

# Transformation of the education landscape in an AI environment

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## Abstract

The integration of artificial intelligence (AI) into the field of education has brought about transformative changes, shaping the way students learn and educators teach. This abstract explores the current trends of education technology within the context of an AI environment as of 2024. The study delves into key developments such as personalized learning platforms, adaptive learning systems, and AI-enhanced teaching tools that leverage machine learning algorithms to tailor educational experiences to individual student needs. Additionally, gamification and immersive learning, along with the integration of blockchain for secure academic credentialing, are discussed as emerging trends in the education technology landscape. The accelerated adoption of remote and blended learning platforms, fueled by the COVID-19 pandemic, is also acknowledged, emphasizing the crucial role AI plays in optimizing online education. The paper addresses the ethical considerations associated with the increasing prevalence of AI in education, focusing on concerns such as data privacy, algorithmic bias, and the responsible and inclusive use of AI systems. The study concludes by emphasizing the dynamic nature of the education technology landscape, suggesting the need for ongoing research and adaptation to ensure that AI continues to enhance the educational experience for students and educators alike.

## Keywords

Trends, Education Technology, AI Environment

## 1. Introduction

The landscape of education is undergoing a transformative shift, propelled by the integration of cutting-edge technologies, with artificial intelligence (AI) at the forefront of this revolution. As we navigate the 21st century, the education sector is embracing AI-driven solutions to enhance the learning experience, foster innovation, and address the evolving needs of students and educators alike.

In this era of rapid technological advancement, the fusion of education and AI has given rise to a multitude of trends that are reshaping traditional teaching methodologies. From personalized learning experiences to intelligent tutoring systems, educators are leveraging AI to create dynamic, adaptive, and student-centric environments. This introduction explores some of the current trends in education technology within an AI environment, shedding light on how these innovations are redefining the educational landscape. Let's delve into the transformative potential of AI in education and the key trends that are shaping the future of learning.

Trends in education technology were evolving rapidly, with a significant focus on integrating artificial intelligence (AI) into educational environments. Keep in mind that the information provided here might not reflect the most recent developments.

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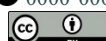
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## 2. Literature review

Science and Technology Promote the Industrial Revolution and the Industrial Revolution Promote Educational Reform (Xia, P., 2019). As artificial intelligence technology continues to advance, its integration into higher education is becoming increasingly inevitable. To meet the evolving needs of colleges and universities in cultivating innovative talent and providing personalized instruction, the adoption of AI is a natural progression.

This study (Gawande, V., et al. 2020) explores the current developments in Artificial Intelligence (AI) and assesses their influence on teaching and learning methodologies within Higher Education Institutions (HEIs). Various AI technologies, such as Hologram technology, those facilitating Ubiquitous learning, tools for Automated evaluations and grading, Green Computing, and Blended learning methodologies, present promising avenues for reshaping the landscape of higher education. The research delves into the potential opportunities and challenges within each domain, providing valuable insights for guiding adoption and suggesting potential avenues for further research.

AI in higher education research mainly focuses on profiling, assessment, and personalization, but there is a need for more critical reflection on challenges, risks, and ethical approaches (Zawacki-Richter, O, et al, 2019).

AI in online learning and distance education (Dogan, M., et al, 2023) is rapidly increasing, with China, India, and the US leading the research, and three dominant research themes: are adaptive, personalized learning, and student behaviour recognition.

AI has the potential to greatly enhance teaching and learning in higher education, supporting students and faculty through bespoke learning, intelligent tutoring systems, facilitating collaboration, and automated grading (Crompton, H., & Song, D. 2021).

Artificial Intelligence (AI) is one of the emerging technologies of today. It provides applications in addition to the traditional computing environments, and is also in affordable smart devices, making AI available everywhere (Jaakkola, H. at al., 2020). These affordable devices offer advanced capabilities, including edge computing, high-speed network access, cloud-based collaboration, and access to vast data resources. As educational informatization gains momentum, the emergence of the "5G + AI era" is driving educational reform. In recent years, intelligence has become a key focus of development in the education industry. The combination of new technologies such as voice recognition, image recognition, big (Xiaoyu, W., & Chunyan, L., 2021) data, artificial intelligence, virtual reality and the education industry has attracted much attention. Intelligent education, as a foundational component of future education, will significantly shape its development trajectory. The increasing integration of artificial intelligence (AI) into education is a prominent trend. However, the widespread adoption of educational AI has also raised concerns about its potential ethical implications. The use of educational AI poses three key ethical risks: the risk of educational data security; the risk of deconstructing the teacher-student role structure and educational inequality; and the risk of alienation from educational goals (Bu, Q., 2022).

