



## INTEGRATIVE ESSENCE OF TECHNOLOGIES INNOVATIVE EDUCATIONAL PROCESS

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### ABSTRACT

Presentation of educational technologies in practice. Characteristic features of educational technologies. The main functions of educational technologies. The technological level of education and their types. Multifactoriality and content diversity of pedagogical processes. The developing nature of modern educational technologies.

**Key words:** *technology, educational technology, conceptuality, didactic goal-setting, innovativeness, optimality, algorithmicity, variability and flexibility, diagnostics, predictability.*

### INTRODUCTION

The term "technology" itself, borrowed from the production sphere, of course, is used in education conditionally, and educational technology itself, as a kind of social technology, does not have such a rigid, predetermined character as production technology, and is based on the theory of psychodidactics, social psychology, cybernetics, etc. management.

Technology (as defined by UNESCO) is a systematic method of creating, applying and defining the entire process of teaching and assimilating knowledge, taking into account technical and human resources and their interaction, which aims to optimize the forms of education [1].

1. At the present time, the idea of the unity of the content and procedural components of the educational system: goals, content, methods, forms and means of teaching has been established in pedagogy. In the process of improving and varying educational technologies, their components show a different degree of conservatism: most often the procedural aspects of learning vary, and the content changes only in structure, dosage, and logic. At the same time, the content of education, as an essential part of educational technology, largely determines its procedural part, although cardinal changes in methods and forms entail deep transformations of goals and content. Thus, the procedural and content parts of educational technology are interrelated and adequately reflect each other.

2. In the original sense, the term "educational technology" means "the use for pedagogical purposes of technical advances in the field of communications", such as audiovisual devices, television, computers, etc. In a new and wider sense, educational technology is a systematic method of planning, applying and assessment of the entire learning process and assimilation of knowledge by taking into account human and technical resources and the interaction between them to achieve the greatest efficiency of education.

Educational technology is associated with a systematic approach to education and training, it covers all aspects and elements of the pedagogical system - from setting goals to designing the entire didactic process and testing its effectiveness.

In educational practice, educational technologies can be represented as educational technologies (didactic technologies) and educational technologies.

The characteristic features of educational technologies are:

- conceptuality - the technology is developed for a specific pedagogical intention, it is based on a certain methodological, philosophical, psychological and pedagogical position of the author;
- consistency - the technological chain of pedagogical actions, operations, communications is built strictly in accordance with the target settings, which have the form of a specific expected result;
- didactic goal-setting - the presence of didactic procedures containing criteria, indicators and tools for measuring the results of students' activities and ensuring the guaranteed achievement of educational goals, the effectiveness of the learning process;
- innovativeness - the technology provides for the interrelated activity of the teacher and the student on the basis of educational cooperation, dialogical communication, interactive approaches to learning;
- optimality - optimal implementation of human and technical capabilities, achievement of planned results in a short period of time;
- adaptability - the possibility of operational processing of communication, consistently focused on clearly defined goals;
- reproducibility and guarantee of results - elements of educational technology should, on the one hand, be reproducible by any teacher, and on the other, - guarantee the achievement of the planned results.

The main functions of educational technologies, due to their essence and characteristic features and carried out in an organic unity, are:

- humanistic, developmental function, providing for the implementation of the educational goals of the educational process (creating comfortable psychological and pedagogical conditions for the development of the student's personality, preparing him for life in an information-technological society);
- methodological function, which expresses the general strategic orientation of the training model and involves the implementation of the training strategy into practice through a system of procedures and operations;
- a design and construction function that allows you to plan educational situations, the activities of learning subjects and, with a high degree of probability, guarantee the desired results.

The principles of educational technologies include:

- the principle of the integrity of technologies, which provides for the laws of development of a technological system: the innovativeness of its structure with the harmonious interaction of all its constituent elements;
- the principle of variative-personal organization of training, which presupposes the adaptability of technology to the personal characteristics of students, their typological and individual properties, which have a significant impact on educational activities;
- the principle of fundamentalization and professional orientation of technology, ensuring the formation and development of professional skills and professionally significant qualities of a specialist's personality in accordance with today's and future requirements;
- the principle of information support for the technological effectiveness of education, focused on the use of pedagogically justified means of information computer technology (personal computers, information data banks, computer expert systems, etc.) in the educational process.

