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Cognitive Competence of Students in Problem-Based Learning Conditions

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Abstract

this article analyzes in detail modern relevant teaching methods. A particular attention is paid to problem-based learning and its role in the context of modern pedagogy, which in turn provides a number of solutions to problems in the field of education.

Keywords: cognitive competence, synthesis of information, problem-based learning, didactics and methodology, activation of potential, cognitive educational activity, educational discourse.

INTRODUCTION

In the course of society development, the goals, content and forms of education have changed, and along with the changes in education, views on pedagogy and the range of issues that it studies have also changed. Today, the mental, creative and spiritual development of students is considered the main priority task of modern education. The process of learning knowledge, abilities and skills takes place in organic unity. However, the leading role in learning belongs to knowledge. Only on the basis of knowledge do students acquire a certain range of skills and abilities. If knowledge is the basis for teaching skills and abilities, then skills and abilities, in turn, have a huge impact on the process of students acquiring knowledge. Consequently, it is necessary to structure the educational process in such a way that the training of students in the system of scientific knowledge, skills and abilities proceeds in organic unity, so that knowledge prepares students for mastering abilities and skills, and skills and abilities contribute to the most successful mastery of knowledge; so that knowledge, abilities and skills are strictly outlined, systematized and brought into line with the requirements of the logic of individual scientific disciplines and the age characteristics of students.

ANALYSIS AND RESULTS

Priorities in modern teaching pose certain tasks for the teacher, which consist in finding the necessary educational technologies and methods aimed at optimizing the cognitive learning activities of students and activating their potential. The goal of properly selected teaching methods and modern didactics is aimed at improving the entire learning process. The teacher is required to clearly pose questions and tasks for students, which, in turn, will greatly facilitate not only the synthesis of new information, but also the acquisition of practical skills by students. The ultimate goal of the educational process is not only the acquisition of new knowledge and practical skills, but also the harmonious moral growth of students and the development of their creative potential.

The essential forms and methods of interconnecting the cognitive process of students with the deep learning process are actively being introduced and integrated. This is confirmed by the recognition of the majority of academicians, as well as teaching staff, of the need to understand

modern technologies and their leading role in the educational process. Within the framework of a person-oriented approach, it is necessary to create a variety of conditions for each student, taking into account his individual psychological characteristics, ability to assimilate new information, propensity for social and personal growth, range of interests, value orientations and subjective experience, cognitive abilities, self-realization in the learning process and mastering scientific knowledge presented in programs of various academic disciplines. Students' ability to perform a comparative analysis of educational material is noticeably reduced if identical units of educational material are analyzed over several lessons and supported by the same type of mental operations.

The ability of students to independently analyze, systematize and compare the material being studied is a key task for effective thinking and solving practical problems. Socially oriented teaching methods and forms of teaching play an important role in the educational process. Constant updating of the educational base and timely intervention in the scientific and technical base of modern educational standards are an integral part of the comparative educational process and the main characteristics of the modern education system.

Cognitive competence, which is the most important aspect of personal competence, is the most important skill that every expert should have in this day and age. It can be seen as a fundamental element of other competencies, as a means for an individual to create a personal basis for furthering their education. The cognitive competence framework can help us differentiate tasks that influence cognitive competence, including developing students' motivational and value-oriented attitudes toward vocational education and the vocational world; technology of independent learning activities; formation of emotional and volitional regulation of educational and cognitive activities; methods of reflection and objective self-assessment. The social and pedagogical task is to create in students a level of cognitive competence that would allow them to effectively carry out professional and educational activities and ensure self-education throughout their lives. Professionally competent professionals are able to withstand today's job market, demonstrate competence in their work, and achieve success in both their professional and personal lives.

Modern educational technology must guarantee the implementation of the content of education provided for by educational standards and curricula, as well as ensure the organization of active cognitive activity of students, their development as subjects of future professional activity and life.

The concept of “interactive” (from the Latin inter – “between”, actus – “action”) means interaction with someone. Interactive educational technology is a specific form of organizing cognitive activity, based on the active interaction of the teacher with students and students with each other. Unlike active teaching methods, interactive technologies are focused on broader interaction of students not only with the teacher, but also with each other and on the dominance of student activity in the educational process.

In modern education, it is best to use the deductive method and the problem-based learning method, based on their effectiveness in the educational process. This method is purposefully designed to improve students' creative potential and develop their logical thinking. This method involves posing a problem of a high degree of complexity to the student and proposing several solutions to this problem. The student must analyze variations in solutions to the problem posed and propose an actual solution. But at the same time, emphasis is placed on the development of logical thinking and creative abilities of students. Students, in turn, improve their knowledge and skills, choose the necessary knowledge to solve a specific problem. In the case of a problem, the most difficult thing is the correct formulation of the problem, the need for an accurate assessment, the possibility of solving it in many ways and the ability to remove the problem from the category of problematic ones.

