



THEORETICAL FOUNDATIONS OF USING SYSTEMIC ANALYSIS IN PEDAGOGICAL PROCESSES WITH INNOVATIVE PEDAGOGICAL TECHNOLOGIES

Oybek Temirxo'jayev Dilshodjon O'g'li

Master's Student, Webster University in Tashkent

Oybek8282888@gmail.com

Abstract: This article explores the new pedagogical technologies of systemic analysis in pedagogy, a pivotal concept in an innovative educational environment. It particularly emphasizes information about the pedagogical system, the enhancement of pedagogical technologies, and the principles of pedagogical technology.

Keywords: Technology, pedagogical technology, pedagogical system, enhancement of pedagogical technology, foundations of pedagogical technology, pedagogical skills, types of pedagogical technology, principles of pedagogical technology.

Analysis of pedagogical literature reveals that the concept of pedagogical technology has firmly established itself in the science of educational practice and theory. However, its precise place in comprehensive pedagogical dictionaries remains unclear. The formation and development of the concept of pedagogical technology have been marked by various perspectives: it has been interpreted as a doctrine concerning technical tools and as a systematic and consistent organization of the teaching process through design.

Different approaches to defining pedagogical technologies indicate that teaching technologies indeed occupy a space between science, production, and the educational-



pedagogical process. It is an independent field within the system of professional didactic preparation, closely intertwined with the theory and practice of didactics. It encompasses the functions of designing and structuring the management of educational activities.

The components of teaching technology include specific methods for managing the educational process, as well as theoretical and practical knowledge about promising management and teaching measures. Their consistency is determined in accordance with the conditions of the educational process.

It is worth noting that "pedagogical technology" and "pedagogical system" are often interrelated phenomena. The pedagogical process, as a dynamically evolving and manageable process, establishes technological relationships. The term "technology" is used in various contexts. For instance, the concept of "pedagogical technology" can be defined in several ways: The term "technology" originates from the Greek words "techne" (art, skill) and "logos" (knowledge), meaning the study of the "science of craft." This concept was first used in 1872 to express the content of technical progress.

Today, the concept of "technology" is applied to denote the following:

- A collection of arts, skills, methods, or processes serving to transform a specific situation;
- A cultural concept linked to human activity and thought;
- Intellectual processing of technically significant qualities and abilities;
- A set of knowledge about methods for implementing a specific process;
- A pedagogical system project requiring implementation in practice.

The term "modern technological process" refers to activities aimed at performing specific operations in a particular sequence using necessary tools and conditions. More precisely, it involves step-by-step influence through labor tools and objects to create a finished product. Applying this definition to the research topic, pedagogical technology



can be understood as a social phenomenon where a teacher (pedagogue), using educational tools, systematically influences learners under specific conditions. The outcome of this activity is the intensive formation of socially necessary and predefined qualities in learners.

Technology is the art of processing a set of methods, transforming an existing state. It is the ability to master and apply technically significant developments. It is a tool for purposeful, organized, and intentional pedagogical influence on educational processes. Technology is a method that guarantees planned success in educational outcomes. As observed, perspectives on pedagogical technology converge to provide common conclusions. Its focus on achieving specific, effective results underscores its significant role in pedagogy. Modern approaches to advancing pedagogical science emphasize the improvement of pedagogical technologies, which remains a focal point for pedagogical scholars. Educational technology is formed and developed based on the pedagogical system, and its quality must align with contemporary needs, becoming a demand of the era. Here, technology serves as a bridge between theory and practice. Without technology, individual pedagogical sciences cannot fully translate into practice.

The widespread application of pedagogical technology in the educational process faces challenges. Firstly, the theoretical foundations of pedagogical technology are quite complex. Secondly, the difficulty lies in the fact that pedagogical scholars and teachers have not fully mastered the synergetic theory of systems. Without a comprehensive understanding of systems theory, one cannot fully grasp the essence and content of pedagogical technology. Without knowledge of the synergetic worldview and its principle of approaching reality as a whole, pedagogical technology cannot be effectively integrated into practice.

Pedagogical technology is a scientifically grounded and selectively applied means of influence aimed at maximally developing an individual's potential in educational processes. It is a broad, individualized system of unique interactions between the



pedagogue and the learner. The term "technology" in education acknowledges the art of influencing learners at a professional level. In other words, "techne" signifies the art of skill, and "logos" denotes doctrine. Pedagogical technology expresses the professional system of a pedagogue's mastery in influencing learners. It is not merely about technical tools but a collection of analytical materials, innovative effective structures, and methods designed to optimize educational processes.

Thus, pedagogical technology addresses questions related to organizing educational processes and achieving goals, including:

- Identifying the characteristics of existing technologies when introducing new ones;
- Defining the purpose of the technology;
- Establishing quality indicators and requirements;
- Formulating mechanisms and principles to achieve set goals and requirements;
- Structuring the technological process to define parameters and balance;
- Developing technological maps and diagrams;
- Defining the motivating functions of the technology;
- Establishing principles for distributing psychological, physiological, technical, and other resources.