## **MATERIAL AND METHODS**

The structural components of educational technology as a systemic category are: learning objectives; content of training; means of pedagogical interaction, including motivation and teaching aids; organization of the educational process; subjects of the learning process; the result of the activity (including the level of professional training).

The technological approach to learning provides for the design of the educational process, based on educational guidelines, goals and content of training. Particular attention is paid to the correction of the educational process and the diagnosis of its quality. In the process of technological design of the educational process, tasks and ways of solving them are sequentially painted at the following levels:

- conceptual (conceptual approaches);
- actually technological - in the form of principles of organizing the educational process and teaching aids;
- normative (training instructions) - in the form of a specific composition and management structure;
- procedural - the implementation of the learning process.

The technological level of training provides for the following mental actions and didactic procedures:

- definition of tasks according to the conceptual model;
- design of effective characteristics formed in the learning process;
- analysis of available training tools;
- translation of pedagogical theory into a strategy for solving tasks;
- development of an algorithm for managing educational activities through the preparation of training programs;
- selection of technological procedures for managing educational activities;
- designing the response of students and the meaningful operational composition of their actions;
- anticipation of compensatory and corrective controls in connection with individual results and unexpected inclusion of outside influences in the pedagogical process;
- development of a diagnostic apparatus capable of registering the state of the "teacher - student" system in order to regulate the effectiveness and consistency of the actions of the teacher and students;
- providing for the flexibility of the technological system, its adaptability, the ability to change the direct and indirect impact on students, depending on intermediate results, learning to analyze their own activities and the formation of professional reflection of the teacher [2].

To describe such complex objects as educational technologies, one should, first of all, highlight their main common qualities.

The most important quality of any technology is consistency as a special quality of a set of components organized in a certain way, expressed in the presence of this set of integral properties and qualities that are absent in its components.

The multifactorial nature and meaningful diversity of pedagogical processes makes educational technologies complex, requiring coordination and interaction of all elements.

The integrity of educational technology lies in the presence of its general integrative quality while maintaining the specific properties of the elements.

Educational technology as a scientifically grounded solution to a pedagogical problem includes the analysis and use of experience, conceptuality, predictability and other qualities, is a synthesis of the

achievements of science and practice, a combination of traditional elements of past experience and what is born of social progress, humanization and democratization of society.

The pedagogical process is always carried out in the name of some global social goals based on the concept - a system of views on the pedagogical process, ideas, principles on the basis of which activities are organized.

## RESULTS

Modern educational technologies are developing in nature.

Modern technologies are characterized by structuredness - the presence of a certain internal organization of the system (purpose, content), system-forming connections of elements (concept, methods), stable interactions (algorithm) that ensure the stability and reliability of the system.

Four hierarchically subordinate classes (levels) of educational technologies are adequate to the organizational levels of socio-pedagogical structures of activity and form the model of the "matryoshka":

1. Metatechnologies (socio-political level).
2. Sectoral macro technologies (general pedagogical and general methodical level).
3. Modular-local mesotechnologies: particular methodical (modular) and narrow methodical (local) levels.
4. Microtechnology (contact-personal level).

The formal and descriptive aspect of the technology is expressed in the logic and clarity of the actions recorded in various documents (project, program, regulation, charter, management, technological scheme, map) and educational and methodological equipment (educational and methodological manual, developments, plans, diagnostic and training techniques).

The algorithmic nature of the spatial structure of this technology consists in dividing it into separate content sections (steps, steps, frames, portions, etc.), which are performed in a certain order, according to the algorithm.

Educational technology is a process - the interaction of its participants developing in time, aimed at achieving the goals set and leading to a pre-planned change in state, transformation of properties and qualities of objects. The development of a purposeful and controlled technological process includes sequential stages of goal-setting, planning, organization, implementation of goals and analytical, which determines the procedural nature (time algorithm).

