

**METHODOLOGY FOR INCREASING STUDENT ACTIVITY BASED ON COGNITIVE
LEARNING TECHNOLOGIES**

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Abstract: This article provides information and recommendations on developing a methodology for increasing student activity based on cognitive learning technologies. It also discusses the difficulties and obstacles students face in solving problems.

Keywords: cognitive educational technologies, problem-solving skills, divergent thinking, SCAMPER, fishbone, reflection, competence, critical thinking, Ishikawa diagram, VARK model.

Introduction.

Today, employers expect not only theoretical knowledge from graduates of educational institutions, but also the ability to independently solve practical problems. The lack of sufficient knowledge and skills of some teachers in modern pedagogical methods, psychological approaches and cognitive educational technologies, as well as the shortcomings in the conditions that need to be created in educational institutions for the use of modern educational technologies, cannot be ignored. The issue of rapid obsolescence of educational content and its inconsistency with the requirements of the labor market is also a priority. As a result, students' problem-solving skills decline, they are unable to fully assimilate knowledge, and they have difficulty in self-assessment. In today's rapidly changing society, technology, and labor market, students are required to think independently and make the right decisions in new situations. The inability to solve problematic situations is a serious obstacle to adapting to real life. The competency-based approach to education is gaining priority. It requires not only the transfer of knowledge, but also the formation of students as active, independent and creative thinkers. The ability to solve problems is a key component of this approach. Many schools still use methods that direct students to memorize ready-made answers. This does not form critical and logical thinking, the skills of analysis and finding appropriate solutions to problem situations. Students who have difficulty solving problems often lose self-confidence, which reduces their overall motivation to learn. In this situation, it is necessary to modernize teachers' teaching methods, adapt to new methodologies, and improve their skills in using cognitive and modern educational technologies. Student motivation can be increased with the help of gamification, project-based learning, and problem-based learning methods.

Literature review.

Each learner has different characteristics and characteristics, therefore, teachers need to regularly work on their own and students' competencies. In a general sense, "competence" is the ability to meet requirements, established criteria and standards in relevant areas of activity and in solving certain types of problems, to have the necessary active knowledge, to confidently achieve and control results (Tursunov, 2021).

The introduction of modern programs and technologies such as artificial intelligence and chatGPT into the educational process provides teachers with a number of conveniences and efficiencies in explaining the content of education to students, assessing their knowledge, and strengthening their problem-solving skills.

In the last 3 years, we can see that artificial intelligence technologies have brought about fundamental changes in all areas. It is no exaggeration to say that the GPT model will be developed by OpenAI in November 2022. Because, based on this model, many researchers and

scientists have scientifically substantiated the possibilities of artificial intelligence (Mamatov, 2025).

For example, let's take the VARK model. It is a famous model that describes the learning styles of students, developed by Neil Fleming. The acronym VIS is derived from the initials of four English learning styles:

V – Visual: These learners learn best through visual materials (diagrams, graphs, maps, colored symbols, tables). They prefer to remember things by seeing.

A – Aural: These learners learn by listening. They understand and remember better through lectures, discussions, and conversations.

R – Read, write: They prefer to learn textual information. Reading books, writing notes, and working with articles are effective for them.

K – Kinesthetic (Kinesthetic Learners): They like to learn through hands-on, hands-on, hands-on, real-life situations. They prefer learning styles that are based on “doing.”

The VARK model recognizes that each person’s learning style is different from others and can engage students more actively by using methods that suit different learning styles. Artificial intelligence and chatbots offer the same opportunity.

The study found that chatGPT offers customized learning materials for learners and the ability to create adaptive learning paths makes the learning process more effective. At the same time, materials that attract learners to learning through chatGPT and are prepared on the basis of an individual approach increase their level of assimilation by 30% (Asyari, Sharov, 2024). Also, another study, based on Fink's

“Taxonomy of Essential Learning Experiences” (TLE), advances a new approach to continuous professional development and training through artificial intelligence. The article mainly puts forward proposals for the development of continuous cognitive training of employees working in the organization based on Fink's taxonomy model, and the integration of artificial intelligence technologies into this process. Research shows that using AI-based training and development methods further increases employee engagement and helps personalize learning (Billiot, 2023).

