

Development of Digital Education in The Higher Education System as A Social-Pedagogical Necessity

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Abstract: This article provides a theoretical-empirical analysis of the social-pedagogical necessity of developing digital education in the higher education system. The study focuses on the impact of digital adaptive technologies on the education system, the need to develop digital competence among educators, and the achievements and barriers in implementing digital education in Uzbekistan's higher education institutions. System analysis and comparative pedagogy research methods were used as the methodological basis. The results show that digital education is not merely a technological innovation, but a key factor in improving social equality and the quality of education. The article presents practical recommendations for Uzbekistan and outlines scientifically grounded directions for expanding digital education within the framework of the "Uzbekistan – 2030" strategy.

Keywords: Digital education, higher education, social-pedagogical necessity, digital competence, educational technologies, digital adaptive technologies, teacher training.

Introduction: The rapid development of digital technologies in the 21st century has fundamentally transformed all spheres of society worldwide - the economy, culture, healthcare, and especially the education system. Higher education institutions cannot remain outside these changes: the modern student must be shaped not merely as a passive recipient of knowledge, but as an active participant and creative individual in the digital environment. From this perspective, the widespread introduction of digital education into the higher education system is today regarded not only as a technological innovation, but as a profound social-pedagogical necessity.

The COVID-19 pandemic made this necessity even more acute and urgent. Universities around the world were forced to suddenly switch to online learning. Research has shown that this pandemic-driven transition transformed digital technologies from an additional tool into a necessary platform for education. However, this process also gave rise to numerous problems - digital inequality, insufficient professional preparation of teachers, weak technical infrastructure, and the need to

reconsider pedagogical methodologies.

Uzbekistan is no exception to this process. The "Uzbekistan – 2030" strategy identifies the implementation of quality digital transformation in higher education as one of the priority directions of state policy. Programs such as "One Million Programmers" and "IT-Talent" are being successfully implemented in the country: in 2023-2024, more than 1.2 million young people completed free courses in 8 IT specializations, and 400,000 people obtained international IT certificates [5].

At the same time, as the available scientific literature indicates, research comprehensively studying the pedagogical foundations of digital education in higher education, its essence as a social necessity, and models of practical implementation in the context of Uzbekistan is still insufficiently developed. This article is aimed at filling this gap, presenting the scientific foundations for developing digital education in the higher education system, and developing practical guidelines for Uzbekistan.

Research objective: to analyze the development of

digital education in the higher education system as a social-pedagogical necessity and to develop practical recommendations for Uzbekistan's higher education institutions.

Research objectives:

- to reveal the social-pedagogical essence of digital education;
- to analyze global trends in the introduction of digital transformation in higher education;
- to examine the state of digital education in Uzbekistan's higher education system;
- to identify barriers in the development of digital education and propose solutions.

METHODOLOGY

To achieve the stated goals and objectives of the study, the following set of methods was employed:

- 1) system analysis and synthesis - a comprehensive approach to theoretical sources related to digital education;
- 2) comparative analysis - a comparison of models for implementing digital education in higher education institutions of various countries;
- 3) documentary analysis - a study of Uzbekistan's national strategic documents and reports from the OECD, CIS, and UNESCO.

The study covers scientific articles, national and international reports, and regulatory documents for the period 2020-2026. Articles published in the Scopus and Web of Science databases, studies from reputable publications such as Springer Nature, MDPI, and Frontiers of Digital Education, as well as official documents from the OECD, UNESCO, CIS, and Uzbekistan's Ministry of Higher and Secondary Specialized Education were selected as sources.

Within the framework of the analysis, evaluation was conducted on three main indicators:

- the pedagogical effectiveness of digital education technologies;
- the state of digital competence among teachers and students;
- organizational-pedagogical conditions for the development of digital education in Uzbekistan.

RESULTS AND DISCUSSION

The Social-Pedagogical Essence of Digital Education

Digital education is understood as an educational process in which information and communication technologies (ICT), digital platforms, and electronic resources are purposefully used to acquire knowledge, develop skills, and form competencies. The role of digital technologies in education must be examined not only in technical terms, but also in cognitive, social, and ethical dimensions [3].

The concept of digital pedagogy is defined as "the meaningful use of digital technologies to achieve pedagogical goals." This definition encompasses not only the mediating function, but also the promotion of collaboration, creativity, and critical thinking between teacher and student in the digital environment.