The main difficulty in problem-based learning is a deep synthesis of information, a clear algorithm of actions, knowledge of probability theory and consistent conclusion. All this

ultimately serves to develop the mental abilities of students. Unfortunately, teachers do not use the problem-based learning method often enough. The problem is that this technique is not widespread enough; there is no systematization and structuring. Consequently, teachers are faced with the task of introducing this methodology, since it is by using the technology of problem-based learning that a student will be able not only to synthesize new information, but also to analyze the situation, compare facts and judgments, draw conclusions and find solutions. All this, in turn, contributes to the development of critical thinking, which is much more relevant in the implementation of any profession than banal theoretical knowledge.

Today, the educational process can be schematically characterized as: presentation of theoretical material, offering students a strict algorithm for solving practical standard problems. In turn, this process is a local level of cognitive competence. That is, the application of knowledge is limited to the area of the current structural principle. To expand the abilities and potential of students, it is proposed to introduce a problem-based learning methodology that can not only teach basic theoretical and practical skills, but also form meta-subject skills, which in turn will be reflected in the practical symbiosis of relevant skills and adaptive principles.

Metacognitive invariants are universal logical actions that are performed by a person in the cognitive process. They represent a category of conceptual connections that can be expressed as an invariant in various concepts, approaches, solution methods, etc. Invariant in this case means a characteristic of an object, process or phenomenon that remains unchanged when a certain group of actions is performed. In the context of cognitive processes, metacognitive invariants refer to those characteristics that do not change during the performance of mental operations.

Creating an innovative model of a training course based on the development of cognitive structures of a meta-subject nature requires the definition and description of these metacognitive invariants. They may include characteristics such as analysis, comparison, classification, abstraction, generalization, etc. It is these invariants that ensure the universality and generality of cognitive processes, allowing students to more effectively master and apply knowledge in various fields and at different levels of complexity. This model of the training course, based on metacognitive invariants, allows students to develop the skills of metacognitive control, self-regulation and reflection, which contributes to a deeper understanding of the subjects being studied and increases their educational effectiveness.

Problem-based learning involves creating special situations that motivate students and stimulate their active participation. In such training, a special methodology is used, which requires adequate design of the didactic content of the material. Didactic content is presented in the form of a sequence of problem situations. It is important that the material contains historically plausible collisions from the history of science, since the logic of scientific knowledge is based on problematic situations. However, a complete basis only on problem situations would be ineffective, so the optimal structure of the material would be a combination of traditional presentation with the inclusion of problem situations. This option is called problem-based learning.

Problem situations may differ in the nature of the unknown, the interestingness of the content, the level of problematicity , the type of information mismatch and other methodological features. Based on the content of the problems being solved, there are three types of problem-based learning:

1. Solving scientific problems, which includes theoretical research, search and discovery of new rules, laws, and evidence for students. This type of problem-based learning is based on the formulation and solution of theoretical educational problems.
2. Solving practical problems, which is aimed at finding a practical solution, that is, a way to apply already known knowledge in a new situation, design and invention. This type of problem-based learning is also based on the formulation and solution of practical educational problems.

3. Creation of artistic solutions, which involves the artistic representation of reality using creative imagination. This may include drawing, playing, playing music and other artistic forms of expression.

Problem-based learning combines elements of active and independent student participation in the learning process. This allows him to develop his thinking, analytical and search skills, as well as the ability to independently formulate and solve problems. However, problem-based learning has its own difficulties and requires more time and effort from both the student and the teacher. The student needs time to comprehend, search for solutions and independently formulate the problem. The teacher, in turn, must have high pedagogical skills in order to competently organize learning, support and manage the process. Perhaps it is because of these difficulties that problem-based learning is not so widely used. However, it is an effective teaching method that helps students develop creative and critical thinking, as well as builds confidence in their abilities.

Based on the works of K.K. Platonov, E.F. Zeer, the development of professionally determined personality has a structure with four components:

- professional orientation (needs, interests, attitudes, expectations, attitudes, motives and components);
- professional competence (professional knowledge, skills and qualifications);
- professionally important qualities (attention, observation, self-control, self-control);
- professionally significant psychophysiological properties (energy, neuroticism , extroversion , visual coordination, reactivity, etc.).

The use of the problem-based learning method leads to the merging of these substructures, which leads to the interaction of key classifications and the formation of integrated professional qualities. All this has a beneficial effect on competitiveness, professional mobility, advanced training and career growth.

The very essence of cognitive competence lies in readiness to constantly improve one's educational level, actualize and realize personal potential, synthesize new knowledge and skills, self-development, and constantly enrich professional competence.

CONCLUSION

In conclusion, I would like to note that since problem-based learning is associated with research, it involves labor-intensive and time-consuming problem solving. The student notes to himself that solving the problems themselves is not a purely mechanical, systematic work. This work is creative, requiring comparison and consistent analysis. The disadvantages of problem-based learning include difficulties that students encounter during the learning process. Also, understanding the essence of the problem, analyzing and finding solutions takes much more time than traditional training. In addition, the problem-based learning method requires the teacher to be highly competent, have good logical thinking and quick reactions. Apparently, it is precisely these requirements that do not allow the widespread use of the problem-based learning method. But it is worth noting that problem-based learning meets all the requirements of modern pedagogy: teach, explore, explore, teach. This is the only way to form a creative personality, and thereby realize the main task of pedagogical work.

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