

## IMPROVING THE EFFICIENCY OF EDUCATIONAL SERVICES BASED ON DIGITAL TECHNOLOGIES

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**Abstract---** This article analyzes the impact of digital technologies on improving the efficiency and quality of educational services in the higher education system. The purpose of the study is to identify the main directions and mechanisms of using digital tools in the educational and management activities of higher education institutions. Systematic and process approaches, as well as methods of comparative and substantive analysis of normative and empirical data, were used as the methodological basis. It is shown that the introduction of digital solutions (online platforms, distance learning systems, data analysis tools) serves to improve educational processes, individualize education and increase student satisfaction. Directions for improving the efficiency of educational services based on digital transformation are proposed.

**Keywords---** Digitalization Of Education, Digital Technologies, Efficiency Of Educational Services, Quality Of Education; Management Of A Higher Education Institution, Digital Transformation, Quality Management System, Innovations In Higher Education.

### I. INTRODUCTION

In recent years, the impact of digital technologies on the efficiency and quality of educational services has become one of the main areas of scientific research in the field of higher education management and pedagogy. Digitalization is considered a strategic factor that determines the competitiveness and sustainability of education in the context of global changes . Digital innovations have demonstrated their ability to complement, enrich and transform education and have the potential to accelerate the achievement of Sustainable Development Goal 4 (SDG 4) in the field of education and improve the methods of providing universal access to education. They are able to improve the quality and relevance of education, strengthen inclusion, and improve the management and control of education.

International organizations such as UNESCO and OECD emphasize in their analytical reports that digital technologies contribute to increasing the convenience, flexibility and personalization of educational services, creating conditions for the development of inclusive and lifelong learning [1; 2]. "Digital technologies are increasingly penetrating all areas of our lives, changing not only the way we live, but also how we learn. They promise much: advances in the fields of communication, mobile devices, open educational resources and artificial intelligence are opening up new opportunities for reaching out to marginalized learners," said UNESCO Director-General Audrey Azoulay in her message on the occasion of the International Day of Digital Education. At the same time, it is emphasized that the effective use of digital tools requires systemic changes in quality management, teaching methods and staff training.

The country's President Shavkat Mirziyoyev emphasizes the importance of digital technologies in improving the quality of education. Digital educational platforms , online educational schools , electronic textbooks , virtual and multimedia laboratories play an important role in this process . He puts forward the idea that these technologies expand the scope of education, allow for individual and interactive organization of lessons, help consolidate students' knowledge and prepare them for the modern world.

## **II. LITERATURE REVIEW**

In addition, among foreign researchers who have made a significant contribution to the development of the topic, T. Bates stands out. He analyzes the strategic and organizational aspects of the digital transformation of higher education institutions and emphasizes the need to integrate information technology innovations into the quality management system [3]. George Siemens, developing the concept of connectivism, explains how digital networks and technologies change the processes of knowledge acquisition and the structure of educational interactions [4]. Neil Selwyn, drawing attention to the risks of digitalization, emphasizes that the introduction of technologies does not automatically guarantee an increase in the quality of education without methodological and organizational support [5]. Digitalization is necessary to increase the competitiveness and originality of educational institutions. This is the key to successful development in the modern world.

Russian researchers consider the digitalization of education as a key factor in increasing the efficiency of higher education institutions . In particular, MG Sorokova, MA Odinsova and NP Radchikova developed a scale for assessing the digital educational environment (RDE) of a university, which allows for a comprehensive description of the RTE [Sorokova et al., 2021]. GU Soldatova, together with her colleagues, proposed short and screening versions of the Digital Competence Index (RKI). This index is designed to measure knowledge, skills , motivation and responsibility/safety in the network in each of the following areas: content, communication, consumption and technosphere [Soldatova, Rasskazova, 2018].

Particular attention is paid to the introduction of digital platforms and LMS systems. Studies show that this leads to increased student engagement, improved learning, and improved feedback between participants in the educational environment [10; 11]. At the same time, attention is also paid to the barriers to digitalization: limited teacher training, uneven technical support , and poor integration of information technology tools into strategic management of educational quality [12; 13].

