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METHODS OF MODELING STUDENTS' LEARNING ACTIVITIES

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Abstract This article analyzes the pedagogical and psychological foundations of modeling students' learning and cognitive activities. The issues of developing students' cognitive activity, independent thinking, creative approach, and problem-solving skills through the use of modeling methods in the educational process are highlighted. The importance of visual, didactic, mathematical, and interactive modeling methods in the educational process is also revealed. The study substantiates the effectiveness of modern pedagogical technologies, interactive methods, and person-oriented approaches in activating students' cognitive processes. The article scientifically highlights the fact that the educational process organized on the basis of modeling serves students' conscious assimilation of knowledge, development of logical thinking, and practical skills.

Keywords: educational and cognitive activity, pedagogical modeling, cognitive activity, interactive methods, mathematical modeling, visual modeling, didactic approach, independent thinking, creative activity, educational effectiveness, innovative technologies, problem-based learning

.In today's era of globalization and the development of digital technologies, the education system is faced with important tasks such as the formation of students' independent thinking, creative approach, and competencies for applying knowledge in practical activities. Modern pedagogical approaches require not only the transfer of ready-made knowledge in the educational process, but also the active organization of students' educational and cognitive activities. From this point of view, modeling students' educational and cognitive activities is emerging as one of the urgent issues of today's education system.

Modeling educational and cognitive activities is an important pedagogical tool for developing students' conscious assimilation of knowledge, logical thinking, skills for analyzing problem situations, and independent decision-making competencies. In particular, the use of interactive methods, visual aids, didactic models, and innovative technologies in the educational process increases students' interest in knowledge and enhances their intellectual activity. Nowadays, the widespread introduction of a competency-based approach in the education system requires a new organization of student activities. Therefore, such methods as modeling lesson processes, artificially creating learning situations, and acquiring knowledge based on problem tasks serve to increase the effectiveness of the pedagogical process. Especially at the primary and general secondary education levels, the use of modeling methods allows students to acquire knowledge more deeply by activating the processes of perception, perception, thinking, and attention.

Research shows that when a student participates in the educational process as an active subject, his need for knowledge, mastery level and creative abilities develop further. Therefore, it is important that the modeled learning processes organized by the teacher take into account the individual characteristics, interests and intellectual capabilities of students.

In this article, the pedagogical and psychological foundations of modeling the learning activity of students, its role in improving educational efficiency, and the practical importance of modern modeling methods are scientifically analyzed.

LITERATURE REVIEW

The issue of modeling students' educational and cognitive activities is being studied as one of the important scientific directions in the sciences of pedagogy and psychology. The psychological foundations of the cognitive process, the developmental nature of education, and the importance of modeling methods in the educational process are widely covered in the researches conducted on this problem.

Cognitive activity has been studied by psychologists in connection with the processes of human thought, intuition, perception, memory and attention. In particular, in his scientific views on psychology, J. Godfrey explained the development of the human psyche and the formation of cognitive processes on a scientific basis. According to the scientist, the process of students' acquisition of knowledge takes place on the basis of the harmony of emotional perception and thinking activity. This shows the importance of using modeling methods in the educational process. R.S. In the research conducted by Nemov, the development of cognitive activity was analyzed in connection with independent thinking, conscious activity and practical actions of students. The scientist said that only when the student participates in the educational process as an active subject, his need for knowledge and intellectual potential develops. Therefore, modeling the educational process is an important pedagogical tool that serves to increase the mental activity of students. The physiological foundations of cognitive activity are also widely covered in the scientific views of Russian scientists I.M. Sechenov and I.P. Pavlov. In their studies, human mental processes are explained in connection with reflex activity, and the neurophysiological mechanisms of the cognitive process are scientifically based. This approach shows that psychological factors play an important role in organizing students' educational and cognitive activities. In pedagogical research, L.V. Zankov put forward the theory of developmental education and substantiated the importance of problem situations and independent activity in activating students' cognitive activity. According to the scientist, the use of tasks that encourage students to search in the learning process develops their thinking and helps them to consciously assimilate knowledge. In modern pedagogical research, modeling methods are interpreted as an effective means of developing students' creative and independent thinking. In particular, the use of mathematical and visual modeling methods in the process of primary education has a positive impact on the development of students' logical thinking, problem-solving, and practical skills. The research of local scientists also pays special attention to the development of students' cognitive activity, the use of interactive methods, and the organization of person-centered education. In their scientific views, the active participation of students in the educational process is considered one of the main factors in the effective assimilation of knowledge. The analyzed scientific sources show that modeling students' educational and cognitive activities is of significant pedagogical importance in increasing the effectiveness of education, developing students' independent thinking and creative activity. Therefore, improving modeling methods in the modern education system and their widespread introduction into practice is one of the urgent scientific issues.