Artificial intelligence (AI) has become an integral part of our world, influencing virtually every field and coexisting with human intelligence. At present, education cannot be discussed without mentioning AI, which has an omnidirectional impact on all its areas, including the purpose, content, method, and evaluation system (Paek, S., & Kim, N., 2021).

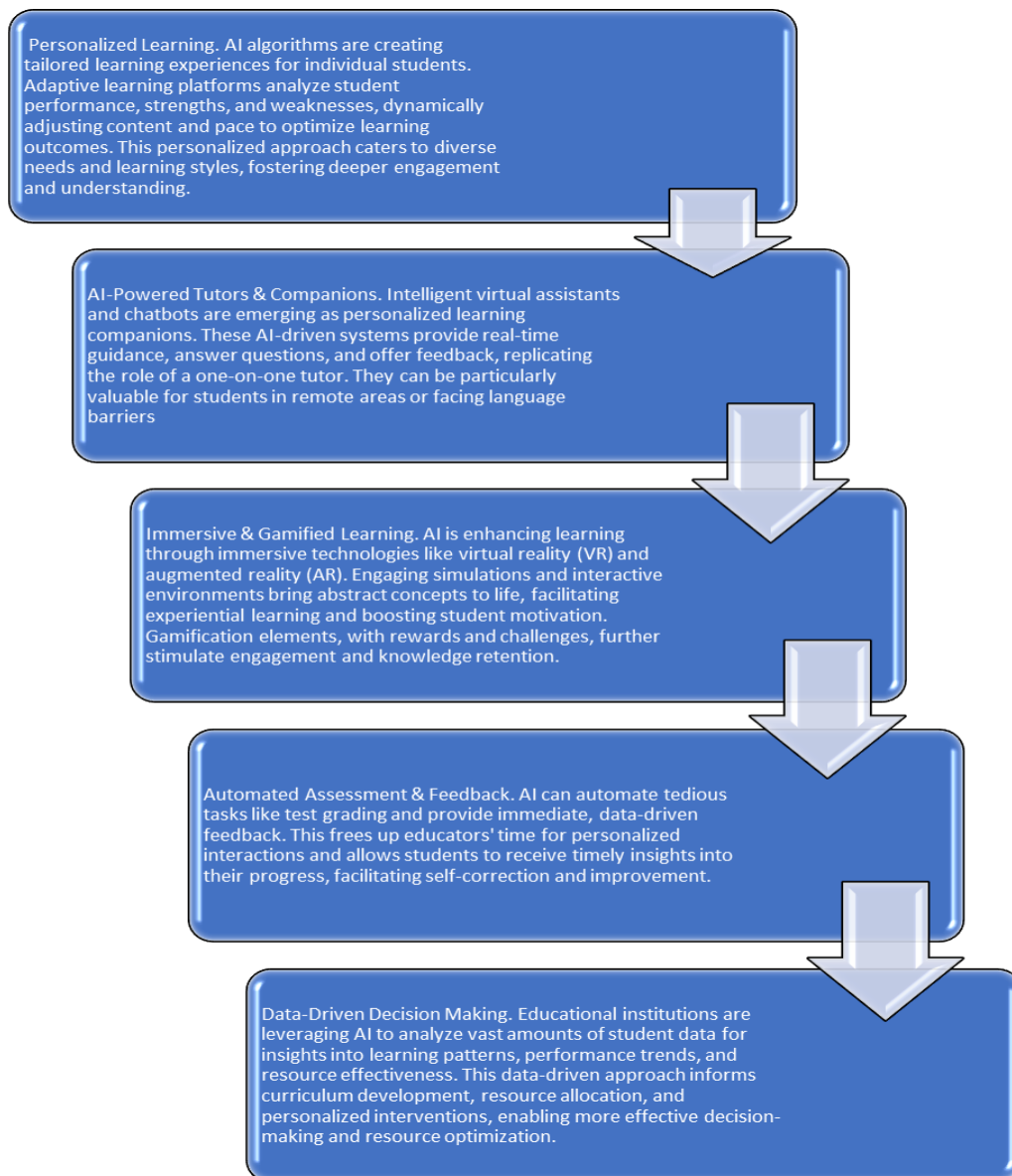
This research investigates the critical role of development in educational institutions and presents a conceptual model centered on inspiring innovation and entrepreneurship within the context of project management. The study explores the impact of such development on the lifecycle of innovative projects, particularly in terms of knowledge and management technologies. Additionally, it identifies the key competencies and priorities that educational institutions must possess to effectively implement sustainable development strategies. Two sustainable development models were selected as case studies to examine how innovative projects can contribute to institutional development (S. Bushuyev, S Murzabekova, A. Biloshchytskyi, 2023).

