

THE HISTORY OF THE ORIGIN AND DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN EDUCATION

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Abstract. This article examines the evolution of artificial intelligence (AI) in the educational sector, focusing on its key developmental stages. The author explores the significant ways in which AI has transformed education by enabling personalized learning, enhancing the overall quality of education, increasing access to a variety of educational resources, and relieving educators from repetitive and time-consuming tasks. AI has proven effective in adapting to the diverse needs of students, fostering individualized learning experiences, and promoting more efficient teaching methods. However, the article also addresses important concerns, such as ethical issues, data privacy risks, and the dangers of over-automation, which could undermine the human element in education. Despite these challenges, the author argues that AI has the potential to greatly improve educational processes. It is essential, however, to ensure that AI is used as a supportive tool for teachers and students rather than a substitute, with careful consideration of its implications for the future of education.

Key words: History, development, artificial intelligence, educational technologies, history of AI development.

Introduction.

Artificial intelligence has been rapidly changing the face of modern society in recent times, and its influence on various sectors is becoming increasingly evident. One of the most promising and relevant areas of AI application is education. In the context of global changes in educational systems driven by technological advancements, the need to implement artificial intelligence in the educational process of public schools is becoming essential. Technologies that use machine learning algorithms and neural networks open up new horizons for personalized approaches to learning, improving the quality of education, and enhancing its accessibility.

In his Address to the People of Kazakhstan, "The Economic Course of a Fair Kazakhstan," President K. K. Tokayev noted that "the widespread implementation of new concepts and technologies such as artificial intelligence, blockchain, the Internet of Things (IoT), and Big Data is changing the rules of the game in virtually every sector, from agriculture to finance" [1, 1].

Today, as globalization and digitalization accelerate, educational systems are facing a number of challenges, such as the need to adapt curricula to a rapidly changing world, increase student engagement, and ensure the fair distribution of educational resources. In response to these challenges, artificial intelligence offers solutions that can not only transform the educational process but also improve it.

The relevance of studying the history and current trends of AI in education lies in understanding how these technologies can not only transform the learning process but also create new opportunities for students and educators, improving the quality of education and expanding its accessibility. Given the rapid changes in technology and education, it is crucial to analyze the achievements and prospects of artificial intelligence in order to effectively integrate these innovations into the educational systems of various countries and regions.

The application of artificial intelligence in educational technologies is significantly transforming traditional methods of teaching and learning, making them more personalized, accessible, and effective. This report will explore the main stages of the development of artificial intelligence in education, its impact on the learning process, and the prospects for further implementation.

Material and research methodology. This study analyzes the evolution and application of artificial intelligence (AI) in the field of education. The research utilizes materials and methods that include a comprehensive review of scientific literature and an analysis of current trends in the integration of AI into educational systems. The research methodology aims to explore both the historical development and modern applications of AI, as well as to assess potential impacts and issues it may cause in educational processes. A review of scientific articles, books, and reports related to the development of AI in education was conducted. Special attention was given to the works of early AI pioneers in education, such as Sidney L. Pressey and B.F. Skinner, as well as to contemporary studies on the role of AI in personalized learning, adaptive educational systems, and the ethical aspects of AI implementation.

As Wayne Holmes, co-authored by Maya Beilik and Charles Fadel, writes in their book *Artificial Intelligence in Education: Promises and Challenges for Teaching and Learning*, the early discussions on using artificial intelligence in education can be traced back to the works of psychologists Sidney L. Pressey, a professor at Ohio State University in the 1920s, and B.F. Skinner, the father of behaviorism, who was a professor at Harvard University from 1948 until his retirement in 1974. For Sidney L. Pressey, the task was to make the most of the potential of multiple-choice tests to reinforce and assess learning outcomes. Based on Thorndike's Effect, he suggested that immediate feedback was required for the success of learning assessments, which is difficult to achieve when tests are checked manually. Mechanical checking could ensure that no opportunities for learning were missed. Devices that immediately inform students whether their answer is correct (or not) and show the correct answer do not just check knowledge but also teach [2, 99].

Sidney L. Pressey developed several versions of an automated testing device, the most complex of which was based on a mechanical typewriter, and made several attempts to commercialize his idea. Inside Pressey's device, there was a rotating drum around which a card with a list of questions and perforations for correct answers was wrapped (very similar to the perforated rolls used in mechanical pianos). A window on the device's casing displayed the question number, and five keys were used to input the answer. Students received sheets with questions and answers, and were required to press one of the keys on the device to select an answer to each question. The device was designed in such a way that students immediately knew whether their answer was correct and could not proceed to the next question until they answered the previous one correctly [2, 100].

