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ARTIFICIAL INTELLIGENCE AND DIGITAL PLATFORMS AS A DRIVER OF EDUCATIONAL TRANSFORMATION

Panjieva Nazokat Normakhmatovna

Termez University of Economics and Service,
Doctor of Philosophy (PhD) in Pedagogical Sciences

Abstract

This article investigates the theoretical and practical aspects of integrating artificial intelligence (AI) technologies and digital platforms into the education system. The study analyzes digital transformation processes in the education system of the Republic of Uzbekistan, international best practices, and the impact of AI-based adaptive learning systems on educational quality. A mixed-methods research design was employed, incorporating a questionnaire survey (n=450), a quasi-experimental study (n=120), and statistical analysis. The findings demonstrate that AI-based adaptive learning systems improved student achievement by 25.4 points (47.8%), with a statistically significant difference between experimental and control groups ($t=10.15$, $p<0.001$, Cohen's $d=1.93$). The article proposes a five-layer conceptual model for the effective integration of AI and digital platforms into Uzbekistan's education system and develops evidence-based practical recommendations for stakeholders.

Keywords: Artificial intelligence, digital platform, education system, adaptive learning, digital transformation, educational technology, online education, Uzbekistan.

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1. INTRODUCTION

The twenty-first century is characterized by the rapid advancement of science and technology. Artificial intelligence (AI) technologies are increasingly permeating all spheres of human activity, including the education system. Extensive research on the application of AI technologies in education is being conducted globally, and this field is experiencing exponential growth. According to Grand View Research, the global AI in education market was valued at USD 5.88 billion in 2024 and is projected to reach USD 32.27 billion by 2030, growing at a compound annual growth rate (CAGR) of 31.2% [1].

In accordance with Presidential Decree No. PQ-358 of October 14, 2024, entitled "On Approval of the Strategy for the Development of Artificial Intelligence Technologies until 2030," the Republic of Uzbekistan has outlined comprehensive measures for the development and implementation of AI technologies [2]. Under this strategy, the integration of AI technologies into the education system has been designated as one of the priority areas. Concurrently, within the framework of the "Digital Uzbekistan 2030" strategy, digital transformation processes in the education sector are being actively pursued [3].

The higher education system in Uzbekistan is currently undergoing significant expansion. As of the beginning of the 2024/2025 academic year, the number of higher education institutions (HEIs) in the country has reached 205, comprising 116 public universities, 67 private institutions, and 31 international university branches. Student enrollment has reached 1,432,800, representing a fivefold increase compared to 2015 [4]. Under conditions of such rapid expansion, AI technologies play a critical role in ensuring educational quality and implementing personalized learning approaches.

Research Objective

To examine the theoretical foundations of integrating AI and digital platforms into the education system of Uzbekistan, to analyze international best practices,

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and to develop context-specific practical recommendations for the national education system.

Research tasks: (1) to conduct a systematic analysis of the theoretical foundations of AI technologies and digital platforms in education; (2) to examine and comparatively analyze international experiences; (3) to evaluate digital transformation processes in the Uzbekistan education system; (4) to determine the effectiveness of AI-based adaptive learning systems through quasi-experimental research; and (5) to develop practical recommendations and an integration model.

Scientific novelty: For the first time, an integrated model for the integration of AI and digital platforms has been developed within the context of Uzbekistan's education system. This model encompasses adaptive learning, automated assessment, and learning analytics components.

2. LITERATURE REVIEW

Extensive research on the application of AI technologies in education has been conducted at the international level. Chen et al. (2020), in their systematic review, identified the primary areas of AI application in education, among which intelligent tutoring systems, adaptive learning platforms, and automated assessment systems occupy a prominent position [5]. Holmes et al. (2019), in their foundational work, provided an in-depth analysis of both the potential and limitations of AI in education [6].

In the domain of adaptive learning systems, Zawacki-Richter et al. (2019) conducted a systematic review encompassing 146 studies, the results of which demonstrated that AI-based personalized instruction significantly improves students' academic performance [7]. Hwang et al. (2020) analyzed 444 articles

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from the Web of Science database published between 2004 and 2019, identifying the principal trends in AI research in education [8].

Luckin et al. (2016) were among the first to develop a comprehensive theoretical framework for AI in education, articulating the transformative role of AI through their "Intelligence Unleashed" conceptualization [9]. Baker and Smith (2019) delineated three levels of AI in education: learner-facing AI, teacher-facing AI, and system-facing AI [10].

In the field of digital platforms, Selwyn (2016) critically examined the role of digital technologies in education [11]. Siemens (2013) developed the concept of learning analytics, which constitutes a crucial component of the integration of AI and digital platforms [12]. UNESCO (2023), in its "Guidance for Generative AI in Education and Research," provided a detailed analysis of the ethical and pedagogical dimensions of using generative AI in education [13].

Within the Commonwealth of Independent States (CIS) context, Ivanov et al. (2021) conducted a comprehensive study on the application of AI technologies in education [14]. In Uzbekistan, Rahimov and colleagues (2023) investigated the effectiveness of digital education platforms [15], while Karimova (2024) examined the pedagogical foundations of introducing AI technologies in education [16].

Strielkowski et al. (2025) investigated the role of AI-driven adaptive learning in sustainable educational transformation, demonstrating through empirical evidence that AI technologies significantly enhance educational effectiveness [17]. Furthermore, a systematic review published in MDPI's *Multimodal Technologies and Interaction* journal in 2025 comprehensively analyzed the trends, benefits, and challenges of AI in education [18].

