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A literature review on the effects of ai-supported learning on academic motivation and self-regulated learning among university students

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Abstract
The rapid integration of artificial intelligence (AI) into higher education has generated growing interest in its potential implications for students' learning processes and psychological outcomes. In particular, academic motivation and self-regulated learning have emerged as two key constructs that may be substantially influenced by AI-supported learning environments. This study presents a literature review that synthesizes existing research on the effects of AI-supported learning on university students' academic motivation and self-regulated learning. Drawing on peer-reviewed empirical studies, review articles, and systematic reviews published in reputable international journals, the review examines how various AI applications—such as intelligent tutoring systems, adaptive learning platforms, learning analytics, and generative AI tools—affect students' engagement, persistence, motivational orientations, and self-regulatory processes.
The findings of the reviewed literature were organized into two main thematic areas: (i) the effects of AI-supported learning on students' academic motivation, including both positive influences such as enhanced engagement and perceived competence, and potential risks related to reduced intrinsic motivation and overreliance on AI; and (ii) the role of AI in supporting or constraining self-regulated learning processes, including goal setting, monitoring, and reflection. The analysis highlights that AI can function as both a scaffold and a constraint, depending on technological design features, instructional contexts, and learner characteristics. Overall, the literature reveals mixed and context-dependent findings, underscoring the need for more integrative research approaches that simultaneously consider motivation and self-regulated learning. The review contributes to a clearer understanding of the psychological implications of AI-supported learning and offers implications for the design and implementation of AI technologies that promote sustainable and autonomous learning in higher education.

Keywords: Artificial intelligence, higher education, academic motivation, self-regulated learning, ai-supported learning, literature review

Introduction

The rapid development of artificial intelligence (AI) has profoundly transformed teaching and learning processes in higher education. AI-based tools such as intelligent tutoring systems, learning analytics platforms, and generative AI applications are increasingly integrated into university learning environments, offering personalized feedback, adaptive learning pathways, and on-demand academic support (Holmes *et al*., 2019; Zawacki-Richter *et al*., 2019) [4, 13]. These developments have raised important questions regarding how AI-assisted learning influences students' psychological processes, particularly academic motivation and self-regulated learning (SRL), which are widely recognized as critical determinants of academic success in higher education (Pintrich, 2004; Zimmerman, 2000) [8, 14].

Self-regulated learning refers to learners' active processes of setting goals, monitoring progress, regulating cognition and motivation, and reflecting on learning outcomes (Zimmerman, 2000) [14]. In the context of higher education, SRL plays a central role in enabling students to manage complex learning tasks and increasingly autonomous learning environments (Pintrich, 2004) [8]. Recent research has highlighted the potential of AI to support various phases of the SRL cycle, including goal setting, performance monitoring, and reflection (Azevedo *et al*., 2024; Taub *et al*., 2023) [1, 11]. Systematic reviews indicate that AI-powered systems can scaffold metacognitive strategies, provide timely feedback, and promote more structured learning behaviors among university students (Chen *et al*., 2025; Rahimi *et al*., 2024) [3, 9].

In parallel, academic motivation has been identified as a key psychological factor influencing students' engagement, persistence, and learning outcomes in technology-enhanced learning environments. Empirical studies suggest that AI-supported learning environments may enhance student engagement and perceived learning effectiveness by offering individualized learning experiences and immediate feedback (Kamalov *et al*., 2023) [5]. Furthermore, students' AI literacy and their ability to use AI tools meaningfully have been shown to be positively associated with SRL and academic performance (Wang *et al*., 2024) [12]. However, the relationship between AI use and motivation is not uniformly positive, as motivational benefits may depend on how AI tools are designed and integrated into learning activities (Holmes *et al*., 2019) [4].

Despite these promising findings, recent studies also warn of potential risks associated with excessive reliance on AI-assisted learning. Research has raised concerns about "metacognitive laziness," whereby students may reduce their active monitoring and regulation of learning when AI systems perform cognitive tasks on their behalf (Bastani & Bastani, 2024) [2]. Similarly, reviews of intelligent tutoring systems emphasize that while AI can enhance learning efficiency, it does not automatically foster deep metacognitive engagement unless learners are explicitly guided to regulate their learning processes (Schroeder &

Adesope, 2021) [10]. These findings suggest that AI may simultaneously support and undermine students' motivation and self-regulation, depending on contextual and individual factors.

