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THE ROLE OF DESIGN IN THE FORMATION OF STUDENTS' RESEARCH ACTIVITIES BASED ON THE STRUCTURING OF EDUCATIONAL MATERIAL IN PHYSICS

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Annotation
It is known that pedagogical design activities are presented in studies as a set of different steps, stages, phases, practical and intellectual activities, and this situation can be explained by the uniqueness of design objects and their essentially different nature.

Keywords: physics, education, project, research, design phase, technological phase, reflexive phase.

Introduction

Currently, design activity is recognized as one of the primary tasks of a teacher. This recognition is expressed in the regulatory and legal documents of the education system of our country and is defined in the "Pedagogical Education" section of the State Educational Standards of Higher Education. In the standards of the professional field, the main functions of the pedagogue during his work are mentioned. That is, it is determined that the pedagogue should perform functions such as "design and implementation of educational processes in educational institutions", "design and implementation of basic general education programs". We believe that it is necessary to clarify the essence of the two concepts of "designing educational processes" and "designing teacher's activities" that are important for the research we are conducting. Appropriate and effective organization of the educational process directly depends on the level of educational resources (curriculum, plan, textbook, manuals), as well as the level of knowledge and pedagogical skills of the pedagogue.

The term "design" entered pedagogy from technical sciences and began to be considered as a separate type of activity. The Latin word "projectus" means "thrown forward", "striving forward". The importance of design technology. The process of designing and teaching is one of the important conditions that ensure the organization and its successful solution. Projects differ from each other according to the subject and its direction. Analytical activities carried out by the pedagogue sequentially and ending with diagnosis: creative activities such as

foresight and design are manifested in the projects. In the field of technology, it is customary to understand the term "project" as "a set of documents (drawings, calculations, etc.) necessary for the creation of a certain structure or product." The activity carried out on the development of this set of documents (that is, the project) is called "design". That is, design is a creative process consisting of developing a copy, prototype of the object that is intended to be created (built).

Over time, some directions of design in social spheres appeared, and pedagogical design is one of them. As the fields of design activity increased, that is, with the expansion of its scope, the meaning of the concept of "design" also changed. It is an acceptable option to describe the concept of "design" as "a thinking activity that determines the processes that ensure that the existing being acquires a new appearance, taking into account the nature and social laws, based on the decisions made and the choices made." A.M. Novikov understands "pedagogical design" as the first period (phase) of project development (in which the activity cycle is considered completed): "The completion of the activity cycle (project) is determined by three periods (phases):

1. Designing phase: the developed model of the pedagogical (educational) system to be created and the adopted plans for its implementation are the result of this phase;
2. technological phase: the developed system is put into practice;
3. reflexive phase: the result of evaluating the effectiveness of the implemented system and determining the need to make some corrections or changes to it is considered as the end of this phase.

A.M. Novikov considers the pedagogical system to be an object of pedagogical design. In his opinion, the pedagogical system should be considered "as a set of goals in education and the unity of all factors of the pedagogical process that ensure the achievement of these goals." The author offers to consider pedagogical systems at different levels. In particular, an educational institution, a separate teacher, a separate subject, a separate chapter of a subject, a separate lesson, and similar levels. The didactic aspect of the design of educational processes in general schools (theoretical foundations and technology of design) was studied in the researches of G. E. Muravyeva. The expert defines the concept of "designing the educational process" as "it is the determination of the planned educational process and methods of targeted development of students, taking into account natural and social laws, through selection and decision-making within a certain period of time. emphasizes that it is a type of teacher's professional activity. The design of the educational process is carried out in the following stages:

Stage 1. The initial stage of designing the educational process is to study the sources of the content of the subject or activity, for example, to collect materials and get acquainted with their idea (essence), to summarize the ideas put forward in them, consists of categorization and summarization.

Stage 2. The second stage is the determination of a single, general goal regarding the topic of the educational subject (content of the activity), the determination of specific goals to be solved by sub-sections (items) within the framework of the general goal, and a positive decision on the way to achieving the educational goal. directed to the development of tasks to be achieved.

Stage 3. The third stage of designing the educational process is to develop the content of the educational process based on the educational goals and tasks.

