

Utilization of Artificial Intelligence to Support the Learning Process in Higher Education

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Abstract

The development of artificial intelligence (AI) has significantly impacted the learning process in higher education. This study aims to analyze the use of artificial intelligence to support the learning process in higher education, including the forms of use, benefits, and challenges it poses. The study used a qualitative descriptive approach with a literature review method. Data were obtained from various scientific journal articles, books, research reports, and institutional documents relevant to the use of AI in higher education. Data analysis was conducted using content analysis by identifying, classifying, comparing, and synthesizing various previous research findings. The results show that AI can be utilized as a learning assistant, a supporter of personalized learning, a developer of teaching materials, a provider of feedback, an assessment supporter, and a tool to enhance student self-directed learning and creativity. The use of AI can also help lecturers increase efficiency in planning and implementing learning. However, the use of AI presents challenges such as information inaccuracy, technology dependency, violations of academic integrity, data privacy, bias, and the potential for a decline in students' critical thinking skills. Therefore, the use of AI in higher education must be carried out ethically, critically, responsibly, and human-centeredly through strengthening AI literacy, improving lecturer competency, institutional policies, and adjusting assessment systems. AI should be positioned as a tool to enhance the learning process, not as a substitute for lecturers or students' thinking processes.

Keywords

Artificial Intelligence, AI Literacy, Generative AI, Higher Education, Learning



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INTRODUCTION

The rapid development of digital technology has brought fundamental changes to various aspects of life, including the provision of higher education. Universities are no longer merely required to provide a learning process oriented towards delivering material, but must also be able to create learning experiences that are adaptive, interactive, and personalized, tailored to the needs of students in the digital age (Erizal et al., 2024). One technological development that

holds significant potential to support this transformation is artificial intelligence (AI). The use of AI in education has actually been developing for decades, including through intelligent tutoring systems, automated assessment, learning analytics, adaptive learning, and various academic support systems. However, the emergence of generative artificial intelligence (AI) such as ChatGPT since late 2022 has broadened attention to the use of AI in education, as this technology can generate text, provide explanations, summarize information, generate ideas, provide feedback, and assist users in completing various academic activities. (Zawacki-Richter et al., 2019) shows that research on AI in higher education has covered a wide range of functions, but its use still requires the involvement of educators for the technology to truly provide pedagogical benefits. Thus, AI should not be viewed solely as an automation technology, but as an instrument that can support changes in the way students learn and lecturers develop the learning process (Kamil et al., 2025).

The use of AI in the learning process in higher education offers significant potential for improving the effectiveness and quality of students' learning experiences. AI can be used as a learning assistant, helping students obtain additional explanations for unfamiliar material, find examples, brainstorm, formulate practice questions, obtain initial feedback, and explore multiple perspectives on a problem. In a more personalized learning context, AI also enables students to receive learning support based on their individual needs and level of understanding. For lecturers, AI can assist in various activities such as developing lesson plans, developing teaching materials, generating alternative questions or case studies, providing ideas for class activities, and assisting in providing feedback on student work. (Kasneci et al., 2023) explain that large language models have the potential to support learning, teaching, and the development of educational technology, although their implementation still requires attention to technological limitations, equitable access, and ethical and responsible use. A systematic review (Montenegro-Rueda et al., 2023) also shows that implementing ChatGPT in education can have a positive impact on the teaching and learning process, but its success is closely related to educators' ability to understand and use the technology appropriately. Therefore, the use of AI in higher education should be directed at strengthening pedagogical interactions, not replacing the role of lecturers or students' thinking processes (Salsabilla et al., 2023).

On the other hand, the use of AI in learning also presents various academic, ethical, and pedagogical issues that require serious attention. The ease with which students can produce writing, answers, summaries, or even academic assignments using AI can pose risks of technology dependency, reduced critical thinking, plagiarism, academic dishonesty, and difficulty in ensuring that a work truly reflects a student's abilities. Furthermore, generative AI systems can produce inaccurate or biased information, requiring students to maintain information literacy skills to verify the output provided by AI. (Tlili et al., 2023; Kasneci et al., 2023) emphasize that the use of generative AI in education requires consideration of issues of accuracy, bias, privacy, academic integrity, and the potential for technology dependency. A systematic review of the use of ChatGPT in education also found benefits in personalized learning, teaching activities, assessment, communication, and feedback, but at the same time,

there are risks of misuse, plagiarism, reduced learning, accountability, and privacy (Lo, 2023). This situation shows that the main challenge is not merely whether AI can be used in learning, but how universities can develop mechanisms for using AI that can maintain academic integrity while optimally utilizing the benefits of technology (Madina et al., 2026).

