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Поступила в редакцию 20.07.2026
Поступила после доработки 20.09.2026
Принята к публикации 22.09.2026

https://doi.org/10.53360/3135-8160-2026-3(7)-9

МРНТИ: 20.53.19

PEDAGOGICAL OPPORTUNITIES FOR THE INTEGRATION OF GENERATIVE ARTIFICIAL INTELLIGENCE INTO KAZAKHSTAN'S HIGHER EDUCATION SYSTEM

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Abstract: *This article examines the opportunities and prospects for integrating artificial intelligence (AI) into the higher education system of the Republic of Kazakhstan in the context of widespread digitalization and the transformation toward an intelligent society. It provides an analysis of both domestic and international studies on the application of AI technologies in university education and scientific research. Particular attention is given to Kazakhstan's national initiatives in this field, including the Artificial Intelligence Development Concept for 2024-2029, the AI-Sana program, and the measures being implemented to advance the digital transformation of higher education.*

Based on a theoretical and analytical analysis and an examination of the practical experience of Shakarim University, the study identifies the key directions for the integration of generative artificial intelligence into the educational process. It describes the university's AI-driven solutions and intelligent agents designed to support academic and research integrity, personalize learning, facilitate project-based and research activities, predict students' academic performance, and enhance the efficiency of university infrastructure management. The study substantiates the use of the ChatGPT Edu platform and the OySyn text similarity detection system as tools for developing digital competencies, improving the quality of educational and research content, and ensuring objective assessment of learning outcomes. The paper also highlights the risks associated with the reliability

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of AI-generated content, academic misconduct, copyright protection, and personal data privacy. It concludes that further investigation into the effectiveness of AI implementation in higher education, including pedagogical experiments involving students from diverse academic programs, is essential.

Key words: *higher education, artificial intelligence, digitalization, intellectual property, academic integrity.*

Introduction

The development of artificial intelligence (AI) technologies is one of the key drivers of the socioeconomic and technological transformation of contemporary society.

In recent years, increasing attention has been paid to generative AI models capable of producing text, images, software code, and analytical materials by processing large volumes of data. The emergence of ChatGPT, Gemini, Copilot, Claude, and other intelligent systems has substantially reshaped perceptions of the potential of digital technologies in education.

Higher education institutions worldwide are facing the need to adapt to new technological realities. AI is rapidly becoming not only a tool for automating routine processes but also an active component of educational interaction. Consequently, identifying effective models for integrating AI into the university environment has become particularly relevant.

This issue is of strategic importance to Kazakhstan. In recent years, national initiatives, including the Concept for the Development of Artificial Intelligence, the AI-Sana programme, and measures aimed at the digital transformation of education, have signalled the country's transition towards a new stage in the development of a knowledge-based economy.

An analysis of the scholarly literature indicates that international and domestic studies identify a wide range of opportunities for the application of AI in higher education, including personalised learning, support for independent study, automated feedback, assistance with academic writing, learning analytics, the development of research competencies, and improved access to education [1–4]. At the same time, the academic community emphasises risks associated with the unreliability of AI-generated content, academic misconduct, reduced learner autonomy, copyright infringement, personal data breaches, and technological dependence [5, 6]. Therefore, the integration of generative AI into higher education requires a comprehensive approach that incorporates pedagogical, methodological, organisational, ethical, and legal considerations.

The research problem arises from the contradiction between the rapid adoption of generative AI tools in university settings and the insufficient development of pedagogically grounded models for their use. In practice, academics and students already use ChatGPT, Gemini, Copilot, Claude, and other systems to prepare educational materials, search for information, produce written texts, and solve professional tasks. However, such use is not always supported by clear methodological guidelines, criteria for permissible use, procedures for assessing pedagogical effects, or mechanisms for preventing violations of academic integrity.

The aim of this study is to identify the pedagogical conditions, methods, and outcomes associated with the integration of generative AI into Kazakhstan's higher education system, drawing on the experience of Shakarim University.

The scientific novelty of the study lies in the systematisation of the pedagogical conditions and methodological scenarios for integrating generative AI into higher education, as well as in the development of a model that links specific AI tools with types of learning activities, expected educational outcomes, and diagnostic criteria for their assessment. The study also proposes a methodology for the quasi-experimental evaluation of the effects of generative AI on students' digital literacy, critical thinking, academic autonomy, research skills, and the quality of their academic work.

The proposed methodological approaches may be applied to the development of course syllabi, the design of AI-assisted learning tasks, academic staff development, the organisation of formative assessment, support for individual learning pathways, and the pedagogical evaluation of intelligent systems in higher education institutions.

Literature Review

The emergence of generative AI has marked a revolutionary development across numerous fields, enabling the automation of routine tasks and allowing individuals to focus on addressing more complex scientific and creative challenges.

