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INNOVATIVE METHODS IN THE DESIGN OF THE PEDAGOGICAL PROCESS, BASED ON CONSTRUCTIVE EFFICIENCY

MÉTODOS INNOVADORES EN EL DISEÑO DEL PROCESO PEDAGÓGICO, BASADOS EN LA EFICIENCIA CONSTRUCTIVA

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ABSTRACT

The article provides an in-depth analysis of the modern dimension of the concept of "pedagogical technology", which acts as a key element in the development of effective educational strategies. Special emphasis is placed on the technological aspect of pedagogy, which includes not only the selection of adequate teaching aids, but also a deep understanding of the process of pedagogical design from a technological point of view. The authors reveal the essence of pedagogical technology as a complex system that includes not only professional knowledge and skills, but also a high level of general culture, humanistic orientation and creative and pedagogical competence. Particular attention is paid to how a technological approach can change the quality of pedagogical design, transforming it from a simple way of presenting information to a more complex and effective process that includes the mastery of learning and design technologies. An important aspect of the study is how mastery of pedagogical technologies can contribute to the improvement of the pedagogical design process, providing greater flexibility, adaptability and efficiency in response to modern challenges of the educational environment. The authors also

consider examples of successful implementation of technological innovations in pedagogical practice, analyzing their impact on the learning process and student development. The article aims not only to clarify the theoretical aspects of pedagogical technology, but also to provide practical recommendations for teachers who seek to integrate innovative technological approaches in their work.

Keywords:

Educational system, pedagogical conditions, pedagogical technology, technological innovations.

RESUMEN

El artículo proporciona un análisis en profundidad de la dimensión moderna del concepto de «tecnología pedagógica», que actúa como elemento clave en el desarrollo de estrategias educativas efectivas. Se pone especial énfasis en el aspecto tecnológico de la pedagogía, que incluye no sólo la selección de material didáctico adecuado, sino también una comprensión profunda del proceso de diseño pedagógico desde un punto de vista tecnológico. Los autores revelan la esencia de la tecnología pedagógica como un sistema complejo que incluye no

solo conocimientos y habilidades profesionales, sino también un alto nivel de cultura general, orientación humanista y competencia creativa y pedagógica. Se presta especial atención a cómo un enfoque tecnológico puede cambiar la calidad del diseño pedagógico, transformándolo de una forma simple de presentar información a un proceso más complejo y efectivo que incluye el dominio de las tecnologías de aprendizaje y diseño. Un aspecto importante del estudio es cómo el dominio de las tecnologías pedagógicas puede contribuir a la mejora del proceso de diseño pedagógico, proporcionando mayor flexibilidad, adaptabilidad y eficiencia en respuesta a los desafíos modernos del entorno educativo. Los autores también consideran ejemplos de implementación exitosa de innovaciones tecnológicas en la práctica pedagógica, analizando su impacto en el proceso de aprendizaje y el desarrollo de los estudiantes. El artículo pretende no sólo aclarar los aspectos teóricos de la tecnología pedagógica, sino también proporcionar recomendaciones prácticas para los profesores que buscan integrar enfoques tecnológicos innovadores en su trabajo.

Palabras clave:

Sistema educativo, condiciones pedagógicas, tecnología pedagógica, innovaciones tecnológicas.

INTRODUCTION

The concept of “technology” entered our everyday life in parallel with the development of computer systems and the introduction of innovative computer technologies. In the scientific world, this led to the emergence of a new field - pedagogical technology, which originated in the 1960s in the USA and England and since then has spread throughout the world.

In the modern educational space, there are many different pedagogical technologies, each of which has its own goals, tasks, structure and methodology. These technologies include accelerated learning methods, group learning, educational games, distance learning, etc. They are used not only in the field of education, but also in other fields of activity. However, the creation of a universal learning technology that would allow each teacher to form an ideal personality that meets all the requirements of modernity remains a distant goal.

A distinctive feature of pedagogical technologies is their ability to provide a more effective learning process,

stimulating the interest and motivation of students. The main component of any technology is a means of learning, which allows us to assert the existence of a single basis of learning technologies (Vygotsky, 1978ab). According to the classification of teaching aids into three levels – educational session, educational subject and the entire educational process, the following levels of educational technologies can be distinguished:

- Lesson technology.
- Subject technology.
- Technology of the educational process.

