SPECIFIC ASPECTS OF THE USE OF MODELING TECHNIQUES IN SOLVING ISSUES RELATED TO PHYSICS

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Annotation. This article analyzes the peculiarities of adaptation to the method of modeling in solving physical problems. In addition, the methods of modeling the stages of educational issues in physics and the generalized methods of solving the issues on the basis of the analysis of cognitive activity were discussed.

Keywords. Model, modeling, physical issue, modeling method, experiment, experimental issues.

Introduction. The formation of modeling skills in solving a variety of complex issues from physics in the students of technical universities: theoretical, experimental, qualitative, quantitative, simple, complex, creative, mavhum and can be done by solving specific issues.
The first definition from physics to educational issues is given as follows: "issues related to physics in teaching practice are usually called non-trivial problems, which are solved by logical conclusions, mathematical actions and experiments based on the laws and techniques of physics.

Literature Review. In the methodological and educational literature, issues are usually correctly selected exercises, the main purpose of which is the study of physical phenomena, the formation of concepts, the development of physical thinking of students and the formation of skills in the application of their knowledge in practice in everyday life.
Through such a definition, the authors understood in different ways the understanding of the issue in educational practice, methodological and educational literature.
Research Methodology. It is emphasized that the issue of physics education is interpreted as a situation and requires reasonable and practical action from students based on the use of physical laws and techniques aimed at mastering the knowledge about physics, applying them in practice and developing their thinking.
“A physical issue is a complex of Information Processes, the sum of uncertain or even dependent relationships that bring about the need for their change.”
The process of transition from the incomplete description of information processes through the structural element of the operator to the most complete one, that is, the process of changing the initial data is carried out by determining the laws that are characteristic of unclear entities, phenomena, processes.
"A physical phenomenon is a physical phenomenon, more precisely, a verbal model or set of phenomena that has some known and unknown physical dimensions that characterize this phenomenon. Solving a physical issue means finding unknown fasteners, physical sizes, etc.”[2].
Analysis and results. A number of authors have studied the rules of solving a number of issues in general, the structure of the process of solving issues, the stages of solving the issue, the generalized methods of finding solutions to the issues on the methodology of teaching the solution of the issue.
The solution of the physical problem is looked at as a complex dynamic system. In this system, the issue is considered as a subject of change. They believe that the solution of his demand and the self-appropriation of activity are the result of the solution of the issue.
On the basis of the analysis of cognitive activity, the generalized method of solving problems is defined, and when solving problems from physics, the following:
1) selecting the subject; 2) distinguishing the position of the subject; 3)distinguishing the effect (conditions, processes); 4) distinguishing the state of the flow; 5) drawing up a system of equations; 6) solving the system of equations; 7) including consecutive actions, such as analyzing the solution of the result.
The following is the holistic process of resolving the issue: Step 1-analysis of issues. Step 2-schematic recording of the issue. Step 3-find a solution to the problem. Step 4-implementation of the solution of the issue. Step 5-checking the solution of the issue. Step 6-research the issue. Step 7-formation of the answer to the question. Step 8-the analysis of the solution of the problem is divided into such stages as[3].

The structure of the process of solving the presented problem is approximate, since in the actual solution of the issue these stages are usually not separated from each other, are closely related to each other, and sometimes their order can be changed simply.

Thus, it can be seen that the actions performed by the student in solving issues in practice, in the study of the general course of physics, are directly related to the actions of the modeling process.

Among the issues of physics of different complexity, a group of issues is distinguished, united by the method of solving. Such issues include verbal, computational, graphic and experimental. "This seemingly division is conditional because several techniques are used to address many issues. For example, verbal reasoning is required in solving an experimental issue, as well as in most cases, working with calculations and graphs"[4].

"Experimental issues include such physical issues that their structure and solution organically relate to experimentation." Experimental issues have been described as issues in which an experiment is used for that or that purpose.

From the definition of the given physical issue, it is possible to divide the issues into experimental and theoretical issues "if the measures are used to solve the issue, then such an issue is called experimental".

"Issues that cannot be addressed without experimentation and measurement implementation include experimental issues." Only those issues that require a creative approach can serve as experimental issues.

Conditionally, there are two types of creative issues related to physics: "research" - why? the answer to the question "How to do it" is demanding, and "constructive" - how to do it? the answer to the question "What is the difference?" is allocated to those species that require it.

The author recommends the following activities in solving these types of issues: expression of the problem; theoretical solution of the problem; it is delimited to the main stages, such as checking the correctness of the solution and, if necessary, material implementation or examination of the found solution in the experiment.

It is necessary to distinguish between the concepts of" experimental issue "and" experiment". Without the use of these measurement results as the initial data for determining other measurements, it can not be an experimental-experimental issue requiring only direct measurement. In this case, the student conducting the experiment uses knowledge about the rules for working with measuring instruments only when measuring.

Modeling in solving experimental issues, in fact, is manifested as a means of experimental activity. Unlike the" usual " experiment-a type of activity that consists in "scientific knowledge, the discovery of obyektiv laws and the influence on the subject or process under study with the help of special devices and instruments ..." there is a special form of experiment, which is characterized by the use of existing material models as a means of Experimental Research. In such an experiment, called a model experiment, the experiment is conducted not with the research object, but with its substitutes. Bunda, a substitute-an object and an experimental device are combined into a single whole in the model under study.

The peculiarity of the experiment in the use of models is manifested not only in the presence of practical action, but also in the situation with a special model - the creation of an experimental device consisting of natural and artificial elements by nature.

Conclusion. In conclusion, it can be said that the correspondence between the stages of solving physical issues and the method of modeling, the technique helps the students of higher educational institutions to form modeling skills in solving issues of varying complexity from physics.

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