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Modeling Of The General Sciences Teaching System In Higher Education Institutions On The Basis Of Interdisciplinary Integration

Mustapakulov Sadik Ungiboyevich,

Karshi Institute of Engineering and Economics

s.mustapaqulov@mail.ru

Abstract: The article focuses on the effectiveness and results of the work performed on the modeling of the system of teaching general professional subjects based on interdisciplinary integration in higher education institutions.

Keywords: modeling, knowledge, skill, competence, integration, object, event, process.

Enter. Science shows that for life on earth, man must learn to model the world of his behavior in a certain time and space, and the world and space are structured. This opinion is confirmed by many scientists, philosophers, sociologists (R.F. Abdeyev, M.S. Kagan, A.D. Ursul, M.G. Chepikov.

The sought-after models of education in the West are associated with the name of D. Dewey. He defined the main stages of thinking as a solution to problems. Later, the development of this approach was expressed in two versions: a practical, cognitive-practical direction (new instrumental knowledge about methods of activity) and a theoretical-cognitive direction (search for new theoretical knowledge, new cognitive directions) D.Bruner et al.

Problem statement and research method. Currently, a research approach of the epistemological direction has been developed. mastering the procedures (processes) of the student's activity becomes an independent didactic goal. Process orientation is expressed in the tendency to teach thinking. The common basis of various innovative educational models with a research orientation is extracurricular learning activities.

Based on the interaction of humanitarian systems in the process of teaching general professional subjects in technical higher education institutions, it is appropriate to use a systematic approach as a methodology, taking into account interdisciplinary integration with engineering graphics in modeling theoretical mechanics lessons.

The object under study, the need to build a model of the event and process does not appear immediately, rather, in the period of the transition from "quantity to quality" when sufficient information has been collected, it appears when a sufficient number of important signs are identified and the invariants of the relationship between them are determined.

This is an important point that determines the need to build models. Without sufficient information, the model can become a fantasy game that has nothing to do with reality. Besides, collected data is objective, must be presented in a meaningful and acceptable form for model creation.

Model (from the Latin modulus measure, a sample is an object or phenomenon under study) a diagram similar to, physical structures, is an artificially created object in the form of symbols or formulas, the structure between the elements of this object in a simple and generalized form, reflects and reproduces properties and relationships.

At the same time, as a rule, the direct study of the object is associated with any difficulties, for example, with financial or technical characteristics. Models can be conditionally divided into three types:

- physical models (natural, life-like);

- mathematical (the physical nature is different from the original, but the original can be described mathematically);

- logical-semiotic (consists of special signs, symbols and structures).

The model we have developed allows to start designing the teaching model of general professional science "Theoretical Mechanics", and this is the basis for the implementation of interdisciplinary integration in the training of students in technical higher education institutions. For this, we will focus on the content of the program on drawing geometry and engineering graphics for engineering majors of higher education institutions. It goes without saying that it is familiar in a descriptive sense "...knowledge, skills, competence" the phrase does not express purpose, does not disclose technology, in practice, it is accepted as a document clearly recommending the provision of knowledge on the subject. And indeed: the science curriculum enumerates the knowledge that reveals the theory of the academic subject.

The analysis of topics allows us to note that the knowledge recommended in the program includes mathematical theory, drawing geometry, visual arts, physics and general professional sciences. Therefore, the study of graphic sciences is closely related to the study of basic natural sciences, general and special sciences, in particular, the science of "Theoretical Mechanics". Thus, the programs are aimed at imparting knowledge in subjects.

The program of "Theoretical Mechanics" is analyzed in the same way.

This approach to knowledge is understandable and the teacher can act in his work, but this program reflects only the content of education, but not the process.

The meaning of the concept of "knowledge". (Knowledge is information about the laws of nature, society and human thinking; information about the surrounding reality is consciously perceived and reflected in memory) Analysis of the concept of "knowledge" allows to distinguish the following components in it: informative (concepts of facts, events), active (sciences).

If we consider the programs taking into account the content of the concept of "knowledge", it becomes clear that the programs are aimed at mastering scientific information and subject methods of activity. However, in addition to these methods of activity, it is necessary to teach subjective skills of mental activity, self-control, etc. Unfortunately, educational programs on drawing geometry and engineering graphics, theoretical mechanics reflect the need to teach these methods of activity only in the explanatory letter of the program. The program itself only contains a list of topics by topic. All information about methods of operation is reflected in a few words "problem solving algorithms". The operational goals of teaching are not reflected in the programs, and without them it is impossible to model the cognitive process or form the mental operations of students.

The program does not specify the professional skills that students should develop. Only

the need to prepare the graduate for the possibility of carrying out scientific activity is noted. These disadvantages are common to all programs.

An analysis of programs in drawing geometry and engineering graphics, theoretical mechanics, allows us to conclude that the program offers a list of topics for the course, regardless of the goals to be implemented by the teacher.

The lack of operational goals does not allow to regulate the process of professional training of students and the interaction of information based on interdisciplinary integration. Half of the standard hours of theoretical mechanics and engineering graphics training programs are allocated to independent work. Therefore, such activity skills should be taken into account in calendar-thematic plans. Formal programs direct the teacher to choose content that takes into account the entire period of student learning in subjects. Therefore, moving to the operational level of program implementation, we offer the following methods of developing training models.

In the teaching model of theoretical mechanics integrated with engineering graphics, we identified the following parameters for determination: lesson topics, educational goals, educational goals, basic concepts, activity methods.

Such parallel determination of class topics and operational goals (education and training) determines the relationships in the content part of the model, and the methods of activity determine its process part. Such determination of the content and process side of each lesson for each lesson, taking into account interdisciplinary integration, with the variability of their forms and means, but developing models of conducting lessons with a fixed and guaranteed result for the realization of the goals serves as a basis for

Summary. The model developed in this way makes it possible to determine the goals set for the entire educational period and the methods of activity, the mastery of which should guarantee learning. Such determination of the goals and methods of the activity at the entrance to the educational system allows them to be monitored using various forms and tools (tests, surveys, colloquiums, exams).

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