The technological approach in educational institutions covers various forms of classes, including:

Lessons or their elements aimed at monitoring the assimilation of knowledge using various technical means that allow you to quickly assess the quality of the acquired knowledge.

Laboratory and practical work that students perform independently, using specially developed methods and tools.

Modern pedagogical technology is not limited to the use of digital tools, but also emphasizes the integration of innovative pedagogical approaches that include elements of gamification, interactive learning, critical thinking, and research-based learning. This reflects the growing need to prepare students to solve complex tasks in a dynamic and rapidly changing world.

Another important aspect is the use of a differentiated approach in pedagogical technology, which allows adapting the educational process to the individual characteristics of each student. This means that technologies allow implementing an individual approach, providing optimal conditions for the development of each student depending on his abilities and needs.

In the context of the modern educational space, pedagogical technologies play a key role in the implementation of inclusive education. Thanks to technology, learning becomes more accessible to students with special educational needs, enabling them to effectively integrate into the educational process (Piaget, 1970; Salomon & Perkins, 1998; Bransford et al., 2000).

In addition, pedagogical technology plays an important role in the professional development of teachers. It contributes to the improvement of teaching skills and methods, helps teachers stay abreast of modern educational trends

and innovations. Thus, pedagogical technology not only improves the quality of education for students, but also supports the constant development and improvement of teachers' professional competences.

Given the rapid pace of technological development, it can be assumed that the role and importance of pedagogical technologies will only grow in the future, opening up new opportunities for effective and innovative education.

A general review of the literature on the topic "Innovative methods in the design of the pedagogical process based on constructive effectiveness" includes the following key points:

Bloom's Taxonomy: The works of Anderson et al. (2001), are dedicated to the further development of the taxonomy of learning and assessment, which helps to determine the levels of difficulty of tasks and learning objectives.

Constructivism: Duffy & Cunningham's (1996), sources examine constructivism as a pedagogical theory that emphasizes the active construction of knowledge by students.

The importance of multimedia learning: Mayer's (2003), work points to the importance of using different media to improve learning effectiveness.

Learning communities: Wenger (1998), emphasize the role of learning communities in supporting effective learning and knowledge sharing.

Interactive Learning: The work of Hmelo-Silver et al. (2007), discuss the importance of collaboration and support in student problem solving.

Reflection: Papert's (1980), and Schön (1983), work points to the importance of reflection in the learning process, where students reflect on their experiences and conclusions.

Model of multiple intelligences: Gardner's (1999), literature addresses the idea of multiple intelligences, pointing to the individualization of learning.

These sources offer a broad overview of approaches to the pedagogical process, emphasizing active learning, interactivity, and the importance of student reflection. Considering them in the context of your research work, you will be able to determine the most suitable methods and approaches for achieving constructive effectiveness in the pedagogical process.

Object of research: Pedagogical process in modern educational institutions. Covers a wide range of interactions,

methods and practices used in the learning process, including teacher-student interactions, teaching methods, assessment, preparation and use of learning materials.

Research subject: Innovative methods and approaches in the design of the pedagogical process, which are based on constructive efficiency. It includes the study of such aspects as the integration of the latest technologies in the educational process, the development and application of effective teaching methods, student motivation strategies, as well as the assessment of their impact on the quality of education and educational results.

The purpose of the study: to determine and evaluate the effectiveness of innovative methods in the design of the pedagogical process, based on constructive effectiveness. The goal is to develop recommendations and strategies for optimizing the learning process, which can be used by educational institutions to increase the overall effectiveness of learning, in particular by increasing the interest and motivation of students, improving the understanding of the learning material, and ensuring a deeper and more sustainable assimilation of knowledge.

MATERIALS AND METHODS

The main research methods were used in the article:

Literature review: Analysis of scientific publications, articles, books and other sources that consider modern approaches and innovations in pedagogy. This allows you to collect the theoretical basis of the research and identify key concepts and trends.

Empirical methods: Using surveys, questionnaires, interviews and observations to collect data from teachers, students, educational administrators. This allows you to get practical information about the effectiveness and application of innovative methods in real educational conditions.

Case studies (case analysis): Detailed analysis of specific examples of successful application of innovative methods in the pedagogical process. This helps to identify success factors and possible problems in their implementation (Jonassen & Land, 2012).

Experimental methods: Development and implementation of pedagogical experiments to assess the impact of specific innovative methods on the educational process and student results.

Data analysis: Using statistical methods to analyze collected data, which allows for trends, correlations, and significance of results.