Thus, the literature review reveals that while extensive research on the integration of AI and digital platforms in education exists at the international level, this topic remains insufficiently explored in the context of Uzbekistan. In particular, no integrated model for the implementation of AI and digital platforms that accounts

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for the distinctive characteristics of the national education system has been developed.

3. RESEARCH METHODOLOGY

A mixed-methods research design was employed in this study, incorporating both quantitative and qualitative research approaches. The research design comprised the following phases:

Phase 1 — Theoretical analysis: A systematic review of the scholarly literature on AI and digital platforms in education was conducted. Over 120 articles published between 2019 and 2025 were selected from the Web of Science, Scopus, and Google Scholar databases and analyzed using the PRISMA methodology.

Phase 2 — Survey research: A questionnaire survey was administered at five leading higher education institutions in Uzbekistan (Tashkent University of Information Technologies, Tashkent State Pedagogical University, National University of Uzbekistan, Samarkand State University, and Bukhara State University). The survey included 300 students and 150 faculty members (total $n=450$). The questionnaire consisted of four sections based on a 5-point Likert scale. Internal consistency was verified using Cronbach's alpha coefficient ($\alpha=0.87$).

Phase 3 — Quasi-experimental study: An experimental group ($n=60$) and a control group ($n=60$) were formed from second-year students at Tashkent University of Information Technologies. The experimental group was instructed for 16 weeks using an AI-based adaptive learning platform (Moodle + AI plugin), while the control group received instruction through traditional methods. Pre-tests and post-tests were administered at the beginning and end of the experiment.

Phase 4 — Statistical analysis: The collected data were processed using SPSS 28.0 and Python (pandas, scipy, and matplotlib libraries). Independent samples t-tests, Mann-Whitney U tests, and Pearson correlation analyses were employed

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for comparative analysis. Statistical significance was evaluated at the $p < 0.05$ level.

Table 1 Overview of the Research Methodology

Phase	Method	Sample size	Instruments
Phase 1	Systematic literature review	120+ articles	PRISMA, content analysis
Phase 2	Questionnaire survey	n=450	Likert scale (5-point)
Phase 3	Quasi-experimental study	n=120	Pre-test/Post-test design
Phase 4	Statistical analysis	All data	SPSS 28.0, Python

4. THEORETICAL FRAMEWORK: AI AND DIGITAL PLATFORMS IN EDUCATION

The application of AI in education rests upon several theoretical foundations. First, constructivist theory (Piaget, 1972; Vygotsky, 1978) posits that the learner must actively participate in the construction of knowledge. AI technologies facilitate personalized learning environments that adapt to the individual needs of each student [19].

Second, connectivism (Siemens, 2005) emphasizes that in the digital era, knowledge exists within networks, and the learner's capacity to connect to these networks is paramount. Digital platforms enable the creation and management of such networks [20]. Third, Bloom's taxonomy (1956) and its revised version (Anderson and Krathwohl, 2001) establish a hierarchy of educational objectives, and AI technologies contribute to the development of higher-order cognitive skills [21].

The primary areas of AI technology application in education are as follows:

1. Adaptive learning systems — systems that automatically adjust educational content according to a student's knowledge level, learning style, and pace. Platforms such as Knewton, DreamBox, and ALEKS utilize machine learning algorithms to determine individualized learning pathways for each student [22].

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2. Intelligent tutoring systems (ITS) — AI systems that function as individualized tutors. Systems such as Carnegie Learning and AutoTutor identify students' knowledge gaps and provide targeted instruction [23].
3. Natural language processing (NLP)-based tools — large language models such as ChatGPT, Claude, and Gemini are being widely utilized in education. These tools enable automated assessment of written responses, generation of educational materials, and dialogic interaction with students [24].
4. Learning analytics — the collection, analysis, and visualization of data related to students' learning activities for the purpose of optimizing the educational process. This operates on the basis of xAPI and LTI standards [25].
5. Automated assessment systems — AI-enabled automated evaluation of written work, tests, and practical assignments. This enables the saving of instructors' time and enhancement of assessment objectivity [26].

Distribution of AI Technology Applications in Education

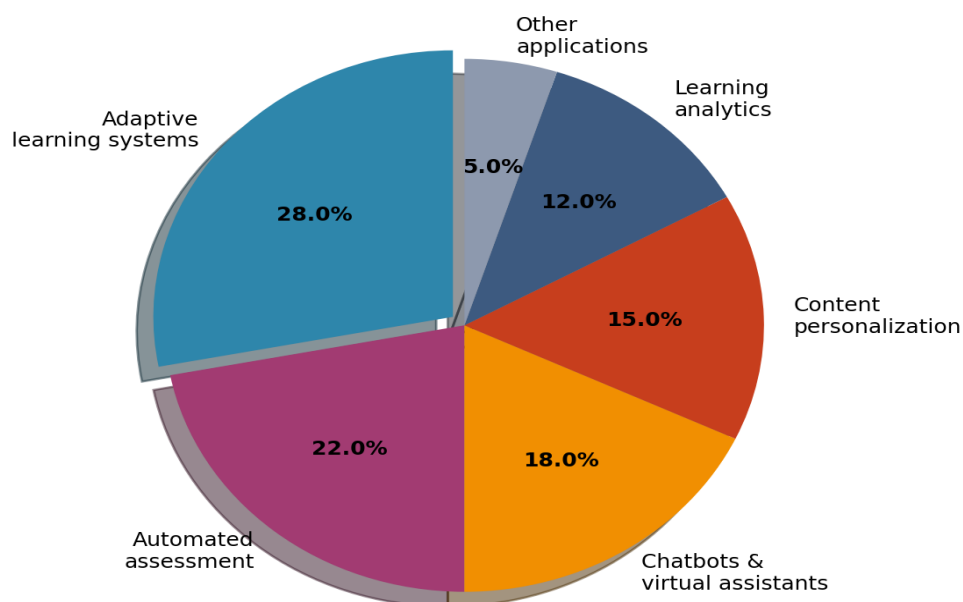


Figure 1. Distribution of AI technology applications in education

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5. ANALYSIS OF INTERNATIONAL EXPERIENCE