Although a growing body of international research has examined AI, motivation, and SRL separately, systematic evidence on their interrelationships remains limited, particularly in higher education contexts outside Western countries. Existing studies often focus on learning outcomes or technological effectiveness rather than the psychological mechanisms through which AI influences motivation and self-regulation (Zawacki-Richter *et al*., 2019; Rahimi *et al*., 2024) [9, 13]. Moreover, empirical evidence from developing educational contexts, including Vietnam, is still scarce (Nguyễn & Trần, 2023; Phạm & Lê, 2024) [6, 7].

In response to these gaps, the present study aims to examine the impact of AI-assisted learning on academic motivation and self-regulated learning among university students. By grounding the analysis in established theories of SRL and motivation and drawing on recent empirical and review studies, this research seeks to contribute to a more nuanced understanding of how AI can be leveraged to support, rather than hinder, students' psychological engagement and autonomous learning in higher education.

Materials and methods

This study employs a literature review method to systematize and analyze previous research findings on the impact of artificial intelligence–supported learning on motivation and self-regulated learning among university students. This approach enables the synthesis of existing scientific evidence, clarifies how AI influences key motivational and self-regulatory processes, and identifies factors that shape both positive and negative psychological outcomes in higher education contexts. The literature was primarily collected from published scientific articles in reputable international journals, as well as authoritative academic reports and review studies, with a focus on empirical research, systematic reviews, and conceptual frameworks related to artificial intelligence in higher education.

The literature was selected based on the following criteria: (1) direct relevance to the use of artificial intelligence or AI-driven systems in higher education; (2) explicit examination of learning motivation, self-regulated learning, metacognition, or closely related psychological constructs; (3) involvement of university or college student populations; and (4) publication within a timeframe relevant to contemporary developments in artificial intelligence and educational technology. After collection, the selected studies were analyzed, compared, and synthesized using a thematic analysis approach.

Specifically, the research findings were organized into two main thematic areas: (i) the effects of AI-supported learning on students' motivation, including engagement, persistence, and motivational orientations; and (ii) the role of artificial intelligence in supporting or constraining self-regulated learning processes, such as goal setting, monitoring, and reflection. The analysis focused on identifying common patterns and divergences across studies, as well as examining how technological design, instructional context, and learner characteristics influence the relationship between AI use, motivation, and self-regulated learning in higher education.

Research results

1. Studies on the effects of AI-supported learning on university students' academic motivation have shown mixed findings

Academic motivation is a key psychological determinant of students' engagement, persistence, and learning outcomes in higher education. With the increasing integration of artificial intelligence (AI) into university learning environments, a growing body of research has examined how AI-supported learning influences students' motivational processes. AI-based tools, such as intelligent tutoring systems, adaptive learning platforms, learning analytics, and generative AI applications, are commonly designed to provide personalized feedback, flexible learning pathways, and immediate academic support, all of which are assumed to enhance students' motivation to learn (Holmes *et al*., 2019; Zawacki-Richter *et al*., 2019) [4, 13].

Empirical studies have reported that AI-supported learning environments may positively influence students' engagement and persistence by increasing perceived learning effectiveness and reducing cognitive overload. Kamalov *et al*. (2023) [5] found that the use of AI applications in higher education was associated with higher levels of student engagement and improved learning outcomes, particularly in technology-enhanced learning contexts. These findings suggest that AI can foster motivational engagement by aligning learning tasks with students' individual needs and providing timely feedback that supports task completion.

Evidence from non-Western contexts further supports the potential motivational benefits of AI-assisted learning. Vietnamese studies indicate that AI-based teaching practices may enhance students' learning motivation by increasing flexibility and responsiveness to individual learning preferences. Phạm and Lê (2024) [7] reported that AI-supported instruction contributed to more positive motivational orientations among university students, while Nguyễn and Trần (2023) [6] emphasized that AI can facilitate self-learning by offering accessible guidance and resources tailored to students' learning needs. Together, these studies highlight the role of AI in supporting students' engagement and persistence through personalized and adaptive learning experiences.

However, the motivational effects of AI-supported learning are not uniformly positive. Several studies caution that excessive reliance on AI tools, particularly generative AI, may undermine students' intrinsic motivation and active engagement. Bastani and Bastani (2024) [2] introduced the concept of "metacognitive laziness," suggesting that when students depend heavily on AI-generated solutions, they may invest less cognitive effort and display reduced curiosity and persistence. In such cases, AI may shift students' motivational orientations toward performance-focused or efficiency-driven goals rather than mastery-oriented learning.