Synthesis and modeling: Development of theoretical models or scenarios that integrate innovative methods into the pedagogical process, followed by analysis of their potential effectiveness and practicality.

In the framework of this research, complex methods were applied, including the analysis of philosophical, psychological and methodical literature, in particular, works devoted to the problems of distance learning. Special attention was paid to the complex design of the pedagogical process, which covers such aspects as analysis, diagnosis, forecasting and development of activities.

A three-level approach to design technology is considered, including projective-content, projective-material and projective-operational aspects. It is important to note that the effectiveness of pedagogical design does not depend on formal documentation (for example, in the form of a plan-summary), but requires deep analysis, creativity and mental work of the teacher.

Special attention is paid to understanding the stages of pedagogical activity and tasks related to them, which play a key role in the formation of personality (Siemens & Downes, 2008; Macanchí et al., 2020; Zambrano et al., 2022; Acuña, 2023). A significant role is assigned to diagnostics, which involves an assessment of the state of the pedagogical process and its components based on a comprehensive analysis.

Issues of thematic planning of educational material were also considered, including the development of calendar plans, establishment of cross-curricular connections and integration with extracurricular educational work. The importance of detailed planning, taking into account the system of questions, tasks, independent work and homework, is emphasized (Marzano et al., 2001).

This approach emphasizes the need for deep understanding and analytical work of the teacher at each stage of the pedagogical process, from the identification of pedagogical tasks to their implementation and evaluation.

The technology of lesson planning, which includes determining the purpose of the lesson, developing the didactic apparatus and establishing the structure of the lesson, can be used the following approach:

Stage 1

Defining the purpose of the lesson:

An integrated approach to the goals: In addition to the emphasis on the assimilation of knowledge, the

development of skills and abilities, the formation of creative activity, it is important to consider the integration of digital literacy, critical thinking and collaboration.

SMART goals: Formulation of lesson goals according to the SMART principle (specific, measurable, achievable, realistic, time-bound) to ensure their clarity and effectiveness.

Stage 2

Specific development of didactic apparatus:

Content and methods: Adaptation of content and methods to the age characteristics of students, including differentiated tasks for different levels of abilities.

Technology: Incorporating modern technologies such as interactive whiteboards, mobile voting apps or quizzes that promote engagement and interactivity.

Stage 3

Setting the structure of the lesson:

Structure flexibility: Development of alternative lesson scenarios to enable rapid adaptation to changing circumstances or student needs.

Interactive elements: Implementation of active forms of learning such as group discussions, role-plays, research projects that promote critical thinking and independent learning.

Stage 4

Reflection and assessment:

Feedback: Providing mechanisms for collecting feedback from students, which helps to evaluate the effectiveness of the lesson and identify possible areas of improvement.

Self-analysis of the teacher: Planning time for self-analysis and evaluation of own work, identification of strengths and weaknesses of teaching.

Stage 5

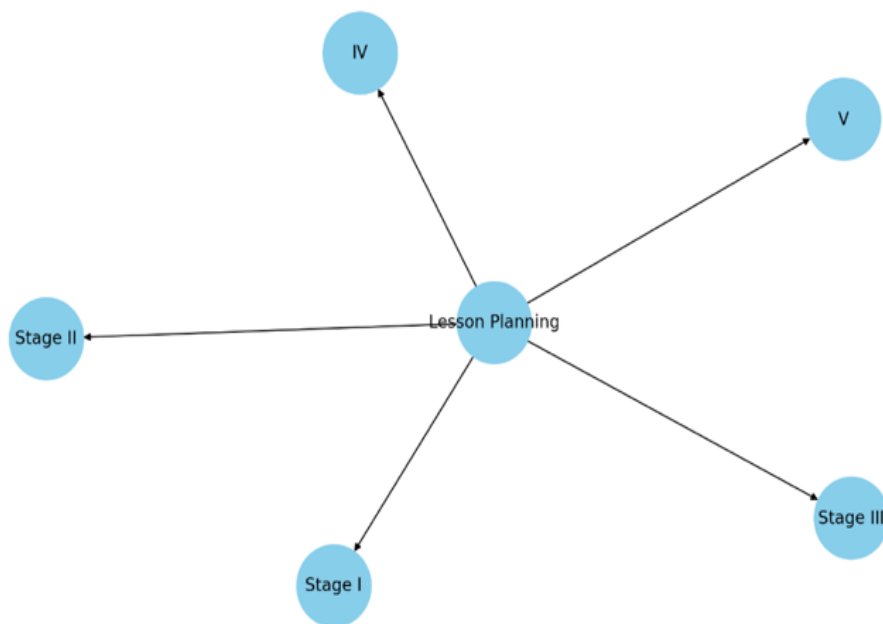
Adaptive learning:

Individualization of learning: Implementation of practices of individualization of learning, where students have the opportunity to work on tasks according to their interests and level of development.