The term artificial intelligence was introduced by John McCarthy in 1956 during the Dartmouth Summer Research Project on Artificial Intelligence. McCarthy defined AI as the science and engineering of creating intelligent machines. Since then, this definition has been applied both to intelligent machines themselves and to the science and technology underlying their development [7]. AI has undergone several stages of evolution, progressing from relatively simple forms, such as reactive machines – computers that cannot retain past experience and respond only to current inputs – to forms of self-aware AI that were once considered conceivable only in science fiction.

Today, advanced AI technologies are widely used in content creation, with humans assuming full responsibility for formulating carefully designed tasks and prompts for machines to execute. Professionals across a variety of fields effectively use AI systems – including ChatGPT, Google Bard, Microsoft Copilot, Microsoft Bing AI, and Perplexity – to perform everyday work-related tasks. These tools offer significant advantages, ranging from drafting emails to creating complete presentations [1].

It is anticipated that emerging technologies, including AI, will generate not merely new jobs but entirely new areas of employment and new professions. AI may replace humans in performing many functions and carry them out with considerably greater efficiency and precision. AI systems can operate continuously, 24 hours a day, seven days a week, 365 days a year; they do not become ill, experience fluctuations in mood, or require salary increases. According to [8], AI systems will assume key tasks in occupations requiring medium or high levels of qualification, while robots will perform routine work. This transformation may result in widespread unemployment, declining wages, and global economic disruption.

International research demonstrates a sustained increase in scholarly interest in the application of AI in education. First, AI enables the personalisation of learning: intelligent systems can select educational materials according to students' prior knowledge, pace of programme completion, and individual learning difficulties. Second, AI can support teachers in designing instructional materials, tests, case studies, and assessment criteria. Third, it can automate certain components of formative assessment and provide learners with timely feedback. Fourth, it can facilitate the development of research skills, including literature retrieval, problem formulation, data processing, and academic writing [1-3].

International scholarship places particular emphasis on the principle that generative models should not be regarded as substitutes for teachers. Their pedagogical value can be realised only when educators retain their leading role as designers of the learning environment, facilitators of educational interaction, and experts responsible for content quality. In this respect, generative AI should be viewed as a means of extending the range of pedagogical tools available to educators rather than as an autonomous source of knowledge.

In Kazakhstani research, AI is regarded as one of the principal drivers of the modernisation of the national education system and the preparation of professionals for the digital economy [4, 9]. In Kazakhstan, this field involves not only updating educational content but also developing digital literacy, technological self-reliance, academic integrity, and students' ability to critically evaluate the outputs generated by intelligent systems. Within a multilingual educational environment, the quality of students' interaction with AI in Kazakh, Russian, and English is also of particular importance. Shakarim University provides a positive example of this approach through its successful implementation of multilingual groups in which instruction is delivered in all three languages.

Despite the considerable number of publications in this field, the comprehensive integration of generative AI into the educational environment of Kazakhstan's higher education institutions remains insufficiently explored.

In his Address to the People of Kazakhstan of 8 September 2025, entitled Kazakhstan in the Age of Artificial Intelligence: Current Challenges and Their Solutions through Digital Transformation [10], Kassym-Jomart Tokayev stated: «Despite global instability, we have taken a decisive step into the era of comprehensive digitalisation and artificial intelligence.... The rapid development of artificial intelligence is already influencing people's worldviews and behaviour, particularly among young people.... I have therefore set the strategically important goal of transforming Kazakhstan into a fully digital nation within three years.... The Government has been tasked with ensuring the comprehensive introduction of artificial intelligence to modernise all sectors of the economy." In accordance with this Address, the Ministry of Artificial Intelligence and Digital Development was established on the basis of the existing Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan. To strengthen the country's institutional framework, the Concept for the Development of Artificial Intelligence for 2024-2029 and the Law of the Republic of Kazakhstan On Artificial Intelligence (№ 230-VIII of 17 November 2025) were adopted. The training of AI specialists is supported through such educational initiatives as AI Corporate, TUMO Center, AI People, and other programmes.

At the international regulatory level, a significant development was UNESCO's publication in 2023 of the world's first global guidance on the use of generative AI in education and research. The document contains recommendations aimed at mitigating risks and preventing the adverse consequences associated with the use of AI technologies [5].

A synthesis of the literature reveals an insufficiently developed dimension of the problem [9, 11-13]. Although a substantial proportion of existing studies describe the potential of AI as a technological tool, considerably less attention has been devoted to the pedagogical conditions, methodological scenarios, and diagnostic criteria required to evaluate its educational effects. This research gap highlights the need for further analysis and for the development of a pedagogically grounded model for integrating generative AI into university practice.

Research Methods

The study employed a theoretical-analytical and practice-oriented descriptive approach aimed at systematising scholarly perspectives and practical solutions concerning the application of generative artificial intelligence in higher education. The methods used included a review of the scholarly literature, comparative analysis of international and Kazakhstani practices, content analysis of regulatory and policy documents, systematisation of pedagogical conditions, and the design of a model for a future pedagogical experiment.