Interestingly, Sidney L. Pressey was also one of the first to show that, in addition to actual teaching, such devices could simplify and diversify the lives of teachers, freeing them from routine tasks (like grading tests) and giving them more time for interacting with students [2, 100]. According to Sidney L. Pressey, "it is necessary to relieve the teacher from this burden as much as possible, so that they have more time to inspire students and make them think, which, in my opinion, is the true work of a teacher" [3, 417].

Sidney L. Pressey's approach was later expanded by B.F. Skinner, who argued that the methods he first applied to train rats and pigeons in operant conditioning chambers (now known as "Skinner boxes") could be adapted for teaching humans. Skinner's teaching machine, developed in 1958, was a wooden box with a window in the lid. In one window, questions would appear on paper boards, and in the second window, students would write their answers on a paper roll (for later grading by the teacher). As the student progressed, the mechanism automatically closed the answer so it couldn't be altered, while simultaneously showing the correct answer. Thus, Skinner's teaching machine provided immediate automatic reinforcement. Unlike Sidney L. Pressey's device, where students selected answers from provided options, Skinner's machine required students to write their own responses. Skinner believed that learning was more effectively reinforced by repeating the correct answer rather than simply selecting it. Moreover, this approach gave students the opportunity to compare their answer with the correct model, which, if properly formulated by the teacher and perceived by the student, also facilitated learning [2,

101].

B.F. Skinner's teaching device, which he believed acted as a personal tutor, became a precursor to many modern intelligent systems in education [2, 101]. According to Skinner, "the machine, of course, does not teach... But its impact on students, surprisingly, is similar to that of a private tutor. The program and the student constantly exchange information. Like a good tutor, the device insists that students first understand the current question before moving on to the next. Like a good tutor, the device provides only the material that the students are ready for. Like an experienced teacher, the device helps students find the correct answer. Finally, like a private tutor, the device reinforces students with every correct answer, and through this immediate feedback... effectively shapes their behavior" [4, 77].

It is argued that Skinner's teaching machine foreshadowed another important component later adopted by AIED—specifically, the division of automated learning into separate components. In Skinner's case, these components included, on one hand, the subject material pre-programmed into the device, and on the other hand, the students' results, regardless of whether they answered the questions correctly. However, while Skinner's device did respond to individual students, it could not be considered adaptive. It did not adjust either the questions or their order based on the achievements or needs of the individual student. The questions themselves were also pre-programmed. Although students could answer the questions at their own pace, the list and order of the questions were the same for everyone [2, 102].

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In the 1960s, when computers were just beginning to appear in universities, the University of Illinois created the PLATO system, which became one of the first attempts to use computers for learning through interactive lessons. It was like science fiction becoming reality: students could learn at their own pace, receive instant feedback, and even communicate with each other through early forms of electronic messaging [5, 14].

Fast forward a couple of decades to the 1980s. During this time, researchers focused on creating expert systems. Imagine a virtual teacher who knows everything about their subject, can discuss any question with students, and explain even the most complex concepts in an accessible way. These systems became the first step toward developing teaching systems capable of adapting to the needs of each student [5, p.14].

But the real revolution began in the 1990s. During this time, scientists developed technologies that allowed AI systems not only to analyze students' progress but also to adapt educational materials to each of them. For the first time, learning became truly personalized. Just imagine – the system knows exactly

what you are struggling with and offers additional exercises to help you better understand the material. It's like having a personal tutor available anytime [5, 14].

In the early 2000s, the internet revolutionized education—online courses became accessible to anyone with internet access. Some platforms, such as Khan Academy and Coursera, began using AI to create adaptive learning courses. Now, people had the opportunity to learn from home. AI analyzed results and suggested which topics to review, which tasks to complete, and how to most effectively absorb the material [5, 15].

Today, AI continues to evolve and open new horizons in education. We already see how educational chatbots help students with homework, virtual assistants lead interactive lessons, and automated knowledge assessment systems make the grading process faster and more objective [5, 15].

Results and discussion of it. The development of AI in education is a story of innovation and the desire to make learning accessible and effective for everyone. While we have not yet reached the final goal, each new step brings us closer to a future where AI becomes an indispensable assistant in the educational process for both students and teachers [5, 15].

