

# Essence, Structure and Classification of Educational Technologies

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## ABSTRACT

The article provides a retrospective analysis of the classification of foreign and domestic educational technologies in theory and practice until the beginning of the 21-st century. As a result, the authors have come to the conclusion that until now a holistic idea of educational technologies and their components has not been formed, answers to the questions have not been found: "Is there a lot of educational technologies or is their number limited?", "What is the structure, content and distinctive features of educational technologies? ", " What are the mechanisms for the implementation of educational technologies? ", " By what criteria and features is it necessary to classify educational technologies? " and etc.

With the help of a comparative analysis of scientific and pedagogical literature, various interpretations of the concept of "educational technology", having carried out a reflection of foreign, domestic and own pedagogical experience, the article substantiates the essence, structure and content of the concept of "educational technology", which is presented as a projected ordered system of actions, the implementation of which leads to the achievement of teaching objectives. Based on a system analysis, a distinction has been made between the concepts of "teaching methods" and "educational technology"; the system-forming components of the structure of "educational technology" have been revealed; its bases and signs have been considered and determined; similarities and differences in educational technologies have been found; the author's classification of educational technologies has been developed.

**Keywords:** *Technology, Educational technology, Classification of educational technologies.*

## 1. INTRODUCTION

The "educational technology" category is currently one of the most discussed in the scientific and pedagogical literature. The educational technology is considered both as one of the approaches to the implementation of teaching, and as a method for the implementation of educational goals, and as a principle of organizing pedagogical activities at different levels. Regardless of theoretical concepts, this category has turned into purely practical matter of interest.

The multitude of teaching technologies or other pedagogical categories being identified with them means

that certain unrelated properties are distinguished from the essence of the teaching process. Each of them, in its own way, becomes an aspect of pedagogical research with the construction of a theoretical concept and its technologization. At the same time, any educational technology is focused on achieving certain goals, but the set of these goals is large and heterogeneous.

## 2. RESEARCH METHODOLOGY

The theory and practice of the implementation of technological approaches to the organization and implementation of the educational process were investigated by domestic educationists such as T.A.

Ilyina [0], M.V. Clarin [0], V.M. Minbulatov [3], S.Ya. Batyshev [0] and foreign ones such as J. Bruner [0], R. Burns [0] and others. These authors highlight the possibility of organizing the educational process based on the use of technical means and teaching devices in educational practice as the advantages of the technological approach.

At the same time, educational scientists V.P. Bepalko [0] and V.I. Bogolyubov [0] noted that the penetration of ideas of a technological approach into the educational process had lasted for four decades. As the reasons, they point to the absence of educational technologists, scientifically grounded and experimentally verified technological developments, educational and methodological literature based on the ideas of the pedagogical technology, modern technical means and teaching devices.

Agreeing with this, V.M. Minbulatov [0] supplements this list with the following reasons: uniformity of methodological analysis of educational problems; limiting the range of pluralism, dissent in pedagogical theory; ideological pressure of pedagogical science and practice; denial of the experience of foreign pedagogy; the spread of opinions of scientists and practitioners about the value of pedagogical technology ideas for the national school. There were other scientists [0,0] who did not consider the technological approach as an innovation in domestic science and innovation in school practice.

From our point of view, this range of opinions has not yet been overcome and remains controversial in the Russian education system. The obvious achievements of domestic scientists and educators at the end of the 20th century in substantiating various aspects of the technological approach to the educational process did not lead to the formation of a holistic view of educational technologies and its components.

The content analysis of publications on this topic indicates that their number has doubled in 2010 - 2020 compared to the previous decade. From these positions, it can reasonably be stated that the problems associated with the development of the pedagogical technology theory and its application in educational practice remains relevant.

