

THE USE OF ARTIFICIAL INTELLIGENCE IN TEACHING AND EVALUATION FOR SMART LEARNING IN HIGHER EDUCATION

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Abstract

Since the spread of various artificial intelligence tools, higher education teachers have expressed various attitudes connected to their use. This paper explores the uses, benefits, and disadvantages of Artificial Intelligence (AI) tools in higher education. In this scope, 17 interviews with teachers from a faculty of communication were performed in June 2023. Results show a high degree of adoption and use of various AI tools in teaching, with an increase in effectiveness. At the same time, the main disadvantages are the lack of human interaction, the concern about the accuracy of information, and the potential overreliance of this type of tool. Specific concerns were raised about the lack of human interaction, the problems facing the lack of accuracy of the information, and the possibility of over-relying on AI-based technologies. Regarding the perspectives on using AI for evaluation, opinions were mixed, with concerns about the validity and correctness of results. Although previous perspectives on AI technologies refer to the positive impacts on the academic landscape, this study found more cautious perspectives among respondents. Some participants expressed a lack of trust in AI-generated data and content, emphasizing the need to keep traditional teaching methods. An institution-wide approach to the adoption of AI-based technologies is needed, which could provide support for integrating these tools while maintaining academic standards.

Keywords

artificial intelligence; higher education; smart learning.

Introduction

Since the development of artificial intelligence (AI) and its applications, predictions on the potential impact in various fields and sectors of activity have been aroused. Several studies estimated that the impact of AI would be revolutionary, especially in education (Karsenti, 2019; Chen, Chen, & Lin, 2020; Adiguzel, Kaya, & Cansu, 2023). The higher education sector is expected to have stronger AI development in the future since the students usually have digital skills, and teachers are also committed to applying innovative teaching and evaluation methods.

At first glance, research studies investigated the uses of AI in education and the degree of adoption (Chen et al., 2020; Gocen & Aydemir, 2021; Chan & Hu, 2023). The issues

debated in these studies were the benefits, opportunities, or advantages, on the one hand, but also the risks and challenges, on the other hand (Adiguzel et al., 2023; Baidoo-Anu & Owusu Ansah, 2023). The empirical research studies finished in recent years used quantitative or qualitative methods. They explored the use of AI from the perspective of a single category of users or different stakeholders (teachers, students, experts, administration, management) (Gocen & Aydemir, 2021; Kuleto, Ilić, Dumangiu, Ranković, Martins, Păun, & Mihoreanu, 2021; Chan & Hu, 2023) and also in the distinct elements of the educational process (for instance teaching, learning, evaluation). Other studies discussed the issue of the implementation of AI from a managerial perspective (Owoc, Sawicka, & Weichbroth, 2019; Pedro, Subosa, Rivas, & Valverde, 2019), observing the needs of educational systems and society in general to benefit from the potential advantages of AI technologies.

Although these studies shed light on the present stage of development for AI and the future perspectives in the field of education, there is still a need for research carried out from the perspective of different stakeholders, especially teachers, because they are the most important category in the chain of using and implementing AI in the educational process. Therefore, the present study emphasizes teachers' attitudes toward adopting and using AI in teaching and evaluation.

Theoretical frame

The topic of AI is largely debated in the current scientific literature since multiple sectors benefit from AI development. Although the characteristics of AI are quite diverse, five aspects are mentioned more often: the potential of AI to solve complex problems, the processing in a human-like manner, intelligence and degrees of intelligence, the focus on technology, and the capacity to process large volumes of external data (Hamm & Klesel, 2021).

The AI tools are very effective through their ability to interpret and learn from a large amount of data and use the learning to perform tasks and fulfill objectives (Kaplan & Haenlein, 2019). Recent definitions proposed for AI were „systems that can correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through specific adaptation” (Schaefer, Lemmer, Samy Kret, Ylinen, Mikalef, & Niehaves, 2021, p.2) or as “a branch of computer science that focuses on creating intelligent machines that can think and act like humans” (Deng & Lin, 2022).