The article (S Bushuyev, K Piliuhina, E Chetin, 2023) is dedicated to the study of the impact of BANI-world conditions on the implementation of the high technology industrial projects and in

particular of the industry projects. This research investigates the impact of the BANI environment on high-technology project management methodologies. The study aims to analyze the transformation from the VUCA (Volatile, Uncertain, Complex, Ambiguous) model to the BANI model, identify key values and their shifts in the new world order, and develop a risk assessment methodology for BANI projects. Additionally, the paper explores the innovative development of educational systems within the BANI environment, focusing on the integration of emerging technologies, pedagogical strategies, and learner-centered approaches. The research provides a comprehensive overview of the BANI framework and its implications for both project management and education. It highlights the key characteristics of the BANI environment, including its inherent brittleness, anxiety-inducing nature, nonlinearity, and incomprehensibility (Bushuyev, S. et al. 2023).

### 3. The education landscape in the AI era

The education landscape is undergoing a revolution fueled by artificial intelligence (AI). As AI capabilities rapidly advance, innovative technologies are reshaping the way we learn, teach, and manage educational systems. Here, we'll delve into the current trends of education technology (EdTech) within this dynamic AI environment presented in Fig. 1.



**Figure 1:** Current trends of education technology (EdTech) within this dynamic AI environment presented.

This model is implemented in the Democratization of Education and Ethical Considerations environment.

The project aimed at preparing a master's in project management based on artificial intelligence systems. Within the project, a DELPHI panel was conducted with several universities from Ukraine, Kazakhstan, and Azerbaijan. The questionnaire consisted of 10 sections with 9-12 questions each. Both IT speciality students and university professors participated in the survey. 160 surveys were prepared for subsequent analysis.

Among the respondents, 40% were students under 30 years old, and 60% were university staff under 55 years old. In terms of gender, 35% were female, and 65% were male.

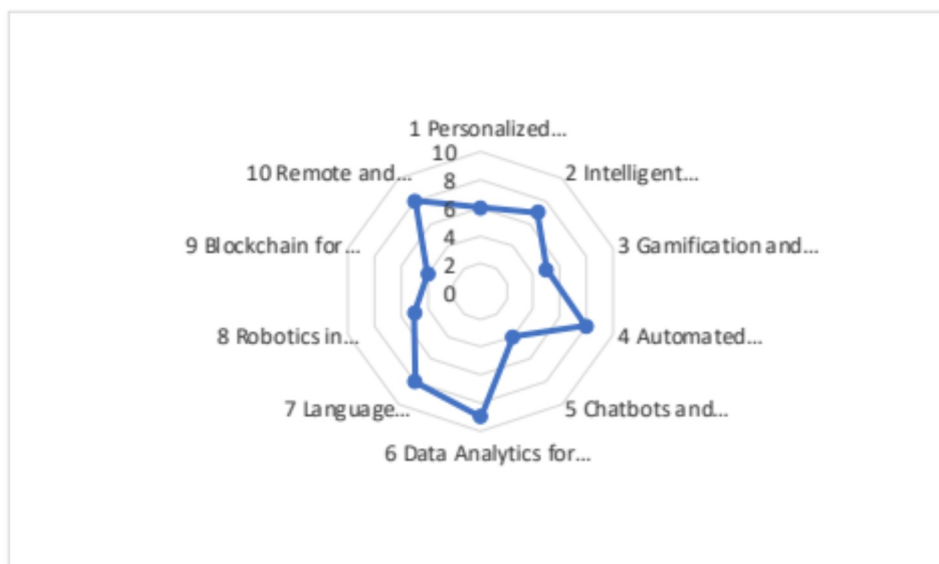
To analyze the priorities of trends in the development of educational systems under the influence of artificial intelligence, the authors conducted a DELPHI panel with the participation of more than 100 university professors from Ukraine, Kazakhstan and Azerbaijan. As a result of the panel, priorities for 2024 were identified (Table 1).