Any of the technologies located below in the hierarchy is part of the one located above, i.e. connected with it by the bonds of continuity: it accepts the ideology, solves a certain part of the overall task, is coordinated in content, time and other parameters.

The systemic qualities of educational technologies also appear in the unity of the scientific, procedural-effective and formal-descriptive aspects.

The variability and flexibility of the technology is based on changing the sequence, order, cyclicity of the elements of the algorithm, depending on the conditions for implementing the technology.

Management proceeds from the strategic direction of the technology, determined by its values and goals. It assumes the possibility of diagnostic goal-setting, planning, designing the pedagogical process, varying means and methods for the purpose of correction, adaptation, etc. Objectives and management are considered as system-forming factors of educational technologies.

Diagnostic is expressed in diagnostically formulated goals, in the ability to obtain information about the progress of the process and control its individual stages, the ability to monitor the results.

The predictability of the results is a generalized quality of any technology and is expressed, in particular, in the “guarantee” of achieving certain goals.

Pedagogical processes are probabilistic in nature and obey statistical laws, not deterministic ones. The predicted result is also characterized by the degree of its probability and permissible deviations. A guarantee can be given only with a certain degree of probability and within a certain confidence interval of the result values.

Technology efficiency refers to the attitude

result to the amount of expended resources. Modern educational technologies exist in a competitive environment and must be effective in terms of results and optimal in terms of costs.

Optimality is the achievement of maximum results with minimum costs; the optimum technology is the best possible for the given conditions.

Reproducibility implies the possibility of application (transfer, repetition, reproduction) of educational technology in other conditions and by other subjects.

All of the above qualities are at the same time methodological requirements for technologies, criteria of manufacturability. The presence and degree of manifestation of these qualities is a measure of the technological effectiveness of the pedagogical process.

## DISCUSSION

The main goal of the development and implementation of educational technologies in practice is to improve the quality of educational processes, primarily in mass education. Therefore, the following can be considered the main criteria for technological effectiveness of the educational process:

- compliance with laws (reliance on a certain scientific concept underlying the design of this technology);
- integrity (the logical relationship of the structural parts of the pedagogical system, giving it the desired qualities);
- manageability (diagnostic goal-setting, monitoring of the educational process, its necessary correction);
- efficiency (compliance with educational standards, the ability to achieve the set learning goals, optimal time and economic costs);
- reproducibility (the possibility of using other teachers in similar conditions).

Any modern educational technology is a synthesis of the achievements of pedagogical science and practice, a combination of traditional elements of past experience and that born of social progress, humanization and democratization of society. Its sources and constituent elements are:

- social transformations and new pedagogical thinking;
- science - pedagogical, psychological, social and technical sciences;
- advanced teaching experience;
- achievements of scientific and technological progress;
- experience of the past (domestic and foreign);
- folk pedagogy (ethnopedagogy).

The most essential features of educational technologies are the following [3]:

- the technology is developed for a specific pedagogical concept, its basis is a certain methodological, philosophical position of the author (for example, they distinguish the technology of the knowledge transfer process, the technology of skills formation, the technology of personality development, etc.);
- the technological chain of pedagogical actions, operations, communications is built strictly in accordance with the target settings, which have the norm of a specific expected result;
- technology provides for the interconnected activities of the teacher and students, taking into account the principles of individualization and differentiation, the optimal implementation of human and technical capabilities, dialogical communication;
- elements of educational technology should, on the one hand, be reproducible (within the limits of reasonable sufficiency) by any teacher, and on the other, ensure the achievement of the planned results (as a rule, in accordance with the state standard);
- an organic part of educational technology is diagnostic procedures containing criteria, indicators and tools for measuring performance.

In the context of educational reforms, innovative activities aimed at introducing various pedagogical innovations have acquired particular importance in vocational education. They covered all aspects of the didactic process: forms of its organization, content and educational technologies, educational and cognitive activities.