An analysis of international experiences in integrating AI and digital platforms in education reveals that developed nations have achieved notable success in this domain. The following section presents an analysis of the experiences of key countries.

United States: The United States holds the largest market share in educational AI applications (36% in 2024) [1]. According to a Gallup survey, during the 2024–2025 academic year, 60 percent of K-12 public school teachers utilized AI tools, with 32 percent using them at least weekly and 28 percent monthly or less frequently [27]. Khan Academy's Khanmigo AI assistant is used by millions of students worldwide.

China: Under the "New Generation AI Development Plan" (2017), the Chinese government is extensively implementing AI in education. The Squirrel AI Learning platform is a leader in adaptive learning, serving more than 2 million students [28]. AI courses have been incorporated into school curricula in China.

Finland: Finland's education system is among the most advanced globally. The Elements of AI online course has attracted over 1 million participants from more than 170 countries [29]. With UNICEF support, the Eduten digital mathematics platform has been piloted in Uzbekistan, resulting in a 16.9 percent improvement in fifth-grade students' mathematics performance [30].

South Korea: Under the AI Digital Textbook initiative, AI-based digital textbooks are being introduced incrementally beginning in 2025. These textbooks adapt to each student's individual learning pace and style [31].

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Table 2 International deployment of AI and digital platforms in education

Country	Key program / platform	Coverage	Outcome
USA	Khan Academy (Khanmigo)	10M+ students	Personalized learning
China	Squirrel AI Learning	2M+ students	Adaptive learning
Finland	Elements of AI	1M+ participants	AI literacy
South Korea	AI Digital Textbook	All schools	Digital textbooks
Estonia	e-Schoolbag	85% of schools	e-Learning ecosystem
Singapore	Student Learning Space	All schools	Adaptive platform
Uzbekistan	Eduten (pilot)	Grade 5 (pilot)	16.9% improvement

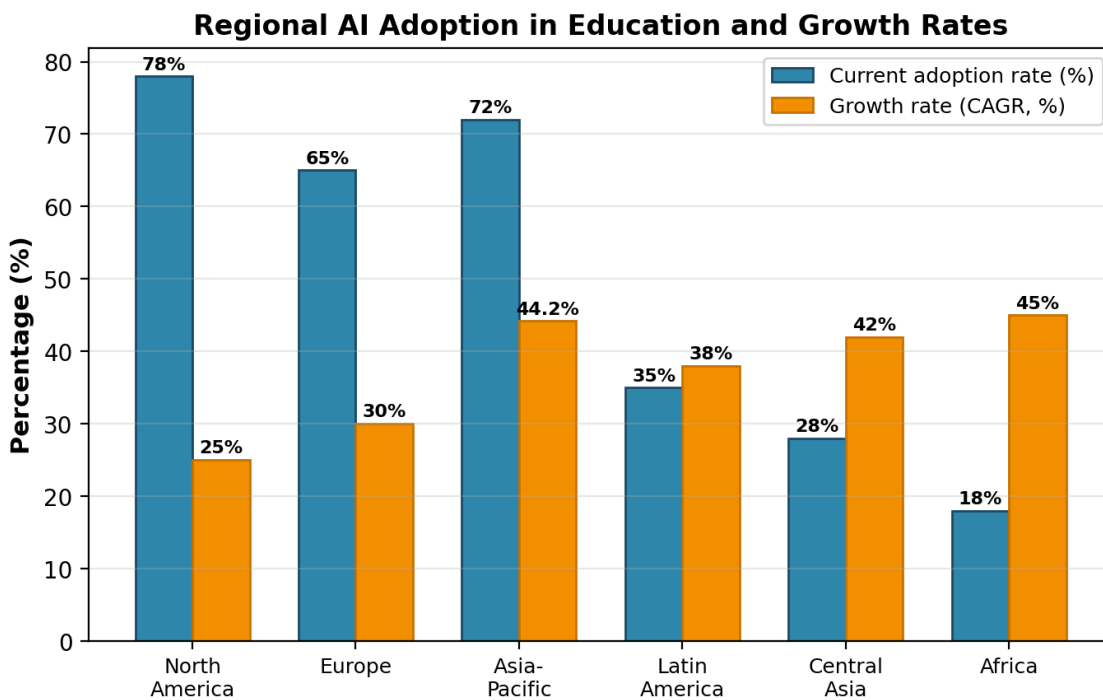


Figure 2. Regional AI adoption in education and growth rates

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6. DIGITAL TRANSFORMATION PROCESSES IN UZBEKISTAN'S EDUCATION SYSTEM

The digital transformation of the education system in the Republic of Uzbekistan is being implemented within the framework of several key government programs and strategies. The "Digital Uzbekistan 2030" strategy encompasses the development of digital infrastructure in education, the expansion of online learning platforms, and the implementation of AI technologies [3].