We have analyzed scientific publications on this topic for 2000-2020 and summarized the experience of using a variety of educational technologies in teaching. The problem of technologization of the educational process was dealt with by such Russian scientists and educators as M.E. Bershadsky and V.V. Guzeev [0], V.V. Zaitsev [0], M.Yu. Oleshkov [0], G.K. Selevko [0], A.A. Faktorovich [0], N.E. Shchurkov [0] and others. Analyzing their works allows us to say that educational technologies are a tool to improve the pedagogical activity quality. This conclusion is also prompted by the

definitions of M.V. Klarin [0], who saw "educational technology" as "a systemic totality and orderliness of the functioning of all personal instrumental and methodological means ...". M.E. Bershadsky and V.V. Guzeev [0] defined "educational technology" as "... an ordered set of actions, operations and procedures that instrumentally ensure the achievement of the predicted result," application, and definition of the whole process, teaching, assimilation, which aims to optimize the forms of education. "

### 3. RESULTS

The tendency of substitution of ideas about "educational technology" in some cases with the terms "teaching technology", "teaching technology" persists, in others it is substituted with the terms such as "methodology", "teaching methodology", "teaching methodology". Discussions about "educational technology" in general are reduced to "lesson know-how", "knowledge control technology", "practice organization technology", etc., which should be considered as fragments or parts of the educational technology itself.

Learners have a different palette of motives and needs, the leading type of activity and the level of their learning, so no educational technology can become universal. If we agree with this statement, then the existence of many educational technologies and the continued growth of their number are completely justified.

This circumstance can be considered as the basis for identifying the features of the classification of pedagogical technologies and searching for an answer to the question, what is the structure of "pedagogical technology".

To establish the essence of "educational technology", a comparative analysis of key words carrying a semantic and logical load in its definitions was carried out.

The authors of the first group use nouns that mean a set of objects: "system", "complex", "set".

The authors of the second group use words denoting individual objects: "method", "knowledge", "process", "area", "project", "approach", "model", "technique", "direction", "part", "art" and "excellence", "skill".

Scientists of the third group define the educational technology using nouns denoting actions: "description", "construction", "design", "reproduction", "improvement", "embodiment", "training", "phenomenon", "use", "application", "interpretation".

This analysis shows the diversity in understanding the term "educational technology" and the breadth of the range of interpretation of the concept using more than three dozen words meaning various classes of objects and

phenomena. The comparative analysis of existing definitions leads to the idea that most scientists are unanimous in the fact that technological effectiveness is expressed in a variety of objects and phenomena, which together constitute a process.

The target component of the definitions of the pedagogical technology fixes attention on its effectiveness. For example, "... achievement of the set goals", "... reproduction of pedagogical actions guaranteeing success" [0], "... achievement of predicted results" [0], "... achievement of planned teaching outcomes" [0], "... achievement of educational goals" [0], "... effective achievement of the set goals" [0], "... the most effective achievement of the set goals" [0], "... achievement of specific goals" [0], "... the optimal way of action (achievement of the goal) under the conditions given" [0], "... achievement of specific and potentially reproducible pedagogical results "and" ... reproduction of pedagogical actions guaranteeing the success" [0].

The qualitative originality of educational technologies is determined by their goals, content, pedagogical processes, and the specific conditions of their course. The study of the essence of educational technologies, their use as an effective way to solve pedagogical problems is complicated by the lack of scientific and methodological tools, which can be a scientifically based classification that includes all educational technologies known in practice.

The previous analysis makes it necessary to substantiate clear criteria and features of the classification of pedagogical technologies and for this it is necessary to have an idea of their essence and know their entire list known to science and practice at this stage.

We started the classification of educational technologies from such a basis as "goal". The goal of the pedagogical technology is to build the potential of the learner, which can be considered from three positions: education, training and development.

The educational technology is necessary for the formation of positive personal qualities of the student, his/her general culture and its individual components. These include such technologies as personality-oriented, the situation of creating success, resolving conflicts, organizing and conducting educational activities, etc.

The purpose of didactic technologies is to form the knowledge, skills and competencies of the student. This class of educational technologies has been the most researched and is widely used in educational practice.

