

