The urgency of utilizing AI is also growing as universities need to prepare students for a workplace and society increasingly influenced by intelligent technology. Mastery of AI is not only related to the ability to use specific applications, but also includes the ability to understand how the technology works, evaluate AI output, formulate commands or prompts appropriately, verify information, understand ethical issues, and use AI responsibly (Muin & Kusmaladewi, 2025). In this context, universities have a strategic role in developing AI literacy among students and lecturers so that the use of technology does not stop at practical aspects, but develops into academic and professional competencies. UNESCO (2023) emphasizes that the use of generative AI in education needs to be placed within a human-centered approach that pays attention to security, equity, inclusion, data protection, and meaningful pedagogical design. UNESCO also emphasizes the importance of developing human capacity and institutional policies so that AI technology can benefit students, educators, and researchers. This means that universities need to move from an approach that merely prohibits or restricts AI to a more constructive approach through integrating AI into learning design, developing lecturer competencies, developing ethical guidelines, and developing assessment models that can still authentically measure students' thinking skills and understanding (Tittahira & Usiono, 2025).

Based on these conditions, the use of artificial intelligence to support the learning process in higher education is an important issue to study because the presence of AI presents both opportunities and challenges for the transformation of higher education. The use of AI that is designed appropriately can help improve access to learning resources, provide a more personalized learning experience, accelerate the provision of feedback, support student creativity, and assist lecturers in designing and managing learning. However, these benefits will not be optimally achieved if the use of AI is not accompanied by digital competence, AI literacy, institutional policies, academic oversight, and an understanding of ethics. Recent research on generative AI practices in teaching and learning also shows that further research is still needed on how to effectively integrate AI into the curriculum, assessment, and delivery of learning in higher education. Therefore, studying the use of AI is not only important to understand the forms and benefits of its use, but also to understand how this technology can be positioned to support a human-centered learning process, where lecturers remain as facilitators, students remain the main actors in the learning process, and AI functions as a tool to strengthen thinking processes, creativity, problem-solving, and the achievement of learning objectives. With this approach, the integration of AI in higher education is expected to not only result in a faster and more efficient learning process, but also improve the quality of learning, student competency, and the readiness of higher education institutions to face changes in the increasingly technology-based educational and work environments.

METHODS

This study uses a qualitative descriptive approach to deeply analyze the use of artificial intelligence (AI) in supporting the learning process in higher education. This approach was chosen because the research focuses on understanding the forms of AI utilization, perceived benefits, challenges of use, and its implications for the learning process. Research data was obtained through library research by reviewing various scientific sources in the form of journal articles, books, research reports, and institutional documents relevant to AI in higher education. The literature used includes studies on generative AI, ChatGPT, intelligent tutoring systems, adaptive learning, AI literacy, and the ethics of AI use in education. The collected data were analyzed using content analysis techniques through the stages of identification, classification, interpretation, and synthesis of various previous research findings to obtain a comprehensive picture of the development and use of AI in higher education learning.

Data analysis was conducted systematically by grouping information into several main themes, namely (1) forms of AI utilization in learning, (2) benefits of AI for students and lecturers, (3) the influence of AI on the effectiveness and personalization of learning, (4) challenges and risks of using AI, and (5) strategies for using AI ethically and responsibly. Each finding from various literatures was compared and synthesized to find patterns, similarities, differences, and research gaps. The validity of the information was maintained through source triangulation, namely comparing information from various scientific journals, educational institution reports, and credible institutional publications. The results of the analysis were then presented descriptively and interpretively to explain how AI can be utilized as a learning support technology without eliminating the role of lecturers as facilitators and students as the main actors in the learning process. With this method, the research is expected to provide an academic overview of the opportunities and challenges of AI integration in improving the quality of learning in higher education.

FINDINGS AND DISCUSSION

Based on the analysis of various literature on the use of artificial intelligence (AI) in higher education, it was found that AI has an increasingly important role in supporting the learning process. The use of AI is not only limited to the use of chatbots such as ChatGPT, but also includes adaptive learning systems, intelligent tutoring systems, automated assessment, learning analytics, the creation of teaching materials, translation, providing feedback, and supporting the academic activities of students and lecturers. Zawacki-Richter et al. (2019) showed that AI applications in higher education can be directed at various functions, including profiling and prediction, assessment and evaluation, adaptive systems and personalization, and intelligent tutoring systems. The development of generative AI then expanded the forms of these uses because students and lecturers can interact with AI systems

using natural language to obtain explanations, develop ideas, organize materials, and conduct initial evaluations of academic work.

