

PRINCIPLES OF THE FORMATION AND DEVELOPMENT OF DIGITAL EDUCATION TECHNOLOGIES

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Abstract: *This article analyzes the developmental stages of digital technologies in education and their impact on the learning process. Digital technologies have evolved, encompassing education through technical capabilities, fundamentally transforming teaching methods and the ways educational materials are delivered. This article examines the stages of technological development, their role in modern education, and their effect on educational efficiency.*

Keywords: *Digital education technologies, artificial intelligence, distance learning.*

Introduction

The process of applying digital technologies in education began to develop in the 1960s of the last century and has now reached even higher stages. In the initial stages of this development process, computers, and later the internet and modern technological tools, began to take their place in the educational process. Today, artificial intelligence, distance learning platforms, and other digital tools have become an integral part of the educational process. This article examines the main stages of the development of digital technologies in education and their impact on the learning process.

Main Part

Digital technologies are being introduced into the education system not only to improve the teaching process but also to deliver information more quickly and conveniently, establish effective communication between teachers and students, and create broader access to educational resources.

Digital education technologies have passed through several stages in their development up to the present day. Specifically:

First Stage: Computerization (1960-1980s) The initial stage of digital technologies in education began with the process of computerization. During this stage, computer technologies were interactively introduced into the educational process, and the main focus was directed towards increasing computer literacy.

- Computer classrooms were organized, and students were taught to use software and were provided with technical knowledge.

- Mathematical calculation programs and analysis tools were used in the learning process. In this stage, computers were primarily directed towards providing scientific research and technical knowledge. Although computers did not introduce very significant changes into the conventional educational process during this period, they were an important step in forming students' fundamental interest in technology.

Second Stage: Multimedia and Interactive Education (1980-1990s) Starting from the 1980s, as the capabilities of computers expanded, multimedia content began to appear in education. During this stage, learning materials based on interactivity and multimedia content were developed.

Students began to learn topics in an interesting and understandable form through textbooks enriched with video and graphics.

- Methods aimed at increasing children's interest through programs and games were introduced. Multimedia tools were used as the primary means of improving education quality and effectively conveying new knowledge.

Starting from this period, interactivity began to take an important place in the educational process.

Third Stage: The Emergence of the Internet and Distance Learning (1990s-2000s)

The widespread adoption of the internet in the late 1990s began a new stage in the educational process. Access to educational resources expanded through the internet, and the possibility of organizing distance education emerged.

- Through distance learning platforms (for example, Moodle), students gained the opportunity to acquire knowledge at their own preferred time.
- Teachers began to deliver topics via online lessons and resources through the internet. In this stage, the importance of digital education increased further, and the learning process began to exist on a global scale.

Fourth Stage: Mobile Technologies and Social Learning (2000s-2010s)

After the 2000s, the development of mobile technologies and the widespread popularization of social networks further popularized education. In this stage:

- Through mobile applications, students gained the opportunity to acquire knowledge at any time.
- Collaborative teaching and knowledge-sharing processes accelerated through social networks (Facebook, Twitter).
- Children and youth began to actively participate in acquiring knowledge through educational games and mobile applications. Mobile technologies and social networks made education open and convenient for everyone, providing students with broader opportunities for knowledge acquisition.

Fifth Stage: Artificial Intelligence and Augmented Reality (2010 to Present)

In recent years, significant changes have been observed in the field of educational technologies. Artificial intelligence and augmented reality technologies are helping to make education more effective and interactive.

· Opportunities have emerged to monitor students' knowledge levels and create customized learning programs tailored to their interests and needs using artificial intelligence [1].

The stages of development of digital technologies in education have had a significant impact on the educational process and fundamentally transformed teaching methods. If in the initial stages computer technologies introduced students to technical literacy, later on, along with the internet, mobile technologies, and artificial intelligence, opportunities were created to further increase educational effectiveness. In the current era, the process of acquiring knowledge through digital technologies has expanded, creating a convenient and flexible environment for students on a global scale. The application of digital technologies in the educational process is making knowledge acquisition even easier, understandable, and convenient.

