Prospects For Implementing A Unified Digital Educational Resources And Services Portal: The Case Of Uzbekistan

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ABSTRACT

Modern digital technologies are emerging as a crucial factor in enabling innovative approaches and high efficiency in the field of education. From this perspective, the need to integrate all digital educational resources and interactive services into a single information platform is growing day by day. This article provides a comprehensive analysis of the conceptual foundations, practical aspects, and expected outcomes of implementing the "Unified Digital Educational Resources and Services Portal" in Uzbekistan's education system. Additionally, comparative analyses based on advanced international practices have been conducted, and recommendations are provided to identify promising directions for the effective implementation of the portal, including the introduction of a digital ecosystem in education through a unified portal.

Keywords:	Unified educational portal, digital educational resources, independent learning, digital competence, digital educational ecosystem, interactive educational services

Introduction

As a result of the globalization process and the rapid development of digital technologies, a comprehensive modernization of modern education systems is required. In particular, the use of digital solutions has become one of the urgent issues in early identification of individual abilities of students at the general secondary education level, providing them with modern skills, and organizing continuous pedagogical and methodological support. In this context, distance and online learning platforms (e-learning) are emerging as an effective tool for transforming the education system. At the same time, opportunities are expanding to individualize the learning process based on digital technologies (personalized approach), develop the digital competencies of participants, and create innovative mechanisms that serve to increase the effectiveness of education.

It would not be an exaggeration to say that the COVID-19 pandemic, which emerged at the beginning of 2020, was a severe test for the entire global education system. The temporary closure of schools, universities, and other educational institutions compelled many

countries to develop and implement national digital educational platforms within a short period. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), during the peak of the pandemic, two-thirds of distance learning was organized through online platforms. However, estimates show that about 465 million children and adolescents, or nearly 47 percent of students in general education schools worldwide, were deprived of the opportunity to access these platforms and receive education due to the lack of internet access at home. In these circumstances, we can observe that the introduction of distance and online educational platforms, as well as the development of digital textbooks, not only played a crucial role in ensuring the continuity of the educational process but also provided impetus to the digital transformation process. This, in turn, laid the foundation for profound changes in the content and technological foundations of the education system.

World experience demonstrates that creating national e-learning platforms at the state level enables the delivery of educational resources to a wide audience, enhances inclusivity and equality in education, and improves the quality of education. Notably, the national e-learning platforms of countries such as Saudi Arabia, South Korea, and China have gained global recognition and have been acknowledged by UNESCO as some of the most advanced digital education models.

In Uzbekistan, systemic reforms have been implemented to introduce modern information and communication technologies across all spheres and sectors. As part of this process, a number of laws, decrees, and resolutions aimed at training qualified personnel have been adopted. The Decree of the President of the Republic of Uzbekistan Sh. Mirziyoyev No. UP-6079, dated October 5, 2020, approved the "Digital Uzbekistan – 2030" strategy, which became the legal foundation for the digital transformation of all spheres and sectors in the country. Particularly in the field of education, special emphasis has been placed on training qualified specialists in creating and using digital technologies, developing digital education, and providing all preschool and school educational institutions with high-speed internet access. Furthermore, the strategy envisages the use of innovations aimed at improving the quality and effectiveness of education, such as automating education management and establishing a mechanism for comprehensive systematic analysis using modern information and communication technologies in the educational process. It also includes implementing a unified distance learning platform to continuously enhance teachers' qualifications, and creating national digital educational resources and multimedia tools for students (Decree, 2020). Additionally, the Decree of the President of the Republic of Uzbekistan No. UP-158 "On the Strategy "Uzbekistan-2030"" dated September 11, 2023, stipulates that in order to elevate the general secondary education system to a new level, it is necessary to develop 1,000 multimedia programs and advance digital education through mobile applications by 2030 (Decree, 2023).