Cognitive learning technologies help students develop deep understanding, reasoning, and comprehension. Students will have the opportunity to think outside of traditional and standard approaches and in new ways (Kholikova, 2025). From the analysis of the above literature, we can see that cognitive learning technologies develop active thinking, ensure deep assimilation of knowledge, increase motivation, develop creative and critical thinking, provide an individual approach, form metacognitive skills, direct the application of learned knowledge in life, and thereby form students' problem-solving abilities.

Research methodology.

Within the framework of this study, the issues of forming students' problem-solving abilities based on cognitive learning technologies were analyzed and information and recommendations were given on this issue. In the process of analysis, such analytical features as checking, separating and grouping the collected data were used. Through the observation method, direct and indirect attention was paid to the shortcomings and errors in the system at that time, taking into account natural conditions. The collected data formed a fundamental basis for drawing conclusions and developing recommendations. The article also recommends the use of methods and technologies such as the WARK model, “SCAMPER”, “Fishbone”.

Analysis and discussion of the results.

In the modern world, knowledge and technologies are being updated very quickly. However, curricula are often outdated and do not meet the demands of the labor market, and due to insufficient interdisciplinary integration and practical knowledge, students are not sufficiently developed in their problem-solving skills. Today, the insufficient development of problem-

solving skills in students is considered one of the most pressing issues. As a result of the analysis, several main reasons for this can be identified:

1. The limitations of traditional teaching methods - the teaching process often uses a ready-made method of providing knowledge, which leads to insufficient attention being paid to developing students' independent thinking and problem-solving skills.
2. Lack of creative and critical thinking – although creative and critical thinking are essential to solving problems in modern society, many students are underdeveloped in these skills.
3. Lack of practice-oriented education – even if students are given theoretical knowledge, they are not given the opportunity to apply it to real-life situations, resulting in them not being able to apply the knowledge they have learned in practice.
4. Cognitive difficulties and pedagogical-psychological barriers - some students may have difficulty expressing their thoughts or analyzing a problem. This prevents them from being active in the learning process.
5. Information overload and attention problems - with the development of digital technologies, children and adolescents are faced with an overwhelming flow of information. This may lead to their inability to concentrate and lack of systematic problem-solving skills.

Various problems arise in the educational process, which negatively affect the effective work of teachers and students. In particular, when students encounter problems, they have some difficulties in solving them. They have poor problem-solving skills. Problem-solving skills are the ability of students to identify problems and find solutions to them. This ability is formed through the development of cognitive, creative and logical thinking. It is considered very important for students to understand the essence and main factors of the problem, separate important and unnecessary information, analyze available resources, generate alternatives to choose the most effective solution, develop the right strategy and implement it in practice, evaluate the results of the solution, identify shortcomings and improve. Many students face difficulties in the process of solving problems. Observations have revealed several reasons for this.

Firstly, there may be cognitive difficulties. Problems with analysis and synthesis – students have difficulty isolating problems and approaching them systematically. Weak logical thinking – difficulty understanding the causes of problems. Inability to solve multi-step problems – for example, complex mathematical problems or scientific experiments.

Secondly, there may be psychological barriers. Insecurity and fear - the student is afraid of making a mistake or giving the wrong answer. Passivity - the student expects a ready-made answer instead of finding an independent solution. Weakness in creative thinking - getting used to standard approaches.

Thirdly, there may be problems associated with the environment and pedagogical approaches. The curriculum may not be suitable for problem-solving - lessons may be based more on memorization. Insufficient independence from the teacher - students' thinking in solving problems is limited. Lack of group discussions – students do not learn to solve problems through the exchange of ideas.