Developing educational technologies are aimed at the growth of mental properties and personality traits such as thinking, memory, attention, innate abilities, etc. This category includes technologies for critical thinking, technologies for self-development, etc.

Another source of classification is "teacher and learner". The educational technologies of this group have long been known and there is no need to disclose their features within the framework of this article. However, I would like to note that today a dynamically developing type of the educational technology from this group is an interactive technology. In some experts' opinion, integrated technologies include gaming, computer, information and communication technologies, case technologies, heuristic ones etc.

The next basis for classification is "content". According to the degree of novelty of the content, routine, supportive and innovative educational technologies can be distinguished.

If repetitive educational material has been reproduced and invariably studied over the years, then educational technology becomes "a dime a dozen".

The teaching technology associated with mastering the past experience of culture and allowing it to be reproduced and preserved can be called "supporting".

The "innovative" educational technology is focused on obtaining new knowledge and a way of acting, and the implementation of future activities. Shock technologies include educational technologies in which the teaching process is carried out in the course of unexpected situations, cases and events.

The allocation of educational technologies on such a basis as the "pedagogical process" is associated with four features: according to the concept of assimilation; according to the way of teaching process organization; according to the degree of cognitive activity of students; according to the leading teaching tool. This group is described in sufficient detail in the pedagogical literature, therefore, we will only explain some of them.

The motor training system was developed in the 20-30s of the last century in the USSR by the Central Institute of Labor (CIL). The main idea was to train individual movements by making them automatic and their gradual integration into labor actions.

The author of the problem and analytical technology for training specialists S.Ya. Batyshev [**Error! Reference source not found.**] builds the following chain of training actions: identifying a certain problem (it can be technical, artificially created, accidentally arising), analyzing and revealing the causes, performing actions to eliminate its consequences.

The last systemic element of the classification basis is the "way of organizing activities". Depending on the product of the activity (product, design, project, etc.), the educational technology is divided into such types as subject-operational, design-technological, project, research, creative and design-heuristic ones. Depending on what educational tasks and to which of the students

and at what stage they are presented for execution, educational technologies can be divided into multi-level, differentiated, step-by-step and modular types.

Thus, the analysis of the bases, features and existing types of technologies allowed us to develop the author's classification of educational technologies (table 1).

#### 4. CONCLUSIONS

Based on the developed classification, we consider educational technologies as an ordered system of actions, the implementation of which leads to a guaranteed achievement of pedagogical goals and the implementation of two main features of the technological

**Table 1.** Classification of educational technologies

Basis	Feature	Types of technologies
Goal	Depending on the goal	Educative didactic developing combined
Teacher and learner	By control style	Authoritarian cooperation personally developing
	By type of interaction	Passive active interactive
	By the coverage of learners	Individual in groups massive
Content	According to the degree of novelty of the content	Routine supportive innovative
Pedagogical process	By the concept of assimilation	Associative-reflex behavioristic gestalt technology interiorisation neuro-linguistic programming suggestive
	By method of organizing the teaching process	Explanatory and illustrative problematic playing
	By the degree of cognitive activity of students	Motor-training reproductive problem-analytical heuristic
	By Leading Learning Tool	Programmed computer information and communication multimedia case technologies
Method of organizing activities	By products of pedagogical activity	Subject-operating design and technological project research creative design heuristic
	Through the differentiation of educational tasks	Multilevel differentiated step-by-step modular

effectiveness of education: reproducibility and diagnostics of pre-planned results.

Both aspects are becoming components of the educational technology. The first component is the design of the pedagogical system (development, description, justification) of different levels and meanings, which take into account the specific conditions of its functioning. The second part of the educational technology is the activity for implementing the project of the pedagogical system. It should be noted that by definition, the project of the pedagogical system must contain everything necessary for its implementation and must be described in such a way that any qualified specialist (teacher) can implement it and get the desired result.

Thus, the final result of the implementation of one or another educational technology directly depends on the goal - therefore, there is no need to create another classification group on its basis.

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