In this regard, it is necessary to emphasize that large-scale reforms are being implemented in Uzbekistan for the digital transformation of the education system. These include providing general secondary education institutions with high-speed internet, developing educational platforms that integrate useful resources for educators and learners, and putting these into practice. However, one of the pressing issues is creating the opportunity to access all developed digital educational resources, multimedia tools, virtual laboratories and simulations, interactive educational services, and other materials from a single point. This is because advanced foreign practices have implemented unified educational platforms for education participants to engage in independent learning at any time and place, and have established effective utilization of such platforms.

Literature review

The development of digital education, enhancing its effectiveness, and improving its implementation mechanisms have been at the forefront of many scientists' and researchers'

attention in recent years. The proposals and recommendations put forward in scientific studies play a crucial role in transitioning the education system to a modern digital model. Specifically, research findings indicate that digital educational platforms enable educators and learners to access educational resources freely from any location and at any time. This, in turn, is recognized as a vital tool in increasing the flexibility and reach of the educational process, expanding opportunities for individualized approaches and the organization of inclusive education.

It has been scientifically proven that integrating digital technologies into the K-12 education system significantly enhances the flexibility, personalization, and accessibility of the learning process. In his scientific work, T. Nakunsong analyzes the role of online educational programs and virtual platforms in this direction, emphasizing that the evolution of digital education not only expands opportunities but also creates new challenges, such as the digital divide and adaptation difficulties. Based on a synthesis of existing research, the author substantiates the need for equitable access, sustainable technical support, and the establishment of professional development systems for educators to effectively implement this system (T. Nakunsong, 2024). Additionally, due to the COVID-19 pandemic, K-12 students faced the necessity to transition fully or partially to online learning. A systematic analytical study conducted by C.Johnson and other researchers aimed to identify methodological approaches, conditions, and systemic mechanisms for effectively supporting students in K-12 online education. According to the research findings, the success of digital education directly depends on technological infrastructure, students' independent learning skills, developmental needs, and the availability of trained teaching staff. Specifically, the authors identify five main pillars that serve to support learners: pedagogical design, connective learning environment, individualization, active learning, and online assessment (C.C. Johnson, J.B. Walton, L. Strickler, J.B. Elliott, 2022).

P.Wang and co-authors analyze the impact of online education on academic outcomes within the K-12 system using an ecosystem approach. The authors conducted a survey involving 1,625 school students in China and employed the Structural Equation Modeling (SEM) model. They emphasize that the level of student engagement in online learning directly influences academic success and reduces personal and social factors (P. Wang, F. Wang, Z. Li, 2023). Another group of researchers examined the effectiveness of digital education platforms, particularly Google Classroom, in developing instructional design skills for future teachers. The research results indicate that lessons conducted through the digital platform had a positive impact on developing students' cognitive, practical, and social competencies. Furthermore, it was found that using the platform served as a crucial factor in enhancing the learning activity and professional preparation of future teachers (A.A. Gameil, A.M. Al-Abdullatif, 2023).

In their research, a Russian scholar analyzes the role of digital platforms in organizing student-centered education in school settings. The author argues that forming individual learning trajectories for students using modern digital tools helps unlock their personal potential. The study, using the "SberKlass" platform as an example, highlights opportunities to increase student motivation and effectively organize teachers' monitoring and assessment activities. Notably, the author emphasizes the need to update methodological training and pedagogical approaches for the successful implementation of digital education (E.A. Salnikova, 2023). A study conducted by E. Yatskaya and A. Teuvazhukov outlines the main challenges and prospects related to the digitalization of the education sector. The authors present digital transformation as a modern approach to achieving desired outcomes through modernizing the education system, improving quality, and implementing new technologies. The research also discusses the digital platforms emerging within national projects, the necessity for their development, and the infrastructural limitations in their

practical implementation (E.A. Yatskaya, A.Kh. Teuvazhukov, 2023).

