



PEDAGOGICAL MODELING OF THE EDUCATIONAL PROCESS

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Annotatsiya: Ushbu maqolada **ta'lim jarayonini pedagogik modellashtirish** tahlil qilinadi, ta'lim va tarbiyaning maqsadlari hamda ularning ta'lim mazmuniga mosligi ko'rib chiqiladi. Alohida e'tibor shundaki, pedagogik amaliyotning yangilanishi va pedagogning kasbiy faoliyatini jamiyat talablariga muvofiq o'quv jarayonini samarali tashkil etishga yo'naltirishga qaratilgan.

Kalit so'zlar: modellashtirish, modernizatsiyalash, pedagogik modellashtirish, mantiqiy-semiotik, abstrakt, zamonaviy ta'lim.

Аннотация: В статье анализируется **педагогическое моделирование образовательного процесса**, рассматриваются цели обучения и воспитания и их соответствие образовательному содержанию. Особое внимание уделяется обновлению педагогической практики и направлению профессиональной деятельности педагога на эффективную организацию учебного процесса в соответствии с требованиями общества.

Ключевые слова: моделирование, модернизация, педагогическое моделирование, логико-семиотическое, абстрактное, современное образование.

Annotation: This article explores **the pedagogical modeling of the educational process**, examining the objectives of teaching and upbringing and their alignment with educational content. It also discusses the renewal of pedagogical practices and emphasizes directing the teacher's professional activity toward organizing the learning process in accordance with the demands of society.

Keywords: modeling, modernization, pedagogical modeling, logical-semiotic, abstract, modern education.

The modernization of the continuous education system and the enhancement of teaching and upbringing effectiveness to a new qualitative level remain among the most pressing issues in contemporary educational development. In Uzbekistan, one of the key drivers of educational reform is the principle of prioritizing personal needs and education in fostering a well-rounded individual. Consequently, pedagogical practice entails the integration of both theoretical and practical activities. However, a number of challenges persist—particularly the tendency of teachers to design instructional content without sufficient consideration of learners' developmental and cognitive levels. Effective





pedagogical activity requires the modeling of educational materials in alignment with students' competencies and the structuring of knowledge, skills, and competencies beyond mere information delivery. The quality of pedagogical practice today is highly dependent on the teacher's organizational and methodological expertise.

For many years, modeling has been among the most frequently employed methods in scientific inquiry. In pedagogical research, modeling enables the integration of theoretical and experimental approaches, the construction of logical structures, and the development of scientific abstractions. Teachers regularly encounter the concept of *pedagogical modeling* when planning lessons. Nevertheless, scholars argue [5, 6] that one factor contributing to the limited effectiveness of contemporary education reforms is the insufficient attention paid to the modernization of educational processes.

A model is generally defined as an artificially constructed representation—such as diagrams, physical structures, symbolic models, or formulas—that reproduces the structure, properties, and relationships of the object or phenomenon under study, albeit in a simplified or idealized form [3]. Human cognition and activity are difficult to imagine without the use of models. Despite the difficulty of establishing universal rules for model construction, humanity has accumulated substantial modeling experience by the 21st century across diverse objects and processes.

Modeling is closely connected with the development of continuous sciences, and visual models are widely utilized in educational settings. Models facilitate learners' understanding of objects and phenomena that cannot be directly observed.

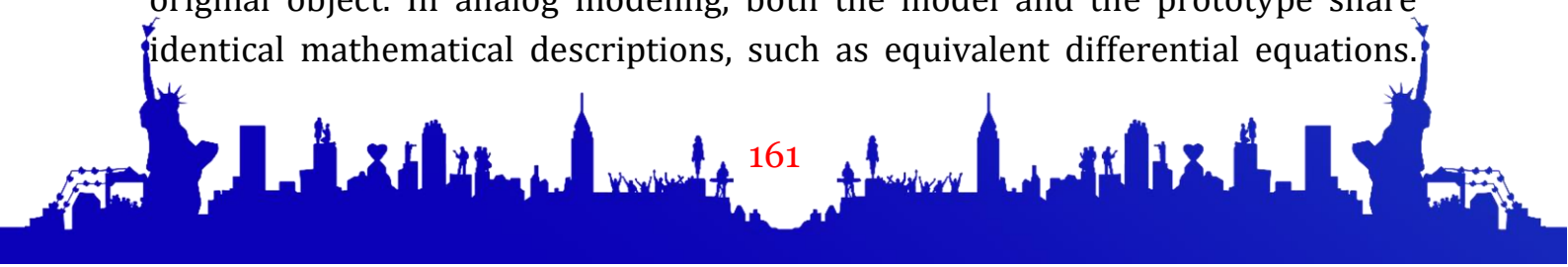
Models are conventionally classified into three main types:

1. Physical models — possessing physical nature and resembling the original object;

2. Real-mathematical models — differing physically from the prototype but mathematically describing its behavior;

3. Logical-semiotic models — constructed using symbolic systems and structural diagrams.

These categories do not have strict boundaries, and pedagogical models typically belong to the second and third groups. Subject modeling is based on reproducing the geometric, physical, dynamic, or functional characteristics of the original object. In analog modeling, both the model and the prototype share identical mathematical descriptions, such as equivalent differential equations.





Diagrams, schemes, and formulas serve as essential tools in this modeling process, and mathematical modeling is considered one of its most fundamental forms [4].

Abstract models, meanwhile, are ideal constructions functioning as instruments of reasoning. They are expressed through specialized linguistic systems and can be communicated within professional communities. Such models may be developed using natural or artificial languages, including formal languages employed in logic and mathematics. Consequently, a hierarchical structure of models corresponds to the hierarchy of representational languages.

The practical significance of modeling in pedagogy is best understood through its principal functions: **descriptive**, **predictive**, and **regulatory**.

- The **descriptive function** enables simplification and explanation of observed phenomena, allowing successful models to become integral components of scientific theories [5].

- The **predictive function** allows the forecasting of future states and properties of simulated systems by addressing the question “What will happen?”

The **regulatory (normative) function** provides guidance on optimizing pedagogical processes by addressing the question “How should it be done?”, thereby supporting not only the description of existing systems but also the formation of normative foundations.

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