The Minister of Science and Higher Education of the Republic of Kazakhstan, SayasatNurbek, notes: "The Fourth Industrial Revolution is already in full swing around the world. In developed countries such as Germany, China, Mexico, Italy, and Latvia, programs are being implemented to enhance the competitiveness of industries through Industry 4.0 technologies. The creation and development of artificial intelligence is a complex and multifaceted process, driven by various factors. AI has immense potential to address tasks that human intelligence cannot always manage. This may include analyzing large volumes of data, optimizing production processes, forecasting weather, developing new medicines, and much more. AI can significantly increase the efficiency and productivity of various sectors such as industry, transportation, healthcare, education, and business. It can also lead to reduced costs, fewer errors, and improved product and service quality" [6, 1].

The development of AI in educational technologies has come a long and multifaceted way, from the first experiments with computer-based learning systems to modern adaptive platforms and virtual assistants. AI has opened new horizons for the educational process, allowing for the creation of personalized learning pathways, improving the quality of education, increasing access to learning, and reducing the burden on teachers.

Today, AI is actively used to develop smart educational systems, virtual assistants, recommendation systems, and learning data analytics. These technologies allow for taking into account students' individual needs and abilities, enhancing their engagement and motivation, and optimizing the teaching and assessment processes. Importantly, AI promotes inclusivity by offering solutions for people with special educational needs and learners from different parts of the world.

However, the integration of AI into education also presents significant challenges. Ethical issues, data security, and potential consequences of over-automation require careful consideration and the development of new standards and regulations. It is essential that AI is used not to replace human interaction but as a tool that supports teachers and students, enhancing educational processes and providing new opportunities for growth.

Conclusion. The prospects for AI use in education are exceptionally broad. Already today, we see significant changes in learning, and with technological advancements, we can expect even deeper transformations of educational systems in the future. AI has the potential not only to improve the quality of education but also to change the very nature of learning, making it more accessible, individualized, and effective. In this context, it is crucial to continue researching and implementing innovations to ensure the best outcomes for all participants in the educational process.

References

1. Poslanie Glavy gosudarstva Kasym-ZHomartaTokaeva narodu Kazahstana ot 1 sentyabrya 2023

g. «Ekonomicheskij kurs spravedlivogo Kazahstana».Elektronnyj resurs: Rezhim dostupa: https://online.zakon.kz/Document/?doc_id=37321590. Data obrashcheniya 08.02.2025.

2. Holms U., Byalik M., Fejdel CH. Iskusstvennyj intellekt v obrazovanii: Perspektivy i problemy dlyaprepodavaniya i obucheniya / Uejn Holms, Majya Belik, CHarl'z Fejdel. – Per. s angl. – M.:Al'pina PRO, 2022. – 304 s.

3. Pressey. S.L. Development and appraisal of devices providing immediate automatic scoring of objective tests and concomitant self-instruction. Journal of Psychology 30: 1950. Page 417-447

4. Skinner, B.F. Teacher machines. Science 128 (3330): 1958. Page 969-77

5. Grebinyuk E.V., Danielian D.G., Danielian S.S., Kramarov S.O. Artificial Intelligence in Education: Opportunities, Methods, and Recommendations for Educators: A Practical Guide / Edited by S.O. Kramarov. – Moscow: RIOR: INFRA-M, 2025. – 99 p. – (Science and practice). – DOI: <https://doi.org/10.29039/02147-7>

6. Petruhin A. Iskusstvennyj intellekt: Pozitivnye vozmozhnosti i potencial'nye riski. //Respublikanskij informacionno-analiticheskij zhurnal "Sovremennoe obrazovanie". Elektronnyj resurs: Rezhim dostupa: <https://www.bilim.expert/post/iskusstvennyj-intellekt-pozitivnye-vozmozhnosti-i-potencial'nye-riski-interv'yu-sayasat-nurbek>. Data obrashcheniya 14.11.2024.

Список литературы

1. Послание Главы государства Касым-Жомарта Токаева народу Казахстана от 1 сентября 2023 г. «Экономический курс справедливого Казахстана».Электронный ресурс: Режим доступа: https://online.zakon.kz/Document/?doc_id=37321590. Дата обращения 08.02.2025.

2. Холмс У., Бялик М., Фейдел Ч. Искусственный интеллект в образовании: Перспективы и проблемы для преподавания и обучения / Уэйн Холмс, Майя Белик, Чарльз Фейдел. – Пер. с англ. – М.:Альпина ПРО, 2022. – 304 с.