In a scientific article written by researchers on the experience of Uzbekistan, the stages of digitalization in the education system, the formation of digital pedagogy and didactics, and the transformation of pedagogical activities in accordance with the modern digital environment are analyzed. The authors, focusing on concepts such as digital literacy, competence, and information-educational environment, emphasize the need to improve the quality of the educational process and technologically update pedagogical approaches (Kh. Ruzimova, J. Dulan, B. Akhmedov, 2024). Additionally, another scientific article highlights the stages of formation, main components, advantages, and challenges of digital education in Uzbekistan. The authors discuss the acceleration of the transition to digital education during the COVID-19 pandemic and how this transformation was met with innovative responses across all regions. The study analyzes the role of technologies in digitalizing education, opportunities for students to freely access educational resources, and future prospects (B.Sh. Usmonov, U.B. Shukurillaev, 2023).

In addition, numerous scientists have conducted research on various aspects of digital education, including: the impact of digital technologies on student learning (C.N. Akpen, S. Asaolu, S. Atobatele, H. Okagbue, S. Sampson, 2024); distinctive features of digital learning in the 21st century (Y. Zou, F. Kuek, W. Feng, X. Cheng, 2025); the effectiveness of digital educational platforms in teaching activities (A.M. Moldavan, C. Edwards-Leis, J. Murray, 2022); digital inequality in the K-12 education system and mechanisms for its elimination (B. Mann, W. Li, K. Besnoy, 2021); online educational infrastructure and its implementation in the school education system (J.A. Machusky, K.G. Herbert-Berger, 2022); main shortcomings of digital platforms (M. Decuypere, E. Grimaldi, P. Landri, 2021); problems and prospective plans for the digital transformation of Uzbekistan's education system (Z.Sh. Sharipova, 2025). These studies have focused on developing digital education,

the effectiveness of distance and online platforms, learning management systems (LMS), and the role of digital technologies in organizing interactive and meaningful lesson processes. However, insufficient research has been conducted on implementing a unified educational ecosystem in the general secondary education system that would allow access to all digital educational resources and interactive educational services from a single point, ensure openness and transparency in education through integration, provide methodological support for educational participants, and enable continuous development of their digital competencies. Considering this, the development and implementation of a "Unified Portal of Digital Educational Resources and Services" in Uzbekistan is of great relevance.

Research methodology

This study employs an analytical approach aimed at examining the prospects for developing the digital education system and implementing a unified portal for digital educational resources and services. The research analyzed the current state, reforms, existing infrastructure, level of resource utilization, and efficiency criteria in the field of digital education. Additionally, based on advanced foreign experiences, the structural and functional capabilities of educational platforms were studied and compared with Uzbekistan's experience. Using methods of data collection, grouping, comparison, logical analysis, and synthesis, the main challenges, opportunities, and promising directions were identified.

Analysis and results

When analyzing the experience of advanced foreign countries in developing digital education, we can observe the implementation of portals such as Turkey's EBA (https://www.eba.gov.tr), China's Smart Education (https://www.smartedu.cn), South Korea's EduNET (https://www.edunet.net), India's DIKSHA (https://diksha.gov.in), Russia's Electronic School (https://resh.edu.ru), Kazakhstan's TopIQ (https://topiq.kz), and similar platforms.

The Turkish Educational Information Network (Eğitim Bilişim Ağı - EBA) was launched by the Ministry of National Education in 2012 and initially operated as part of the FATİH (Fırsatları Artırma ve Teknolojiyi İyileştirme Hareketi) project. Due to the COVID-19 pandemic in the 2020-2021 academic year, the EBA portal was regularly used by 7,383,213 students and 1,030,516 teachers. To date, this information network has created opportunities for online learning through 5,954,174 live lessons. Additionally, 1,170,168 students and 189,477 teachers have been using the EBA Academic Support module (a module that allows preparation for exams). In October 2020, the portal ranked first worldwide in terms of user numbers and internet traffic among global educational sites. EBA contains 186 types of e-books, 270 video modules, 53 categories of audiobooks and interactive tests. The fact that government organizations have provided more than 3,600 additional content items demonstrates the richness of the platform's resource base.

