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PREPARING FUTURE TEACHERS FOR A TECHNOLOGICAL APPROACH TO THE EDUCATIONAL PROCESS AS A PEDAGOGICAL PROBLEM

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Abstract. This article examines the importance of gaining a thorough understanding of the concept of technology in order to apply pedagogical technologies; scholars' definitions of pedagogical technology; the objective laws of education; and the development and improvement of the educational process, its content, methods and tools on the basis of diagnostic objectives. It also discusses the laws and principles underlying the theory and practice of pedagogical technology, the pedagogical system, instructional design and the revision of a project together with students in the classroom, the use of the concepts of "didactic task" and "educational technology", and the development of a pedagogical technology as a design of the educational process that describes the forms and content of students' learning and cognitive activities.

Keywords: pedagogical technology, laws and principles, pedagogical system, design, didactic task, objective laws, diagnostic objectives

During a period of socio-economic reforms, the introduction of innovations into society, the improvement of human labour, the growing need for convenience and continuous renewal are also necessitating a number of changes in the field of education. Today, while preserving the achievements made in education, it is time to abandon certain established stereotypes.

At a time when renewal is taking place in all spheres, introducing innovations into the training of specialists also requires a new, technological approach to the educational process.

The National Programme for Personnel Training of the Republic of Uzbekistan states: "The strengthening of the material, technical and information resources of educational institutions will continue, and the educational process will be provided with high-quality teaching materials and advanced pedagogical technologies."

To apply advanced pedagogical technologies in education, it is necessary to gain a thorough understanding of the concept of technology. The word "technology" is of Greek origin: "techne" means skill or art, while "logos" means concept or doctrine.

The concept of technology is defined as a set of methods and techniques used in production processes to obtain a finished product, as well as a field of knowledge that develops and improves such methods and techniques.

Operations that form part of production processes—such as extracting, transporting, arranging and storing materials—are also referred to as technology. Technology further includes descriptions

of production processes, instructions for carrying them out, technical rules and requirements, and schedules.

Thus, technology refers to a set of production processes in a particular sector, as well as the scientific description of production methods.

The term “pedagogical technology”, used in pedagogical science and practice, derives from the English expression “educational technology” and literally means “technology of education”.

A student or pupil comes to an educational institution to acquire knowledge. In addition to imparting knowledge, the teacher organizes the educational process by seeking the most convenient and effective ways of helping the student learn. Such activity may also be called educational technology. In educational or pedagogical technology, the teacher must not only introduce various teaching methods and approaches into their practice but also make sure that the process produces the intended results. This, in turn, makes it necessary to define the concept of pedagogical technology.

A number of publications point out that pedagogical science has not yet reached a consensus on the definition of pedagogical technology. Nevertheless, several definitions of this concept are available.

The definition approved by UNESCO states: “Pedagogical technology is a systematic method of identifying, creating and applying the entire process of teaching and learning, taking into account technical resources, human capabilities and their interaction, in order to optimize the forms of education.”

V. P. Bespalko stated: “Any activity may be either technology or art. Art is based on intuition, whereas technology is based on science. Everything begins with art, ends with technology, and then begins again.”

Other authors have also offered definitions of pedagogical technology.

An analysis of the existing definitions indicates that the process of understanding and clarifying the meaning of pedagogical technology has not yet been completed. To clarify this issue, it is first necessary to identify the essential features of pedagogical technology.

The study and analysis of pedagogical literature make it possible to identify the following important characteristics of pedagogical technology:

- designing the educational process in advance and revising it together with students in the classroom;
- developing, on the basis of a systematic approach, a design of the educational process that describes students’ learning and cognitive activities;
- ensuring that educational objectives are realistic, specific and diagnostic, and objectively assessing the quality of students’ learning;
- ensuring the integrity of the structure and content of the educational process, as well as their interconnection and mutual influence;
- optimizing (making more convenient and effective) the forms of education;
- taking into account the interaction between technical resources and human potential in the educational process;

- clarifying educational objectives on the basis of a defined standard, in terms of students' observable and identifiable actions;
- organizing instruction around students' active participation;
- identifying and correcting errors made during the process of acquiring knowledge;
- using formative and summative assessments;
- completing test tasks in accordance with established criteria;
- guaranteeing the achievement of the planned learning outcomes;
- ensuring high educational effectiveness.

We have presented the existing definitions of pedagogical technology in a generalized form, summarizing its essential characteristics and features. According to the science of logic, a scientific definition of a concept must combine the concepts of genus and species and indicate the essential features that distinguish the concept being defined from other concepts belonging to the same genus.