In accordance with Presidential Decree No. PQ-358 of October 14, 2024, strategic directions for the development of AI technologies have been established. The strategy envisions the training of 1 million AI specialists and the creation of a national AI model. An investment of USD 50 million has been allocated for this purpose [2].

The following digital platforms are actively operating within Uzbekistan's education system:

1. Hemis.uz — a higher education management information system that serves as a unified platform connecting all HEIs. This system enables the centralized management of data concerning students, faculty, and the educational process.
2. Kundalik.com — an electronic gradebook and digital platform for secondary education. It facilitates communication among parents, teachers, and students.
3. Moodle-based LMS systems — numerous HEIs have implemented distance learning systems based on the Moodle platform. The significance of these systems was further amplified during the COVID-19 pandemic.
4. Ziyonet.uz — an educational resources portal containing educational materials, academic articles, and electronic textbooks.
5. The "One Million Uzbek Programmers" initiative — a large-scale program aimed at expanding IT education, through which over 1 million learners have completed IT courses and obtained certification [4].

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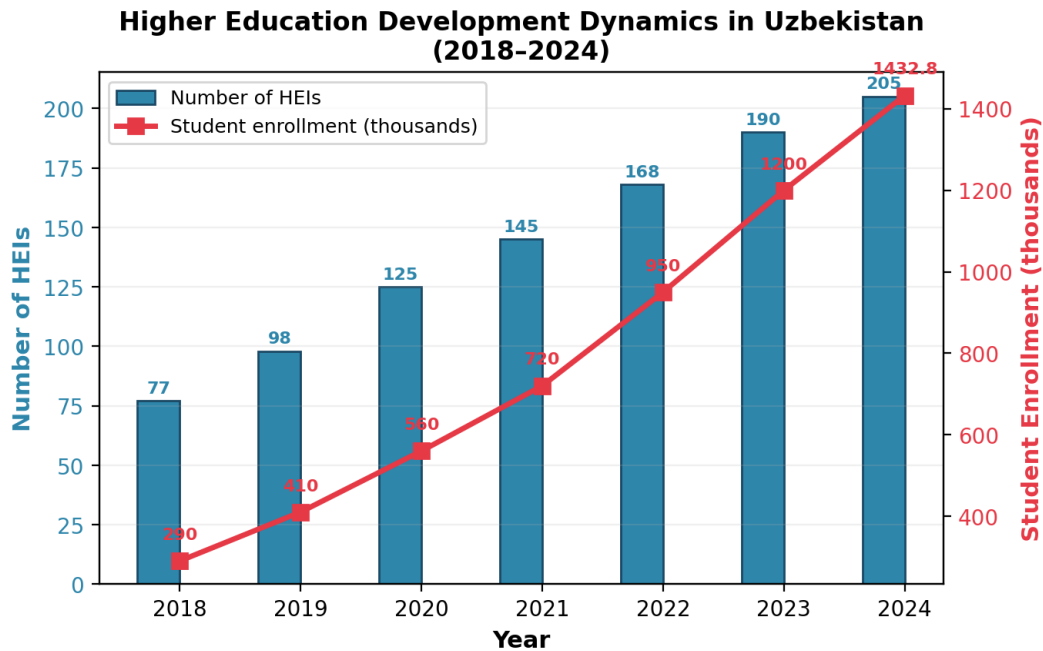


Figure 3. Higher education development dynamics in Uzbekistan (2018–2024)

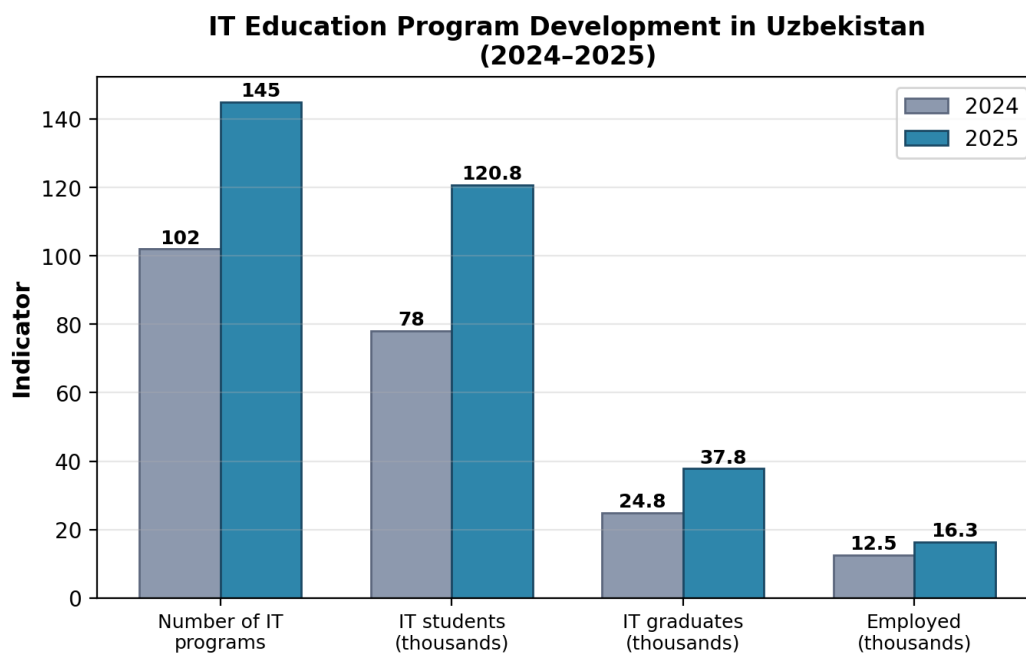


Figure 4. IT education program development in Uzbekistan (2024–2025)

