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MODERN PEDAGOGICAL TOOLS IN TEACHING: FROM TRADITIONAL TO DIGITAL

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ANNOTATION: This article examines pedagogical tools that have played a key role in knowledge transfer for centuries and are currently undergoing a qualitative evolution: from traditional printed and visual materials to interactive digital resources and intelligent learning systems. This transformation alters not only the technical capabilities of learning but also the pedagogical logic of interaction between teacher and student. The study reveals the conceptual foundations of integrating digital technologies into the educational process and analyzes leading theoretical approaches (TPACK, SAMR, constructivism, and connectivism), thereby contributing to the development of scientific understanding of the patterns of digital transformation in education.

Key words: pedagogical tools, digital technologies, higher education, laboratory, independent work, simulations, quality of education, constructivism, connectivism .

АННОТАЦИЯ

В статье рассматриваются педагогические средства, которые на протяжении веков играли ключевую роль в передаче знаний и в настоящее время проходят этап качественной эволюции: от традиционных печатных и визуальных материалов к интерактивным цифровым ресурсам и интеллектуальным обучающим системам. Данная трансформация изменяет не только технические возможности обучения, но и педагогическую логику взаимодействия между преподавателем и обучающимся. Исследование раскрывает концептуальные основы интеграции цифровых технологий в образовательный процесс, анализирует ведущие теоретические подходы (TPACK, SAMR, конструктивизм, коннективизм), что способствует развитию научных представлений о закономерностях цифровой трансформации образования.

Ключевые слова: педагогические средства, цифровые технологии, высшее образование, лаборатория, самостоятельная работа, симуляции, качество образования, конструктивизм, коннективизм.

Introduction . Modern education is undergoing profound and qualitative transformations associated with digitalization and the rapid development of information and communication technologies. Pedagogical tools, which for centuries have served as a means of knowledge transfer, are now undergoing a qualitative evolution: from traditional printed and visual materials to interactive digital resources and intelligent learning systems .

This transformation is changing not only the technical capabilities of teaching but also the pedagogical logic of interaction between teacher and student. This necessitates a scientific understanding of the essence of modern pedagogical tools, their classification, and their effectiveness in shaping students' cognitive activity. Thus, research into the evolution of pedagogical tools from traditional to digital is one of the most important areas of modern teaching, reflecting the processes of adaptation of the educational system and its changes under the pressure of modern trends.

Statement of the problem

The problem lies in the lack of a holistic understanding of the evolution of pedagogical tools as a reflection of the development of human cognitive modes. The digital age requires a

rethinking of the nature of pedagogical tools—from a material medium to an intellectual environment for interaction.

Object and subject of research

The object of the research is pedagogical teaching aids as an element of the educational process.

The subject of the research is the evolution of pedagogical tools from traditional to digital and their impact on the quality and nature of educational interaction.

- **Purpose and objectives**
- **Research methods**
- **Novelty and significance of the work**

Review of existing approaches

Modern approaches to the use of pedagogical tools can be divided into three areas: traditional, blended, and digital.

Traditional approaches are based on direct teacher-student interaction and the use of printed materials, chalkboards, oral explanations, and demonstrations. They provide a high level of control and discipline, but limit individualization and engagement.

Blended learning) approaches combine offline and online formats, creating a flexible educational environment. The use of digital tools (Google Classroom , Moodle , Microsoft Teams) allows you to expand the boundaries of the class, increasing student independence and responsibility.

Digital - first approaches make technology a central element of learning .

They include:

– Flipped **classroom** classroom), where students study theory online and complete practical exercises in class;

– **Mobile learning** (m - learning), based on the use of smartphones and microlearning applications ;

