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REVIEW ARTICLE



Benefits and Challenges of Using Artificial Intelligence by Stakeholders in Higher Education



Author's Contribution:

- A – Study design;
- B – Data collection;
- C – Statistical analysis;
- D – Data interpretation;
- E – Manuscript preparation;
- F – Literature search;
- G – Funds collection

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Background and Aim of Study:

Abstract

The benefits and challenges of using artificial intelligence (AI) in higher education are discussed. This has been the subject of a great deal of discussion among the general public and in the academic periodicals.

The aim of the study: to specify the benefits and challenges of using AI in academic university teaching based on a review of periodical research, and to develop a classification of directions for the use of artificial intelligence in higher education for interacting stakeholders.

Material and Methods:

The present study used a number of theoretical methods: analysis, synthesis, comparison, generalisation, systematisation to define the benefits and challenges of the use of AI by stakeholders; classification and modelling to develop a classification of directions for the use of AI in higher education.

Results:

It highlights the key benefits and challenges of using AI in academic university teaching that stakeholders face. Classification of directions of AI use in higher education is developed. The following four criteria are highlighted: content of education; forms and methods of teaching; diagnosing of learning outcomes; administering of educational services.

Conclusions:

AI offers exciting new prospects for its application in higher education, but there are also many concerns about its rapid development. First and foremost, there are the issues of the ethical and legal implications of using AI in higher education. The results of the study are important for stakeholders involved in developing strategies for the use of AI in higher education. The need to increase digital literacy and prepare all higher education institutions for the intensive process of information technology development in the coming years is highlighted.

Keywords:

artificial intelligence, higher education, benefits of artificial intelligence, challenges of artificial intelligence, stakeholders in higher education.

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Introduction

The rapid evolution of artificial intelligence (AI) is becoming a topic of discussion among the general public and in the scientific literature. Education systems, particularly higher education, were among the first to see the prospects of using AI in the educational process. In the present study, we define the term AI as computer systems, various AI technologies and applications, intelligent learning systems, chatbots, robotic and automated assessment systems that support and enhance education.

We look in detail at the benefits and challenges of using AI to train future professionals in higher education, and the use of AI by students, teachers, and employers.

The aim of the study. To specify the benefits and challenges of using AI in academic university teaching based on a review of periodical research, and to develop a classification of directions for the use of artificial intelligence in higher education for interacting stakeholders.

Materials and Methods

In the present study, we used internet resources to search for information based on the main concepts of AI in education, and analysed previous studies and reviews of periodicals. Studies published in scientific journals in a given field covered the following scientometric bases: Google Scholar, Education Resources Information Center (ERIC), Social Science Citation Index (SSCI), MDPI.

For the review, we selected English-language research studies on the use of AI in higher education that were published in reputable scientific peer-reviewed journals within the last 5 years.

We used a search string that specified such selection criteria: “artificial intelligence”, “higher education”, “artificial intelligence technologies”, “blockchain technology”, “ethics and legal of artificial intelligence”, “AI-based Chatbots”, “benefits AI in higher education”, “challenges AI in higher education”, “stakeholders in higher education”.

A number of theoretical methods were used in the present study: analysis, synthesis, comparison, generalisation, systematisation to define the benefits and challenges of the use of AI by stakeholders; classification and modelling to develop a classification of directions for the use of AI in higher education.

Results and Discussion

Changes have never been so swift as nowadays. In just a few years, higher education has been significantly digitised and enriched with new information technologies. Some of them open up fundamentally new possibilities, namely blockchain technology and artificial intelligence technologies.

The implementation of blockchain technology in education has been considered in numerous studies. Researchers (Bhaskar et al., 2021; Melnyk & Pypenko, 2020; Pypenko & Melnyk, 2020; Raimundo et al., 2021) have studied the challenges and benefits of blockchain technology in different areas of education. They have

concluded that blockchain technology can be applied to solve problems of efficiency, effectiveness, privacy control, technological improvement and others. It should also be noted that despite the positive aspects of blockchain, some researchers (Loukil et al., 2021) argue that several concerns continue to undermine its adoption in education, such as legal, immutability and scalability issues.

Next, we will look in more detail at artificial intelligence technologies, which also have advantages and some serious disadvantages. This has generated widespread controversy among scholars, which continues to be debated at conferences, on the pages of journals and in other media.

Let us first consider the ethical and legal aspects of artificial intelligence in higher education. Previous periodicals (Al-Zahrani & Alasmari, 2024) have largely pointed to the need to pay attention to ethical considerations and recommendations for AI implementation, highlighting the urgent need to address issues such as privacy, security and bias.

A meta-review by Bond et al. (2024), which examined the extent and nature of AI research in higher education, identified research gaps. There is a need for more ethical, methodological and contextual considerations in future research, as well as interdisciplinary approaches to the application of AI in higher education.

Airaj (2024) proposes a human-centred approach to the use of AI in higher education that promotes equitable access to knowledge while respecting privacy and ethics. Discussed through the lens of third generation activity theory, which explores the interaction between three activity systems in higher education: AI teachers, human teachers and students.

