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AI AND HIGHER-EDUCATION: BENEFITS AND CHALLENGES

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Abstract. *In this paper, the authors investigate one of the most pressing issues in contemporary education: the impact of Artificial Intelligence (AI) on higher education students, focusing on both its potential benefits and the challenges associated with its integration into teaching and learning processes. The study draws on OUYANG and JIAO's (2021) conceptual framework, which identifies three paradigms of Artificial Intelligence in education: AI-directed, learner-as-recipient; AI-supported, learner-as-collaborator; and AI-empowered, learner-as-leader. By employing this theoretical perspective, the research seeks to assess the extent to which AI influences undergraduate students' learning experiences, academic engagement, and relationships with educators. Particular attention is given to the opportunities offered by AI-powered tools in supporting personalized learning, facilitating access to information, and improving educational efficiency, alongside potential challenges related to independent thinking, academic integrity, and excessive reliance on technology. The findings highlight the continued importance of the teacher–student relationship and suggest that, despite the rapid development of AI technologies, human interaction remains a central component of effective higher education. Although AI can provide valuable support for learning activities, its current role does not replace the pedagogical expertise, guidance, and interpersonal engagement offered by educators. The study therefore emphasizes the need for a balanced approach to AI integration, ensuring that technological innovation complements rather than undermines the educational process.*

Keywords*: AI, higher-education, students, benefits, challenges.*

INTRODUCTION

Artificial Intelligence (AI) is reshaping the university experience: students are using it for daily campus life, learning, and research, but it also raises concerns about cheating, critical thinking, and trust.

AI impacts university students in the following ways:

- Autonomous learning: studies show AI can increase students' willingness to learn independently, but only when guided by professors (WANG & LI, 2024);
- Campus integration: some universities even provide AI agents to answer questions about campus life and courses;
- Emotional reactions: surveys reveal students often feel anxious, confused, or distrustful about AI, worrying it undermines critical thinking and peer relationships;
- Learning enhancement: AI tools help students brainstorm, practice problem-solving, and summarize readings;
- Shortcut risks: many students use AI to bypass assignments rather than deepen understanding, unless educators actively design AI-inclusive tasks (AGUILAR et al., 2025).

OUYANG & JIAO (2021) have identified three paradigms of Artificial Intelligence in education:

- "Paradigm One: AI-directed, learner-as recipient:
  - Theoretical underpinning: behaviourism;
  - Implementation: earlier work of Intelligent Tutoring Systems;
  - AI techniques: AI based on statistical relational techniques;
  - Examples: ACT Programming Tutor, Stat Lady.
- Paradigm Two: AI-supported, learner-as collaborator:
  - Theoretical underpinning: cognitive, social constructivism;
  - Implementation: Dialogue-based Tutoring Systems, Exploratory Learning Environments;
  - AI techniques: Bayesian network, natural language processing, Markov decision trees;
  - Examples: an exploratory environment Querying the Expert system.
- Paradigm Three: AI-empowered, learner-as leader:
  - Theoretical underpinning: connectivism, complex adaptive system;
  - Implementation: the human-computer cooperation, personalized / adaptive learning;
  - AI techniques: the brain-computer interface, machine learning, deep learning;
  - Examples: a real-time Massive Open Online Course predictive modelling."

This paper presents both benefits and challenges of AI in education from the perspective of the learner as recipient, collaborator, and leader in his/her relationship with AI.

MATERIAL AND METHODS

The material used in this paper consists of scientific articles, academic books, and other relevant scholarly publications addressing the impact of Artificial Intelligence (AI) on higher education. The selected literature explores the growing integration of AI-based technologies into university teaching and learning processes, highlighting their potential to transform educational practices, improve learning outcomes, and reshape the relationship between students and educators. Attention is given to studies examining the use of AI-powered tools for personalized learning, automated assessment, academic support, information retrieval, and the development of students' knowledge and skills. In addition, the reviewed publications address the challenges associated with AI adoption, including ethical concerns, data privacy, academic integrity, algorithmic bias, and the risk of excessive dependence on technological solutions.

