PROBLEMS OF MODELING THE TEACHING OF GENERAL AND SPECIALIZED SCIENCES IN HIGHER EDUCATION INSTITUTIONS

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Abstract: The article gives recommendations on the development of training for professional activities by modeling the teaching of general and specialized subjects in technical higher education institutions in the Republic of Uzbekistan. The teaching of general and specialized sciences in higher education institutions faces numerous challenges. These challenges stem from the need to balance broad foundational knowledge with in-depth specialization, integrate technology effectively, and meet diverse student needs. This article explores the key problems in modeling the teaching of these subjects, evaluates current methodologies, and suggests potential solutions to enhance educational outcomes. Through a comprehensive analysis, we highlight the importance of adaptable curricula, interdisciplinary approaches, and continuous pedagogical innovation.

Key words: technology, method, professional activity, educational methods, informative presentation method, component, software, innovative, creative.

Method: The methodology for this study involves a literature review and analysis of existing teaching models in higher education. Sources include academic journals, educational policy reports, and case studies from various institutions. The analysis focuses on identifying common problems and successful strategies in the integration of general and specialized science teaching.

Introduction: Higher education institutions are tasked with providing comprehensive education that equips students with both broad knowledge and specialized skills. The teaching of general sciences (e.g., biology, chemistry, physics) and specialized sciences (e.g., molecular biology, quantum mechanics) requires distinct yet complementary approaches. Balancing these aspects presents significant challenges, including curriculum design, resource allocation, and pedagogical strategies. This article examines these issues, aiming to identify effective models for teaching both general and specialized sciences.

In today's rapidly changing process of globalization, serious changes are taking place in the modern conditions of modernization of the higher education system of the countries of the world. The increase in demands placed on specialists by employers at all levels of social life puts the issue of their professional training and qualification level in a new perspective. Today, especially in the field of education, "Quality" has become the main category in education policy. In this regard, the problem of modeling the teaching of general and specialized subjects in the higher education system has become urgent. The analysis of scientific-edagogical and didactic-methodical literature showed that the term "Model" acquired a general scientific character, and modeling became an effective research method in various fields of science, including editorial.

All model models of objects of various shapes require the originality, similarity, and imitation of objects. Zeyer E.F. and Simanyuk E.E. state in their research that "The resulting model provides new information about the object of further study, allows to establish laws that cannot be obtained by other means of knowledge."

The analysis of scientific editorial, methodical, didactic literature allows to come to the conclusion that the term "Model" has blind meanings.

Before proceeding to the consideration of modeling in editorial research conducted by specialists in our country and abroad, we will briefly touch on the issue of epistemological importance of modeling and first of all clarify the meaning of the term "model".

The term "model" (from the Latin "modulus" - a measure, a sample, a standard) is used in almost all European languages to mean a sample or a rototiller or something similar. In the natural sciences of ancient times, the term "model" meant a mentally or practically created structure that reproduces this or that part of reality in a simplified (schematic or idealized) and visual form.

Results and Discussion

Curriculum Design Challenges

One of the primary issues is creating a curriculum that adequately covers both general and specialized sciences. General sciences provide foundational knowledge crucial for understanding specialized subjects, but allocating sufficient time and resources to both areas is difficult. An overly general curriculum may create insufficient problems in specialized areas, or may lead to gaps in core knowledge in a specialized curriculum. Let's consider them as follows.

Integration of Technology - Another significant challenge is the integration of technology in teaching. While digital tools and online resources offer great potential for enhancing learning, they also require substantial investment and training. Effective use of technology can bridge gaps between general and specialized knowledge by providing interactive and flexible learning opportunities. However, disparities in technological access and proficiency among students and faculty can hinder this integration.

Pedagogical Strategies - The pedagogical approaches used in teaching general and specialized sciences must be carefully considered. General sciences benefit from broad, conceptual teaching methods that emphasize critical thinking and problem-solving. In contrast, specialized sciences often require more focused, research-oriented approaches. Blending these methods effectively to cater to diverse learning styles and academic needs remains a complex challenge.

Addressing Diverse Student Needs - Students come with varying backgrounds and aspirations, necessitating flexible and inclusive teaching models. For instance, students majoring in specialized sciences may need more intensive laboratory work, while those taking general science courses for breadth might benefit more from interdisciplinary projects. Adapting teaching methods to accommodate these differences is essential for effective education. Today, in the works of modern philosophers, various definitions of the concept of "model" are considered. Some of them do not have such an important and basic function as the ability to display an object. The advantage of other definitions of the concept of "model" is that the indicated property, that is, the representation of the object, is placed at their base.