Sources were selected according to the following criteria: relevance to the application of AI and generative AI in higher education; the presence of pedagogical, methodological, or diagnostic content; publication in peer-reviewed academic journals or on the official websites of international organisations; and relevance to the current period of digital transformation in education. The study also examined the regulatory legal acts of the Republic of Kazakhstan and official government documents.

The object of the study was the educational process in higher education institutions of the Republic of Kazakhstan amid digital transformation, with particular emphasis on the integration of generative AI technologies at Shakarim University.

The subject of the study comprised the pedagogical potential, conditions, and methodological models for applying generative AI in students' classroom learning, independent study, project-based and research activities, and assessment.

The analytical procedure consisted of several stages. At the first stage, the principal areas of AI application in higher education were identified: personalised learning, formative assessment, academic writing support, facilitation of project-based activities, development of digital competencies, and automation of educational processes. At the second stage, the educational outcomes potentially associated with the use of generative AI were determined. At the third stage, international research, Kazakhstani regulatory and policy documents, and the practical experience of

Shakarim University were compared. At the fourth stage, the pedagogical conditions required for the effective use of AI were formulated. Finally, a methodology for the future empirical validation of the proposed approach was developed (Table 1).

Table 1 – Stages of Investigating the Pedagogical Potential of Integrating Generative AI into Higher Education

Stage of analysis	Description	Outcome
Conceptual analysis	Clarification of the concepts of artificial intelligence, generative AI, digital literacy, academic autonomy, and pedagogical conditions.	The fundamental categories of the study were defined.
Literature review	Comparative analysis of studies addressing the application of AI in higher education.	The key areas and risks associated with the use of AI were identified.
Analysis of institutional practice	Examination of practical solutions implemented at Shakarim University: Shakarim AI Check, ChatGPT Edu, Smart Course, Student AI Advisor, and OySyn.	Opportunities for integrating AI into the educational process and the academic integrity system were examined.
Pedagogical modelling	Development of pedagogical conditions, methodological scenarios, and measurable educational outcomes.	A model for the pedagogical integration of generative AI was developed.
Experimental design	Description of the study sample, experimental and control groups, diagnostic instruments, assessment criteria, and statistical data-processing methods.	A methodology for a future pedagogical study was proposed.

Research Results

The objectives related to the implementation of AI were first established in the Digital Kazakhstan State Programme and initially focused on the healthcare sector. The national project Technological Breakthrough through Digitalisation, Science, and Innovation also envisaged the digital transformation of Kazakhstani society. Notable examples of AI applications across various sectors [14], aimed at enhancing efficiency, safety, and service quality, are presented in Figure 1.

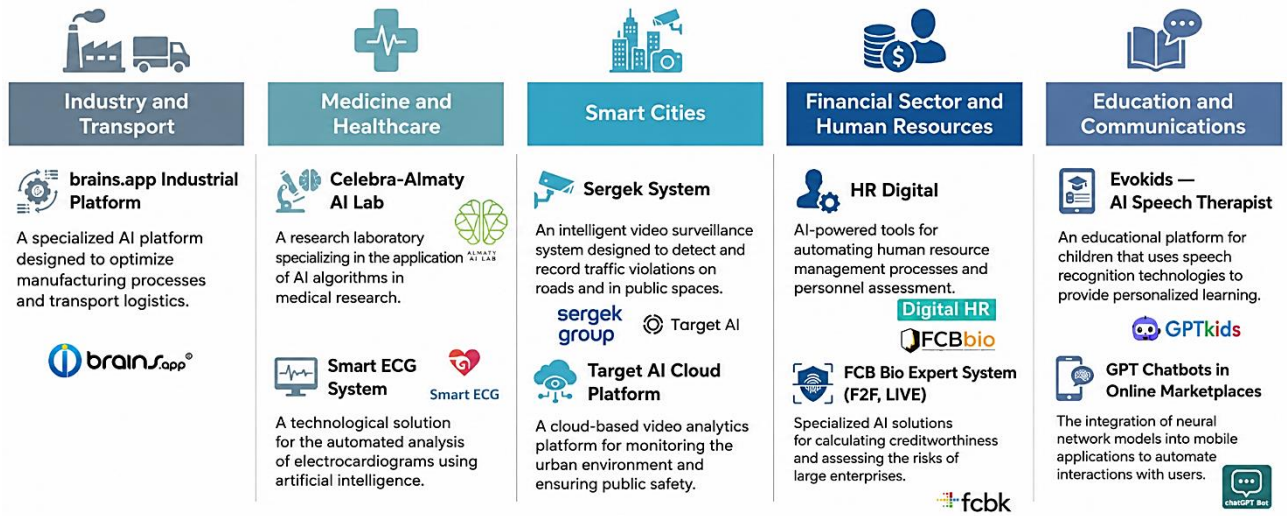


Figure 1 – Kazakhstan's AI Ecosystem: Key Areas and Solutions

In December 2024, the Government of Kazakhstan launched the AI-Sana programme, which aims to provide students enrolled in relevant degree programmes with additional knowledge and practical skills in AI and AI entrepreneurship, with opportunities for their gradual advancement. The programme is designed to create a dynamic ecosystem integrating education, scientific research, and the development of innovative start-ups [15]. A distinctive feature of AI-Sana is its cooperation with leading international universities, educational platforms, and technology companies, including Stanford University, Huawei, Coursera, Astana Hub, and other partners. From a pedagogical perspective, the programme is significant because it transforms AI from an external technological trend into an integral component of educational policy and university practice.