China's online education portal Smart Education of China (SmartEdu), launched in March 2022, stands out with its registered user base exceeding 164 million as of April 2025. The portal's database contains over 110,000 school-level resources, more than 11,300 vocational education courses, 31,000+ higher education courses, and over 2,000 lifelong learning courses. The portal encompasses 51 different services across eight main categories, including modules for examinations and job placement. During the pandemic, more than 13.15 million learners received education online through the portal. Currently, artificial intelligence technology has been integrated into this portal, serving as a virtual assistant to provide personalized approaches to users throughout their learning process.

The EduNET online educational portal, introduced by the South Korean Education and Research Information Service (KERIS) in September 1996, is currently one of the primary tools for digitalizing school education. Today, more than 4.3 million education participants are using this portal. Of these, approximately 3.9 million are students, 0.31 million are teachers, and 1.09 million are general users. The platform's content includes over 320,000 digital educational resources, comprising 136,336 lesson materials, 83,378 education policy-related documents, 54,646 personal developments by teachers, and 48,802 modules created for specialists. Additionally, the portal offers the ability to work with interactive lesson materials, lesson plans, educational and methodological content, pedagogical community networks, including online classrooms and assessment systems (Kyubok Cho, 2023).

The Digital Infrastructure for Knowledge Sharing (DIKSHA) portal, launched by the Ministry of Education of India in September 2017, currently contains 291,168 e-learning resources (including QR-coded textbooks, videos, tests, and interactive materials). Additionally, the DIKSHA portal has over 150 million course enrollments, with more than 4.7 million teachers participating in professional development programs. It has been reported that by 2025, the platform will be utilized by over 200 million students and 7 million teachers. According to statistics, DIKSHA mobile and web applications attract 700,000 active users daily and more than 8 million users monthly. Overall, the DIKSHA portal has been implemented as a comprehensive, digital infrastructure and user-centered solution based on India's "One Nation, One Digital Platform" concept.

As of April 2022, the Russian Electronic School Portal (Российская электронная школа - РЭШ) had reached over 9.7 million students, parents, and teachers, with its number of visits exceeding 137 million. The portal offers fully interactive courses, video lessons, and diagnostic tests for grades 1 through 11, as well as practical resources for students' independent work. The resource repository is structured in a strict order and contains various text lessons, video materials, student assessment tools, and electronic textbooks. Additionally, the portal allows for the creation of separate personal accounts for students, parents, and teachers.

The TopIQ digital education portal, presented by Kazakhstan's "Алматыкітап" publishing house, has been providing

interactive electronic textbooks for grades 1-11 since the 2020-2021 academic year. The portal features both mobile and web interfaces, making it accessible on all smart devices. In 2023, the portal was successfully used in digitalizing 30% of school activities, receiving positive feedback from thousands of teachers and students. The electronic textbook database of the TopIQ portal contains a rich library of audio and video materials, animations, and interactive tasks. Unlike traditional PDFs, each textbook is presented as a comprehensive multimedia tool.

Along with the aforementioned foreign experience, several platforms have been developed in the general secondary education system of the Republic of Uzbekistan. One of them is "eMaktab" - a unified digital educational platform of the Ministry of Preschool and School Education of the Republic of Uzbekistan, designed for teachers, students, parents, administrators of educational institutions, as well as representatives of educational management bodies.

The main areas of activity of "eMaktab" are:

- Digitalization of school and preschool education.

- Integration of advanced ICT into the educational process.

- Development of interactive communication between "teacher-student-parent".

- Implementation of distance and independent learning opportunities.

- Development of a multiservice online platform "eMaktab.Smart" for additional study of subjects within the school curriculum.