The literature review shows that , although most of the work is devoted to the general theoretical and organizational aspects of digitalization, there are still few empirical studies aimed at determining the specific impact of digital technologies on the quality indicators of educational services. In particular, the relationship between the level of digital maturity of higher education institutions and the effectiveness of educational activities, as well as the impact of digital solutions on the satisfaction of students and teachers, has not been sufficiently studied. Thus, despite the large number of studies conducted, the question of the real impact of digital technologies on the effectiveness of educational services remains open. This situation determines the need for practical research at the level of individual higher education institutions. Such research should be aimed at assessing the relationship between the level of digitalization, the quality of educational services and the effectiveness of the educational process, and at developing practical recommendations for improving the effectiveness of the digital transformation of higher education.

## **III. RESEARCH METHODOLOGY**

We used methods of logical analysis and synthesis, logical approach of the theory of knowledge, induction and deduction, comparative and factor analysis, time and space, comparison, and monographic observation in the research.

## **IV. ANALYSIS AND RESULTS**

The methodological basis of the study was the principles of systemic, process and competency approaches and the concept of strategic management of educational quality in the context of digital transformation. The use of a systemic approach made it possible to consider

educational services as a complex socio-economic product formed in the process of interaction of pedagogical, technological and management subsystems of a higher educational institution [1; 3; 8]. The process approach provided the opportunity to analyze digitalization as a continuous cycle of controlled processes aimed at increasing the efficiency and quality of educational outcomes [7; 14].

The issues of quality education are especially relevant in the era of EDUCATION 5.0. The concept of EDUCATION 5.0 appeared relatively recently, during the COVID-19 pandemic . During this period, distance education (DE) became more active. Before the pandemic, supporters of DE were divided into two groups : active and passive users who were skeptical about the future development of DE systems, while during and after the pandemic, the number of supporters of the development of tools and methods of distance education increased significantly. The acceleration of large-scale work on the creation of artificial intelligence systems , as well as research on the topic of distance education from the perspective of a social phenomenon, led to new paradigms: the need to take into account the specific characteristics of teaching and learning, to improve teaching methods taking into account social problems, and to use the achievements of artificial intelligence technologies to increase the efficiency of learning.

The development of EDUCATION 5.0 is of great importance for the development of society as a whole. Because the tasks of this concept are mainly aimed not only at the active use of new ICT, but also at training specialists who are critical thinkers, able to adapt to rapidly changing conditions, creative and interdisciplinary, and capable of solving problems in various fields of knowledge and activity. Creating access to advanced technologies and scientific and educational information not only increases the efficiency of the educational process, but also develops the principles of person-centered, holistic and continuous education within the framework of Education 5.0. Only when innovations are person-centered, sustainable development can be achieved in higher education and society as a whole. The efforts of those who adhere to the principles of EDUCATION 5.0 are aimed at personalizing the educational process, using technological advances to support lifelong learning through the provision of interactive content and special software and hardware. Moreover, these principles are aimed at the formation of a well-rounded individual, not only with cognitive skills, but also with emotional intelligence, social awareness and moral values. These principles correspond to the tasks of a civilized society that is “human-centered, contributing to well-being, inclusion and adherence to ethical standards” [5]. Digitalization opens up new perspectives for universities and can become one of the main factors of their transformation. The implementation of the principles of Society 5.0 and Industry 5.0 in the practice and policy of Education 5.0 will allow both universities and society to fully benefit from the benefits of digital transformation [11].

The theoretical and methodological basis of the study was the works of domestic and foreign authors in the field of digitalization of education (T. Bates, J. Siemens, N. Selvin, N. Sh. Kozlova, VP Bepalko, etc.) and regulatory documents. Uzbekistan pays special attention to the introduction of digital solutions into the education system.

The legal foundation for this was created by the Law of the Republic of Uzbekistan "On the Strategy of Digital Uzbekistan - 2030", adopted in 2020 <sup>1</sup>.