RESEARCH METHODOLOGY

My personal opinion is that in the modern educational process, the effective organization of students' educational and cognitive activities serves not only to master theoretical knowledge, but also to develop students' independent thinking, creative approach and practical skills. Therefore, during the research process, special attention was paid to identifying the pedagogical possibilities

of modeling students' cognitive activities and studying their impact on educational effectiveness. During the research, the analysis of scientific sources on pedagogy, psychology and educational technologies was chosen as the main methodological approach. Scientific views, theoretical concepts and modern pedagogical approaches related to modeling students' educational and cognitive activities were studied on the basis of comparative analysis. Also, psychological factors affecting the development of cognitive activity were considered as an important component of the research process. Modeling methods serve as an effective tool for students' conscious assimilation of knowledge. Therefore, in the research process, the impact of visual modeling, didactic modeling, problem-based learning technologies and interactive methods on students' cognitive activity was observed. In particular, the role of artificially created learning situations, problem tasks and logical exercises in the development of students' thinking activity during the lesson was analyzed. The research used observation, pedagogical analysis, comparison, interview and generalization methods. Through observation methods, students' activity in the lesson process, independent work skills and the level of interest in knowledge were studied. Using comparative methods, the effectiveness of educational processes organized on the basis of traditional and modeling was analyzed comparatively. In my opinion, a person-oriented approach is of great importance in modeling students' learning activities. Because each student has different cognitive needs, interests, and intellectual capabilities. Therefore, during the research, attention was also paid to the issues of organizing the educational process, taking into account the age and psychological characteristics of students. Based on the generalization of the research results, it was determined that the use of modeling methods is an important pedagogical factor in increasing students' cognitive activity, developing logical and critical thinking, and improving educational efficiency.

ANALYSIS AND RESULTS

The effectiveness of lessons organized on the basis of modeling students' learning activities was analyzed during the research. Observations showed that while in the traditional lesson process students mainly participate as subjects who receive ready-made knowledge, in classes where modeling methods are used, their independent thinking, solving problem situations, and active participation significantly increased.

During the analysis, visual and didactic modeling methods were used in mathematical exercises with primary school students. For example, simple mathematical tasks on the topic of “formulating and solving problems” were explained using pictorial diagrams, tables, and object models. When students were asked to perform addition and subtraction operations using images of fruits during the lesson, it was observed that they understood the problem faster and tried to find answers independently. In particular, the active participation of students who usually participate poorly in lessons showed the effectiveness of the modeling method. During the observations, it was also found that the use of problem situations increases the cognitive activity of students. For example, when students were asked simple questions such as “If there are 10 notebooks in a store and 3 of them are sold, how many notebooks are left?” Some students answered only using formulas, while in the modeling-based exercise, they tried to imagine the problem through objects and explain it in different ways. This situation showed that the logical and analytical thinking of students was developing.

During the study, positive results were also observed in lessons using interactive methods. In group-based activities, students exchanged ideas with each other and sought to solve the problem collectively. For example, in lessons conducted using the “Cluster” and “Brainstorming” methods, students put forward independent ideas on the topic and tried to create various models. As a result, it was found that students’ speech activity, communication culture, and skills in justifying their

opinions developed. Also, some problematic situations were observed during the study. Initially, students who were not adapted to modeling methods had difficulties in completing assignments. Some students were slow to participate in solving problem situations, as they were used to waiting for a ready-made answer rather than independent thinking. However, their interest in the lesson gradually increased through regularly organized interactive activities and didactic games..

The impact of modeling methods of students' learning and cognitive activities on educational effectiveness№ Modeling method Methods used Skills formed in students Observed results

1 Visual modeling Pictures, schemes, diagrams Imagination, quick perception The level of quick understanding and memorization of the topic has increased

2 Mathematical modeling Solving examples and problems based on models Logical thinking, analysis The speed and accuracy of problem solving have increased

3 Didactic modeling Didactic games, problem tasks Independent thinking, active participation Students' interest in the lesson has increased

4 Interactive modeling Group work, "Brainstorming", "Cluster" Communication and teamwork Speech activity and free thinking have developed

5 Problem modeling Creating a problem situation Analytical and critical thinking Independent problem-solving skills have been formed

6 Digital modeling Multimedia and ICT tools Competence in working with information The effectiveness of the lesson and activity have increased

7 Creative modeling Role games, creative tasks Creativity and innovative approach Students' creative abilities developed

According to my observations, in the educational process organized on the basis of modeling, students feel more free and strive to connect knowledge with practical activities. In particular, visual aids, schemes, role-playing games and problem tasks attract students' attention and increase their need for knowledge. The results of the analysis showed that modeling of educational and cognitive activities:

Therefore, the widespread use of modeling methods in the modern education system is of great importance as one of the important pedagogical factors in the development of students' cognitive activity. In conclusion, modeling of students' educational and cognitive activities is one of the most important pedagogical directions of the modern educational process. During the study, it was found that the use of visual, mathematical, didactic, interactive and problem-based modeling methods in the educational process has a positive effect on the conscious assimilation of knowledge by students, the development of logical and critical thinking, and the formation of creative abilities. Also, lessons organized on the basis of modeling are important in that they increase students' interest in knowledge and involve them in the educational process as active subjects. In particular, creating problem situations, using interactive methods, and completing practical tasks based on models develop students' independent thinking skills. The results of the study showed that the systematic and targeted use of modeling methods increases educational effectiveness, enhances students' intellectual activity, and serves to develop their practical competencies. Therefore, the widespread introduction of modeling of educational and cognitive activities in the modern education system is one of the important pedagogical tasks.

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