These contrasting findings indicate that the impact of AI-supported learning on academic motivation is highly context-dependent. Motivational outcomes appear to be shaped by how AI tools are designed, how they are integrated into instructional activities, and how students perceive and use them. While AI has the potential to enhance engagement, persistence, and positive motivational orientations, it may also weaken intrinsic motivation if it diminishes students' sense of autonomy or responsibility for

learning. This complexity underscores the need to examine motivational effects of AI-supported learning in relation to instructional context and learner characteristics.

2. Studies on the role of artificial intelligence in supporting or constraining self-regulated learning processes

Self-regulated learning (SRL) is widely recognized as a core competency for university students, particularly in autonomous and technology-rich learning environments. SRL involves learners' active engagement in goal setting, monitoring learning progress, regulating cognitive and motivational processes, and reflecting on learning outcomes (Zimmerman, 2000; Pintrich, 2004) [8, 14]. In recent years, researchers have increasingly focused on the role of AI in shaping these self-regulatory processes within higher education.

A growing body of literature suggests that AI-supported learning environments can facilitate various phases of the SRL cycle. Systematic reviews indicate that AI-driven systems are capable of scaffolding goal setting, providing adaptive feedback for monitoring learning progress, and supporting reflective activities through learning analytics and intelligent feedback mechanisms (Azevedo *et al*., 2024; Rahimi *et al*., 2024) [1, 9]. Chen *et al*. (2025) [3] further highlighted that AI can be intentionally designed to promote SRL by embedding metacognitive prompts and adaptive guidance into learning systems.

Empirical studies have also emphasized the importance of learners' ability to effectively use AI tools. Wang *et al*. (2024) [12] found that AI literacy was positively associated with self-regulated learning and academic performance among university students, suggesting that students who understand how to interact with AI meaningfully are more likely to benefit from its regulatory support. Similarly, Nguyễn and Trần (2023) [6] noted that AI can enhance students' self-learning skills by providing structured resources and guidance that support independent learning.

At the same time, research has raised concerns about the potential constraining effects of AI on self-regulated learning. Scholars argue that when AI systems assume regulatory functions traditionally performed by learners—such as planning, monitoring, or evaluating performance—students may become overly dependent on external regulation. Schroeder and Adesope (2021) [10] observed that intelligent tutoring systems can influence learners' metacognitive processes, but their effectiveness depends on whether they actively encourage self-regulation rather than passive compliance.

Recent reviews further emphasize the dual role of AI in SRL. While AI can support multiple self-regulatory processes, overly directive or automated support may inhibit learners' development of robust self-regulatory skills. Bastani and Bastani (2024) [2] argued that generative AI, in particular, may discourage metacognitive engagement if students rely on AI outputs without critical evaluation. Thus, AI's influence on self-regulated learning should be understood as conditional, mediated by technological design, instructional practices, and learner characteristics.

Overall, the literature suggests that AI can both support and constrain self-regulated learning processes in higher education. The effectiveness of AI in fostering goal setting, monitoring, and reflection depends not only on the capabilities of the technology itself but also on how it is integrated into learning environments and how students engage with it. This highlights the importance of examining AI-supported learning through a nuanced lens that considers both its enabling and limiting effects on students' self-regulation.

Discussion

Overall, the findings indicate that artificial intelligence plays a complex and multifaceted role in higher education, simultaneously offering opportunities to enhance students' psychological engagement and posing challenges to the development of autonomous learning capacities. Rather than exerting uniformly positive or negative effects, AI appears to influence motivation and self-regulated learning in conditional and context-dependent ways.

The reviewed studies suggest that AI-supported learning environments can enhance key components of academic motivation, particularly student engagement and persistence, when AI is used to personalize learning experiences and provide timely, relevant feedback (Kamalov *et al*., 2023; Phạm & Lê, 2024) [5, 7]. These motivational benefits align with established theoretical perspectives emphasizing the role of perceived competence and task value in sustaining students' effort and involvement in learning activities (Pintrich, 2004) [8]. By adapting instructional content to learners' needs and reducing unnecessary cognitive barriers, AI technologies may help students maintain engagement and persist in challenging academic tasks.