The social necessity of digital education is manifested in several key aspects. First, there is the issue of ensuring equal access to education. The UNESCO Global Education Monitoring Report (2023) notes that digital technologies created an educational bridge for millions of learners, but simultaneously intensified the problem of the digital divide in underprivileged regions. Second, digital education creates opportunities to meet labor market demands - in the Coursera Global Skills 2024 report, Uzbekistan ranked 1st among countries investing in human resource preparation [5].

Digital Transformation in Higher Education: Global Trends

A bibliometric study published in Springer Nature journal (Gomez-Galan et al., 2023) analyzed 242 scientific articles on digital pedagogy in higher education and identified three main clusters: the "social network cluster" (2000-2010), the "digitalization cluster" (2011-2015), and the "digital pedagogy expansion cluster" (2016-2023) [6]. Studies from 2020-2022 focused primarily on digital pedagogy and education issues in the context of COVID-19.

The OECD Digital Education Outlook 2023 report notes that many member countries are in the process of updating or adopting digital education strategies, with countries such as Korea, Austria, Latvia, and Ireland placing particular emphasis on artificial intelligence integration [7].

The European Digital Competence Framework for

Educators - DigCompEdu - and UNESCO's ICT Competency Framework for Teachers are today widely used worldwide [7].

A study conducted in Slovenia (MDPI, 2025) found that among students, practical learning using modern teaching methods - access to digitized materials via websites, social networks, and smartphones - received the highest ratings [4]. This result indicates that the student himself is also prepared for the digital learning environment.

Importantly, it was found that general pedagogical experience is not directly correlated with the level of digital pedagogical competence - this indicates the necessity of developing digital competence in a special, targeted manner.

Development of Digital Education in Uzbekistan: Achievements and Challenges

In recent years, Uzbekistan has been actively implementing digital transformation in higher education at a rapid pace. The economic development of Uzbekistan requires an active position in the direction of digital higher education, and advancing in the digitalization process without digital technologies is practically impossible [8].

The "Uzbekistan - 2030" Strategy has identified the following key directions: complete digitalization of library collections, creation of modern infrastructure in higher education institutions, and improvement of education quality. In 2024, the Center for the Research on Development of Higher Education, established by the Ministry of Higher Education, Science and Innovations, held discussions on teacher-methodologists and pedagogical-methodological support issues, and approved a plan of measures aimed at acquiring foreign literature and developing scientific activity.

A study conducted in Uzbekistan's universities has proven that innovation and digitalization have a positive impact on the quality of higher education. Today Uzbekistan has 38 international branch campuses, ranking 3rd in the world after China and the UAE; this creates broad opportunities for international scientific cooperation and access to modern digital education models.

Barriers in Digital Education and Pedagogical Solutions

Based on the literature review, the following main barriers to the development of digital education in higher education were identified:

1. Digital inequality: the large gap in the level of access to digital resources between urban and rural areas creates social inequality in education.
2. Low level of digital literacy among teachers: teachers who are not sufficiently familiar with digital resources face difficulties in pedagogical activities. Therefore, pedagogical practice must be evidence-based and built on the principles of using quality digital resources.
3. Academic integrity issues: in the context of the expanding use of large language models such as ChatGPT, ensuring academic integrity is a new pedagogical challenge that requires each university to form its own policy.
4. Insufficient technological infrastructure: universities face organizational difficulties in coordinating multiple online learning systems - such as Moodle, Blackboard, and Google Meet - with one another [1].

As solutions to these problems, contemporary research recommends the following pedagogical models: blended learning models - a rational combination of traditional and online education; digital adaptive learning technologies - systems that adapt to the individual needs and level of each student [11].

CIS Countries' Experience: Comparative Analysis

CIS (Commonwealth of Independent States) countries, particularly Kazakhstan, Russia, and Uzbekistan, operate in similar socio-economic conditions regarding the application of digital adaptive technologies in higher education. Problems common to these countries - the digital divide between urban and rural areas, insufficient infrastructure, and the need to improve teacher qualifications - make the study of Uzbekistan's experience important and relevant in the regional context.