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Table 3 Digital infrastructure indicators in Uzbekistan's education system

Indicator	2020	2022	2024	Growth (%)
Number of HEIs	125	168	205	64%
Student enrollment (thousands)	560	950	1,432.8	155.9%
Number of IT programs	48	78	102	112.5%
Internet connectivity (schools)	72%	88%	99.6%	+27.6 p.p.
LMS users (thousands)	85	320	680	700%
IT Park residents	650	1,500	2,800+	330.8%

Under the UNICEF GIGA initiative, 99.6 percent of schools in Uzbekistan have been provided with internet connectivity at a minimum speed of 10 Mbit/s [30]. This figure represents the highest in the Central Asian region and provides the requisite infrastructure foundation for the widespread implementation of digital learning platforms.

Furthermore, in 2024, Uzbekistan was selected as one of six "Global Champions" of the UNICEF Learning Pioneer program. This two-year program is aimed at implementing innovative approaches and scaling world-class digital education solutions [30].

7. RESULTS AND DISCUSSION

A. Survey Results

The responses of 450 respondents (300 students and 150 faculty members) who participated in the survey were analyzed. The survey results are presented across the following principal dimensions.

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Table 4 Overall survey results

Indicator	Students (%)	Faculty (%)	Overall (%)
AI technology awareness	72.3	81.5	75.4
AI tool usage	65.8	42.6	58.1
Perception of AI as beneficial in education	84.2	76.8	81.7
Digital platform usage	91.3	85.4	89.3
Support for AI integration	78.6	69.2	75.5
Desire for additional AI training	82.1	74.3	79.5
Digital competence level (good/excellent)	58.4	45.2	54.0
Concern about AI ethical issues	38.5	56.7	44.6

The survey results indicate that while 65.8 percent of students are using AI tools (ChatGPT, Gemini, Claude, and others), only 42.6 percent of faculty members utilize such tools. Nevertheless, 81.7 percent of respondents consider AI technologies beneficial for education. Digital platform usage stands at 89.3 percent, which is attributable to the widespread implementation of distance learning during the COVID-19 pandemic.

Notably, 56.7 percent of faculty members express concern regarding AI-related ethical issues (plagiarism, academic integrity, and personal data security), whereas this figure stands at only 38.5 percent among students. This finding is consistent with data from the RAND Corporation's 2025 report, which indicates that policies and guidelines regarding AI lag behind technological development [27].

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Table 5 Correlation analysis results for key variables

Variable pair	Pearson r	p-value	Correlation strength
AI usage ↔ Achievement	0.68	<0.001	Moderate-to-strong
Digital platform ↔ Motivation	0.72	<0.001	Strong
AI literacy ↔ Support for integration	0.81	<0.001	Very strong
Age ↔ AI usage	-0.35	<0.01	Weak negative
Years of experience ↔ Digital competence	-0.28	<0.05	Weak negative

The correlation analysis reveals a very strong positive correlation between AI literacy and support for AI integration ($r=0.81$, $p<0.001$). This indicates that respondents possessing greater knowledge about AI technologies demonstrate stronger support for their integration into education. Additionally, a weak negative correlation was identified between age and AI usage ($r=-0.35$, $p<0.01$), suggesting that younger respondents are more likely to use AI tools.

B. Quasi-Experimental Results

The quasi-experiment was conducted over 16 weeks, during which the experimental group ($n=60$) received instruction using an AI-based adaptive learning platform, while the control group ($n=60$) received instruction through traditional methods. The groups were selected to be homogeneous based on pre-test scores ($t=0.42$, $p=0.67$).

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Table 6 Quasi-experimental results (comparative analysis of control and experimental groups)

Indicator	Control group	Experimental group	t-value	p-value	Cohen's d
Pre-test mean score	52.3 ± 8.4	53.1 ± 7.9	0.42	0.67	0.10
Post-test mean score	61.8 ± 9.2	78.5 ± 8.1	10.15	<0.001	1.93
Score gain (points)	9.5	25.4	—	—	—
Score gain (%)	18.2%	47.8%	—	—	—
Learning quality (5-point)	3.2 ± 0.8	4.1 ± 0.6	6.84	<0.001	1.27
Student engagement (5-point)	2.8 ± 0.9	4.3 ± 0.5	11.05	<0.001	2.06

The quasi-experimental results demonstrate that the post-test scores of the experimental group, which received instruction through the AI-based adaptive learning platform, were statistically significantly higher than those of the control group ($t=10.15$, $p<0.001$). The mean score of the experimental group increased by 25.4 points (47.8%), whereas this figure was only 9.5 points (18.2%) in the control group.

The effect size (Cohen's $d=1.93$) is very large, indicating substantial practical significance of the AI-based adaptive learning system. Furthermore, the student engagement indicator was significantly higher in the experimental group (4.3 vs. 2.8, $d=2.06$). These findings are consistent with the conclusions of Strielkowski et al. (2025) and the MDPI systematic review (2025) [17, 18].

