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DIGITALIZATION OF EDUCATIONAL PROCESSES

Shingis Urmanov
Chirchik State Pedagogical University
urmanovshingis@gmail.com

Abstract
The modern world is rapidly developing under the influence of information and digital technologies that penetrate all spheres of human activity, including education. Digitalization of educational processes is becoming a key condition for improving the quality of education, expanding access to knowledge and forming new pedagogical practices. This topic became especially relevant during the COVID-19 pandemic, when educational institutions were forced to switch to a distance learning format as soon as possible, relying exclusively on digital platforms and resources. This circumstance showed both the possibilities and vulnerabilities of the digital environment, revealed the need for a systemic digital transformation of education. Digitalization also plays an important role in the formation of digital literacy, critical thinking and readiness for life in the digital economy. That is why the study of the processes of digitalization of education is an important and timely scientific task.

Keywords: Digitalization of education, information and communication technologies (ICT), artificial intelligence (AI), big data, digital educational environment.

Introduction

ЦИФРОВИЗАЦИЯ ОБРАЗОВАТЕЛЬНЫХ ПРОЦЕССОВ

Урманов Шингис Майхан угли
Чирчикский государственный педагогический университет.
urmanovshingis@gmail.com

Аннотация:
Современный мир стремительно развивается под влиянием информационных и цифровых технологий, которые проникают во все сферы человеческой

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деятельности, в том числе в образование. Цифровизация образовательных процессов становится ключевым условием повышения качества обучения, расширения доступа к знаниям и формирования новых педагогических практик. Особенно актуальной данная тема стала в период пандемии COVID-19, когда образовательные учреждения были вынуждены в кратчайшие сроки перейти на дистанционный формат, опираясь исключительно на цифровые платформы и ресурсы. Это обстоятельство показало как возможности, так и уязвимости цифровой среды, выявило потребность в системной цифровой трансформации образования. Также цифровизация играет важную роль в формировании цифровой грамотности, критического мышления и готовности к жизни в условиях цифровой экономики. Именно поэтому исследование процессов цифровизации образования представляет собой важную и своевременную научную задачу.

Ключевые слова: цифровизация образования, информационно-коммуникационные технологии (ИКТ), искусственный интеллект (ИИ), большие данные (big data), цифровая образовательная среда**.**

The purpose of the study is to analyze the essence, directions and tools of digitalization of educational processes and to determine their role in the transformation of the education system.

Research objectives:

1. To reveal the concept and stages of digitalization in the context of education;
2. To study the regulatory and methodological foundations of digital transformation;
3. To analyze the key digital technologies used in educational practice;
4. To consider examples of domestic and international experience;
5. To identify the problems and prospects for the implementation of digital solutions in education.

The object of the study is educational processes in the context of digital transformation. The subject of the study is digital technologies, platforms and tools that ensure the development and transformation of the educational environment.

The following methods are used in the work:

1. Theoretical analysis of scientific, regulatory and methodological literature;
2. Comparative and contrastive method for studying international experience;

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3. A systems approach to the analysis of digital solutions;
4. Content analysis of educational platforms;
5. Generalization and interpretation of the obtained data.

The novelty of the study lies in the integrated approach to considering the digitalization of education as a multi-level process that includes not only technical and organizational changes, but also the transformation of pedagogical practices, as well as the analysis of the role of modern technologies (including artificial intelligence and big data) in building a flexible and personalized educational environment. The work consists of an introduction, two main sections, a conclusion and a list of references. The first section discusses the theoretical and methodological foundations of the digitalization of education. The second section presents key digital technologies and examples of their application in educational practice. Theoretical and methodological foundations of the digitalization of education. The concept of digitalization in the context of education. Digitalization of education is the process of introducing digital technologies and solutions into the teaching and learning system in order to increase its efficiency, accessibility and flexibility. This is not just the use of computers or the Internet, but a fundamental change in the forms, methods and content of education, as well as a revision of the role of the teacher and student in the learning process. Historical evolution of digital processes in the educational environment. The development of digital technologies in education has gone through several stages: from the first computer classes in the 1980s, through the mass introduction of the Internet in the 2000s, to the emergence of online platforms and distance learning. The 21st century is seeing a rapid transition from electronic to intelligent education, where automation, adaptability and data analysis are becoming key. Regulatory and strategic foundations of digitalization. Digitalization of education is regulated by strategic documents and state programs (for example, in Russia - "Digital Economy", in Uzbekistan - "Digital Uzbekistan - 2030"). They define the goals: creation of a digital educational environment, development of digital infrastructure, training in digital competencies and support of digital educational platforms. Main directions and levels of digital transformation of education. Digitalization covers the following levels: Institutional level - digital infrastructure of schools and universities, LMS systems; Pedagogical level - new forms of interaction (webinars, hybrid classes), individualization of learning; Student level — development of