The applications of AI in education and especially in higher education, are up-and-coming, as Karsenti (2019) observed by enumerating over 26 positive impacts of AI in education, including personalized content and feedback, adaptive learning, better class management, capacity to expand and improve quality learning in long-distance educational systems, automated tasks in evaluation, etc. Other studies, such as Adiguzel et al. (2023), summarize the scientific literature and discuss the advantages and opportunities induced by AI development and the risks. The main benefits for students were considered individual guidance and timely feedback, which would help improve skills and special communication abilities. Also, instructors' teaching skills would be enhanced by providing more support for teaching, insights into the progress of learning, and reduced workload by assignment scoring and automated feedback. The main challenges from the authors' perspective were the potential for manipulation

brought by AI, the overreliance on AI, the potential bias induced by the limited information or context, and privacy issues. Also, the authors emphasize the weak link to pedagogical strategies and perspectives.

Relying on several studies on using ChatGPT in education, Baidoo-Anu and Owusu-Ansah (2023) reveal more challenges than benefits. Among the most important benefits presented by the authors were personalized tutoring, automated essay grading, language translation, interactive learning by virtual tutors in a conversational manner, and adaptive learning by the adjustment of teaching methods to the needs of students. Another study identifies similar advantages of ChatGPT use in higher education (Sok & Heng, 2023). Returning to Baidoo-Anu and Owusu-Ansah (2023), the authors considered that the main challenges induced by ChatGPT use were the lack of human interaction, the limited understanding (for example, AI cannot provide feedback tailored to students' needs), bias in training data, limited ability to personalize instruction, lack of creativity, dependency of input data, lack of contextual understanding, and privacy.

Only a few studies rely on empirical data; some gathered data using a small sample. The survey of Chan and Hu (2023) on 399 students obtained the expected advantages: personalized learning support, writing and brainstorming support, research and analysis, visual and multimedia support, and administrative support for repetitive tasks. In exchange, the challenges expected by students while using AI in learning were the overreliance on AI, the privacy issues, the unequal access to these tools, and the career prospects (the loss of jobs on the market). This last threat was also identified in a study by Gocen (2023) that presents results from interviews with several categories of stakeholders (academia, experts, engineers, law persons, and general). The most important benefits of AI development, as considered by respondents, were that AI tools keep pace with the learner's speed, adapt to the learner's needs, and offer insights into learning analytics. Consequently, the most important risks were the lack of interaction and the possibility of users' overreliance on these tools.

At the level of outcomes, the scientific literature emphasized some characteristics of AI that have positive results in education, such as better teaching through facilitation instead of content transmission adaptive learning that can bring inclusion of social categories previously excluded, such as students with disability (Karsenti, 2019).

Also, reviewing 30 articles on the impact of AI in teaching, learning, administration, and education management, Chen et al. (2020) found out that curriculum and content have been customized and adapted to student's needs, which has fostered uptake and retention, thus improving the experience of learners and the overall quality of learning. This aspect was confirmed in a study by Kuleto et al. (2021), in which, using survey and content analysis, the authors showed that AI could enhance customized learning in many ways by developing students' skills and providing a collaborative environment (2021). The conclusions of Adiguzel et al. (2023) are along the same lines, observing that the use of AI determines an increased level of motivation in students, an enhanced learning interest, better outcomes, and a positive disposition. Fewer studies demonstrated the correlation between the use of AI in teaching or evaluation and the progress in students' performance, as the experimental study of Wang and Yu (2022), which proved that the use of smart education learning strategies improved students' performance to 98.5%, and the efficiency to 96.7%.

Overall, the impact of AI in education is considered more positive than negative in the scientific literature. As a result of implementation, scholars consider that AI tools have great potential for automating administrative tasks for institutions and teachers, contributing to the production of smart classrooms (Timms, 2016). AI tools can already automate the grading of homework and the evaluation of essays, which allows teachers to spend more time with students one-on-one (Chen et al., 2020).

To ensure that the opportunities of AI are fully exploited, there is a need for a strategic approach to implementing AI in educational institutions. Karsenti (2019) and Sousa (2021) insisted on the urgent need to implement training for teachers to face the rapid development of these tools.

Recent approaches at the institutional level observed that the main challenges are the organizational maturity and the infrastructure needed for AI implementation (Owoc et al., 2019). Thus, the study of Pedro et al. draws the main strategic lines for the sustainable development of AI in higher education, observing that, while advancing with the digital competencies of stakeholders involved, there is a need to rethink programs and curriculums to prepare the learners and the users. While using the opportunities offered by AI implementation, such as facilitation of access to education, collaborative environment, and intelligent tutoring systems, there is also a need to develop systematic data analysis for overviewing each phase. The implications at the policy level ensure a comprehensive view that includes equity and prepares teachers, especially while significant research is still needed to support these policies.