Additionally, the Maktab.uz platform is the largest general education online school for grades 1-11, as well as a project that includes video lessons and other materials based on the school curriculum. Since 2020, this platform has been providing every learner with the opportunity to gain knowledge from the best students. The platform also features video lessons for learning modern knowledge and skills, such as programming, graphic design, robotics, effective communication, and leadership.

However, creating the possibility of accessing all digital resources and educational services in the preschool and school education system from a single point is one of today's requirements. Taking into account advanced foreign experience and local needs, having a single portal for all educational resources allows for the creation of a unified ecosystem in education. Considering this, to develop digital education in the Republic of Uzbekistan, enable access to digital resources and interactive services related to education from a single point, and thereby create convenience for education participants, the Republican Scientific and Methodological Center for the Development of Education has developed a "Unified Portal of Digital Educational Resources and Services".

The main tasks of this portal are:

- creating access to all information systems and platforms in the preschool and school education system from a single point;

- creating favorable conditions for the continuous development of digital competencies of education participants;

- providing methodological assistance to teachers on modern pedagogical software tools, their use, and practical application;

- forming a unified database of digital educational resources and multimedia tools organized by classes, subjects, and topics of general education schools;

- Create conveniences for educational participants, including teachers, students, and their parents, to use interactive educational resources anywhere and at any time;

- Provide psychological support for educators, psychologists, and parents of learners in the preschool and school education system;

- Form general concepts and provide interactive resources on international assessment programs (PISA, PIRLS, TIMSS, TALIS);

- Facilitate the development of students' skills by providing digital and interactive resources related to STEM education;

- Create opportunities for teaching and learning using virtual laboratories and simulations in natural sciences, linking them to

topics presented in the curriculum and lesson plans;

- Create conveniences for educational participants in the effective use of resources

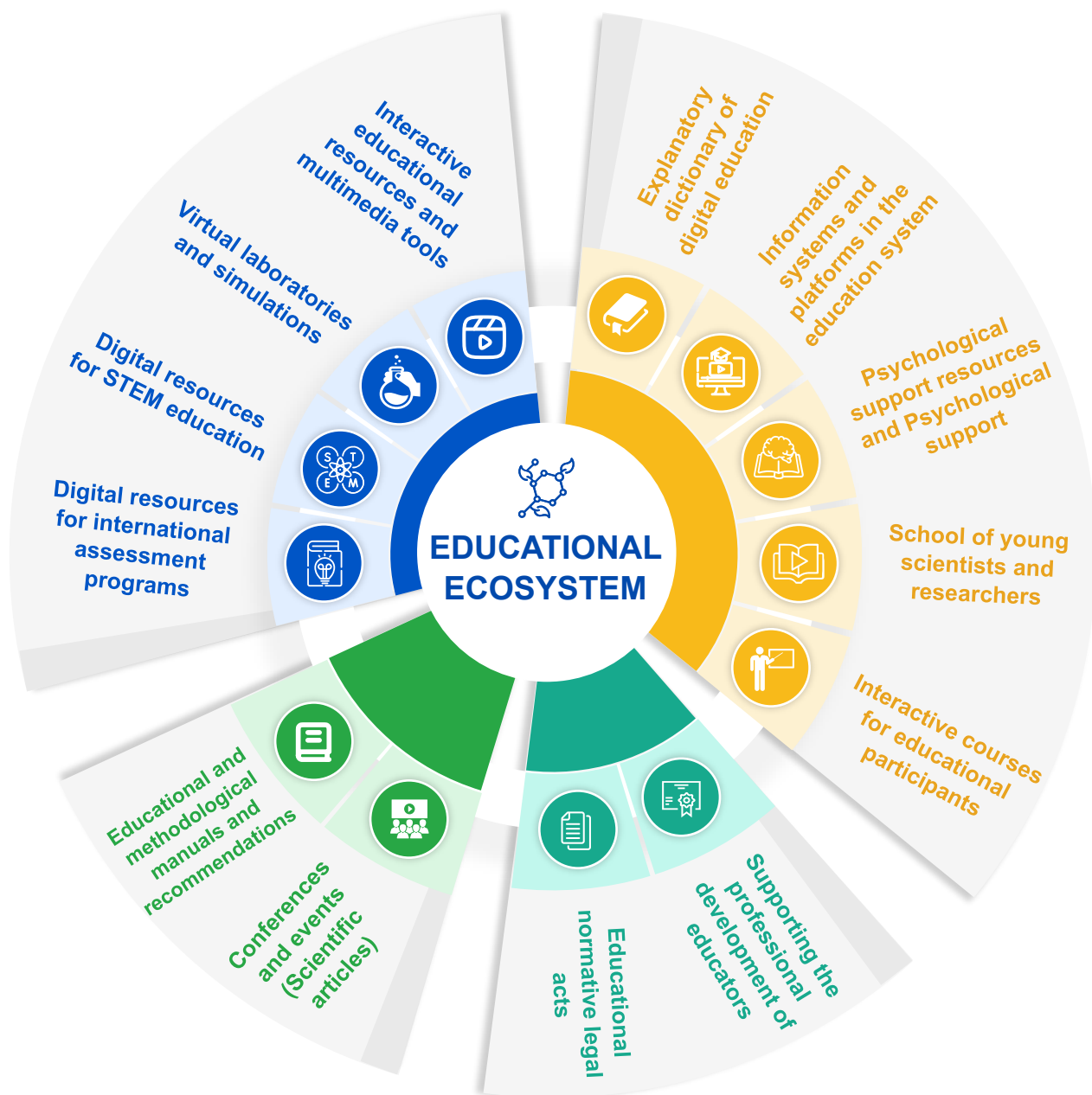through an artificial intelligence-based virtual assistant (chatbot).