Innovative educational technologies include: interactive educational technologies, project-based learning technology and computer technologies [4].

In the psychological theory of learning, interactive learning is called learning based on the psychology of human relationships. Interactive learning technologies are considered as ways of assimilating knowledge, forming skills in the process of relationships and interactions between the teacher and the student as subjects of educational activity. Their essence lies in the fact that they rely not only on the processes of perception, memory, attention, but, first of all, on creative, productive thinking, behavior, communication. At the same time, the learning process is organized in such a way that students learn to communicate, interact with each other and other people, think critically, solve complex problems based on an analysis of production situations, situational professional tasks and relevant information.

In interactive learning technologies, the roles of the trainer (instead of the role of informant - the role of the manager) and students (instead of the object of influence - the subject of interaction) change significantly, as well as the role of information (information is not a goal, but a means for mastering actions and operations).

Educational innovation is one of the central components of the overall structure of the innovation process at the university. At the same time, the goal of educational innovation is defined by us as the formation of innovative thinking in the student (listener) and acts as the value basis of the methodology for training highly professional specialists.

This approach has led to the search for innovative technologies: pedagogical, intellectual, informational, etc., which together will ensure the implementation of the main goal of higher professional education at the present stage - the formation of a full-fledged personality, ensuring the possibility of obtaining fundamental, comprehensively universal and special knowledge, educating the personality of a constant the need to learn and the ability to adapt to changes in the field of activity.

The introduction of educational innovations is associated with the emergence of a number of problems, which, first of all, should include:

- the difficulty of combining innovative approaches to teaching, new blocks of educational content with existing (including regulated) curricula and programs;
- the need for the coexistence of carriers of different pedagogical ideas in the conditions of one university;
- strengthening the requirements for retraining and advanced training of teachers, ensuring their increasing demands in interdisciplinary professional communication;
- constant search and development of new teaching materials, teaching aids, textbooks, etc .;
- change of the entire management scheme of pedagogical and student (student) collectives that are in an innovative mode;
- inclusion in the educational process of employees of research departments and teachers in active research activities;
- providing conditions for involving students and listeners in the innovation process.

Based on the analysis of modern trends in the development of educational technologies, it is possible to determine the directions of the development of higher professional education, which will determine the overcoming of the above problems:

- widespread use of highly effective learning technologies in the educational process;
- giving education an interdisciplinary character.

## CONCLUSION

We believe that the concept of integrated learning should be based on the indissoluble unity of four parts: scientific-theoretical, epistemological, methodological and practical, which are implemented in the implementation of educational innovations by the following set of principles: consistency, harmonization, instrumentalities, student-centered learning, and advanced development of the educational system. , ease of knowledge, cost-effectiveness and potential intelligent security.

The methodological core of educational innovations is the formation of “participatory thinking” as an individual experience of knowledge.

Based on the analysis of the current state of the education system, it can be noted that the innovative educational technologies used are an indicator of the development of science and technology, an important element of culture, an environment that contributes to the emergence of talented highly professional personnel. A number of conclusions were also drawn from this analysis:

1. The greatest effect from the use of various educational technologies can be achieved only with the integration of the most effective modern methods, means, techniques and a wide arsenal of scientific knowledge into an integral system.
2. The result of the integration of a set of interrelated and complementary educational technologies should be a science-intensive educational technology.
3. High-tech educational technology can be implemented in various types of educational activities: educational, scientific, management.
4. The widespread use of science-intensive educational technology will provide a variety of didactic, social, psychological, pedagogical and methodological results

5. Based on a comparison of the content and conceptual foundations of innovation in a technological university and the content and general principles of the formation of science-intensive technologies, we concluded that the innovation process can be considered as one of the types of science-intensive educational technology. This conclusion is justified by considering educational innovation in a didactic aspect from three points of view:

- philosophical or philosophical-methodological, including learning objectives;
- theoretical or socio-scientific, representing the content of learning, the structure and patterns of the learning process;
- technological, providing normative principles of training organization.

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