Based on the above, in this study we adopt the following definition of a model: "A model is a system that provides new information about a mentally represented or materially realized learning object by representing or repeating it." This definition of a model includes four features:

1 - the model is mentally expressed or materially realized system;

2 - repeats or reflects the object of study;

3 - the ability to replace the object;

4 - its study gives new information about the object.

As a result of the analysis, we come to the opinion that modeling and model are two related concepts. Building and studying models provides learning of knowledge about objects. We can see that in scientific literature, modeling is considered as one of the ways of knowing, the functions of models in scientific research and the features of their application are studied.

Modeling in the field of education and modern edagogy is related to the search for ways to improve the training of specialists. However, we can see that experts have not expressed a clear relationship to the modeling method in the field of redagogy today. There are debates about the possibilities of its application in this field. At the same time, it can be said that the model approach is gaining more and more blind supporters in editorial.

V.S. Bezrukova states in her research that "in editorial research, modeling is the highest and special form of visualization, it works as a means of sorting information, which allows to deepen the essence of the phenomenon being studied."

In the works of experts from a number of foreign countries, it is noted that there is no general definition of the model.

B.G.Ananev notes in his research that by describing the functions of models, it is possible to determine what it means to use a model, but it is not possible to determine what a model is. The paucity of foreign literature in this field is to some extent compensated by the use of generalizations contained in some works of specialists of the Russian Federation. For example, V.E.Steinberg in his research considered the model mainly in the linguistic context and found that the term "model" is used in thirty senses. The comment by W. E. Steinberg is a bit superficial, but it illustrates well the ambiguity of the term "model" noted above.

At the same time, the theoretical aspect of editorial modeling as we know it was studied by S.I. Arkhangelsky, A.A. Verbitsky, V.O. Meskov and others. In their research, these authors considered issues in the field of their modeling methodology, increased their content and approaches. Thus, according to S.I. Arkhangelsky, the modeling process is closely related to the use of mathematical methods. In the author's opinion, the use of mathematical methods is very effective in methodological theoretical research. The usefulness of mathematical modeling is determined by the practical value of the model. S.I. Arkhangelsky states that "the method of scientific modeling allows creating a generalized, abstract, ideal model, provided that it is based on the principles of visibility, accuracy and objectivity."

In the traditional sense, the study of models and models requires the identification of the similarity of the structure and relations of the studied object or phenomenon with evidence. While studying the process of modeling in his research, S.I. Arkhangelsky came to the conclusion that a certain relationship is established between the original copy and the model, based on which it is possible to study certain aspects of the object. According to the author, such relationships are based on the theory of similarity in modeling, which expands the theoretical and practical possibilities of research.

The Russian scientist A.A.Verbitsky in his research analyzed different approaches of using modeling in the scientific study of the educational process of higher education institutions in the modern educational paradigm, and considers the study of the model as a means of coordinating various components of the specialist training system. The author emphasizes that there is a constant connection between modeling and the learning process, and suggests the following directions of connection:

- epistemological direction;
- using a model instead of the original;
- informative model;
- analytical;
- general methodological;
- psychological .

In the research carried out by V.I. Mikheyev, based on the generalization of the scientific material of collective editorial research, he increases the possibilities of modeling in higher education editorial. At the same time, the author distinguishes two main modeling approaches. The first approach is the structuring and simplification of the editorial phenomenon, which allows the use of various methods of blind statistical analysis. A second approach to modeling is the use of algorithmic models. Therefore, the systematization, simplification and use of models of the studied redagogical phenomena in redagogical research increases the level of validity of the research results.

V.I. Mikheyev believes that it is important for the methodological scientific didactic development of educational sciences in higher education that the model constructions in any psychological-edagogical research correspond to already established educational concepts and are related to their content. The views of the above-mentioned authors on defining the concepts of "model" and "modeling" are grounds for concluding that solving complex problems in the field of editorial methodology and editorial research methods creates the necessary conditions.

Conclusion: Modeling the teaching of general and specialized sciences in higher education involves navigating numerous challenges, from curriculum design to the integration of technology and pedagogical strategies. Institutions must strive for a balanced approach that provides robust foundational knowledge while allowing for in-depth specialization. Continuous innovation in teaching methods and curricula, along with investment in technology and faculty development, is crucial for addressing these challenges. By adopting flexible and inclusive educational models, higher education institutions can better meet the diverse needs of their students and prepare them for the complexities of their future careers..

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