Abulibdeh et al. (2024) state that AI-based chatbots have the potential to be integrated into education. However, they argue that this raises ethical issues that require, among other things, a review of curricula, continuing education strategies and compliance with industry standards.

Several studies have identified different approaches to addressing the legitimacy of AI use that stakeholders in higher education may face. At their core, however, they relate to issues of AI licensing, which is an important legal tool. The study conducted by Malgier and Pasquale (2024) focuses on the issues of regulating AI through licensing. Such licensing should be applied to many high-risk areas of AI. The authors believe that “without proper assurances that the abuse of AI has been foreclosed, citizens should not accede to the large-scale application of AI now underway”. Ex-ante licensing of large-scale AI use should become commonplace in jurisdictions committed to enabling democratic governance of AI (Malgier & Pasquale, 2024).

Melnyk and Pypenko (2023), exploring the legitimacy of using AI-based chatbots in scientific research, proposed a new method for indicating the involvement of AI and the role of chatbots in a scientific publication. Researchers (Melnyk & Pypenko, 2023) have developed a basic logo that can be used to signify chatbots’



participation and contribution to publications. For practical applications, the authors have designed and implemented an information technology platform AIC AI Chatbots (<https://doi.org/10.26697/ai.chatbots>), which provides technological solutions related to the use of AI-based chatbots (text, images, videos) in scientific research and publications.

Noteworthy is the work of Pypenko (2023), who proposes the attribution of a product created by humans without the involvement of AI. In the author's opinion, this helps to protect the human right to own activities and to increase the value of natural human labour.

Studies describing AI as a revolutionary technology in higher education have emerged in recent years (Melnyk & Pypenko, 2024). Researchers explored the different uses of AI in higher education, and the benefits and challenges for stakeholders in education systems.

A number of studies have investigated the impact of distance learning, as well as trends in the use of AI-based chatbots in higher education among stakeholders (Aleedy et al., 2022; Al-Sharafi et al., 2023; Pypenko et al., 2020). These studies suggest that blended learning and the adoption of AI chatbots in higher education can be effectively used to assist students with their academic matters, progress monitoring, academic counselling and administrative affairs while studying at university.

Wang et al. (2023) argue that AI can enhance learning and provide personalised educational support. However, there are risks and limitations, among which are privacy concerns, cultural differences, language competence, and ethical implications.

Özer (2024) observes that AI systems have a bias problem and can reproduce biases based on social factors such as religion, culture, gender, race, etc. with training data.

Among other challenges, Crompton et al. (2022) identified a lack of technology skills among students and teachers, and skills directly related to the usability and design of AI tools.

Ahmad et al. (2022) highlighted the following benefits of using AI: minimising the administrative tasks of the educator, assisting with different types of tasks in the form of learning analytics, virtual reality and minimising teacher workload, effective and easy assessment of students.

These benefits of AI in education are highlighted by Clugston (2024): personalised learning, immersive learning experiences, improved student engagement and motivation, cost-effective learning, integrated learning and intelligent tutoring systems, continuous evaluation and improvement over time, raising academic standards and quality of education. Clugston (2024) also highlights the shortcomings of AI: privacy concerns, reliance on technology, lack of human touch, risk of fraud, displacement of teacher jobs.

Celik et al. (2022) argue that AI offers teachers several opportunities to improve planning, implement immediate feedback and assessment. In addition, these scholars have identified several limitations and challenges to the use of AI by teachers, including limited

reliability, technical capability, and applicability in different contexts.

Chan and Zary (2019) noted that the main application of AI in medical education is to support learning, due to its ability to provide personalised feedback. However, the lack of digitisation and the sensitive nature of examinations has limited the use of AI in curriculum review and assessment of student learning.

Chiu et al. (2023) highlighted the following four key educational domains of AI application in education: learning, teaching, assessment and administration, in which thirteen roles were identified. Let us focus on those that are of interest to us for the purposes of the present study: the use of AI in student learning. For the educational domain, four main roles are highlighted: signing tasks based on individual competence; providing human-machine conversations; analysing student work for feedback; increasing adaptability and interactivity in digital environments.

Kuleto et al. (2021) argue that AI and ML are essential technologies that enhance learning, primarily through students' skills, collaborative learning in higher education institutions, and an accessible research environment.

Pisica et al. (2023) describe such benefits of AI in education: can facilitate learning and provide both students and teachers with personalised attention and feedback; the effectiveness of AI tools and applications such as virtual and augmented reality, voice assistants, translation tools, chatbots, gamification, learning and tutoring programmes, instant assessment, etc.

These authors also point to shortcomings that need to be addressed as soon as possible: control of artificial intelligence technologies in terms of careful monitoring, regulation and legislation to avoid ethical violations, confidentiality dilemmas and bias; adaptation of higher education stakeholders to new technologies and methods.

Based on an analysis of current publications and the authors' own practical experience of working in universities, we have developed a classification of AI implementation in higher education in 4 main directions.

Classifying the directions of implementing AI in higher education:

1. Content of Education.
2. Forms and Methods of Teaching.
3. Diagnosing of Learning Outcomes.
4. Administering of Educational Services.