The law defines the goals and objectives of digitalization, including the development of digital literacy, ensuring equal access to quality education, and creating a unified digital educational environment. It also defines financing mechanisms and requirements for the digital infrastructure of educational institutions. In the period until 2030

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<sup>1</sup>Law of the Republic of Uzbekistan "On Digital Education" - Tashkent: Republic of Uzbekistan, 2020. - 25 p., (Official regulatory document. Adopted in 2020, Lex.uz

Thus, to achieve the research objective - namely, to identify the mechanisms and factors influencing the effectiveness of digital technologies in educational services - the following research methods were used :

**Theoretical methods:** analysis and generalization of scientific literature, regulatory and strategic documents, comparative study of Russian and foreign experiences in the digitalization of education. This stage made it possible to identify the main trends, advantages and risks of introducing digital technologies into the higher education system.

**Empirical methods:** A survey and expert interviews were conducted among teachers and students of higher education institutions in Samarkand . 210 students and 65 teachers studying in various fields participated in the survey. The questionnaire included blocks of questions on the level of use of digital tools, satisfaction with digital services, their impact on the quality of education , and assessment of the effectiveness of feedback.

**Quantitative analysis methods:** processing and interpretation of the obtained data using statistical tools of descriptive and correlation analysis (Microsoft Excel, SPSS). This made it possible to determine the relationship between the level of use of digital technologies and indicators of the effectiveness of the educational process - student participation, quality of communication, and satisfaction with the educational environment.

A substantive analysis of the official documents and internal regulations of local higher education institutions regulating digitalization processes and education quality management systems. This analysis focused on identifying institutional mechanisms for supporting digital transformation and assessing its impact on the quality of educational services.

**The comparative analysis method was used to compare the effectiveness of educational services in traditional and digital formats**, allowing us to identify areas where the introduction of digital technologies has the most significant impact (for example, increasing interactivity, speed of feedback, accessibility of educational materials).

and validity of the results obtained were ensured by the comprehensive use of complementary methods, the representativeness of the sample of respondents, as well as by verifying the conclusions by comparing them with the results of previous studies in domestic and foreign literature [3; 4; 5; 9].

allowed not only to identify the role of digital technologies as a factor in increasing the efficiency of educational services, but also to identify specific management and pedagogical mechanisms that ensure the realization of this potential in the context of the digital transformation of higher education .

The empirical part of the study focused on identifying the relationship between the level of use of digital technologies and indicators of the effectiveness of educational services. During the survey, data were collected from 210 students and 65 teachers ( between May and September 2025 ) on the frequency of use of digital tools, the level of digital competencies, and the perception of the quality of educational processes.

### **1. The level of digitalization of the educational process**

UNESCO is leading global efforts to ensure access to digital education for all through initiatives such as the “Artificial Intelligence Competence Framework for Teachers and Learners” and the “ICT Competence Framework for Teachers.” These frameworks serve as clear guidelines for governments and educators seeking to effectively and inclusively integrate technologies into education systems .

The results showed that digital technologies are deeply embedded in everyday learning activities:

- 87% of students and 92% of teachers indicated that they regularly use digital learning platforms such as Ziyonet Moodle, Google Classroom, Khan Academy Uzbek, and Zoom;

- 68% of students use additional digital resources such as Coursera, Bloom Library, OsonEdu, Biblio.uz for independent learning;
- However, only 64% of teachers regularly use digital analytics tools such as monitoring systems, tests, and flexible courses to assess learning outcomes.

This shows the gap between the level of technological equipment of the educational process and the readiness of educators to effectively use digital tools.

2. The impact of digital technologies on the quality of educational services

of digitalization on the quality of educational services is assessed based on the following four criteria:

1. convenience and flexibility of education;
2. the quality of communication between teacher and student;
3. interactivity of the educational process;
4. Learners' satisfaction with the learning environment.

of 1 to 5 are presented in Table 1.