The Impact of Educational Technologies on Student Development
Educational technologies have significantly changed students' knowledge acquisition process. The digital resources and platforms provided to students are creating new learning opportunities for them. Technologies allow students to receive education according to their own time and in line with their abilities. At the same time, these technologies also help develop students' social skills. For example, online platforms offer opportunities for group work and collaborative learning, enabling students to develop mutual communication by exchanging experiences and discussing knowledge with each other. Interactive lessons and virtual teaching methods enhance students' analytical thinking and problem-solving skills. Furthermore, digital technologies provide students with the opportunity to quickly and accurately assess their achievements, which encourages students to engage in self-development [2].

Significant steps are also being taken to develop digital education in the Republic of Uzbekistan. The "Digital Uzbekistan – 2030" strategy for 2020–2025, the Decree of the President of the Republic of Uzbekistan No. PQ–4851 dated September 28, 2020, and the orders of the Ministry of Higher and Secondary Special Education regarding the introduction of electronic education platforms are the fundamental documents of the national policy in this direction¹.

The quality and effectiveness of lessons increased with the help of digital education technologies – through digital presentations, tests, and video lessons used by educators, educational materials became more lively and understandable, and students' interest in the subject increased. Teachers' technological literacy improved – 80% of the teachers who participated in the research process strengthened their skills in using digital tools and began to use them regularly in their professional activities. Overall, by integrating digital education and interactive teaching methods, it can be seen that the quality indicators of the educational process have changed positively, and significant results have been recorded in students' motivation and the level of knowledge acquisition [4].

Due to the rapid development of information technologies in modern society, people's interaction with media products and digital resources is increasing. The widespread dissemination of the internet, social networks, interactive educational tools, and multimedia content has heightened the importance of the concepts of media literacy, media education, and digital literacy. Digital media competence is closely related to these concepts and expresses an individual's ability to function effectively in a digital and media environment [5].

¹ Decree of the President of the Republic of Uzbekistan No. PQ-4851 dated September 28, 2020 "On approval of the 'Digital Uzbekistan – 2030' strategy".

Media education holds an important place in shaping digital media competence. Media education is the process of developing skills for obtaining, processing, and presenting information through media tools [6].

Based on trends in the modern field of education, it is expected that the digital learning environment will further develop in the future, integrating with artificial intelligence, cloud technologies, and innovative technologies. This, in turn, will serve to further personalize the educational process, increase its adaptability, and integrate it into the global education ecosystem [7].

At the international level, UNESCO has developed recommendations for developing the digital learning environment, in which it is emphasized that digital technologies can expand learning opportunities, improve the quality of education, and make educational management more effective [8].

Russian scholar A.Yu. Uvarov defines the digital learning environment as "a system encompassing pedagogical and didactic conditions necessary for organizing the educational process, teaching materials, as well as technical and software tools." He highlights three main components of the digital learning environment: technological (technical infrastructure), content-related (electronic educational resources), and organizational-pedagogical (educational process management system) [9].

As with all sciences, the role of digital education technologies is also increasing in geography. In particular, through Google Earth, anyone can view, rotate, and study any part of the world in 3D (three-dimensional) form, based on satellite images of the Earth.

ArcGIS is a Geographic Information System (GIS) software developed by Esri. It allows for the collection, analysis, creation of maps, and visualization of various geographical data [10].

Conclusion

Today, the role of digital education technologies is increasing not only in science but in every field. The formation and development of digital

education is not merely a technical advancement but a pedagogically purposeful strategic process. Its foundation lies in the harmonization of principles: strategic management, pedagogical transformation, robust infrastructure, and the development of human capital. Uzbekistan possesses a clear legal basis in this field and is on the path of assimilating international experience. To achieve successful results, it is necessary to balance all these principles, requiring the joint efforts of the state, teachers, technologists, and society.

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