Despite notable achievements in digitalisation and the advanced adoption of AI, Kazakhstan is not currently a major producer of technology-driven content. Accordingly, the advancement of AI is directly linked to the growth and diversification of the national economy, the development of science and innovation, and the strengthening of technological sovereignty. Therefore, the dissemination and implementation of AI in Kazakhstan's education and research systems require continuous, comprehensive, and rigorous examination by the academic community [16]. The use of AI undoubtedly offers opportunities to improve the quality of education and may encourage students to seek innovative solutions and strategies when choosing their professional and personal pathways. However, these outcomes can be achieved only by creating a personalised, adaptive, interactive, and engaging educational process supported by technologies that take into account each student's individual characteristics, needs, preferences, goals, and potential.

A pedagogical analysis of generative AI requires the specification of educational outcomes that can be developed or enhanced through its use. This study identifies six interrelated groups of outcomes:

- The development of digital literacy is reflected in students' ability to make informed choices regarding digital tools, formulate appropriate prompts, assess the reliability of the information generated, and comply with citation requirements and ethical standards for working with data. In this context, generative AI serves as a means of fostering a critical digital culture;
- Increased learning motivation is associated with access to timely assistance, diverse explanations, personalised recommendations, and interactive learning materials. AI can help reduce anxiety related to complex tasks, sustain students' interest, and strengthen their motivation to succeed;
- The development of critical thinking results not from the mere use of AI but from specially designed tasks involving verification, comparison, evaluation, and argumentation. Students analyse AI-generated content, identify errors, verify sources, formulate alternative solutions, and provide reasoned support for their own positions;
- The development of academic autonomy involves a transition from the passive reproduction of AI-generated content to the conscious management of one's own learning. AI thus functions as a tool for planning, self-assessment, and reflection;
- Research skills can be developed by using generative AI to identify research problems, conduct literature reviews, formulate hypotheses, analyse data, and prepare academic texts and presentations. Expert verification of sources and strict adherence to the principles of academic integrity are essential requirements;
- The quality of academic and project-based assignments may be improved through clearer organisation, preliminary error analysis, more coherent reasoning, the application of assessment criteria, and the receipt of formative feedback before submission of the final version.

Of particular importance to pedagogical analysis is the relationship between these technological solutions and specific educational outcomes, including the development of digital literacy, improvement in the quality of academic work, formation of self-monitoring and critical-thinking skills, enhancement of research competencies, strengthening of academic responsibility, and, most importantly, increased learning motivation.

AI technologies can not only improve the quality of education but also enhance teachers' professional capabilities by supporting them in performing instructional, methodological, and

administrative tasks. This creates favourable conditions for optimising teaching practices, reducing workload, and mitigating professional burnout.

The literature- and practice-based analysis conducted in this study identified several key areas for the effective use of AI: personalised learning, automation of educational processes, support for research activities, and the development of digital competencies (Figure 2).

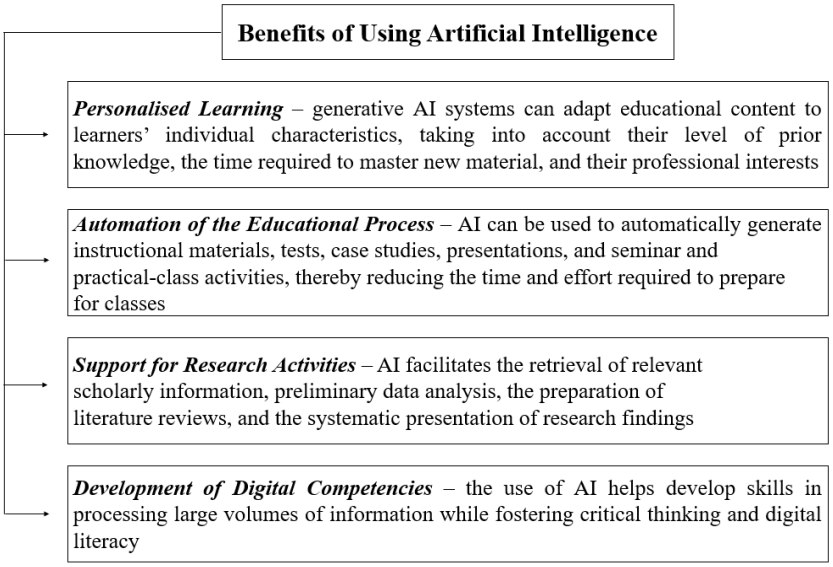


Figure 2 – Advantages of using AI in a university environment

Alongside these advantages, the use of AI also entails several significant risks:

- the generation of inaccurate or misleading information;
- academic misconduct;
- reduced learner autonomy;
- copyright-related concerns;
- personal data protection issues;
- the development of technological dependency.