The research method employed in this paper is the bibliographical method, which involves identifying, selecting, reviewing, and analyzing relevant academic literature on the subject. This approach enables the authors to examine existing theoretical perspectives and research findings concerning the benefits and limitations of AI in higher education. The analysis is structured around the three paradigms of AI in education proposed by OUYANG AND JIAO (2021), providing a conceptual framework for understanding the different roles AI can play in the learning process. By synthesizing the findings and arguments presented in the selected publications, the paper aims to develop a comprehensive understanding of the opportunities and challenges associated with AI integration and to highlight the importance of maintaining a balance between technological innovation and the essential human dimension of higher education.

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RESULTS AND DISCUSSIONS

Seven years ago, ZAWACKI-RICHTER et al. (2019, 1) noted "the almost lack of critical reflection of challenges and risks of AIEd [Artificial Intelligence in Education], the weak connection to theoretical pedagogical perspectives, and the need for further exploration of ethical and educational approaches in the application of AIEd in higher education", as well as the "new ethical implications and risks [that] come in with the development of AI applications in higher education" (*idem*, 2). They also mention that there are, in higher education in particular, "three categories of AI software applications in education that are available today: a) personal tutors, b) intelligent support for collaborative learning, and c) intelligent virtual reality" (*idem*, 4).

Using AI by university students presents both *benefits* and *challenges / disadvantages / drawbacks / harms / limitations / pitfalls / risks / threats*.

Benefits of Using AI at University

There are numerous benefits of using AI at university (ZAWACKI-RICHTER et al., 2019; BERENDT, LITTLEJOHN & BLAKEMORE, 2020; HOLMES et al., 2022; KHAN, KHOJAH & VIVEK, 2022; TAPALOVA & ZHIYENBAYEVA, 2022; AHMAD et al., 2023; CROMPTON & BURKE, 2023; DOGAN, GORU DOGAN & BOZKURT, 2023; GARCÍA-MARTÍNEZ et al., 2023; GEORGE & WOODEN, 2023; GRASSINI, 2023; KAMALOV et al., 2023; LIU et al., 2023; OWAN et al., 2023; OPESEMOWO & ADEKOMAYA, 2024; STRIELKOWSKI et al., 2024; WANG & LI, 2024; ZHAI, WIBOWO & LI, 2024; AGUILAR et al., 2025; FIGUEROA DE LA FUENTE & FARHADIAN, 2025): *affording AI to both instructors and students*; *allowing assessment and evaluation*, which are more applicable to courses or programs with large student numbers; can perform assessment and evaluation tasks at very high accuracy and efficiency levels; and involve automated grading; feed-back; evaluation of student understanding, engagement and academic integrity; and evaluation of teaching. *allowing digital asset classification*; *allowing global accessibility of 24/7 training for diverse learners*; *allowing learner choice*, which involves autonomy, choice, and the ability to "opt out" of data collection as a fundamental human right; *allowing learning in virtual context*; *allowing personalized tutoring and feedback*, which have the following functions: teaching course content, diagnosing strengths or gaps in students' knowledge and providing automated feedback, curating learning materials based on students' needs, and facilitating collaboration between learners; and need a dialogue between the student and the computer; *allowing student's rhythms and circumstances adaptive systems and personalization*, which are situated at the teaching and learning level; develop agent-based distance learning management systems designed to manage resources, support decision making and institutional policy, and assist with managing undergraduate student study flow by giving users access to data across disciplines, rather than just individual faculty areas; help explore undergraduate students' academic advising; and support university career services; *benefiting students with special needs*; *developing campus-wide AI support systems* to monitor student participation and expressions via face recognition in classrooms; *developing intelligent tutoring systems*, which are used to simulate one-to-one personal tutoring; can make decisions about the learning path of an individual student and the content to select; have enormous potential, especially in large-scale distance teaching institutions, which run modules with thousands of students, where human one-to-one tutoring is impossible; *developing intelligent virtual reality*, which involves virtual agents that can act as teachers, facilitators, or students' peers in virtual or remote labs; and is used to engage and guide students in authentic virtual reality and game-based learning environments; *drawing on the experience of other communities in related areas*; *encouraging collaborative learning*, which facilitates collaborative writing by providing