3. Pressey. S.L. Development and appraisal of devices providing immediate automatic scoring of objective tests and concomitant self-instruction. Journal of Psychology 30: 1950. Page 417-447

4. Skinner, B.F. Teacher machines. Science 128 (3330): 1958. Page 969-77

5. Grebenyuk E.V., Danielyan D.G., Danielyan S.S., Kramarov S.O. Iskusstvennyj intellekt v obrazovanii: vozmozhnosti, metody i rekomendacii dlya pedagogov: uchebno-prakticheskoe posobie / Pod red. S.O.Kramarova. – Moskva: RIOR: INFRA-M, 2025 – 99 s. – (Nauka i praktika). – DOI: <https://doi.org/10.29039/02147-7>

6. Петрухин А. Искусственный интеллект: Позитивные возможности и потенциальные риски. //Республиканский информационно-аналитический журнал "Современное образование". Электронный ресурс: Режим доступа: <https://www.bilim.expert/post/iskusstvennyj-intellekt-pozitivnye-vozmozhnosti-i-potencial'nye-riski-interv'yu-sayasat-nurbek>. Дата обращения 14.11.2024.

БІЛІМ БЕРУ САЛАСЫНДАҒЫ ЖАСАНДЫ ИНТЕЛЛЕКТІНІҢ ПАЙДА БОЛУЫ МЕН ДАМУЫНЫҢ ТАРИХЫ

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Андатпа. Осы мақалада білім беру саласындағы жасанды интеллектің (ЖИ) эволюциясы толығымен қарастырылады, оның білім беру үдерісінің түрлі аспектілеріне айтарлықтай әсері ерекше атап өтіледі. Автор ЖИ-дің білім беру жүйесінде жүзеге асырылған негізгі жаңалықтар мен тәсілдерді талдайды. Олардың арасында жеке тұлғаға бағытталған оқыту, білім сапасын арттыру, әртүрлі білім беру ресурстарын кеңінен қолжетімді ету және мұғалімдерге қайталанатын әрі көп уақыт алатын тапсырмалардан босату сынды маңызды аспектілер бар. Жасанды интеллект студенттердің әртүрлі қажеттіліктеріне бейімделуде тиімді құрал ретінде өздігінен танылып, жеке оқу үдерістерін қолдайды және оқытудың тиімділігін арттырады. Дегенмен, автор жасанды интеллекттің білім беру саласына енгізілуімен байланысты туындайтын күрделі этикалық мәселелерді ескертеді. Мақалада жасанды интеллект білім беру жүйесінде айтарлықтай жақсартулар жасауға үлкен әлеуеті бар екендігі туралы пікір білдіріледі, бірақ оны қолдану мұқият ойластырылуы тиіс. Автор жасанды интеллект педагогтар мен студенттер үшін көмекші құрал ретінде қолданылуы тиіс екенін, дәстүрлі оқыту әдістерін толық ауыстыру ретінде емес, оның білім беру жүйесіне болашақтағы ықпалына қатысты барлық әсерін ескере отырып, енгізілуі тиіс екенін атап көрсетеді.

Түйін сөздер: Тарих, даму, жасанды интеллект, білім беру технологиялары, ЖИ дамуының тарихы.

ИСТОРИЯ ПРОИСХОЖДЕНИЯ И РАЗВИТИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОБРАЗОВАНИИ

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Аннотация. В статье подробно рассматривается эволюция искусственного интеллекта (ИИ) в образовательной сфере, с акцентом на его значительное влияние на различные аспекты образовательного процесса. Автор рассматривает важнейшие способы, с помощью которых ИИ трансформировал образование, включая персонализированное обучение, улучшение общего качества образования, расширение доступа к разнообразным образовательным ресурсам и освобождение педагогов от повторяющихся и трудоемких задач. ИИ зарекомендовал себя как эффективный инструмент для адаптации к разнообразным потребностям студентов, способствуя индивидуализированным образовательным процессам и повышению эффективности преподавания. Однако автор не обходит стороной и сложные этические вопросы, которые возникают при внедрении ИИ в образование. В статье выдвигается мнение о том, что ИИ имеет огромный потенциал для значительных улучшений в системе образования, но его использование должно быть тщательно продумано. Автор подчеркивает важность того, чтобы ИИ использовался в качестве вспомогательного инструмента для педагогов и студентов, а не как полная замена традиционным методам обучения. С учетом всех вызовов и рисков, ИИ должен внедряться осторожно и с учетом его возможного воздействия на будущее образовательной системы.

Ключевые слова: история, развитие, искусственный интеллект, образовательные технологии, история развития искусственного интеллекта (ИИ).