At the same time, the literature highlights that motivational outcomes are not guaranteed and depend heavily on how students interact with AI tools. Concerns regarding reduced intrinsic motivation and "metacognitive laziness" underscore the risk that AI-supported learning may shift students' motivational orientations toward efficiency or performance rather than mastery and deep learning (Bastani & Bastani, 2024) [2]. This finding reinforces earlier cautions that educational technologies, if poorly designed or overly directive, may undermine learner autonomy and intrinsic motivation (Holmes *et al*., 2019) [4].

From a broader perspective, these findings suggest that AI should not be conceptualized merely as a motivational enhancer but as a pedagogical tool whose motivational impact is mediated by instructional design, task structure, and learner agency. AI-supported learning environments that encourage active participation, decision-making, and reflection are more likely to support sustainable motivation than those that emphasize automation and answer generation.

The reviewed literature provides substantial evidence that AI can support multiple phases of the self-regulated learning cycle, including goal setting, monitoring, and reflection (Azevedo *et al*., 2024; Rahimi *et al*., 2024) [1, 9]. AI-driven scaffolds, adaptive feedback, and learning analytics tools can make learning processes more transparent and structured, thereby supporting students who may struggle with self-regulation in complex academic environments. These findings are consistent with theoretical models that view external supports as valuable resources for developing self-regulatory skills, particularly when learners are still acquiring these competencies (Zimmerman, 2000) [14].

However, the literature also cautions that AI systems may inadvertently assume regulatory functions that should remain under learners' control. When AI systems plan learning activities, monitor progress, or evaluate

performance without requiring active learner involvement, opportunities for developing self-regulatory competence may be reduced (Schroeder & Adesope, 2021) [10]. This risk is particularly pronounced in the context of generative AI, where learners may bypass critical monitoring and reflection processes by relying on AI-generated outputs (Bastani & Bastani, 2024) [2].

An important insight emerging from the reviewed studies is that learners' AI literacy plays a mediating role in determining whether AI functions as a scaffold or a constraint. Students who possess higher levels of AI literacy are better positioned to use AI tools strategically and critically, thereby integrating AI support into their own self-regulatory processes rather than replacing them (Wang *et al*., 2024) [12]. This finding suggests that fostering AI literacy is essential for ensuring that AI-supported learning environments promote, rather than undermine, self-regulated learning.

Although motivation and self-regulated learning are theoretically and empirically intertwined (Pintrich, 2004; Zimmerman, 2000) [8, 14], the reviewed literature indicates that research on AI-supported learning often addresses these constructs in isolation. This fragmentation limits understanding of how AI simultaneously shapes students' motivational beliefs and self-regulatory behaviors. The present review highlights the need to conceptualize AI-supported learning as an integrated psychological environment in which motivation and self-regulation dynamically interact.

AI technologies can influence both constructs through common mechanisms, such as feedback, goal structures, and perceived control over learning. For example, AI-generated feedback may enhance motivation by increasing perceived competence while also supporting monitoring and reflection. Conversely, overly directive AI support may reduce both intrinsic motivation and opportunities for self-regulation. These interdependencies suggest that future research and practice should adopt integrated frameworks that examine motivation and self-regulated learning together rather than as separate outcomes.

The findings of this review have several important implications. For researchers, there is a clear need for more integrative empirical studies that examine how AI-supported learning influences motivation and self-regulated learning simultaneously, particularly in diverse cultural and educational contexts. Much of the existing evidence is concentrated in Western higher education systems, while research from developing contexts remains limited (Nguyễn & Trần, 2023; Phạm & Lê, 2024) [6, 7].

For educational practice, the review underscores the importance of intentional AI design and pedagogical integration. AI systems should be developed not only to optimize efficiency and performance but also to promote learner autonomy, metacognitive engagement, and sustained motivation. Educators play a critical role in guiding students' use of AI tools, setting expectations for active engagement, and fostering critical reflection on AI-generated outputs.

In sum, AI-supported learning holds significant promise for enhancing motivation and self-regulated learning in higher education, but its benefits are neither automatic nor universal. The psychological impact of AI depends on how technologies are designed, implemented, and used within specific instructional contexts. By aligning AI-supported learning with established theories of motivation and self-regulated learning, higher education institutions can better harness AI's potential to support meaningful, autonomous, and sustainable student learning.