The methodological dimension of generative AI use involves identifying specific approaches to its integration into various forms of the educational process (Table 2).

The effective use of generative AI in higher education is possible only when a set of interrelated pedagogical conditions is met:

- Teachers' methodological readiness – Teachers must not only be proficient in using AI tools but also be able to design assignments in which intelligent systems contribute to the achievement of educational outcomes without replacing students' own learning activities;
- Students' digital and academic literacy – Students must understand the limitations of generative models, distinguish legitimate assistance from academically dishonest completion of assignments, verify facts, cite sources appropriately, disclose their use of AI, and assume responsibility for the final outcome;
- Institutional academic integrity policies – Higher education institutions must define permissible and impermissible uses of AI, establish requirements for disclosing the use of generative models, specify originality criteria, and implement procedures for reviewing academic work. In this respect, Shakarim AI Check and OySyn (described in greater detail below) are particularly relevant, as they can serve not only as monitoring tools but also as instruments for preventing academic misconduct;
- Integration of AI with active learning methods – Generative AI is most effective when incorporated into problem-based learning, project-based activities, the case-study method, research assignments, debates, reflective practices, and formative assessment;

- Transparency of assessment – Students must be informed in advance about the types of AI assistance permitted, the assessment criteria to be applied, the methods used to document their independent contribution, and the procedures for verifying the accuracy of the information presented;
- Ethical and legal safeguards – The use of AI must comply with requirements concerning personal data protection, copyright, non-discrimination, transparency of algorithmic decision-making, and respect for intellectual property.

Table 2 – Methodological Scenarios for the Integration of Generative AI

Form of educational activity	Potential applications of generative AI	Example of an assignment
Lecture	Generation of case studies, questions, alternative explanations, and concise conceptual diagrams.	Compare three AI-generated explanations of a topic and determine which is the most scientifically accurate.
Practical class	Analysis of situational tasks, simulation of professional cases, identification of common errors, and preparation of alternative arguments.	Use AI to create a section of a learning task, analyse the AI-generated response, identify errors, and propose a corrected version.
Independent study	Planning, self-assessment, identification of key concepts, explanation of complex terms, and preparation of self-assessment questions.	Use AI to develop an outline for an essay, research paper, or project, and then justify the revisions made by the student.
Project-based learning	Idea generation, data analysis, presentation development, and reflection.	Develop a project that presents several possible solutions to a problem, indicating the stages at which AI was used and specifying each participant's individual contribution.
Assessment	Formative feedback and preliminary evaluation against established criteria; however, responsibility for the final assessment must remain with the teacher.	Obtain AI-generated feedback and prepare an improved version of the work.
Individual learning pathway	Selection of supplementary materials, personalised recommendations, examination preparation, prediction of potential difficulties, and support for an individual learning pace.	Develop an individual plan for mastering a topic based on diagnostic assessment results.

The Experience of Shakarim University and Its Pedagogical Interpretation

The experience of Shakarim University demonstrates that the potential applications of AI extend beyond individual learning assignments and encompass various areas of university activity. In particular, the University's researchers conduct research and development in the field of generative AI. The following *research projects* are currently being implemented: Development of a Neural Network-Based Intelligent System for Analysing Oncological Diseases and Providing Treatment Recommendations in the Semipalatinsk Region; Innovative Digital Technologies as a Means of Supporting Inclusive Learning in Higher Education; and A Comprehensive Literary-Cultural, Historical-Ethnographic, Geographical, and Linguistic Study of the Spiritual Heritage of Shakarim Kudaiberdyuly: Digital Integration and Ethnotourism.

The implementation of a forward-looking workforce development model involves intensifying the training and professional retraining of academic staff across all departments and schools. Faculty members incorporate AI components and resources into the educational process across all academic programmes. *GPT models* are among the preferred and most convenient tools because of their flexibility and adaptability for use in academic research. Students are offered such courses as Artificial Intelligence Systems, Data Mining, Artificial Intelligence and Decision Theory, Robotic Systems and Complexes with Fundamentals of Artificial Intelligence, and The Application of Artificial Intelligence in Student Research, among others. Furthermore, in accordance with an instruction issued by the Minister of Science and Higher Education, Sayasat Nurbek, all bachelor's and master's students, irrespective of their mode of study, were required to complete an AI course during the 2025–2026 academic year. They also completed AI courses offered by the Huawei ICT Academy and received the corresponding certificates.