**Table 1**

Potential focus areas on the application of current trends

№	Area	2024 Priority (1-10)
1	Personalized Learning and AI	6
2	Intelligent Tutoring Systems (ITS)	7
3	Gamification and Simulations	5
4	Automated Grading and Assessment	8
5	Chatbots and Virtual Assistants.	4
6	Data Analytics for Educational Insights	9
7	Language Processing for Writing Assistance	8
8	Robotics in Education	5
9	Blockchain for Credentialing	4
10	Remote and Hybrid Learning Solutions	8

The results obtained are presented in Fig. 2 in the form of a spider diagram.



**Figure 2:** Priority focus areas on the application of current trends in 2024.

The conducted research made it possible to concentrate changes in educational programs in 3 areas - Automated Grading and Assessment, Data Analytics for Educational Insights and Remote and Hybrid Learning Solutions.

AI-powered platforms and tools can offer accessible and affordable education to a wider audience. Online learning platforms with AI-powered features can reach students in remote areas or challenging circumstances, bridging geographical and socioeconomic disparities. While AI promises significant opportunities, it also raises ethical concerns around data privacy, algorithmic bias, and job displacement of educators. It's crucial to address these concerns head-on through responsible development, transparent data practices, and ongoing human oversight to ensure inclusive and equitable education for all.

This is just a glimpse into the current trends of EdTech in the AI era. As AI capabilities continue to evolve, we can expect further advancements and disruptive innovations that will redefine the future of learning. It's an exciting time to be involved in education, and the possibilities for AI-powered learning are truly limitless.

It's crucial to stay updated with the latest developments in education technology, as the field continues to evolve rapidly with ongoing advancements in AI and other technologies.

Let's look at the Personalized learning trend.

Personalized learning is indeed a fascinating and crucial trend emerging in the education landscape driven by AI. If you'd like to delve deeper into this realm, I'm happy to explore it further with you!

4. Case studies on the current trends focused

Table 2 presents potential focus areas on the application of current trends. This case study with an assessment of the application of current trends impact done by the group of 12 IT project managers from Kyiv National University of Construction and Architecture.

Table 2  
Potential focus areas on the application of current trends

№	Area	Impact 1-10
1	Specific benefits of personalized learning. We discussed how it caters to individual learning styles, optimizes pace and difficulty, boosts motivation, and improves overall learning outcomes.	6
2	Technology tools for personalized learning. We explored examples of adaptive learning platforms, AI-powered tutors, intelligent content recommendation systems, and other tools that facilitate personalized learning journeys.	7
3	Challenges and limitations. We addressed concerns around data privacy, algorithmic bias, teacher training, and potential inequities in access to technology.	5
4	Implementation strategies and best practices. We discussed approaches for adopting personalized learning in different educational settings, including practical tips for educators and institutions.	8
5	Future possibilities and ethical considerations. We explored the potential of emerging technologies like VR/AR in personalized learning and discussed the importance of responsible development and ethical considerations for a future of inclusive and equitable education.	4

The analysis of the areas of personalization made it possible to identify two areas that have the greatest impact on the effectiveness and efficiency of educational programs. Such areas in 2024 were Technology tools for personalized learning and Implementation strategies and best practices.

## 5. Conclusion

In conclusion, the integration of artificial intelligence (AI) into education technology is ushering in a new era of learning that is dynamic, personalized, and adaptive. The current trends in education technology within an AI environment showcase a commitment to leveraging advanced technologies to meet the diverse needs of students and educators.

The shift towards personalized learning experiences, driven by AI algorithms that adapt to individual learning styles, marks a departure from one-size-fits-all education. Intelligent tutoring systems provide real-time support, creating a more interactive and responsive learning environment. Gamification, simulations, and virtual assistants enhance engagement and immerse students in educational content, fostering a deeper understanding of the material.

AI-powered automated grading and assessment significantly reduce administrative burdens for educators, enabling them to concentrate on strategic teaching approaches. Data analytics provide valuable insights, empowering institutions to make data-driven decisions that enhance educational outcomes. The emergence of robotics and blockchain further illustrates the diverse applications of AI in education, from hands-on learning experiences to secure credentialing.

As we navigate the ever-evolving landscape of education technology, the trends discussed here reflect a commitment to harnessing AI's potential to optimize learning, promote collaboration, and prepare students for the challenges of a rapidly changing world. While challenges and ethical considerations remain, the ongoing exploration and implementation of AI in education signal a promising future where technology enhances the educational journey, empowering learners to thrive in the digital age. The dynamic synergy between education and AI continues to pave the way for innovative and inclusive learning experiences, ensuring that students are well-equipped for the opportunities and complexities of tomorrow's globalized, tech-driven society.

## Declaration on Generative AI

The authors have not employed any Generative AI tools.

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