In summary, pedagogical technology is a teaching approach and, in a broader sense, a combination of the educational process, resources, forms and methods. Selecting and adapting teaching materials, processing them and changing their format and volume to suit students' abilities and learning characteristics are also part of educational technology. Pedagogical technology is a system for developing and improving the learning process, educational content, methods and tools on the basis of the objective laws of education and diagnostic objectives.

The tasks of pedagogical technology also include defining and describing the process of pedagogical practice; identifying in advance the tasks that pupils or students will encounter in their future activities; determining the content of education at each stage of instruction (the curriculum, learning elements, their logical structure, syllabi and textbooks); determining whether the academic workload corresponds to pupils' abilities and identifying students' learning pace; preparing the forms and resources of education and upbringing (teaching aids and technical teaching equipment); preparing additional situational texts and tests for inclusion in subject content in order to activate the motivational component of the learning process; developing a system of exercises aimed at acquiring the professional qualities and moral values intended to be developed in an individual; preparing tests and assessment tasks to objectively evaluate the quality of students' knowledge and skills in accordance with criteria for learning outcomes, achievement levels and quality; planning assignments for classroom and extracurricular work; and determining the structure and content of independent study.

As a field of science, pedagogical technology aims to identify the pedagogical and psychological laws that make the educational process as effective and economical as possible and contribute to the formation of an individual as a professional. It also seeks ways to apply the laws of philosophy, sociology, physiology, mathematics, cybernetics, computer science and other disciplines.

The theory and practice of pedagogical technology are based on the following laws and principles:

- integrity and unity of the educational process in terms of its structure and content;

- optimization of the educational process: creating favourable conditions and achieving high results with less time and effort;
- modernity: introducing scientifically grounded didactic innovations and new procedures into pedagogical practice, while continuously updating and modernizing educational content;
- scientific approach: applying new forms and resources, active methods and didactic materials in education, and conducting continuous inquiry and research;
- rational organization of student and teacher activities: the teacher must have a thorough understanding of educational objectives and content and be proficient in teaching methods and technical resources; students should demonstrate interest, motivation and commitment;
- intensification of the pedagogical process: developing and widely using didactic materials that improve the effectiveness of information technologies and technical resources;
- creating the material and technical infrastructure required for the educational process;
- impartial and objective assessment of the results of the pedagogical process through testing, a rating system, monitoring students' acquisition of knowledge and skills, and automation of assessment;
- ensuring that education is consistent with nature;
- ensuring that education is adapted to society, and other principles.

The method of pedagogical technology is based on systematic and technological approaches.

The pedagogical system is the foundation and basis of pedagogical technology.

A pedagogical system is an integrated, dynamic socio-pedagogical phenomenon consisting of: the learner (1), the aims of education and upbringing (2), their content (3), the learning process (4), the teacher or technical resources (5), and the organizational forms of education and upbringing (6).

The aims of education and upbringing are objective in nature. They arise from the material and spiritual needs of each society and are generally expressed as a social order in the state's regulatory documents in the field of education. These aims have a system-forming function. All components of the pedagogical system are connected with educational objectives and serve to implement them.

The aim of developing an individual and a specialist determines the content of education, including the curriculum, syllabus and textbooks.

The pedagogical system includes a didactic task and educational technology. The aims and content of education constitute the didactic task, while the didactic process, the teacher and technical resources, and the forms and methods of education constitute educational technology. In pedagogical practice, pupils and students master the didactic task with the help of educational technology.

The essence of pedagogical technology is, first, that it involves designing the educational process in advance and then revising the design together with pupils in the classroom. This can be achieved by using the concepts of "didactic task" and "educational technology".

Second, whereas in traditional pedagogy methodological materials are prepared to help the teacher conduct a lesson, pedagogical technology proposes developing a design of the educational process that describes the forms and content of students' learning and cognitive activities.

Third, an important feature of pedagogical technology is the process of setting objectives. In traditional pedagogy, both theorists and practitioners have paid relatively little attention to the issue of "pedagogical objectives". Objectives have often been expressed vaguely in methodological literature, and the degree to which they have been achieved has been assessed subjectively.

In pedagogical technology, defining pedagogical objectives is a key issue. It involves formulating objectives in diagnostic terms and objectively assessing the quality of knowledge acquisition.

Finally, fourth, the integrity of the educational process in terms of its structure and content is an important principle in the development and implementation of pedagogical technology. The principle of integrity also requires that, when designing a future pedagogical system for each type of education, all its elements be interconnected throughout each quarter, semester and academic year, as well as throughout the entire period of study.

As a result of properly mastering and implementing educational technology, both teachers and students can learn to develop individual programmes based on their needs, while ensuring the relevance of educational content and the effectiveness of the pedagogical process.

A sound, scientifically grounded technology of education and upbringing forms the foundation of pedagogical excellence.

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