Particular attention at the University is devoted to assessing students' work in terms of originality, independent authorship, and reliability. For this purpose, the University maintains a subscription to *OySyn*, a licensed software system designed to detect textual borrowing in academic and research papers. OySyn is the first plagiarism-detection system developed in Kazakhstan. It successfully competes with international alternatives, supports both its interface and text-checking functions in three languages, and is specifically designed for higher education institutions, schools, researchers, and authors. The platform employs advanced AI algorithms for text analysis and includes its own institutional database, the OySyn Collection. Shakarim University has approved Regulations governing the procedure for checking written works (documents and materials produced through the University's educational and research activities) for textual borrowing using this plagiarism-detection system [16]. The use of any plagiarism-detection software should be combined with teaching students the principles of appropriate citation, academic writing, paraphrasing, reference formatting, and the ethical use of AI. Under these conditions, plagiarism detection functions not only as a monitoring mechanism but also as an educational means of preventing academic misconduct.

Since April 2026, all faculty and staff members at Shakarim University have been registered with *ChatGPT Edu*, an institutional version of ChatGPT developed by OpenAI specifically for higher education institutions and vocational education providers. The platform provides access to AI within a unified institutional workspace, can support scientific research, and may serve as an environment for curriculum development. Importantly, user data remain within the university-managed workspace and are not used to train OpenAI models. Students and faculty members at Shakarim University already actively use ChatGPT Edu to prepare for examinations, explore complex topics, analyse scholarly literature, and prepare reports. Similar examples of ChatGPT adoption can be found internationally; for instance, ChatGPT Enterprise is used at the University of Oxford, Arizona State University, Columbia University, the University of Pennsylvania, and other institutions.

The Shakarim University team has developed *Shakarim AI Check*, an intelligent system designed to promote academic integrity, personalise learning, and support research and project-based activities (aisana.shakarim.kz). From a pedagogical perspective, the system demonstrates a transition towards more accessible communication between the University and its students [6]. The platform already includes the following specialised AI agents (Figure 3):

- *AI Check* – an intelligent system for assessing the quality, structure, and originality of students' work;
- *Admission Bot* – a Telegram bot designed to automate the admissions process, advise applicants, and process documents;
- *Career A* – a personalised career adviser that analyses users' skills and provides relevant recommendations;
- *Smart Course* – an adaptive learning system offering personalised courses and intelligent selection of educational materials;
- *Research Center* – an AI-supported research centre for data analysis and the identification of suitable research partners;

- *AI Anomaly Agent* – a system for detecting unusual situations within campus infrastructure through real-time analysis of access control and management system data, traffic, and system availability;
- *Student AI Advisor* – a system for the early identification of academic risks, GPA prediction, and the provision of personalised recommendations regarding attendance and study plans;
- *AI Labor Market Analytics* – a system for analysing occupations in demand within the regional labour market and aligning them with the University's educational programmes;
- *AI Research Intelligence* – a system for identifying promising research areas and trends through the analysis of dissertations, scholarly publications, and external sources;
- *AI Procurement Analytics* – an intelligent system for analysing the University's needs to support evidence-based public procurement planning and budget optimisation;
- *Shakarim DormAI* – an automated and transparent system for allocating places in student residences, with priority given to students from socially vulnerable groups.

In addition to the agents described above, several other modules are currently under development and are expected to become available in the near future. Students, faculty, and administrative staff actively use the platform in their academic and professional activities.



Figure 3 – The Shakarim AI Check Intelligent Platform

In 2025, an awards ceremony for the winners of the national AI SANA Leaders competition was held in Astana as part of the International Forum of Strategic Partners, Kazakhstan: A Territory of Academic Knowledge, organised by the Ministry of Science and Higher Education of the Republic of Kazakhstan. More than 200 AI projects were submitted to the competition. Shakarim University was ranked among the country's 15 leading teams and won the Best AI Project in Education – Academic Integrity category for developing the Shakarim AI Check system. This achievement demonstrates the University's strong scientific and technological potential and confirms the effectiveness of its strategy for integrating AI into the educational process while ensuring strict adherence to the principles of academic integrity.

Design of the Proposed Pedagogical Study

To further investigate the effectiveness of AI use in the educational process, a quasi-experimental pedagogical study is planned. The proposed sample will comprise 150–200 undergraduate and master's students enrolled in various degree programmes. The sample composition should ensure comparability between the control and experimental groups in terms of year of study, field of study, average academic performance, and baseline level of digital literacy.

Digital literacy is expected to be assessed using a test comprising 25-30 items, including questions and practical cases related to formulating prompts for generative AI, verifying the reliability of AI-generated responses, locating primary sources, complying with copyright requirements, and protecting personal data.