automated feedback, generated automatic questions, and the analysis of the process; has to be facilitated and moderated; is at the heart of the learning process; needs supporting adaptive group formation based on learner models, by facilitating online group inter action or by summarising discussions that can be used by a human tutor to guide students towards the aims and objectives of a course; supports online collaborative learning discussions by using academically productive talk moves; *fostering faster research and ideation*; *identifying logical inconsistencies or gaps in arguments ensuring a more cohesive and well-structured final written product*; *improving content design, optimizing the teaching process, and evaluating teaching more comprehensively*; *increasing cost and time efficiency*, which leaves the teachers the role of providing new hints and the correct solution to the tasks; provide cognitive scaffolding and help; and share teachers' tutoring tasks by providing immediate feedback (automating tasks); *profiling and predicting*, which can forecast the costs of a university to support management decisions based on an artificial neural network; devise student models and academic achievement; help assess drop-out and retention; and help design admission decisions and course scheduling; *providing guidance and suggestions to improve writing style, grammar, and sentence structure*; *providing timely feedback in real time*; *scheduling*; *streamlining administrative processes*; *strengthening learning and knowledge transmission*; *tailoring learning experiences*; *triggering further questioning and encourage students to apply their knowledge and reasoning skills*; *using ChatGPT as a tool throughout the writing process, including topic selection, context setting, outlining, drafting, and revising*; *using ChatGPT for quick information gathering, handling large amounts of text, personalized learning, real-time feedback, and multi-language support*; *using data analysis to monitor students' progress and provide targeted interventions*; *using predictive analytics to identify at-risk students who may need additional support*; and *visualising*, which is an optimal method chosen for the solution of complex conception, making complex knowledge entertaining (e.g. game-based learning) in which learners' motivation is greatly generated.

Challenges of Using AI at University

There are numerous challenges / disadvantages / drawbacks / harms / limitations / pitfalls / risks / threats of using AI at university, which "are not always apparent because they are unseen, unintended or unanticipated consequences of the use of AI systems in education" (BERENDT, LITTLEJOHN & BLAKEMORE, 2020). AHMAD et al. (2023, 5) pointed out that "Many of the ethical issues and challenges of AI are due to sudden development, sociocultural changes, issues of predictability, responsibility, and the handling of huge amounts of data".

Examples of challenges (BERENDT, LITTLEJOHN & BLAKEMORE, 2020; KHAN, KHOJAH & VIVEK, 2022; CHAN, 2023; DOGAN, GORU DOGAN & BOZKURT, 2023; GARCÍA-MARTÍNEZ et al., 2023; GEORGE & WOODEN, 2023; GRASSINI, 2023; KAMALOV et al., 2023; LIU et al., 2023; OWAN et al., 2023; OPESEMOWO & ADEKOMAYA, 2024; STRIELKOWSKI et al., 2024; WANG & LI, 2024; ZHAI, WIBOWO & LI, 2024; AGUILAR et al., 2025; FIGUEROA DE LA FUENTE & FARHADIAN, 2025): *accessing and protecting data*; *affecting teaching experience*; *allowing plagiarism and academic dishonesty* (ethical implications and risks); *allowing pretentious alliances between government organisations and schools*; *allowing profiling produce discriminatory outcomes*; *allowing technological administration of the well-balanced growth of man-machines*; *allowing unequal access to AI tools*; *amplifying the "status quo" in education*; *benefiting from experience of AI educational tools that have been developed without addressing any ethics*; *benefiting more advantaged groups of learners*; *causing anxiety and distrust among students*; *causing bias and discrimination*; *designing and using new educational resources*; *designing digital literacy plans*; *designing new pedagogical models that*

include AI and computer science; *developing systems with limited "opt out"* of data collection as a fundamental human right; *embedding human rights principles*; *ensuring adherence to best practices for data protection and confidentiality*; *ensuring the use of high-quality data*; *focusing excessively on imparting knowledge*; *generating drafts and perfecting the final version of written assignments by correcting errors and adding references*; *guaranteeing an adequate level of both organizational and technical transparency*; *ignoring emotional communication*; *overlooking students' critical thinking*; *lacking special knowledge and skills for effective and thorough technology management*; *making learning expensive*; *monitoring and controlling the technology adoption process and the outcomes* improperly; *optimizing resources*; *protecting online information privacy*; *questioning safety ethics of advanced technology*; *questioning the validity of the data and how records of achievement are interpreted* by employers; *reducing critical thinking if misused*; *saving a problem may cause other problems*; *standpointing*; and *undermining learners and teachers' fundamental human rights*.