The results of the literature synthesis indicate that the use of AI offers several key benefits in the learning process, namely increasing the personalization of learning, accelerating the provision of feedback, assisting in the provision of learning resources, increasing the efficiency of lecturers' work, and encouraging more interactive learning activities. AI allows students to obtain additional explanations according to their needs and level of understanding, thus allowing the learning process to proceed more flexibly. Students can also use AI to develop questions, find alternative solutions to problems, conduct discussion simulations, and obtain initial feedback on assignments. Meanwhile, for lecturers, AI can help generate ideas for teaching materials, compile case studies, develop evaluation questions, and support the management of learning activities. Kasneci et al. (2023) explain that large language models have the potential to support various educational activities, particularly in providing feedback, tutoring, brainstorming, and personalized learning.

Table 1. Synthesis of AI Utilization in Supporting Learning in Higher Education

Aspects of AI Utilization	Form of Utilization	Main Benefits	Challenges Faced
Personal learning	AI provides explanations and materials based on student needs.	More adaptive and individual learning	Dependence on AI
Learning assistant	Chatbot/AI is used to answer questions and provide explanations.	Facilitating access to information and independent learning	Risk of inaccurate information
Development of teaching materials	AI helps create materials, case studies, questions, and learning ideas.	Save time and increase the variety of teaching materials	The quality of the material needs to be verified by the lecturer
Feedback	AI provides initial feedback on writing or assignments	Speed up the evaluation and revision process	AI feedback isn't always contextually appropriate
Assessment	AI supports question creation and learning evaluation	Improve the efficiency of the assessment process	Risk of academic fraud
Development of thinking skills	AI is used for brainstorming, discussion, and exploration of ideas.	Encourage creativity and problem solving	Students can become passive if they are too dependent.
Academic administration	AI helps with routine tasks and learning information management	Improving lecturers' work efficiency	Data privacy and security

AI Literacy	AI is used as a medium to study the use of intelligent technology	Improving students' readiness to face the digital world of work	Differences in technology capabilities and access
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Discussion

The research findings indicate that AI can be a learning support tool that can increase flexibility and personalization of the learning process. In conventional learning, students generally receive material and explanations in a relatively uniform format. The presence of AI allows students to interact with the system more individually. Students can request further explanations, ask for simpler examples, develop follow-up questions, or compare multiple perspectives on a problem. This situation indicates that AI has the potential to shift learning from a pattern that is entirely focused on material delivery to a more interactive and adaptive learning model. These findings align with Zawacki-Richter et al. (2019), who demonstrated that personalized and adaptive learning are important areas of AI application in higher education. Thus, AI can function as a technology that helps students achieve learning experiences tailored to their needs and learning pace.

The use of AI also benefits lecturers' efficiency and productivity. Lecturers can use AI to gain inspiration in compiling materials, creating question variations, developing case studies, organizing discussion activities, and providing initial feedback on student assignments. This can reduce routine workloads, freeing up lecturers' time to focus on activities with high pedagogical value, such as student interaction, mentoring, discussions, research development, and learning evaluation. However, AI cannot completely replace lecturers, as pedagogical decisions still require an understanding of student characteristics, course context, learning objectives, and academic values. (Kasneci et al., 2023) emphasize that the use of large language models in education offers significant potential, but still requires human involvement to ensure their quality, relevance, and accuracy.

From a student perspective, AI can also support independent learning and the development of creativity. Students don't always have to wait for explanations from lecturers when they encounter initial difficulties understanding material. AI can be used as a companion resource for additional explanations, examples, practice questions, and alternative problem-solving options. Appropriate use of AI can even encourage students to explore a topic more broadly (Cahyaningtyas, 2024). However, these benefits depend heavily on how students use the technology. If AI is used solely to obtain final answers and complete assignments automatically, it has the potential to reduce students' cognitive engagement. Therefore, the use of AI should be directed as a thinking partner, not as a substitute for students' thinking processes. Students still need to read, analyze, compare, verify, and draw conclusions based on their own understanding (Dewi et al., 2024).