**Table 1. The impact of digital technologies on the efficiency of educational services (according to survey results, 2025)**

Indicator	Student GPA	Teachers' average score	Dynamics compared to the pre-Covid period*
Ease and flexibility of education	4.6	4.4	+1.1
Contact form	4.2	4.0	+0.8
Interactivity and engagement	4.1	3.8	+0.9
Satisfaction with the learning environment	4.3	4.1	+0.7

\* according to subjective assessments of respondents (compared to the period before 2020)

The data shows that respondents attribute the most significant improvements to the increased convenience and flexibility of education, as well as the increased interactivity of the learning process. This can be explained by the expansion of remote access options and the use of digital platforms that allow simultaneous and distributed interaction.

**3. Factors limiting the effectiveness of digitalization**

Despite positive changes, the survey identified a number of systemic problems: and methodological support provided by universities was insufficient;

- 46% of students reported an excess of digital assignments and a lack of live interaction ;
- 37 percent of respondents noted that the quality of online courses is not uniform, especially across faculties ;
- 14% of teachers face difficulties in implementing digital tools into traditional forms of education.

This situation demonstrates the need to maintain a balance between digital and face-to-face forms of education, as well as the importance of systematic training of personnel in the field of digital pedagogy.

4. The relationship between digital competencies and teaching effectiveness

The correlation analysis showed a moderate but statistically significant relationship ( $r = 0.48$  ;  $p < 0.05$ ) between teachers' level of digital competence and students' satisfaction with the quality of educational services. This confirms the hypothesis that the quality of digital education is determined not by the availability of technologies, but by the ability of teachers to use them effectively.

#### 5. Qualitative results and observations

Research has shown that universities are implementing a digital transformation strategy aimed at improving the efficiency of educational services through:

- introducing digital analytics into the education quality management system;
- improving electronic document management and monitoring services;
- support digital pedagogy and improve teacher training.

However , digitalization processes are not always accompanied by mechanisms to assess their impact on educational outcomes, which confirms the need to include digital performance indicators in internal quality control systems.

### V. CONCLUSION/RECOMMENDATIONS

The study conducted on the example of local higher education institutions allowed for a comprehensive assessment of the role of digital technologies in improving the efficiency of educational services in the higher education system. The results of the empirical analysis confirmed that digitalization has become a key factor in changing the content, forms and mechanisms of educational services . This affects both the quality of educational outcomes and the level of satisfaction of learners with the educational process.

First, digital technologies have been shown to significantly increase the convenience and flexibility of education. This is done by creating opportunities for blended and distance learning, individualizing educational paths, and expanding the range of educational resources. According to the majority of students and teachers surveyed, digital solutions help to accelerate communication, provide quick feedback , and develop independent learning activities.

Secondly, it was found that it is impossible to increase the efficiency of educational services without developing the digital competencies of the teaching staff. The level of digital literacy of teachers is directly related to the perception of the quality of the educational process by students. This indicates the need for systematic work on improving the skills of teaching staff in digital technologies, online teaching methods , and educational data analysis.

Third, the research results show that the digitalization process in Russian higher education institutions is fragmented and instrumental in nature: the introduction of separate platforms and services is often not accompanied by changes in management processes, quality control models, and pedagogical approaches. The lack of a holistic strategy for digital transformation limits the possibilities for improving the efficiency of educational services.

Fourth, it was found that the effectiveness of the digital environment is directly dependent on the availability of mechanisms for monitoring and evaluating the quality of digital educational services. At the level of higher education institutions, it is necessary to develop digital performance indicators - indicators that reflect the participation, satisfaction, interactivity and achievements of learners in the digital environment. Their inclusion in the internal quality audit system will allow for an objective assessment of the impact of digital solutions on educational outcomes.

Overall, the results of the study confirm that digital technologies are becoming not just a tool, but a strategic resource for the development of educational organizations. Their potential is revealed in the context of a systematic approach that includes the managerial, methodological and cultural components of digital transformation.

Digitalization of education should be viewed not as a one-time technological upgrade, but as a long-term model of organizational development of a higher education institution based on the knowledge, quality and participation of all participants in the educational process. The implementation of the proposed recommendations will increase the competitiveness of Russian higher education institutions and ensure the sustainable quality of educational services in the digital economy.

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