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SPECIFIC FEATURES OF PEDAGOGICAL MODELING

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Annatation: This article describes the theoretical bases of pedagogical modeling, its essence and efficiency. Modeling, being one of the methods of the scientific study, is broadly used in pedagogy. The Method of modeling is an integrative, he allows to unite empirical and theoretical in pedagogical study i.e. combine in the course of studies of the pedagogical object experiment with building logical design and scientific abstraction.

Key words: modeling, theory, pedagogue, method, formation, projecting, planning.

PEDAGOGIK MODELLASHTIRISHNING O‘ZIGA XOS JIHATLARI

Annotatsiya: Ushbu maqolada pedagogik modellashtirishning nazariy asoslari, uning mohiyati va samaradorligi ko‘rib chiqiladi. Modellashtirish ilmiy tadqiqot usullaridan biri bo‘lib, pedagogikada keng qo‘llaniladi. Modellashtirish usuli integratsion bo‘lib, u pedagogik tadqiqotda empirik va nazariy jihatlarni birlashtirishga imkon beradi, ya’ni pedagogik obyektni o‘rganish jarayonida mantiqiy tuzilmalar va ilmiy abstraktlarni yaratish bilan eksperimentni birlashtirish.

Kalit so‘zlar: modellashtirish, nazariya, pedagogika, usul, shakllantirish, dizayn, rejalashtirish.

СПЕЦИФИЧЕСКИЕ ОСОБЕННОСТИ ПЕДАГОГИЧЕСКОГО МОДЕЛИРОВАНИЯ

Аннотация: В данной статье рассматриваются теоретические основы педагогического моделирования, его сущность и эффективность. Моделирование является одним из методов научного исследования и широко используется в педагогике. Метод моделирования носит интегративный характер, так как позволяет объединять эмпирические и теоретические аспекты в педагогическом исследовании, то есть совмещать эксперимент с созданием логических структур и научных абстракций в процессе изучения педагогического объекта.

Ключевые слова: Моделирование, теория, педагогика, метод, формирование, дизайн, планирование.

One of the priority directions in the development of society is the “formation of an advanced system for training highly qualified personnel based on the rich intellectual heritage of the nation, universal human values, and the achievements of modern culture, economy, science, technology, and innovation.”

The great scholar Abu Rayhan al-Biruni stated: “Science should serve the people and contribute to the development of society.” According to Al-Biruni’s views, science emerges from the necessity to meet the vital needs of humanity and society. Neither in politics, nor in social life, nor in science should there be allowed to exist any gaps or vacant spaces, as continuous

development and progress require the active application of knowledge and scientific achievements [1].

Education cannot exist without the processes of acquiring knowledge, upbringing, and personal development. Neglecting any one of these components may lead to significant shortcomings: the absence of the educational (knowledge-providing) aspect prevents the formation of motivation, as motivation is often developed through the acquisition of knowledge; the lack of a developmental component negatively affects the formation of skills and abilities; while the absence of purposeful upbringing does not contribute to the comprehensive formation and maturity of an individual.

However, society does not merely need a person who simply possesses certain knowledge or is able to communicate verbally. It requires a morally responsible individual who has developed communication skills and competencies necessary for effective interaction both in everyday life and in professional activities. Such a person should be capable of applying acquired knowledge, demonstrating social responsibility, and engaging constructively with others in various spheres of life. [2].

Therefore, the educational process should not be limited solely to the objective of providing knowledge; it should also incorporate pedagogical and psychological dimensions. All of these components must be integrated and reflected within the education system as a whole.

The current priority task is to provide the education system with modern textbooks and teaching materials, as well as with scholarly and educational literature aimed at fostering the moral development of young people and enhancing their spiritual values. These resources should be developed in the Republic of Uzbekistan and in foreign countries on the basis of new educational standards, curricula, and programs, while taking into account the latest achievements in the fields of education, science, technology, innovation, and economics [3].

“A good textbook,” as K. D. Ushinsky rightly emphasized, “is the foundation of effective education.” In order to create such a foundation, it is necessary to define the fundamental conceptual approaches related to the content, procedural, and educational aspects of textbooks, as well as to develop a well-considered “infrastructure” for the textbooks of the third millennium.

In other words, it is essential to develop the necessary components of an educational and methodological complex, in which the textbook functions, on the one hand, as an integral element of the linguodidactic system, and on the other hand, as a central component that organizes, regulates, and guides the entire educational process [4].

To address this issue, it is necessary to study the theoretical foundations of pedagogical modeling and the methodology of modeling not only as a general scientific method of cognition but also as an essential tool for solving psychological and pedagogical problems. When students construct models of various phenomena being studied, modeling serves simultaneously as a means of instruction, a method for generalizing educational material, and a way of presenting information in a concise and structured form.

Furthermore, modeling is widely applied for the logical organization of educational content, the development of semantic frameworks, the visual representation of learning materials, and the facilitation of memorization through the creation of associative images based on mnemonic strategies. Thus, pedagogical modeling contributes to enhancing the effectiveness of the learning process by improving students’ understanding, systematizing knowledge, and supporting cognitive activity [5].

In the field of pedagogy, the modeling method has been theoretically substantiated in the scientific works of M.Kh.Tokhtakhodjayeva, K.Khoshimov, J.Hasanboyev, H.Sariboyev, V.G.Afanasyev, V.A.Venikov, I.B.Novik, V.A.Shtoff, and other researchers.