Figure 1. Subplatforms of the "Unified Portal of Digital Educational Resources and Services"

To date, approximately 20 sub-platforms have been launched on the Unified Portal, with digital educational resources and multimedia tools being continuously added to each of them. As of October 2025, the portal includes about 9,000 digital resources, of which nearly 6,000 are interactive resources summarizing topics from subject textbooks for grades 1-11 in general education schools. Additionally, about 550 virtual laboratories and simulations, approximately 800 STEM-related materials, around 200 psychological support resources, and content from various other educational fields have been consolidated into a single point.

Conclusions and recommendations

Modern digital technologies continue to be one of the main factors shaping global trends

in the transformation of education systems. As evidenced by countries such as Turkey, China, South Korea, India, Russia, and Kazakhstan, the implementation of unified digital education portals serves to improve the quality of education, create equal opportunities for educational participants, and ensure the continuity of the learning process. Portals like EBA, SmartEdu, EduNET, DIKSHA, REShU, and TopIQ, with their extensive content bases, interactive tools, solutions integrating artificial intelligence technologies, and real-time monitoring systems, have become an integral part of the global educational ecosystem today.

We can observe that the education system of Uzbekistan has taken significant steps towards digital transformation in recent years. Specifically, local platforms such as eMaktab, Maktab.uz, My.maktab.uz, and ERP systems are being gradually implemented. However, the fragmentation of existing digital resources, services, and platforms, along with their lack of integration into a unified system, creates difficulties for students, teachers, and parents in utilizing them effectively. Consequently, the creation of the "Unified Portal of Digital Educational Resources and Services" is of great importance as a strategic element of the national digital educational infrastructure.

This portal ensures the continuity of the educational process by combining all digital resources related to preschool and general secondary education, interactive services, virtual laboratories, STEM activities, content related to international assessment programs, methodological guides, and modern software tools in a single environment. It aims to provide a range of opportunities for developing digital literacy, offering resources tailored to the individual needs of teachers and students, and improving the quality of education through artificial intelligence-based support services.