Influencing learners requires several parameters, such as rational-emotional states, general developmental levels, age, the formation of relationships, and moral and intellectual development. These parameters define the learner as an object. The subject's influence is then selected relative to the identified object (education must avoid insult, humiliation, or negative impact, as noted by V. M. Koretkov).

Foundations of Pedagogical Technology:

1. The practical appropriateness of respecting the learner;



2. The purposeful and logically justified pedagogical influence;
3. The completion of every task.

Pedagogical Skills:

1. Psychological-pedagogical erudition;
2. Professional mastery;
3. Pedagogical technique.

Types of Pedagogical Technology:

1. Instructional and demonstrative educational technology, which provides information about activities related to teaching general education subjects.
2. Person-centered educational technology, aimed at fostering self-development.
3. Developmental educational technology, comprising tools and methods to develop the learner's personality.

The distinctive features that set pedagogical technology apart from other educational methods are as follows:

Firstly, as emphasized earlier, pedagogical technology is created based on a synergetic worldview and the principle of a holistic approach to objective phenomena and processes. Previous pedagogical methods were more flexible in structure, with lesson content largely at the teacher's discretion.

Secondly, pedagogical technology guarantees the achievement of predefined primary goals. Unlike other pedagogical methods, which often rely on spontaneous results without guaranteed outcomes, pedagogical technology ensures planned success.

Thirdly, pedagogical technology achieves its primary goal step-by-step, with each stage defining specific objectives, tasks, required tools, and precise modules of methods



and approaches. In contrast, other pedagogical methods set a general goal at the end of the educational process, leaving the path to achieving it to the teacher's discretion.

Fourthly, pedagogical technology is universal, enabling any specialist, even if not exceptional, to implement it effectively. The intensity and effectiveness of a lesson are minimally dependent on the pedagogue's skills or personal qualities.

Pedagogical technology in educational processes develops and takes shape based on specific principles.

The first principle is “consistently adhering to a holistic approach.” This means that when designing and applying a lesson plan, the principles and rules of the holistic approach must always be followed. The rules of the holistic approach include:

- Viewing any object or phenomenon under study as a whole (system), which is the foundation of the holistic approach.
- Recognizing that any whole consists of several parts (elements) that are functionally interconnected.

Additionally, every part of a whole is itself a whole, consisting of smaller wholes (sub-elements). Each whole is an element of a higher-level whole, and so forth. This reflects the hierarchical principle of the holistic approach.

The second principle is “dividing the subject into layered modules.” Based on the holistic approach, to apply pedagogical technology to the lesson process, the entire subject must first be treated as a whole and divided into several smaller wholes (modules) based on the type of knowledge and their internal connections. These can be conditionally called “large modules.” The second stage involves dividing large modules into “medium modules,” considering the similarity of knowledge, the relative completeness of content, and the volume of knowledge deliverable within a single lesson. The volume of



knowledge in each medium module should be manageable within the time frame of one lesson.

The third principle is “ensuring that students comprehend, retain, and apply the given knowledge in practice simultaneously.” To ensure students fully understand and assimilate the knowledge, a problematic situation must be created during the lesson. Sparking students’ interest in the knowledge to be delivered enhances effectiveness. To create a problematic situation, real-life examples are used, and questions are posed to students. Some student responses are expected, but prolonged waiting may reduce interest and waste allocated time. Thus, after hearing one or two student responses, correct or incorrect, the teacher connects their answers to the correct response, enabling students to better comprehend the lesson’s content.

The fourth principle is “ensuring that the outcomes of goals are expressed in actions.” As a continuation of the previous principle, this requires pedagogues to transform the knowledge given to students into skills. The final outcome of the knowledge should manifest as a skill, meaning students can perform specific practical activities based on the acquired knowledge. These actions take the form of tasks or activities, indicating their completion. At a minimum, students should be able to independently articulate the given knowledge. If the knowledge is tied to practical activities, students must perform specific tasks based on that knowledge, which is a fundamental requirement of pedagogical technology.

The fifth principle is “identifying key concepts.” When designing a lesson based on pedagogical technology, it is essential to identify the key concepts within the modules. Key concepts refer to the core essence of each piece of knowledge expressed in a specific concept. For example, if two modules are allocated for introducing new information in a lesson, each module may cover two or three new pieces of knowledge. These are conveyed to students through concepts, with one or two concepts revealing the essence of the



knowledge. These key concepts must be identified before the lesson and consistently considered during the lesson process.

The sixth principle is “defining control questions and criteria for assessing students’ knowledge and skills.” Control questions are developed based on key concepts. If there are few key concepts, questions can be directly formulated from them. If there are many, the most important ones are selected and turned into control questions. Monitoring and assessing students’ knowledge is necessary to observe the impressions left on students, their attitudes toward their peers’ achievements and shortcomings, and their progress. A rating system has been introduced to ensure regular and systematic assessment throughout the academic year, providing opportunities for consistent evaluation.

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