The control group will be taught according to a traditional instructional model involving standard learning materials, teacher consultations, and conventional forms of independent study. The experimental group will receive instruction involving the regulated use of generative AI tools: ChatGPT Edu for learning support and self-assessment; Smart Course for the adaptive selection of learning materials; Shakarim AI Check and OySyn for the formative assessment of the quality and originality of students' work; and Student AI Advisor for personalised recommendations.

The pedagogical experiment comprises three stages:

- Baseline assessment stage – diagnosing the initial levels of digital literacy, learning motivation, critical thinking, academic autonomy, research skills, and the quality of academic task performance;
- Intervention stage – integrating generative artificial intelligence into classroom instruction, students' independent learning, and the project-based activities of the experimental group;
- Post-intervention assessment stage – conducting repeated assessments, expert evaluation of academic and project work, surveys of students and instructors, and statistical comparison of the groups' results.

The diagnostic instruments may include a digital literacy test, a learning motivation questionnaire, an academic autonomy scale, critical-thinking tasks, an expert assessment rubric for research projects, an analysis of the quality of written work, students' self-reports on their use of AI, interviews with instructors, an assessment of students' level of reflection, and measures of compliance with academic integrity principles.

Compliance with academic integrity principles will be assessed by screening written assignments using the OySyn and Shakarim AI Check systems, evaluating the accuracy of citations, verifying the authenticity of bibliographic references, and checking for the inclusion of an AI-use declaration. In this declaration, students will be required to specify the AI services used, the purposes for which they were employed, and the elements of the work that were generated or revised with AI assistance.

Statistical data analysis may include descriptive statistics, tests for normality of distribution, Student's t-tests for independent and paired samples, the Mann-Whitney U test for non-normally distributed data, analysis of variance (ANOVA) or analysis of covariance (ANCOVA) to account for baseline differences, correlation analysis to identify relationships among digital literacy, learning motivation, and the quality of students' work, as well as the calculation of Cohen's d effect size. This combination of methods will make it possible to assess not only the presence of statistically significant differences but also the educational significance of the observed changes.

Conclusion

Artificial intelligence is becoming one of the key drivers of the modernization of higher and postgraduate education. Kazakhstan has considerable potential for integrating AI technologies into educational practice owing to the implementation of national digitalization programs and the development of a domestic AI ecosystem.

The analysis of scholarly literature and institutional practices indicates that the use of AI technologies contributes to the professional development of academic staff and improves the quality of higher education. At the same time, the effective integration of AI into the education system and its nationwide scaling are possible only through the comprehensive development of four interconnected areas: establishing modern AI infrastructure; modernizing the education and professional training system; supporting research and innovation; and developing a regulatory and legal framework governing the development and use of AI resources.

The development of harmonized international norms and standards regulating human–AI interaction is essential for the effective and safe use of artificial intelligence. This is particularly important in relation to protecting intellectual property, preventing plagiarism, countering the dissemination of inaccurate information, and establishing accountability for the unethical use of AI technologies.

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ҚАЗАҚСТАННЫҢ ЖОҒАРЫ БІЛІМ БЕРУ ЖҮЙЕСІНЕ ГЕНЕРАТИВТІ ЖАСАНДЫ ИНТЕЛЛЕКТТІ ИНТЕГРАЦИЯЛАУДЫҢ ПЕДАГОГИКАЛЫҚ МҮМКІНДІКТЕРІ

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Аңдатпа: *Мақалада жаппай цифрландыру және зияткерлік қоғамның трансформациясы жағдайында Қазақстан Республикасы жоғары білім беру жүйесіне жасанды интеллект (ЖИ) технологияларын интеграциялаудың мүмкіндіктері мен перспективалары қарастырылған. Университеттік білім беру мен ғылыми зерттеулерде жасанды интеллект технологияларын пайдалану мәселелеріне арналған отандық және шетелдік зерттеулерге талдау жасалған. Сонымен қатар, осы саладағы Қазақстанның мемлекеттік бастамаларына, атап айтқанда, 2024-2029 жылдарға арналған Жасанды интеллектті дамыту тұжырымдамасына, AI-Sana бағдарламасына және жоғары білімді цифрландыру бойынша іске асырылып жатқан шараларға ерекше назар аударылған.*