According to OUYANG & JIAO'S (2021) three paradigms of Artificial Intelligence in education, the benefits and challenges of using AI in education can be grouped as follows:

- ***Paradigm One: AI-directed, learner-as recipient***: *Benefits* (6): affording AI to both instructors and students, allowing global accessibility of 24/7 training for diverse learners, allowing learning in virtual context, benefiting students with special needs, providing guidance and suggestions to improve writing style, grammar, and sentence structure, and using ChatGPT for quick information gathering, handling large amounts of text, personalized learning, real-time feedback, and multi-language support; *Challenges* (10): accessing and protecting data, allowing plagiarism and academic dishonesty, allowing profiling produce discriminatory outcomes, allowing unequal access to AI tools, benefiting from experience of AI educational tools that have been developed without addressing any ethics, benefiting more advantaged groups of learners, causing anxiety and distrust among students, causing bias and discrimination, protecting online information privacy, reducing critical thinking if misused.

- ***Paradigm Two: AI supported, learner-as collaborator***: *Benefits* (20): affording AI to both instructors and students, allowing assessment and evaluation, allowing digital asset classification, allowing personalized tutoring and feedback, allowing student's rhythms and circumstances adaptive systems and personalization, developing campus-wide AI support systems, developing intelligent tutoring systems, fostering faster research and ideation, improving content design, optimizing the teaching process, and evaluating teaching more comprehensively, increasing cost and time efficiency, profiling and predicting, providing timely feedback in real time, scheduling, streamlining administrative processes, strengthening learning and knowledge transmission, tailoring learning experiences, triggering further questioning and encourage students to apply their knowledge and reasoning skills, using data analysis to monitor students' progress and provide targeted interventions, using predictive analytics to identify at-risk students who may need additional support, and visualizing; *Challenges* (23): affecting teaching experience, allowing plagiarism and academic dishonesty, allowing pretentious alliances between government organisations and schools, allowing technological administration of the well-balanced growth of man-machines, amplifying the "status quo" in education, designing and using new educational resources, designing digital literacy plans, designing new pedagogical models that include AI and computer science, developing systems with limited "opt out", embedding human rights principles, ensuring adherence to best practices for data protection and confidentiality, ensuring the use of high-quality data, focusing excessively on imparting knowledge, guaranteeing an adequate level of

both organizational and technical transparency, ignoring emotional communication, lacking special knowledge and skills for effective and thorough technology management, making learning expensive, monitoring and controlling the technology adoption process and the outcomes improperly, optimizing resources, overlooking students' critical thinking, questioning safety ethics of advanced technology, questioning the validity of the data and how records of achievement are interpreted, and undermining learners and teachers' fundamental human rights.

- ***Paradigm Three: AI empowered, learner-as leader***: *Benefits* (4): allowing learner choice, drawing on the experience of other communities in related areas, identifying logical inconsistencies or gaps in arguments, ensuring a more cohesive and well-structured final written product, and using ChatGPT as a tool throughout the writing process, including topic selection, context setting, outlining, drafting, and revising; *Challenges* (3): allowing plagiarism and academic dishonesty, generating drafts and perfecting the final version of written assignments by correcting errors and adding references, and standpointing.

CONCLUSIONS

It is worth noting that Paradigm Two: AI supported, learner-as collaborator records the largest numbers of benefits (20) and challenges (23), which proves that teacher-learner relationship continues to be a strong one; that Paradigm One: AI-directed, learner-as recipient ranks second, which showing that students as recipients are facing more challenges (10) than benefits from the use of AI in higher education; and that Paradigm Three: AI empowered, learner-as leader ranks third, with just 4 benefits and 3 challenges, which shows that learner's leadership in his/her relationship with AI is still far from optimal. To also note that allowing plagiarism and academic dishonesty is common to all three paradigms of Artificial Intelligence in education is, obviously, the most important challenge / disadvantage / drawback / harm / limitation / pitfall / risk / threat of using AI at university.

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