Use of learning analytics: Application of tools for analyzing data on student performance and progress, which helps the teacher in adapting the learning process.

1. Thus, the lesson plan becomes more comprehensive, takes into account modern educational trends and the needs of students, contributing to the creation of a dynamic, effective and motivating learning environment, the structural diagram is shown in Figure 1.

Fig. 1: Structural diagram of lesson planning.



Source: Preparation of authors

Here is a flowchart of lesson planning that shows the main steps and components of this process. In the center is “Lesson planning”, from which branches go to each of the stages: “I stage” (Determining the purpose of the lesson), “II stage” (Development of didactic apparatus), “III stage” (Establishing the structure of the lesson), as well as to sections “Reflection and assessment” and “Adaptive learning”. This diagram demonstrates the relationship and sequence between the various stages of planning.

Thus, an innovative method in the design of the pedagogical process, which is based on constructive efficiency, may include the following components:

Project-oriented approach: Students work on real projects, which allows them to apply theoretical knowledge in practice. It helps develop critical thinking, creativity, teamwork and problem solving skills.

Flipped Classroom: In this method, the traditional elements of homework and lectures are reversed. Students are exposed to new material at home through video lectures and other resources, and classroom time is used to study the topic in depth through discussions, practical exercises, and group work.

Integrating digital technologies: Using e-textbooks, educational platforms, mobile apps, VR/AR and other digital tools to provide more interactive and engaging learning.

Interdisciplinary connections: Integration of different disciplines within the framework of one project or lesson. This allows students to see connections between different areas of knowledge and understand their practical significance.

Involvement of students in the evaluation process: Students participate in self-evaluation and evaluation of the work of their classmates, which contributes to the development of critical thinking and responsibility for their own learning.

Emphasis on soft skills: Developing communication skills, leadership, emotional intelligence, and other soft skills that are essential for today’s workplace.

These components make it possible to create a more flexible, adaptive and effective learning environment that prepares students for the real challenges of the modern world.

A key aspect of the development of the modern educational process is the formation of a detailed plan or outline that reflects the characteristics and experience of each teacher (Hattie, 2009). This process, which is based on a science-based approach, includes the analysis of existing methods and the integration of innovative teaching strategies that meet the needs of today's students.

It is important that the planning of educational and cognitive activities corresponds to the most modern educational trends, such as the integration of technologies, orientation to the practical application of knowledge, as well as the development of critical thinking and creative skills of students. At the same time, planning should be flexible and adaptive to take into account the individual needs and specifics of each learning group.

Modern approaches to learning, such as project-based learning, emphasize the importance of research activities, contributing to the formation of students as active participants in the learning process. This approach involves creating conditions under which students can develop their own projects that have practical application and contribute to the development of important life skills.

Science-based planning also includes taking into account the possibilities of cooperation with various educational, cultural and sports organizations, expanding the horizons of the traditional educational environment. Plans defining the strategy of education and upbringing should be purposeful, specific, systematic, and also include various forms and methods of education.

Completion of planning involves flexibility and variability, providing the opportunity to take into account the individual characteristics of students, their age and educational needs. This ensures the reality and practicality of learning, connecting theoretical knowledge with real life and preparation for future professional activity.

A modern teacher must possess competencies in the field of design and scientific research, which are key to the effective development of the pedagogical process. Research in the educational field is aimed at identifying and solving problems in the interaction between teachers and students, in the work of educational systems and other areas. Identifying and analyzing contradictions between the components of the pedagogical system, educational outcomes, and societal expectations is an important part of this process.

Effective design technology of pedagogical research involves a number of steps:

Analysis of the pedagogical system: Understanding its functioning and identifying key problems.

Defining the research topic: Limiting the research work to a specific topic.

Choosing the object of research: Identification of the area where there are problems or contradictions.

Defining the subject of research: Focus on a specific element that will provide new knowledge.

Formulation of the purpose of the research: Determination of the expected knowledge.