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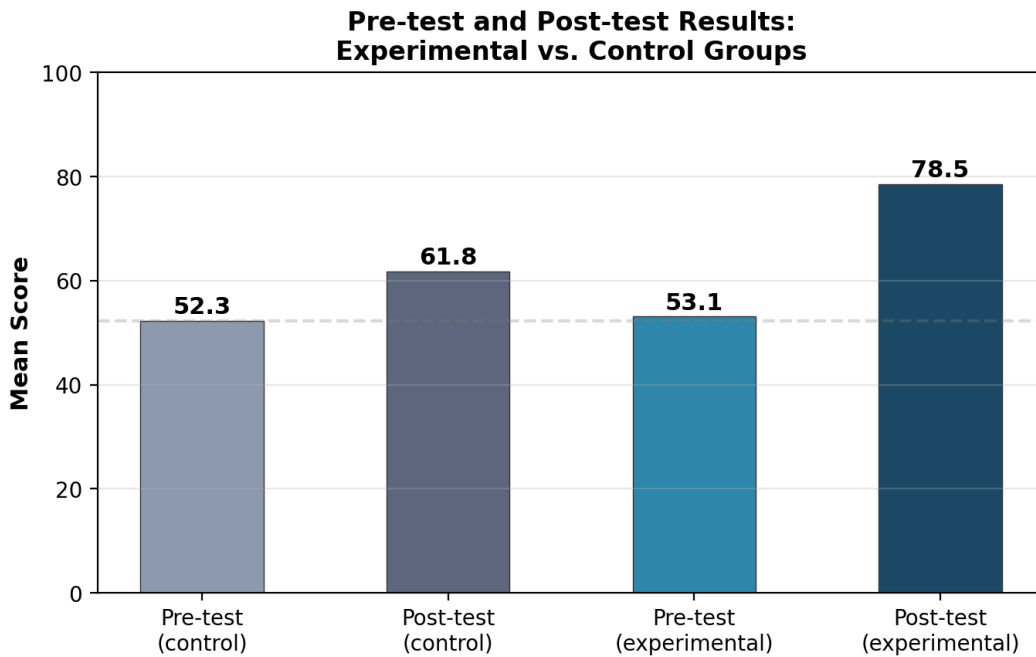


Figure 5. Pre-test and post-test results of experimental and control groups

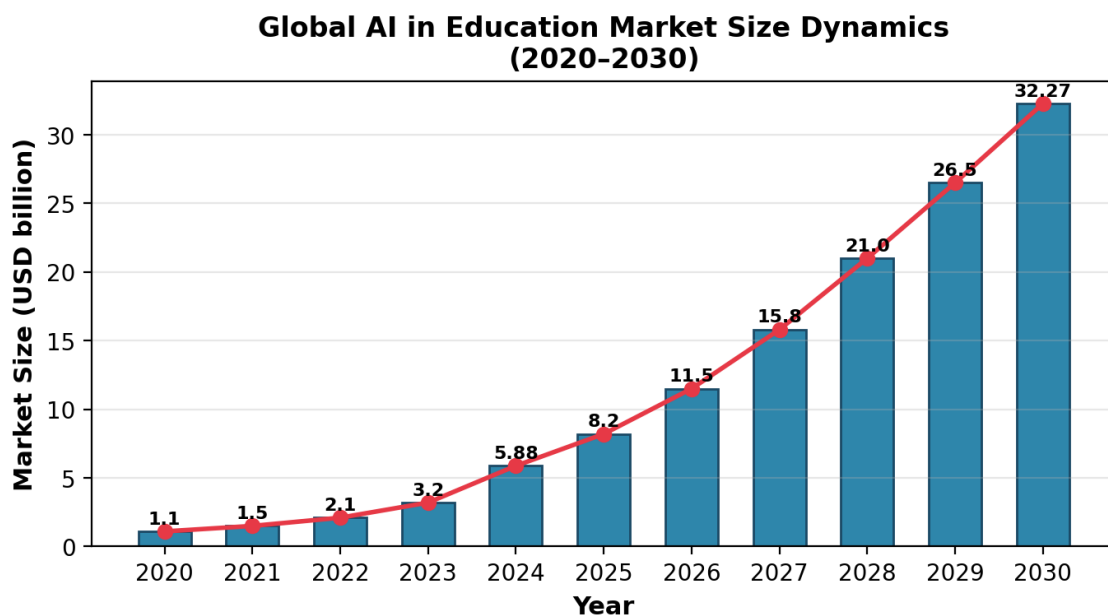


Figure 6. Global AI in education market size dynamics (2020–2030)

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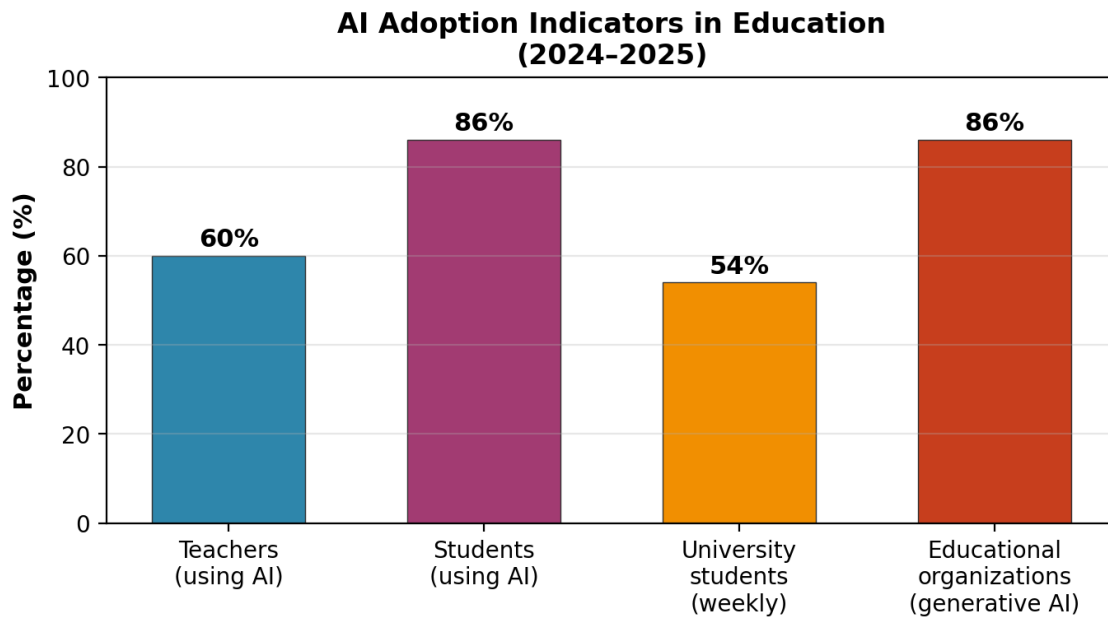