In Kazakhstan's higher education system, 16 universities applying digital adaptive technologies were ranked in the QS World University Rankings 2023, with improving the quality of digital education and expanding international cooperation identified as main priorities. Uzbekistan is also pursuing an active policy in this

direction.

A study on online education in Kazakhstan's schools noted that during COVID-19, digital inequality between urban and rural students was sharply manifested. Urban students, having access to reliable internet and devices, participated more effectively in online education, while in rural areas the shortage of connectivity and devices reduced education quality. This situation is also relevant for Uzbekistan, indicating the need to expand digital infrastructure at the regional level.

At the same time, improving the quality of higher education, implementing digital education, and institutional reforms have been identified as important factors in the sustainable economic development of CIS countries. Uzbekistan in this context holds a special place as one of the countries carrying out the most dynamic reforms in the region.

CONCLUSION

The conducted research has shown that the development of digital education in the higher education system today is a strategic necessity that goes far beyond the main technological task - it is an imperative in the area of social justice, pedagogical quality, and the development of human capital. Digital education creates an important environment for ensuring equal access to education, developing creativity, critical thinking, and collaboration among teachers and students.

Uzbekistan's experience shows that the country is seriously investing in the digital transformation of higher education: the "One Million Programmers" and "IT-Talent" programs, the presence of 38 international branch campuses, and digital education priorities in the "Uzbekistan - 2030" strategy - all of these are creating a worthy foundation. However, issues of digital inequality, teacher qualification improvement, and ensuring academic integrity still require deep attention.

Based on the research results, the following recommendations are put forward:

1. development of systemic programs aimed at developing digital competence of teachers and students in higher education institutions;
2. introduction of national digital competence standards based on DigCompEdu and UNESCO ICT competencies;
3. enrichment of the resource library based on the application of digital adaptive technologies;
4. expansion of digital infrastructure in rural and remote areas;
5. development of institutional policy regulating AI-based educational tools from a pedagogical-ethical standpoint.

Future research should be directed toward empirically testing the effectiveness of digital pedagogical models in higher education, conducting comparative analysis across Uzbekistan's regions, and evaluating programs aimed at forming digital competencies of teachers.

REFERENCES

1. Y. Chen, X. Zheng, Y. Liu & T. He. (2024). Development and implementation of digital pedagogical support systems in the context of educational equity. *Humanities and Social Sciences Communications*, 11, 1084. <https://www.nature.com/articles/s41599-024-03616-y>
2. OECD. (2023). Education and innovation for the digital and green transitions. OECD Publishing. <https://doi.org/10.1787/6407e9f4-en>
3. K. Mafa, M. Mkansi. (2024). Digital pedagogy for sustainable education transformation. *Frontiers of Digital Education*. <https://doi.org/10.1007/s44366-024-0031-x>
4. Nedelko, Z., Simenc, M., & Kranjcic, P. (2025). Digitalization of higher education: Students' perspectives. *Education Sciences*, 15(7), 847. <https://doi.org/10.3390/educsci15070847>
5. IT Education Association. (2024). Developing education in Uzbekistan: IT courses and certifications. <https://ite-association.uz/en/news/120>
6. Gomez-Galan, J. et al. (2023). Mapping of digital pedagogies in higher education. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-11888-1>
7. OECD. (2023). OECD digital education outlook 2023: Towards an effective digital education ecosystem. OECD Publishing. <https://doi.org/10.1787/c2143a64-en>
8. B. Usmonov. (2024). Higher education in

Uzbekistan: Transition to digital learning. Education Journal, 13(2), 53-58.
<https://doi.org/10.11648/j.edu.20241302.12>

9. Center for the Research on Development of Higher Education. (2024). Meeting on higher education development. Ministry of Higher Education, Science and Innovations, Republic of Uzbekistan.
<https://devedu.uz/en/3831/>
10. Tashkent Medical Pediatric Institute. (2024). Strategy 'Uzbekistan - 2030': Priorities and indicators of the education system.
<https://tashpmi.uz/en/2024/02/strategy-uzbekistan-2030-priorities-and-indicators-of-the-education-system-have-been-identified/>
11. Qo'chqorova D. Raqamli ta'lim tizimida adaptiv texnologiyalarning nazariy asoslari va rivojlanish bosqichlari.
<https://doi.org/10.5281/zenodo.17914794>