Fourth, there may be metacognitive difficulties. Lack of understanding of one's own thought process – the student does not understand how he or she thinks. Weak planning and self-control – inability to clearly control the solution process. Inability to evaluate the result – inability to analyze the correctness of one's own solution. Cognitive educational technologies should be used to develop students' problem-solving skills. Cognitive educational technologies are a set of modern pedagogical approaches aimed at activating students' thinking processes, developing their analytical, problem-solving, and independent decision-making skills. Based on these

technologies, the formation of students' problem-solving skills is carried out through the following stages:

Stage 1: Understanding and analyzing the problem. Metacognitive strategies are developed and students are given skills on how to understand the problem, analyze its causes and identify the main factors. For example, the essence of the problem is revealed using the questions “What? How? Why?” based on “Question and Answer Technology”.

Stage 2: Searching for solutions and thinking creatively. This involves using “Divergent Thinking,” a thinking process or method used to generate creative ideas by exploring multiple possible solutions. For example, techniques such as “SCAMPER,” “Fishbone,” and “Squawk” are used. Analogical analysis is also taught, in which students are taught to compare the problem with other disciplines or real-life situations.

Stage 3: Decision Making and Testing the Solution. This creates opportunities for experiments and simulations, or testing theoretical and practical solutions to problems. For example, role-playing games and projects are used. Students learn to solve problems from different perspectives by playing different roles.

Stage 4: Evaluation of the results of the solution and reflection. In modern pedagogy, attention is paid to the fact that reflection is an analysis of activity and its results. Therefore, the process of reflection involves drawing a certain conclusion, generalizing, finding alternatives, comparing and evaluating, reflecting, remembering, and solving a problem.

The SCAMPER technology is considered an effective method for developing students' creative and critical thinking, directing them to solve problems, and shaping innovative approaches. Developed by Bob Eberle, this technology can be used in the classroom, in project work, or in creative exercises.

First, students are given a problem or question to solve. For example, in a technology lesson, “What should the car of the future be like?”, in an ecology lesson, “How can the problem of plastic waste be solved?”, in a mathematics lesson, “How can complex problems be easily understood?”. With the SCAMPER method, different questions are asked at each stage to solve the problem and the students' answers are analyzed.

Conclusions and recommendations.

Creating a methodology for increasing student activity based on cognitive learning technologies gives effective results. These methods teach students not only to acquire knowledge, but also to apply what they have learned in practice. As a result, they grow up to be critical thinkers, creative and independent decision-makers. Students begin to apply the stages of problem identification, analysis, development of solution options and their evaluation. Cognitive technologies create an interactive learning process, which increases student interest. Tasks aimed at solving real-life problems arouse enthusiasm in students. Students have the opportunity to apply their knowledge in real life. Students learn to think critically, that is, to analyze and improve the effectiveness of their own solutions. They also develop the ability to defend their own ideas and be open to alternative ideas through group discussion and collaboration. They develop the ability to approach problems from different perspectives. The following are proposed to develop students' problem-solving skills based on cognitive learning technologies:

- Active learning methods should be used in teaching. For example, problem-based learning: Presenting real-life problems to students during the lesson and directing them to solve them independently. Working in small groups: Through collaborative work, students analyze each other's ideas and begin to look at the problem from different points of view.

- Students need to be taught cognitive strategies. For example, metacognitive approaches: Teaching students to monitor and evaluate their own thought processes (i.e.: “How am I solving this problem?”).

- Questioning techniques need to be developed. For example, teaching students to ask open-ended, analytical questions: “Why?”, “How?”, “What if...?” help to understand the problem in depth.
- Students should be taught to reflect and analyze. For example, at the end of each assignment or project, students should write answers to questions such as: “What did I learn?”, “What challenges did I face?”, “What will I do differently next time?”
- The education system should regularly use programs and technologies such as artificial intelligence, chatGPT, the WARK model, “SCAMPER”, “Fishbone (bone with a handle)”. This will enable learners to develop the ability to identify, analyze, and assess the true nature of problems, their causes, and their impact, to block emerging threats, develop highly effective technologies to eliminate them, select appropriate options, and ultimately solve problems.

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