Figure 7. AI adoption indicators in education (2024–2025)

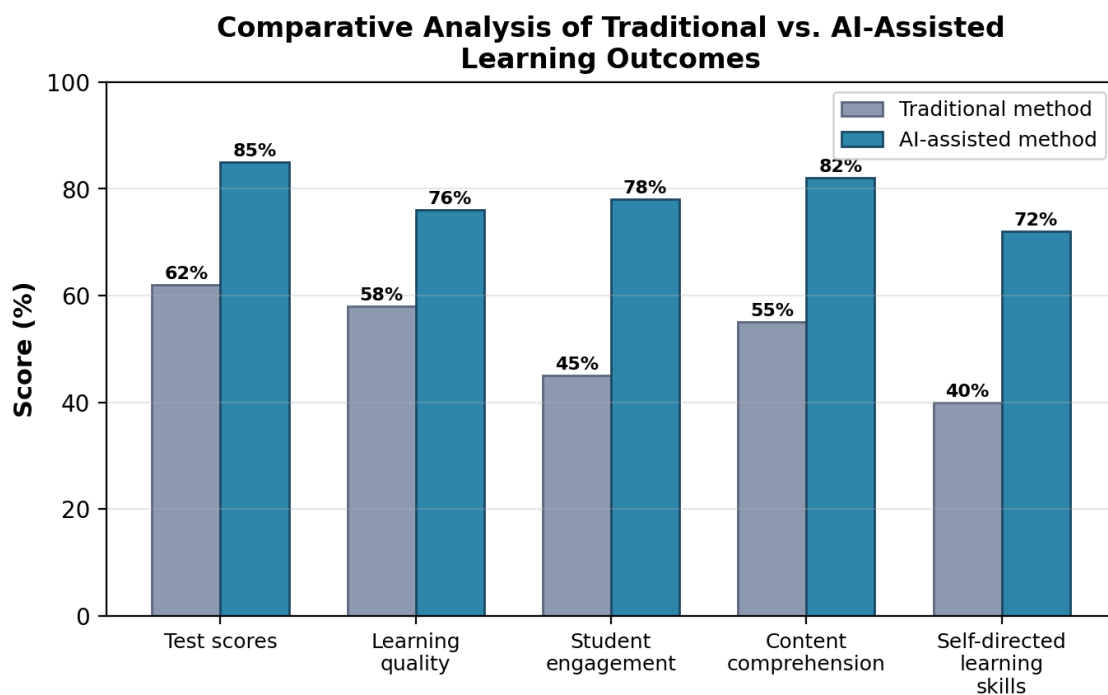


Figure 8. Comparative analysis of traditional vs. AI-assisted learning outcomes

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C. Discussion

The research findings enable the formulation of significant conclusions regarding the effectiveness of integrating AI and digital platforms in education. First, the survey results indicate that Uzbekistan's educational community maintains a positive attitude toward AI technologies. The fact that 81.7 percent of respondents consider AI beneficial for education and 75.5 percent support its integration suggests the existence of a favorable environment for implementing these technologies.

However, several challenges have been identified. First, the level of digital competence remains insufficient: only 58.4 percent of students and 45.2 percent of faculty rated their digital skills as good or excellent. Second, the rate of AI usage among faculty (42.6%) is lower than that among students (65.8%), indicating the necessity of enhancing faculty professional development.

Third, AI-related ethical issues constitute a significant source of concern. A total of 56.7 percent of faculty express concern about plagiarism, academic integrity, and personal data security. This issue is equally pressing at the international level, as emphasized in UNESCO's (2023) guidance on generative AI [13].

The quasi-experimental results demonstrated that AI-based adaptive learning systems significantly enhance educational effectiveness. According to Engageli (2025), students in AI-assisted learning environments achieve 54 percent higher test scores, demonstrate 30 percent better learning outcomes, and exhibit 10 times greater engagement [35]. Our research findings corroborate these global trends.

8. A MODEL FOR INTEGRATING AI AND DIGITAL PLATFORMS IN THE EDUCATION SYSTEM

Based on the research findings and international best practices, a conceptual model for integrating AI and digital platforms into Uzbekistan's education system has been developed. The model comprises the following principal layers:

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Layer 1: Infrastructure layer. This layer encompasses the technical infrastructure supporting digital education platforms: high-speed internet, cloud computing resources, server infrastructure, and end-user devices. The fact that 99.6 percent of schools in Uzbekistan are connected to the internet provides a robust foundation for this layer.