Development of research objectives: Planning specific steps to achieve the goal.

Hypothesis formation: An assumption that will be confirmed or disproved in the course of the study.

Choosing research methods: Using scientific methods to collect and analyze data.

Planning stages of research: Determination of directions and terms of research implementation.

Inclusion of research participants: In the case of collective research, definition of roles and responsibilities of participants.

As part of this process, design involves the development of detailed models of planned processes and phenomena, taking into account the methodological principles and structure of the educational paradigm. Designing in pedagogy requires not only a creative approach, but also a deep understanding of the scientific foundations of pedagogical activity and the ability to adapt theoretical knowledge to the practical needs of the educational process.

CONCLUSIONS

Importance of Technology Integration: The modern pedagogical process requires the integration of digital technologies and innovative teaching methods. The use of electronic resources, interactive platforms and adaptive learning systems ensures more effective learning of the material and meets the needs of modern students.

The Need for a Flexible Approach to Learning: Effective lesson and course planning requires flexibility, adaptability, and individualization. The pedagogical process must take into account the diversity of student needs, learning styles and interests.

The Importance of a Science-Based Approach: The development and implementation of curricula and programs must be based on scientific research and data. This includes a systematic analysis of educational needs, challenges and current trends in education.

Project-Based Learning as Key to Skill Development: Incorporating project-based learning and research projects allows students to apply knowledge in practice, develop critical thinking, creativity, and problem-solving skills.

Involvement of Students in the Educational Process: Active involvement of students in the educational process, including participation in the planning and evaluation of the educational process, contributes to the development of responsibility, independence and motivation.

Focus on the Interdisciplinary Approach: The integration of different disciplines and interdisciplinary connections in education provides a deeper understanding of knowledge and its practical application.

Continuing Professional Development for Teachers: The field of education is constantly changing, so teachers need to regularly update their knowledge and methods, according to the latest educational trends and research.

Flexibility and Variability in Planning: The planning of the educational process should be flexible enough to adapt to different educational scenarios, including interaction with different social and cultural groups.

These findings emphasize the need for modern educators to be flexible, innovative, and focused on continuous professional growth in order to effectively teach in a dynamic educational environment.

REFERENCES

- Acuña, M. (2023). *Conectivismo como teoría del aprendizaje basada en las TIC*. <https://www.evirtualplus.com/conectivismo-como-teoria-del-aprendizaje-basada-en-las-tic/>
- Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Bransford, J.D., Brown, A.L., & Cocking, R.R. (2000). *How people learn: Brain, mind, experience, and school*. National Academies Press.
- Duffy, T.M., & Cunningham, D.J. (1996). *Constructivism: Implications for the design and delivery of instruction*. Handbook of research for educational communications and technology, 170-198.
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. Basic Books.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational psychologist*, 42(2), 99-107. <https://www.tandfonline.com/doi/abs/10.1080/00461520701263368>
- Jonassen, D. H., & Land, S. M. (2012). *Theoretical foundations of learning environments*. Routledge.
- Macanchí Pico, M. L., Orozco Castillo, B. M., & Camponverde Encalada, M. A. (2020). Innovación educativa, pedagógica y didáctica. Concepciones para la práctica en la educación superior. *Revista Universidad y Sociedad*, 12(1), 396-403. http://scielo.sld.cu/scielo.php?script=sci_abstract&pid=S2218-36202020000100396
- Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. ASCD.
- Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and instruction*, 13(2), 125-139. <https://www.sciencedirect.com/science/article/abs/pii/S0959475202000166>
- Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*. Basic Books.
- Piaget, J. (1970). Piaget's theory. In, P. Mussen (Ed.), *Carmichael's manual of child psychology*. (pp. 703-732). Wiley.
- Salomon, G., & Perkins, D.N. (1998). Individual and social aspects of learning. *Review of Research in Education*, 23(1), 1-24.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
- Siemens, G., & Downes, S. (2008). *Connectivism and connective knowledge: Essays on meaning and learning networks*. National Research Council Canada.
- Vygotsky, L. S. (1978a). Interaction between learning and development. *Readings on the development of children*, 34(3), 34-41.
- Vygotsky, L. S. (1978b). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.
- Zambrano Romero, W. J., & Meza Hormaza, J. A. (2022). Impacto de las tecnologías disruptivas en el proceso de enseñanza - aprendizaje: caso UTM online. *Revista Científica UISRAEL*, 9(1), 29-47.