The directions for the use of AI in higher education for interacting stakeholders are illustrated in Figure 1.

The classification we propose allows us to specify the benefits and identify the challenges (problems) identified by researchers on the directions for the use of artificial intelligence in higher education for interacting stakeholders.

Key benefits of using AI in higher education:

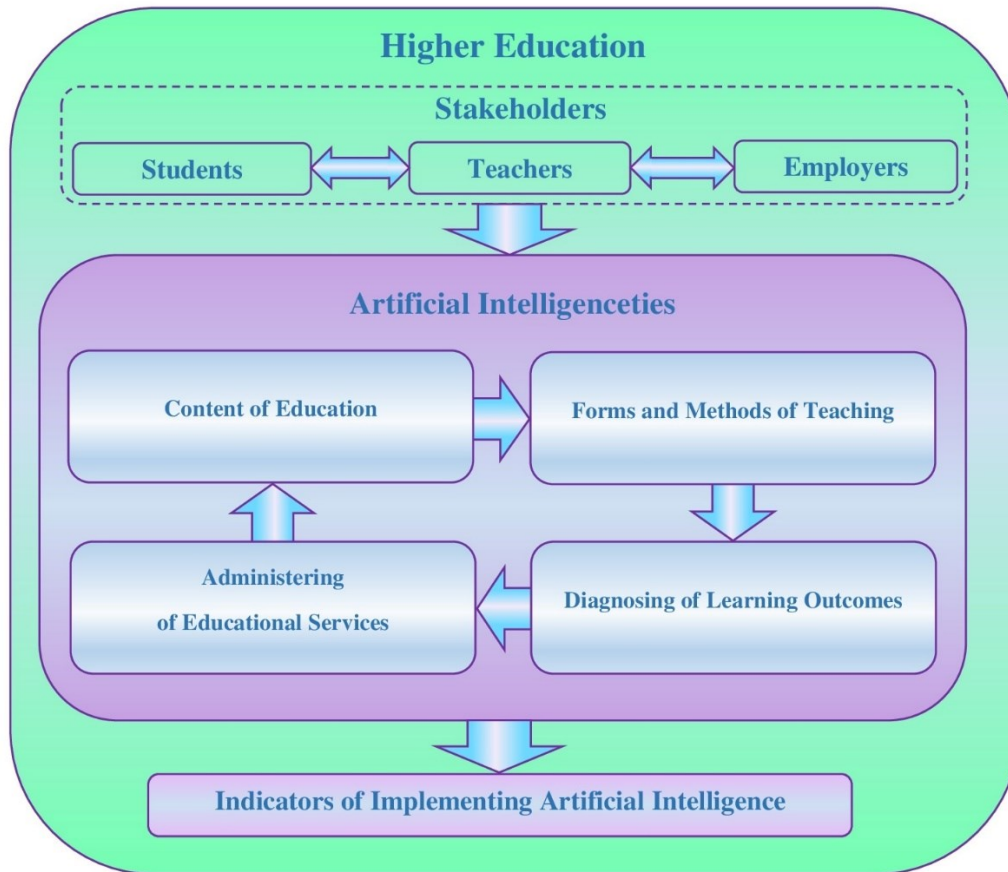
1. Benefits for the content of education (analysing huge amounts of data and transforming it into educational content).
2. Benefits of forms and methods of teaching (use of innovative methods and technologies such as virtual and

augmented reality; voice assistants; translation tools; chatbots).
3. Benefits of diagnosing learning outcomes (no bias, speed of information processing).

4. Benefits of administering educational services (raising academic standards and quality of education, optimising the planning of educational processes, cost-effectiveness).

Figure 1

Directions for the Use of Artificial Intelligence in Higher Education for Interacting Stakeholders



Significant challenges (problems) faced by stakeholders in using AI in higher education:

1. Challenges for the content of education (creating incorrect information, biasing training data, relying on technology and not having equal access to AI tools).
2. Challenges of forms and methods of teaching (lack of human contact, students' lack of technological skills, lack of consideration for language and cultural differences of users, limited exposure of students to different points of view).
3. Challenges of diagnosing learning outcomes (biased scoring algorithms, risk of cheating, and no recourse).
4. Challenges of administering educational services (limited technical capacity and reliability, threats to privacy and security, ethical and legal implications).

Conclusions

The application of AI in education is a relatively new phenomenon for researchers and practitioners. AI offers exciting new prospects for its use in higher education, but there are also many concerns about its rapid development.

Most researchers expressed concern about the ethical and legal implications of using AI in higher education.

Increasingly, academics are calling for a consensus on the safe and responsible implementation of AI in education.

We believe that digital literacy and the readiness of all stakeholders in higher education for the intensive process of information technology development in the coming years is necessary.

Our proposed classification of directions for the use of AI in higher education allows us to specify the benefits and prepare stakeholders for the challenges they may face in implementing AI in their universities.

Ethical Approval

The study protocol was consistent with the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a prior approval by the Institution's Human Research Committee. Research permission was granted by the Committee on Ethics and Research Integrity of the Scientific Research Institute KRPOCH (protocol no. 024-2/SRIKRPOCH dated 10.08.2023).

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