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independence, digital literacy, digital portfolio. The main areas include digital platforms, electronic educational resources, artificial intelligence, big data, distance formats.

Global experience in digitalization of education. Many countries demonstrate successful examples of digital transformation:

1. Finland — integration of digital technologies into primary education;
2. South Korea — electronic textbooks and online learning with AI;
3. USA — Coursera, Khan Academy, edX platforms;
4. Uzbekistan — digital school "Bilimlar Akademiyasi", platform "EduMarket.uz".

Global experience shows that the effectiveness of digitalization depends not only on technology, but also on strategy, teacher training and infrastructure.

Digital technologies as a tool for transforming educational processes. Electronic educational resources: classification and examples. EER are digital materials used for educational purposes. Classification: Information resources — digital textbooks, encyclopedias (Wikipedia, Britannica); Interactive resources — simulators, simulations (PhET, GeoGebra); Assessment resources — tests, quizzes (Kahoot, Quizizz); Multimedia resources — video lessons, animations (YouTube Edu, TED-Ed); Methodological resources — manuals for teachers (Uchi.ru, MOODLE). They make learning accessible, engaging and effective, allow you to take into account the individual learning style and provide continuous access to materials.

Platform solutions: LMS, online courses, cloud technologies. Learning Management Systems (LMS) — learning management systems such as Moodle, Google Classroom, Edmodo, allow you to organize, manage and track the learning process. Online courses (Coursera, Udemy, Stepik) provide flexibility and access to global universities. Cloud technologies (Google Workspace, Microsoft 365) provide collaboration, storage and exchange of educational materials. These solutions form a digital educational ecosystem, promote mobile and asynchronous learning. Interactive and multimedia learning tools. Interactive technologies include boards, voting, simulations, AR/VR technologies. They engage students in active learning. Multimedia (video, infographics, audio lectures) help diversify the presentation of material, making it visual and memorable. The use of such tools increases motivation, promotes the development of critical thinking and 21st century skills. Artificial intelligence and adaptive learning. AI is used to

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personalize the educational process: the platform tracks the student's progress and selects material for his or her level. Examples: Knewton, Smart Sparrow, Yandex Textbook. AI is also used in automatic assignment checking, chat bots for consultations, and performance prediction systems. Adaptive learning makes the process efficient and individualized.

The role of big data and analytics in educational practice. Big data is large amounts of information obtained in the learning process: test results, time spent on assignments, behavior on the platform. With the help of analytics, this data is used to:

1. evaluate the effectiveness of teaching;
2. identify difficulties in students;
3. adapt courses;
4. predict academic performance.

The use of big data helps to make informed pedagogical decisions, create a personalized learning path, and improve the overall quality of education. The impact of digitalization on the structure and content of education. Transformation of pedagogical models and learning formats. Digitalization has led to a fundamental change in pedagogical models. The traditional lecture-seminar system has been replaced by blended learning, hybrid, and fully online learning. The role of independent work, project activities, and microcourses has increased. The flipped classroom methodology allows students to study theory at home and practice in class. These changes make learning more flexible, individualized, and interactive. Changing the role of the teacher and student in the digital environment. The teacher is no longer the only source of knowledge and becomes a mentor, facilitator, and organizer of the learning environment. He or she guides, consults, and helps to master digital resources. The student, in turn, becomes an active subject of learning, independently choosing the trajectory and pace. Developing self-organization, responsibility and critical thinking skills. Developing digital competencies of educational process participants. Effective participation in the digital educational process requires developed digital competencies: For students: the ability to search for, evaluate and use digital information, work in an online environment, and comply with digital ethics; For teachers: mastery of platforms, digital tools, knowledge of online pedagogy, and the ability to integrate ICT into the educational process.