Some authors (Baidoo-Anu & Owusu Ansah, 2023) observed that, even though the development of AI tools in education might pose more significant risks than benefits, the technology will develop further and therefore needs more research, regulation, and managerial perspective.

Consequently, the objectives of research for the present study are:

- The identification of the attitudes and behaviors regarding the use of AI technologies in teaching and evaluation;
- The exploration of the ethical concerns about the use and development of AI technologies in higher education;
- The identification of the advantages and disadvantages of using these technologies in teaching.

Methodology

The interview guide was built from open-ended questions and included two sections, one for teaching and one for evaluation. The teaching section included three questions, one for using the tools and the others for identifying advantages and disadvantages. The data was collected online via video-conference platforms, Zoom and Google Meet, in June and July 2023. The 17 respondents presented different grades and years of experience (from assistant to full professors). The recordings were used for a verbatim transcription. The resulting transcripts were analyzed using thematic analysis.

Presentation of results

Among the 17 respondents, 9 used AI in teaching, from which were mentioned: Kahoot! ChatGPT, Midjourney, Canva. Some respondents (n=3) used more advanced tools: Deepl, Google Trends, Turnitin, Content Detector, and SlidesAI.io. While applications such as Kahoot! were used for role play, contributing to the increase of interactivity of the course and seminar, the other applications were used in different scopes, for translation and materials for teaching (e.g., Canva Text to Image – for seminar applications, Turnitin and ContentDetector – for checking the final projects of students).

R15 (Associate Professor) mentioned the use of technologies for seminar applications, even with some limitations: *“Before ChatGPT, we used another AI text generator (...) The photos used for examples were done with Dali and Midjourney (...)*. Another respondent tested the AI tools in an international context: *“in Austria, the feedback was great, students were very opened. They learned to use databases for references and data collection – PubMed, Cochrain, Zoterro, Python”* (R14, Lecturer).

Even though 8 out of 17 respondents have not used AI technologies, there is interest in testing and using them in the future. They expressed the need to understand better the functions of these tools.

As the main advantages of using AI tools in teaching, two directions were more prominent: (1) personalized and interactive teaching experiences applied to the needs and expectations of students; (2) increase of effectiveness for the tasks of teachers, especially for the preparation of courses and seminars (n=12): AI creates personalized, interactive experiences that make the meaning of new concepts easier to understand” (R1, associated teacher); *“AI tools offer ideas and help to the adaptation of the teaching materials to the needs of everyone”* (R5, Teaching Assistant).

The AI tools can be used for the automation of tasks that usually request significant time and effort from teachers (n=9): *“automates tasks of evaluation and testing. AI can ensure continuous educational support by chatbots that can respond to questions 24/7”* (R10, Associate Professor); *“AI makes the work easy, winning time for other complex activities”* (R5, Teaching Assistant); *“Documentation and mechanical tasks (translation, references) are simple with AI”* (R11, Lecturer).

The other 3 respondents emphasized the perceived benefits of structuring information. At the same time, AI can offer virtual assistance for teaching: *“AI helps to structure the information, to the coherent presentation of complex concepts”* (R3, Lecturer). Other respondents emphasize the role of counseling of AI: *“AI could compare some resources with the existing materials. Also, it could contribute to presentations and intermediate tests”* (R13, Full Professor)

Regarding the disadvantages and challenges of using AI tools in teaching, the main aspects mentioned were the lack of accuracy of the information given by AI, the lack of human interaction, the potential overreliance on AI, the lack of trust, and the issue of data privacy.

Discussing the accuracy of information (n=6), the respondents expressed concerns about the data provided by AI. Most of them believed that supplementary checking is needed: *“Not all the information provided are correct, you have to be careful and check their correctness”* (R2, Associated Teacher); *“not all the information offered by ChatGPT are real, they should be checked every time; also, the given examples are limited to 2021”* (R17, Teaching Assistant).

Other disadvantages identified by respondents refer, on the one hand, to the limitations of human interactions (n=2), the fact that AI cannot understand some human aspects such as empathy and intuition; on the other hand, the use of AI can induce overreliance and decrease of some abilities of students in the future (n=2). Other respondents (n=3) emphasized a lack of information about the functioning of AI tools. Therefore, users' trust is limited: *“If the topic is important, the information offered by ChatGPT should not be trusted”* (R16, Associate Professor). According to other respondents (n=3), using AI tools involves collecting and processing data, which brings issues regarding data privacy and protection. Moreover, the AI algorithms can involve favoring attitudes and subjective attitudes: *“The use of AI determines important questions regarding the confidentiality and the safety of data. The algorithms of AI can include favoring attitudes, which can produce a lack of equity”* (R10, Associate Professor).

