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Features of increasing students' ability to solve problems using effective strategies

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Annotation. In this article, methods of active learning have been investigated and described, which make it possible to increase the ability of students to solve various kinds of tasks set in the learning process with particular success. Special methods of teaching the development of creative thinking of students were also considered.

Keywords: effective strategies, active teaching methods, educational modifications, empirical system, empirical thinking.

Особенности повышения способности учеников решать задачи с помощью эффективных стратегий

Аннотация. В данной статье были исследованы и описаны методы активного обучения, позволяющие с особым успехом повысить способность учеников решать разного рода задачи, поставленные в процессе обучения. Также были рассмотрены особые приемы обучения развития творческого мышления учеников.

Ключевые слова: эффективные стратегии, активные методы обучения, модификации образования, эмпирическая система, эмпирическое мышление.

Оқушылардың тапсырмаларды тиімді стратегиялар арқылы шешу қабілетін арттыру ерекшеліктері

Аннотация. Бұл мақалада белсенді оқыту әдістері зерттелді және сипатталды, бұл оқушылардың оқу процесінде қойылған барлық мәселелерді шешу қабілетін ерекше жетістікке жеткізуге мүмкіндік береді. Сондай-ақ оқушылардың шығармашылық ойлауын дамытуға оқытудың ерекше тәсілдері қарастырылды.

Түйінді сөздер: тиімді стратегиялар, оқытудың белсенді әдістері, білім беруді модификациялау, эмпирикалық жүйе, эмпирикалық ойлау.

The twenty-first century is an era of large-scale modifications in the field of education, the introduction of innovative systems that require rethinking the very concept of the content of education. The implementation of the vectors of its development determined the direction – the improvement of a flexible and multifunctional school education system. As you know, today education is recognized as one of the most important vectors of development. The improvement of the education system plays an important role in achieving this task. Significant trends in the work to increase the quality of education are the provision of equal access for absolutely all participants in the educational process to the best educational resources and technologies; satisfaction of students' needs for education, which ensures success in a rapidly changing world; the development of an intellectual, physically and spiritually developed citizen of the Republic of Kazakhstan in secondary schools.

In the real educational process of a modern school, the concept of variability is implemented through a system-activity approach, a variety of information, organizational and other didactic resources of the teacher. At the same time, it is understood that the diversity of children's activities is carried out in offering them various forms of educational and creative tasks; by including children in school-wide affairs, extracurricular activities; the use of active and interactive forms of learning, methods of formative assessment in the classroom. As you know, some very successful strategies and teaching techniques have already been successfully applied in our state. Let's look at some of them. One of the popular strategies developed by David Kolba, later he first applied it back in 1984. As a result of the development of the empirical model, new terms have also appeared, such as the empirical learning model and the theory of empirical learning. In Figure 1, you can learn more about this model.

Figure 1 – Empirical model of the Flask learning process

As can be seen from the diagram shown in Figure 1, each training block of classes includes four stages. The stage of obtaining direct experience by the participants on the topic /

skill/technology being analyzed, this stage smoothly transitions into the stage of discussing the experience gained and the views of the participants within the framework of the topic being analyzed. This stage also smoothly passes into the stage of generalization, structuring, schematization, correlation of experience «here and now» with previous experience in this field, theory. Forming a hypothesis about which ideas and methods of action are most effective. The last and final stage is the stage of students designing the practical application of the received ideas and methods of action in practice. This model of teaching is very effective and is widely used in many schools and other educational institutions [1].

Another effective model in the field of education is Jerome Bruner's spiral learning model. This model, which is presented in Table 1, makes it possible to teach students very effectively to solve certain tasks of a creative or any other nature.

Table 1 – Jerome Bruner Spiral model

Stages of learning	Key features	Benefits of Spiral Learning
1) Active (training in the process of work); 2) Sign (learning with the help of images and pictures); 3) Symbolic (learning with words or numbers)	1) The student reviews the topic several times throughout the training; 2) The complexity of the topic increases with each repetition; 3) New learning is related to old learning and is seen in context with old information	1) Information is repeated and remembered every time the student repeats the topic; 2) The spiral curriculum allows a logical transition from simplified ideas to complex ones; 3) Students can apply knowledge to subsequent course objectives

Figure 2 shows a schematic interpretation of this model.

Figure 2 — Jerome Bruner's Spiral Model

Another effective and widely used strategy for teaching students to solve various kinds of problems is the argument of Tulmin. A schematic interpretation is presented in Figure 3. Toulmin believes that argumentation is less a process of hypothesizing, containing the discovery of new thoughts, but more a process of verifying previously existing ideas. Grounds is a statement that allows you to switch from evidence to a statement.

Figure 3 – A sample of Tulmin's argument

It also makes sense to mention many other effective strategies for improving students' ability to solve problems. The case method refers to intensive technologies of active learning, it is interactive, focused on cooperation and business partnership between teacher and student, as the work takes place in groups.

The purpose of the method: through the joint efforts of a group of students to analyze a case situation arising in a particular state of affairs and develop a practical solution [2].

The case method as a form of teaching and activation of the educational process are aimed at achieving the following results:

– Intellectual development of trainees.

– Awareness of the ambiguity of professional problems and life situations.

– Gaining experience in finding and developing alternative solutions.

– Formation of readiness for assessment and decision-making.

– Ensuring the improvement of the quality of knowledge acquisition by deepening them and detecting gaps.

– Development of communication skills.

The next technique is brainstorming or brainstorming – a widely used way of producing new ideas to solve scientific and practical problems. Its purpose is to organize collective thinking activity to find non—traditional ways to solve problems. The use of the brainstorming method in the educational process allows solving the following tasks:

– creative assimilation of educational material by schoolchildren;

– the connection of theoretical knowledge with practice;

– activation of educational and cognitive activity of trainees;

– formation of the ability to concentrate attention and mental efforts on solving an urgent problem;

– formation of the experience of collective mental activity [3].

The problem formulated in the classroom by the method of brainstorming should have theoretical or practical relevance and arouse the active interest of schoolchildren. A common requirement that must be taken into account when choosing a problem for brainstorming is the possibility of many ambiguous solutions to the problem that is put forward to students as an educational task. Another effective way is the six hats of thinking.

The Six Hats of Thinking is a simple and practical method that allows you to overcome three

fundamental problems associated with practical thinking: emotions, helplessness, confusion. The method makes it possible to divide thinking into six varieties, or systems, each of which corresponds to a figurative multicolored «hat». Such a separation makes it possible to apply any order much more effectively, and the whole process of thinking becomes the most focused and stable. The peculiarity of this method is as follows. In color printing, the main colors are applied to the paper separately. However, in the end, without exception, they all mix and provide a multi-colored print. The six hats method is the use of the same principle in thinking: the desire to learn to focus attention on various aspects of thinking one at a time. As a result, the totality of these various nuances provides an understanding in absolute volume. Six metaphorical hats of various colors suggest each of the key types of thinking. The largest number of hats would be cumbersome and confusing. Less is far from adequate. Six thinking hats are provided for the purpose of creative and constructive thinking, which expand evaluative and analytical thinking [4].

In order to achieve the necessary results in the field of education and as the main topic of improving the ability of students to solve various kinds of tasks, whether creative or any other world leaders in the field of education have developed and successfully applied various techniques and strategies for teaching schoolchildren. All of the above-listed and described methods are widely used in many educational institutions. Using these methods, students very successfully cope with the assigned educational tasks [5].

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