The following findings indicate that information accuracy is a critical issue in the use of generative AI. AI systems can produce answers that appear convincing but are actually

inaccurate, incomplete, or inappropriate for the academic context. This situation becomes increasingly important in higher education settings because the information students use can impact the quality of assignments, research, and academic decision-making. Therefore, the use of AI must be accompanied by information literacy skills, particularly the ability to verify the information generated. Students need to be guided to compare AI output with books, scientific journals, academic databases, and other authoritative sources. UNESCO (2023) emphasizes the importance of a human-centered approach in the use of generative AI in education to ensure the technology is used safely, ethically, inclusively, and responsibly.

Beyond accuracy, academic integrity is a crucial challenge. AI's ability to rapidly generate text can encourage students to use technology to complete assignments without understanding the academic process. If left unchecked, this can lead to a decline in originality, academic dishonesty, and difficulties in objectively assessing student abilities. Lo (2023) points out that the use of ChatGPT in education offers benefits for learning and teaching, but also raises concerns regarding plagiarism, academic integrity, and dependence on technology. Therefore, universities need to adapt their assessment systems. Assessment should not be solely focused on the final written product, but should also consider students' thinking processes, presentations, discussions, reflections, case studies, projects, and the ability to account for their work (Harnawati & Hidayati, 2024).

From an institutional perspective, research findings indicate that the successful use of AI is significantly influenced by university policies and preparedness. Institutions need to have clear guidelines regarding the use of AI in academic activities, including limitations on use, the obligation to disclose the use of AI where relevant, personal data protection, academic ethics, and oversight mechanisms (Hutasuhut et al., 2025). Universities also need to improve the competency of lecturers to design learning that utilizes AI pedagogically. Policies solely focused on prohibiting AI are potentially ineffective, as students can still access the technology outside the campus environment. A more constructive approach is to build a culture of responsible AI use through AI literacy education, faculty competency development, and learning designs that encourage students to use AI to strengthen their thinking processes (Hartono, 2025).

Thus, the research results show that the use of AI in higher education has two opposing sides. On the one hand, AI can increase efficiency, personalization, access to information, creativity, self-directed learning, and support the work of lecturers. On the other hand, AI can raise issues related to accuracy, bias, privacy, dependency, academic integrity, and decreased cognitive engagement when used without control (Putera et al., 2024). Therefore, the success of AI utilization is not determined by the sophistication of the technology alone, but by how the technology is integrated into the learning design. AI should be positioned as a learning aid, while lecturers remain as facilitators, mentors, and directors of the academic process, and students remain the primary actors responsible for the process and outcomes of their learning. This approach aligns with UNESCO's (2023) principles regarding the responsible and human-centered use of generative AI.

Overall, the use of AI has the potential to positively contribute to the transformation of learning in higher education if supported by AI literacy, digital competency, institutional policies, academic ethics, and human oversight. AI integration should not be solely aimed at accelerating assignment completion, but rather at improving the quality of the learning process. Higher education institutions should encourage students to use AI to explore ideas, test arguments, obtain feedback, conduct simulations, and broaden their understanding, while still retaining the critical analysis and decision-making processes. With this strategy, AI can become part of a modern learning ecosystem that not only increases efficiency but also supports the development of critical thinking, creativity, and problem-solving skills, as well as preparing students for an increasingly digitalized workforce.

CONCLUSION

Based on the research results, it can be concluded that the use of artificial intelligence (AI) has great potential to support and improve the learning process in higher education. AI can be used as a learning assistant, a personalized learning medium, a tool for preparing teaching materials, providing feedback, supporting assessments, and a means to enhance student self-directed learning. For lecturers, the use of AI can increase efficiency in preparing materials, developing learning activities, formulating questions, and providing initial feedback. Meanwhile, for students, AI can help obtain more flexible explanations, explore ideas, develop creativity, and support problem-solving. Thus, AI can be a strategic technology in encouraging more adaptive, interactive, and personalized learning.

However, the use of AI also presents a number of challenges, particularly related to information accuracy, technological dependency, academic integrity, data privacy, bias, and the potential decline in critical thinking skills if students use AI only to obtain instant answers. Therefore, the implementation of AI in higher education must be carried out ethically, critically, responsibly, and human-centered. Higher education institutions need to strengthen AI literacy for lecturers and students, develop clear AI usage policies, adjust assessment systems, and improve lecturers' competency in integrating AI into learning. AI should not be positioned as a substitute for lecturers or students' thinking processes, but rather as a tool that strengthens the learning process. With this approach, the use of AI is expected to improve the quality of learning while preparing students to face the increasingly evolving demands of academic and work environments based on digital technology.

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