The next topic in the interview guide referred to the ethical issues of using ChatGPT. The aspects more frequently mentioned were: (1) the issue of author rights and plagiarism; (2) the abuse of using AI or elaboration of materials totally with AI; (3) the increase of inequality. The respondents expressed concerns about the author's rights and the risk of plagiarism (n=7). They emphasized the need to set limits between human-created content and the AI created content: *“There will always be a suspicion that they do not create the projects of students. Currently, we do not have a tool that identifies the plagiarism of content with a 100% validity”* (R17, Teaching Assistant). Also, the elaboration of materials with the help of AI could limit students' thinking and communication capacity: *“When students fully use AI for the elaboration of materials and projects, then we have a problem”* (R4, Teaching Assistant).

Moreover, the use of AI algorithms can intensify the inequalities of the digital society: *“The overreliance on technology can determine inequalities in education if some students do not have access to the necessary resources”* (R10, Associated Professor); *“AI can increase the prejudices if the algorithms are instructed on biased data”* (R5, Teaching Assistant). Still, other perspectives (n=2) are more relaxed and consider that the concerns related to the replacement of human positions by AI are exaggerated and that the adaptation to future technologies will be a natural process.

Regarding the use of AI in evaluation, in the second section of the interviews, half of the respondents (n=7) mentioned that they did not use AI tools for assessment, remaining with the traditional methods. As for attitude towards using AI in evaluation, more than half of respondents (n=8) expressed concerns. The reasons involved were the correctness of the evaluation, the lack of matching with the current evaluation methods, the lack of subtle nuances, and potential bias. Moreover, transparency of evaluation is needed: *“Students need to understand how their work has been evaluated; this explanation might be difficult with AI algorithms that are complex and hard to understand”* (R17, Teaching Assistant). There were also respondents interested in the

use of AI in evaluation (n=6): *“Instead of trying to prove plagiarism, I think that the proof given by AI would be stronger; there would be no room left for denial and negotiation”* (R13, Full Professor).

Discussion

The research results emphasize the benefits and risks of AI in education. The benefits perceived are in line with the previous studies on this topic, especially Badoo-Anu and Owusu Ansah (2020) and Chen et al. (2020). Difference from scholars (Karsenti, 2019) or stakeholders in previous similar studies (Gocen & Aydemir., 2021; Kuleto et al., 2021) who perceived AI in a very positive manner in this study, respondents did not express enthusiasm or very positive expectations. On the contrary, they expressed many concerns and the need for regulation to limit the risks and negative consequences.

In contrast with the study of Chen et al. (2020), which concluded that AI is already used on a large scale in education, half of the respondents did not use AI in teaching or evaluation. When asked why, they showed a lack of trust in AI tools' data, content, or solutions. Instead, they expressed trust in traditional teaching methods as being more reliable and having proven outcomes. This shows that the need identified by Karsenti (2019) to find a balance between traditional teaching methods and the new advances opened by AI tools is a real problem that will manifest in the future. Also, a limit in the use of AI, expressed by respondents, was the lack of training and the lack of information on the activities that can be carried out with the support of AI. This finding proves that the managerial perspective promoted by Owoc et al. (2019) and Pedro et al. (2019) is necessary. Thus, implementing AI in higher education should not result from individual efforts and/or isolated development of teacher skills. Institutional efforts should be made to keep pace with the development of these tools and offer equal access to information and training for teachers and students.

Conclusions and recommendations

Using the new technologies and AI tools in higher education involves benefits but also significant challenges for the stakeholders involved. The research results indicate a positive impact on teaching, making the teaching experience more interactive, effective, and personalized. Thus, the process of teaching benefits from the development of AI, which brings a general improvement. On the other hand, the lack of human interaction, the potential overreliance on AI, and data privacy are important aspects that need to be approached responsibly while implementing AI in education. Concerns about author rights, plagiarism, increasing inequality, and access to education are important aspects that should also be considered.

Finally, the research results show that the use of AI in higher education is a complex topic, with multiple aspects that need to be regulated and considered. The adaptation of AI in education should be doubled by an ethical and responsible perspective to ensure that all the stakeholders involved maximize the advantages of AI and limit the risks and challenges.

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