Step 4. The most important stage of the design of the educational process is considered, in the fourth stage actions such as choosing the form, methods and tools of the training are carried out.

Step 5. In the next (fifth) stage, the amount of time determined as sufficient for the acquisition of knowledge, skills and qualifications by students, that is, the students of certain concepts, skills and qualifications related to a specific topic (activity content) It is determined how long it can be absorbed.

Step 6. In the sixth stage, a system of exercises (assignments) is developed. The requirement to attach special importance to the effectiveness of the system of exercises (assignments) developed as a result of the stage is the main condition of this stage. It is appropriate to divide the exercise system developed at this stage into the following groups:

a) exercises that must be solved (solved) by students during training;

b) exercises (homework) intended to be performed in extracurricular conditions.

Step 7. At the seventh stage of designing the educational process, tasks such as monitoring the general activities of students and developing a test system are carried out.

Step 8. The last stage of the design of the educational process ends with the application of the created project (template) to the educational process, the study of the final level (efficiency) of the educational process. At this stage, the general condition of the educational process, the achieved achievements and the shortcomings, the causes of their occurrence are analyzed, measures aimed at preventing the shortcomings during the next training are determined.

Pedagogical design objects are shown differently in different studies. In our opinion, the objects and subjects of pedagogical design are detailed and clearly defined in the research of G. I. Kitaygorodskaya: in it, the subject of pedagogical design is the teacher, and its objects are "the pedagogical system, processes, events, situations and their components of pedagogical realities and existence; educational systems of different scope and their components; various forms of pedagogical processes and their components; pedagogical situations; educational and informative communicative space and environment; it is emphasized that it should consist of all types of pedagogical activity and others. Let's consider the sequence of steps and stages of the design process proposed by A.M. Novikov.

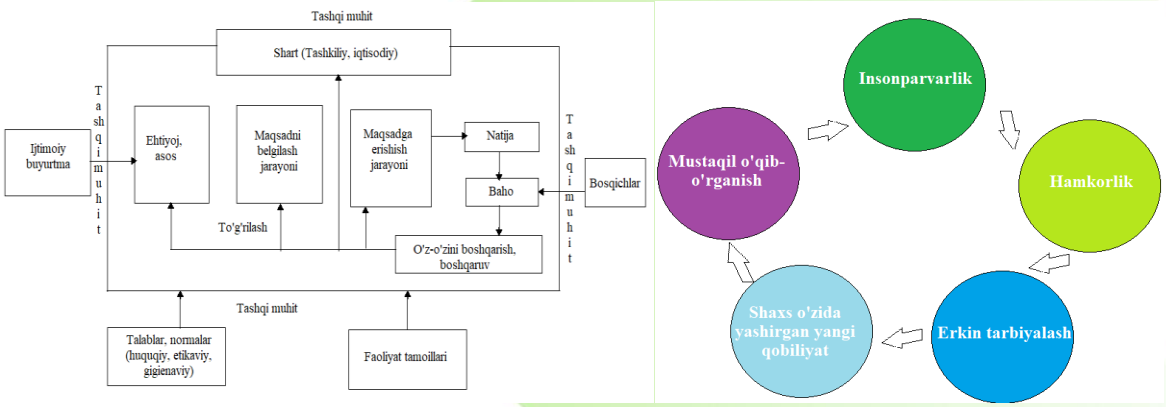

Fig. The general structure of the activity and its interrelationship with the external environment

N.A. Alekseyev, reflecting on the issues of pedagogical design of person-oriented education, states that its basis is "the introduction of the generalized algorithm of pedagogical technology by the pedagogue into the educational practice." According to the author, this algorithm includes elements such as goal clarification, lesson direction, diagnosis of the initial state of the pedagogical system, reflection, prediction, modeling, extrapolating control, implementation, evaluation and correction.

A physics teacher goes through three stages during the systematic design of the educational process. These are: - goal setting and preparation stage (analysis of the basics of the route); - analytical stage (determining the nature of the design object); - synthesis stage (the same as the systematic design of the object).

Summarizing the above points, it can be concluded that pedagogical design activities are presented in research as a complex of various steps, stages, phases, practical and intellectual actions. In our opinion, this situation can be explained by the uniqueness of design objects and their essentially different nature.

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