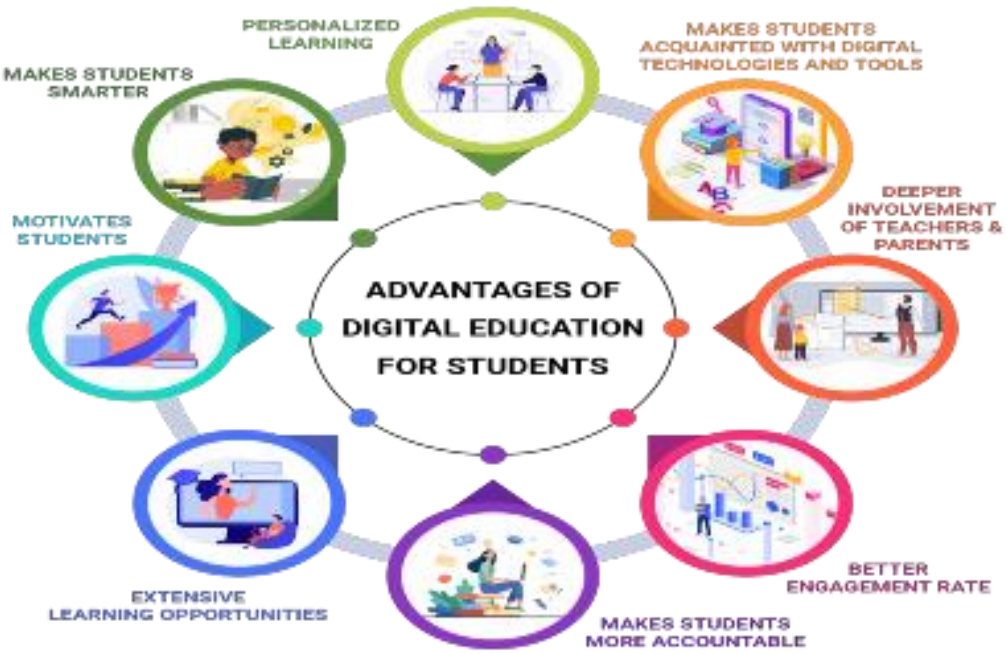
– **Gamification** , which uses game mechanics for motivation (badges, levels, ratings);

– **Adaptive learning** (adaptive learning), in which systems based on AI algorithms select tasks according to the student's level;

– **Online courses** (MOOCs), providing mass access to education, but requiring a high level of self-organization;

– **Data pedagogy** (learning analytics), aimed at analyzing students' digital footprints to adjust the educational process.

Overall, the trend in recent years has been a shift from a teacher-centered model to a student-centered model, where the teacher serves as a moderator and digital tools serve as a tool for personalization, visualization, and interaction.



Comparison and analysis of the theory

Modern pedagogical tools are based on a number of theoretical models and concepts that explain their role in learning.

TPACK Theory (Mishra & Koehler)

Defines successful technology integration as the combination of three types of knowledge: content , pedagogical , and technological . It serves as a methodological basis for preparing teachers for digital teaching.

2. SAMR Model (Puentedura)

Describes levels of technology use—from simple replacement of traditional tools (Substitution) to radical rethinking of learning tasks (Redefinition). The model helps evaluate the effectiveness of digital tool implementation.

3. Bloom's Taxonomy (and its digital version)

Classifies levels of cognitive activity from memorization to creation. Digital editing (Anderson & Krathwohl) introduces the concepts of "creating a digital product" and "editing online content," which align with modern forms of student activity.

4. Constructivism and social constructivism (Piaget , Vygotsky)

They emphasize students' active participation in knowledge creation and the importance of social interaction. In the digital environment, these principles are implemented through collaborative projects, forums, online discussions, and gamified simulations.

5. Connectivism (Siemens , Downes)

Views learning as the ability to establish connections between information sources and network participants. This approach underlies online education and working with large amounts of digital data.

6. Cognitive load theory (Sweller)

Emphasizes the optimal amount of information a student can absorb. When designing digital courses, this is reflected in minimalist interfaces, step-by-step instructions, and visual support.

7. The concept of digital competence (UNESCO , OECD)

Describes the set of knowledge and skills needed to use technology effectively and safely: information literacy, critical thinking, digital ethics, and data security.

These theories form the foundation of modern instructional design, where technology doesn't replace the teacher, but rather enhances the teaching strategy, making learning flexible, personalized, and interactive. **The distinctive feature of the model we're developing is that there's no need to completely abandon traditional teaching; rather, it needs to be properly integrated into the educational environment. Teachers must learn to use modern technologies in tandem with their existing knowledge, and strive to keep up with current trends rather than trying to remain stagnant.**

This work is significant both **theoretically** Both in practice and **in practice.** The theoretical significance of this work lies in its clarification and systematization of the conceptual framework associated with modern pedagogical teaching aids. The study reveals the conceptual foundations of integrating digital technologies into the educational process and analyzes leading theories (TPACK , SAMR , constructivism, connectivism), which contributes to the development of scientific understanding of the patterns of digital transformation in education. Furthermore, the work develops a holistic understanding of the transition from traditional to digital teaching aids, identifying the pedagogical conditions under which technology becomes not an external tool, but an integral part of the didactic system.

The practical significance of the work lies in the possibility of using its results by teachers, methodologists and students of pedagogical specialties to improve the effectiveness of the educational process.

The identified approaches and principles of digital pedagogy can be applied in the development of e-learning courses, educational platforms, interactive teaching aids, and in teacher training systems.

The research materials can be used in the design of educational programs incorporating digital teaching aids, in the implementation of flipped classroom technologies, gamification, and adaptive learning, as well as in the development of digital competence in teachers and students.

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