In this study, we rely on the definition of modeling proposed by G.V.Sukhodolskiy, which we consider to be one of the most comprehensive interpretations of this concept. He defines modeling as "the process of creating a hierarchy of models of a particular real existing system by representing it from different perspectives and using various means of modeling" [5].

The fundamental concept of the modeling method is the model.

A model is an artificially created object represented in the form of a scheme, physical structure, symbolic representation, or mathematical formula. It reflects and reproduces the structure, characteristics, elements, and interrelationships of the object (or phenomenon) under study in a simplified and generalized form, while maintaining its essential features. Direct investigation of an object is often associated with various difficulties, including financial, technical, or practical limitations; therefore, modeling provides an effective means of studying complex systems and processes.

Conventionally, there are three main types of models:

Physical models — models that possess a nature similar to the original prototype and reproduce its physical characteristics;

Material-mathematical models — models whose physical nature differs from the prototype, but whose behavior can be described through mathematical representations;

Logical-symbolic models — models constructed using special signs, symbols, and structural schemes.

There are no strict boundaries between these types of models. The majority of pedagogical models belong primarily to the second and third categories mentioned above, namely material-mathematical and logical-symbolic models.

The practical value of a model in any pedagogical research largely depends on its adequacy in representing the essential aspects of the object under investigation, as well as on the extent to which the fundamental principles of modeling — visualization, accuracy, and objectivity — are taken into account during the stages of model development. These principles determine the capabilities, type, and functions of the model within the framework of pedagogical research. [6].

The effectiveness of modeling depends on the initial theories and hypotheses that determine the extent to which simplifications may be introduced during the modeling process. Therefore, an important question arises: How can the adequacy of a model be ensured? All researchers who employ modeling techniques pay particular attention to this issue. In this regard, it is necessary to refer to an important methodological principle concerning the validity and reliability of models.

Models are created for various purposes, including the analysis of the processes under investigation, the verification or demonstration of new ideas, methods, and systems, as well as the study and transformation of reality and the development of forecasts. A model makes it possible to represent, in a clear and concise form, the essential characteristics of the system, process, or idea being studied, as well as the significant connections and relationships within the object under investigation.

Thus, modeling serves as an effective methodological tool that allows researchers to identify the most important aspects of complex phenomena, analyze their internal structures, and obtain meaningful results for theoretical.

According to V. V. Davydov, a model contains a representation of the object being studied. Depending on the characteristics of how the modeled system is described, there are two main

approaches: structural modeling (structural models), which focuses on representing the organization and components of the system, and functional modeling (flow or process models), which focuses on modeling the functioning of processes occurring within the system.

To address the second problem, mathematical modeling is considered to be one of the most effective approaches, as it allows the dynamics, relationships, and operational characteristics of processes to be expressed and analyzed in a formalized manner. [7].

The analysis of nonlinear models of the educational process described in pedagogical literature has made it possible to identify their common characteristics:

Problem-oriented nature — determines approaches to educational activity and the specificity of working with information in relation to a particular problem. Problem solving involves passing through certain stages and implementing a sequence of purposeful actions.

Subjectivity — involves taking into account the individual characteristics of the subjects of the educational process, creating opportunities for students' self-determination, independent choice, individual advancement, active participation in their own development, and self-assessment of achieved results.

Interactivity, dialogic and polylogic nature — is expressed through collaborative activity, co-creation in the development of goals, joint selection of methods and means of activity, as well as collective determination and evaluation of results.

Transformational processes — include the transition from "information – knowledge – understanding" and from "explicit – implicit – personal knowledge," through which the information-based educational environment is continuously expanded and enriched by the knowledge of all participants in the educational process.

Reflexivity — refers to the evaluation of new knowledge against the background of previous experience, the correlation between personal knowledge and acquired information, reflection and assessment of personal achievements, as well as the realization of individual goals associated with educational activity.

Complementarity — involves mutual exchange of knowledge among participants of the educational process and emotional support arising through interpersonal interaction and cooperation.

Development of logical thinking — represents the movement from information disorder within the educational environment toward the construction of an individual model for solving a problem; it includes understanding information, experiencing it through the prism of personal experience, and forming individual knowledge.

Transition from multiplicity of concrete elements to universality — involves moving from solving specific problems toward the formation of universal knowledge necessary for a particular subject area.

Modularization — refers to the creation of general educational content through a set of completed content modules of different directions and levels of complexity. In essence, it represents the implementation of a faceted and mosaic structure of educational content as a reflection of the socio-cultural context of education.

Intellectualization — involves developing the ability to work with knowledge in a wide range of contexts based on understanding the concept of the life cycle of knowledge. Intellectualization of activity serves as a method for creating innovations, while intellectualization of knowledge functions as a means of knowledge commercialization through the transformation of intellectual capital into material resources.

Valeological orientation — implies the ability to work effectively with knowledge through understanding, applying, and appropriately utilizing the psychological mechanisms underlying these processes.

Synergetic interaction — reflects the formation of educational content and the professional and personal development of students based on the interaction of educational process participants, their mutual enrichment, and the organization of knowledge development within a dynamic and self-organizing educational environment. [8].

Thus, the educational process can be viewed as a nonlinear interaction among its participants, in which multiple trajectories for the development of educational process subjects are possible. The educational process itself is oriented toward the creation of new knowledge, the development of intellectual potential, and the generation of innovative approaches to learning.

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