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The development of digital competencies has become a priority in professional training. Psychological and pedagogical aspects of digital interaction. The digital environment brings new challenges to the psychology of education: anxiety levels increase, personal interaction decreases, and concentration problems arise. At the same time, online formats require the development of new forms of motivation, support, and feedback. Psychological and pedagogical support should be aimed at creating a safe, ethical, and human-centered digital environment. Inclusion and accessibility through digital technologies. Digitalization opens up great opportunities for inclusive education. Special applications, voice assistants, text synthesizers, and distance learning courses allow children with special needs to study. Geographically remote and socially vulnerable groups also gain access to quality resources. Digital technologies are becoming a tool for social justice and equal opportunities. Problems and risks of digitalization of educational processes. Digital inequality and infrastructure barriers. One of the key problems is the digital divide. Not all educational institutions and families have the necessary equipment, internet, and support. Differences in the level of technical equipment create inequality in access to digital educational opportunities, especially in rural and remote areas. Problems with digital literacy of teachers and students. Many teachers do not have sufficient digital training. This leads to superficial use of resources, ineffective management of online learning, and resistance to digital innovation. Students, although they actively use technology, often do not know how to critically evaluate digital content or maintain information hygiene. Overload, dependence on technology, and digital fatigue. The transition to online is often accompanied by information overload, lack of balance between work and rest, which leads to emotional burnout in teachers and students. The risk of gadget addiction increases, physical activity decreases, sleep patterns are disrupted, and the overall quality of life decreases. Ethical, legal, and personal risks (data, privacy). The collection and storage of personal data in the digital environment is associated with the risks of leaks, manipulation, and unauthorized use. The rules for protecting personal information are not always observed. In addition, there are violations of digital ethics, cyberbullying and substitution of academic values (for example, plagiarism or custom work). Limited traditional forms of control and socialization. In online learning, it is difficult to apply the usual forms of knowledge control - they are easily bypassed (cheating, outside help). Socialization

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of students also suffers, interaction with teachers and peers decreases, the emotional component of the educational process is lost.

Prospects and conditions for effective digitalization of education. State policy and strategies for digital transformation. Successful digitalization is impossible without strategic support at the state level. It is important to have clear programs, funding, a regulatory framework and interdepartmental cooperation. The state must invest in infrastructure, personnel training and domestic development of digital platforms. Digital transformation is impossible without qualified teachers. Systematic work is needed to improve qualifications, including digital didactics, media literacy, and ethics of online interaction. Methodological support, mentoring and the creation of communities of practice are also important. To ensure quality, it is necessary to create digital educational standards that determine the structure of digital courses, requirements for platforms and tools. The formation of holistic digital ecosystems (synchronization of LMS, EER, AI systems and analytics) will become the basis for a sustainable digital environment. Modern education goes beyond formal institutions. Online courses, webinars, MOOC platforms are becoming a full-fledged source of knowledge. It is necessary to recognize the results of informal learning (digital certificates, micro-qualifications), their integration into the academic system. An important condition is the constant monitoring of the quality of digital educational processes. The use of big data and analytics systems allows us to identify weak links, track progress, adapt programs and improve their effectiveness. Scientific assessment of digitalization should accompany its implementation at all levels.

Conclusion

Digitalization of education is not just the introduction of technologies, but a profound transformation of the structure, content and methods of teaching. It forms new roles of the teacher and the student, changes the interaction model and requires an integrated approach to all levels of the educational system. The results of this study can be used in the development of educational programs, teacher training, design of digital platforms and the development of a state strategy in the field of education. Ensure equal access to digital resources and infrastructure. Strengthen the training of teachers to work in the digital environment. Create a safe and ethically sustainable digital educational environment. Implement personalized learning and support systems. It seems appropriate to conduct further research into

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the effectiveness of specific digital tools, develop methods for assessing digital competencies, and study the impact of digitalization on the psychological state of students and teachers.

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