Layer 2: Data layer. At this layer, data pertaining to students, instructors, and the educational process are collected, stored, and processed. Databases, xAPI standards, and data security protocols constitute the core elements of this layer.

Layer 3: AI technology layer. This layer incorporates machine learning, deep learning, natural language processing, and computer vision algorithms. These algorithms execute functions such as adaptive learning, automated assessment, content personalization, and learning analytics.

Layer 4: Application layer. This layer hosts user-oriented services: the adaptive learning platform, intelligent tutoring system, automated assessment system, chatbot and virtual assistant, and learning analytics dashboard.

Layer 5: User layer. Students, instructors, administrators, and parents constitute the primary users of this layer. Each user group is provided with a personalized interface and functionalities.

Table 7 Layers of the AI and digital platform integration model

Layer	Key components	Technologies	Responsible party
Infrastructure	Internet, servers, cloud	Cloud, 5G, IoT	IT department
Data	Databases, xAPI	SQL, NoSQL, Data Lake	Data center
AI Technologies	ML, DL, NLP algorithms	TensorFlow, PyTorch	AI laboratory
Application	LMS, ITS, chatbot	Moodle, API, microservices	Development team
User	UI/UX, mobile application	React, Flutter	Frontend team

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The following phased implementation plan is proposed for operationalizing this model:

Phase I (2025–2026): Pilot project — deployment of the AI-based adaptive learning platform on a pilot basis in 10 selected HEIs. During this phase, AI plugins will be installed on the Moodle LMS, and instructors will undergo professional development training.

Phase II (2027–2028): Scaling — rolling out the platform to all HEIs based on the successful pilot experience. This phase involves the creation of a national adaptive learning platform and its integration with the Hemis.uz system.

Phase III (2029–2030): Full integration — ensuring the complete integration of AI and digital platforms across all levels of education (secondary, specialized secondary, and higher education). This phase also involves the creation of a national AI model and its linkage with the ai.gov.uz platform.

9. PRACTICAL RECOMMENDATIONS

Based on the research findings, the following practical recommendations have been developed for the effective integration of AI and digital platforms into Uzbekistan's education system:

1. Human capital development: Mandatory professional development courses on AI literacy and digital competencies should be organized for faculty. The research findings indicate that only 42.6 percent of instructors currently use AI tools. National standards should be developed based on the UNESCO (2024) AI Competency Framework for Teachers [13].
2. Infrastructure development: Cloud computing resources should be expanded, GPU servers installed, and AI laboratories established at HEIs. Within the framework of the "Digital Uzbekistan 2030" strategy, the technical equipping of educational institutions should be further enhanced.
3. Development of a national adaptive learning platform: Drawing upon international experiences (Squirrel AI, Knewton, DreamBox), a national adaptive

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learning platform should be developed that accounts for the Uzbek language and cultural specificities. This platform should operate in an integrated manner with Hemis.uz and other existing systems.

4. Legal and regulatory framework: A legal and regulatory framework for the application of AI technologies in education should be established. These documents should regulate matters of academic integrity, personal data protection, transparency of AI algorithms, and accountability. The ongoing development of ethical norms for AI in Uzbekistan [2] represents a crucial step in this process.

5. Research and innovation: Research centers for AI and educational technology should be established at HEIs, and grants and scholarships should be allocated. The expansion of international cooperation, particularly joint projects with UNESCO, UNICEF, and other international organizations, is of critical importance.

6. Content development: High-quality digital educational content in the Uzbek language should be developed. This encompasses educational materials, video lessons, interactive simulations, and AI-based curricula. The creation of a national language model could significantly accelerate this process.

10. CONCLUSION

This study comprehensively examined the theoretical and practical aspects of integrating artificial intelligence and digital platforms into the education system.

The principal conclusions of the research are as follows:

First, AI technologies in education are experiencing rapid growth globally. The AI in education market is projected to expand from USD 5.88 billion in 2024 to USD 32.27 billion by 2030 (CAGR of 31.2%). Eighty-six percent of educational organizations utilize generative AI, representing the highest rate across all sectors.

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Second, digital transformation processes in Uzbekistan's education system are being actively pursued. The number of HEIs has reached 205, and student enrollment has risen to 1.43 million. Internet connectivity covers 99.6 percent of schools. Presidential Decree No. PQ-358 has established a critical strategic foundation for the development of AI technologies.

Third, the survey results (n=450) demonstrate that Uzbekistan's educational community maintains a positive attitude toward AI technologies: 81.7 percent of respondents consider AI beneficial, and 75.5 percent support its integration. However, the level of digital competencies and faculty AI literacy remains insufficient.

Fourth, the quasi-experimental results (n=120) demonstrated that AI-based adaptive learning systems significantly enhance educational effectiveness. The mean score of the experimental group increased by 25.4 points (47.8%), compared to only 9.5 points (18.2%) in the control group ($p < 0.001$, Cohen's $d = 1.93$).

Fifth, a five-layer conceptual model for integrating AI and digital platforms into Uzbekistan's education system has been developed: infrastructure, data, AI technology, application, and user layers. A phased implementation plan (2025–2030) has been proposed.

The practical significance of the research findings lies in the fact that the developed recommendations and integration model can serve as practical guidance for the effective implementation of AI and digital platforms in Uzbekistan's education system. Future research should test the model under real-world conditions, evaluate its long-term impact, and explore the possibilities of application at other educational levels (secondary and specialized secondary education).

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