International experience demonstrates that a single digital educational portal functions effectively not only as a collection of resources but also as an integrated ecosystem that harmonizes pedagogical, technological, and management systems. Uzbekistan's step in this direction, namely the initiative to implement a unified portal, will serve as a crucial foundation for qualitatively developing the national education system through digital reforms.

References

1. Nakunsong, T. (2024). Evolving K-12 Digital Education: Enhancing Flexibility and Access through Online Learning and Virtual Programs. Journal of Education and Learning Reviews, 1 (5), 1-12; DOI: https://doi.org/10.60027/jelr.2024.791.

2. Johnson, C. C., Walton, J. B., Strickler, L., & Elliott, J. B. (2023). Online teaching in K-12 education in the United States: A systematic review. Review of Educational Research, 93(3), 353–411. https://doi.org/10.3102/00346543221105550.

3. Wang P., Wang F. and Li Z. (2023). Exploring the ecosystem of K-12 online learning: an empirical study of impact mechanisms in the postpandemic era. Front. Psychol. 14:1241477. doi: 10.3389/fpsyg.2023.1241477.

4. Gameil, A.A., Al-Abdullatif, A.M. (2023). Using Digital Learning Platforms to Enhance the Instructional Design Competencies and Learning Engagement of Preservice Teachers. Educ. Sci. 13, 334. https://doi.org/10.3390/educsci13040334.

5. Е.А. Сальникова (2021). Школьная цифровая платформа как инструмент организации персонализированного обучения. Научно-методическое обеспечение оценки качества образования. № 3 (14). ст. 70-73.

6. Яицкая, Е. А., & Теуважуков, А. Х. (2023). Цифровизация образования: проблемы и перспективы. Журнал прикладных исследований: научно–практический журнал, (8), ст. 139-143.

7. Dulan, J., Akhmedov, B., & Rozimova, X. (2024). Features of digitalization of education in Uzbekistan. Critical Review, 23(2), 278–282.

8. Усмонов, Б. Ш., & Шукуриллаев, У. Б. (2022). Краткий обзор развития цифрового образования в

Узбекистане. Человеческий капитал, (12)168, том 2.

9. Akpen, C. N., Asaolu, S., Atobatele, S., Okagbue, H., & Sampson, S. (2024). Impact of online learning on student's performance and engagement: A systematic review. Discover Education. Vol. 3(205). P.24-31.

10. Zou Y., Kuek F., Feng W. and Cheng X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. Front. Educ. 10:1562391. doi: 10.3389/feduc.2025.1562391.

11. Moldavan, A. M., Edwards-Leis, C., & Murray, J. (2022). Design and pedagogical implications of a digital learning platform to promote well-being in teacher education. Teaching and Teacher Education, Vol. 115, p. 1-9.

12. Mann, B., Li, W., & Besnoy, K. (2021). Digital divides: K-12 student profiles and online learning. Education Policy Analysis Archives, 29(112). https://doi.org/10.14507/epaa.29.6351 .

13. Machusky, J. A., & Herbert-Berger, K. G. (2022). Understanding online learning infrastructure in U.S. K–12 schools: A review of challenges and emerging trends. International Journal of Educational Research, Vol. 114, p. 1-7.

14. Decuypere M., Grimaldi E., Landri P. (2021). Introduction: Critical studies of digital education platforms, Critical Studies in Education, 62:1, 1-16, DOI:10.1080/17508487.2020.1866050.

15. Sharipova, Z. Sh. (2025). Digital transformation of the education system in Uzbekistan: Challenges, opportunities, and future prospects. International Scientific-Electronic Journal "Pioneering Studies and Theories", Vol.1(4). P.35-39.

16. Cho, K. (2023). A Review of the ICT Environment for Customized Learning Among Elementary and Secondary School Students in South Korea: Focusing on the One PC per Student Initiative. Information and Technology in Education and Learning, Vol. 3(1), P.1-

10. https://doi.org/10.12937/itel.3.1.Inv.p003.