Теориялық-аналитикалық талдау мен Shakarim University тәжірибесін зерделеу негізінде генеративті жасанды интеллектті (ЖИ) білім беру үдерісіне енгізудің негізгі бағыттары айқындалды. Университет әзірлеген академиялық және ғылыми адалдықты қолдауға, білім алуды дараландыруға, жобалық-зерттеу қызметін сүйемелдеуге, білім алушылардың оқу жетістіктерін болжауға және жоғары оқу орны инфрақұрылымын басқарудың тиімділігін арттыруға бағытталған интеллектуалды шешімдер мен AI-агенттер сипатталды. ChatGPT Edu платформасы мен оқу және ғылыми жұмыстардағы мәтіндік ұқсастықтар мен дәйексіз мәтіндік алуларды анықтауға арналған OySyn бағдарламалық жүйесін цифрлық құзыреттерді дамыту, ғылыми-білім беру контентінің сапасын арттыру және оқу нәтижелерін объективті бағалауды қамтамасыз ету құралдары ретінде қолданудың негіздемесі берілді. Жасанды интеллект қалыптастыратын ақпараттың сенімділігіне, академиялық алаяқтыққа, авторлық құқықты сақтауға және дербес деректерді қорғауға байланысты тәуекелдер айқындалды. Білім беру үдерісінде жасанды интеллектті қолданудың тиімділігін жан-жақты зерделеу және әртүрлі білім беру бағдарламалары бойынша білім алушылар арасында педагогикалық эксперименттер жүргізу қажеттілігі туралы қорытынды жасалды.

Түйін сөздер: *жоғары білім, жасанды интеллект, цифрландыру, зияткерлік меншік, академиялық адалдық.*

ПЕДАГОГИЧЕСКИЕ ВОЗМОЖНОСТИ ИНТЕГРАЦИИ ГЕНЕРАТИВНОГО ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В СИСТЕМУ ВЫСШЕГО ОБРАЗОВАНИЯ КАЗАХСТАНА

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Аннотация: *В статье рассмотрены возможности и перспективы интеграции искусственного интеллекта (ИИ) в систему высшего образования Республики Казахстан в условиях массовой цифровизации и трансформации интеллектуального общества. Представлен анализ отечественных и зарубежных исследований об использовании технологий ИИ в университетском обучении и научных изысканиях. Особое внимание уделено государственным инициативам Казахстана в данной области, включая Концепцию развития ИИ на 2024-2029 годы, программу AI-Sana и принимаемые меры по цифровизации высшего образования.*

На основе теоретико-аналитического анализа и изучения практического опыта Shakarim University выявлены основные направления внедрения генеративного ИИ в образовательный процесс. Описаны разработанные университетом интеллектуальные решения и AI-агенты, направленные на поддержку академической и научной честности, персонализацию обучения, сопровождение проектно-исследовательской деятельности, прогнозирование учебных достижений и повышение эффективности управления инфраструктурой вуза. Обосновано использование платформы ChatGPT Edu и программной системы для обнаружения текстовых заимствований в учебных и научных работах OySyn – как инструментов развития цифровых компетенций, повышения качества научно-образовательного контента и обеспечения объективной оценки результатов обучения. Обозначены риски, связанные с достоверностью генерируемой информации, академическим мошенничеством, авторским правом и защитой персональных данных. Сделан вывод о необходимости тщательного изучения эффективности использования ИИ в образовательном процессе и проведении педагогических экспериментов среди обучающихся различных образовательных программ.

Ключевые слова: *высшее образование, искусственный интеллект, цифровизация, интеллектуальная собственность, академическая честность.*

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Received 30.06.2026
Revised 04.09.2026
Accepted 15.09.2026

https://doi.org/10.53360/3135-8160-2026-3(7)-10

МРНТИ 15.81.70

НАБЛЮДЕНИЕ КАК ФАКТОР САМОРЕГУЛЯЦИИ ПИЩЕВОГО ПОВЕДЕНИЯ

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Аннотация: *Расстройства пищевого поведения связаны с нарушениями эмоциональной, когнитивной и поведенческой регуляции. В связи с этим представляет интерес поиск кратковременных психологических факторов, способных поддерживать осознанность непосредственно в ситуации пищевого выбора. В статье рассматривается воспринимаемое наблюдение как потенциальный фактор саморегуляции пищевого поведения.*

На основе теории объективного самосознания, исследований эффекта «Watching Eyes», работ с зеркальным отражением и нейрокогнитивных данных о переработке взгляда предлагается теоретическая модель, согласно которой визуальный сигнал наблюдения может направлять внимание человека на собственное поведение, усиливать самофокусировку и способствовать актуализации значимых личных стандартов.

Отдельно рассматривается фотография собственных глаз как специфический визуальный стимул самонаблюдения, потенциально сочетающий социально значимый компонент взгляда с самоотнесением. В отличие от изображения лица или тела, такой стимул позволяет минимизировать информацию о внешности и сосредоточиться на визуальном признаке взгляда.

В статье представлен обзор исследований пищевого поведения в казахстанских выборках, демонстрирующих взаимосвязь психоэмоционального стресса, эмоционального и экстернального типов пищевого поведения, образа тела, копинг-стратегий и особенностей образа жизни. Вместе с тем отечественная литература преимущественно изучает устойчивые индивидуальные и психосоциальные факторы, тогда как кратковременные ситуационные механизмы изменения пищевого выбора остаются недостаточно исследованными.

Предлагается экспериментальная модель с сопоставлением фотографии собственных глаз, глаз другого человека и нейтрального визуального стимула, а также с

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