Conclusion

This literature review aimed to synthesize existing research on the effects of AI-supported learning on university students' academic motivation and self-regulated learning. Based on the systematic analysis of previous empirical and review studies, the findings indicate that artificial intelligence has become an increasingly influential factor in shaping students' learning experiences in higher education. Overall, the reviewed literature suggests that AI-supported learning environments hold significant potential to enhance learning motivation and support self-regulated learning processes, while simultaneously presenting certain psychological and pedagogical challenges that require careful consideration.

The review shows that AI-supported learning can positively influence academic motivation by providing personalized feedback, adaptive learning paths, and immediate support, which may increase students' perceived competence, autonomy, and engagement. Many studies highlight that intelligent tutoring systems, learning analytics, and AI-based recommendation tools help learners set clearer goals, monitor their progress, and sustain effort over time. These features align with key components of self-regulated learning, including goal setting, self-monitoring, strategy use, and self-reflection. As a result, AI technologies may serve as important external scaffolds that foster students' capacity to regulate their own learning more effectively.

However, the literature also reveals that the impact of AI on motivation and self-regulated learning is not uniformly positive. Several studies indicate that excessive reliance on AI systems may reduce learners' sense of agency, weaken intrinsic motivation, or encourage surface-level learning strategies. In some cases, students may become passive recipients of AI-generated guidance rather than active regulators of their own learning processes. These mixed findings suggest that the effectiveness of AI-supported learning depends on how AI tools are designed, implemented, and integrated into pedagogical practices, as well as on learners' individual characteristics and learning contexts.

Policy implications

From a policy perspective, these findings have important implications for higher education institutions, educators, and policymakers. First, institutional policies should emphasize the pedagogically informed integration of AI technologies rather than technology-driven adoption. AI systems should be designed and selected to support, rather than replace, students' self-regulatory processes and intrinsic motivation. This includes ensuring transparency in AI decision-making, promoting learner control, and encouraging reflective use of AI tools.

Second, universities should invest in developing students' AI literacy and self-regulated learning skills simultaneously. Training programs and curricular initiatives should help students understand how to use AI as a supportive learning resource while maintaining responsibility for their own learning goals, strategies, and outcomes. Strengthening students' metacognitive awareness and critical thinking is essential to prevent overdependence on AI systems.

Third, faculty development policies should focus on equipping instructors with the knowledge and skills needed to integrate AI-supported learning effectively into teaching and assessment practices. Educators play a critical role in mediating the relationship between AI technologies and students' motivation and self-regulation by designing meaningful learning tasks, providing appropriate guidance, and fostering a supportive learning climate.

Finally, future research and policy frameworks should consider ethical, psychological, and equity-related issues associated with AI-supported learning in higher education. Issues such as data privacy, algorithmic bias, and unequal access to AI technologies may indirectly affect students' motivation and learning autonomy. Addressing these concerns is essential to ensure that AI contributes to sustainable and human-centered educational development.

In conclusion, AI-supported learning offers promising opportunities to enhance university students' academic motivation and self-regulated learning, but its benefits are not automatic. Effective educational policies and practices must be grounded in psychological theory, empirical evidence, and a clear understanding of learners' needs to ensure that AI serves as a tool for empowerment rather than constraint in higher education learning processes.

References

1. Azevedo R, Taub M, Mudrick NV, Bradbury AE. A qualitative systematic review on AI-empowered self-regulated learning in higher education. npj Science of Learning, 2024, 9(1). Article 19. https://doi.org/10.1038/s41539-025-00319-0
2. Bastani H, Bastani O. Beware of metacognitive laziness: Effects of generative AI on self-regulated learning processes, 2024. https://arxiv.org/abs/2412.09315
3. Chen L, Chen P, Lin Z. A systematic literature review on designing self-regulated learning with artificial intelligence in higher education. Computers Education,2025:204:104852. https://doi.org/10.1016/j.compedu.2024.104852
4. Holmes W, Bialik M, Fadel C. Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign, 2019.
5. Kamalov F, Santandreu Calonge D, Gurrib I. Artificial intelligence in higher education: Impacts on student engagement and learning outcomes. Education Sciences,2023:13(3):343. https://doi.org/10.3390/educsci13030343
6. Nguyễn TH, Trần VQ. Tự học và rèn luyện kỹ năng tự học của sinh viên với sự hỗ trợ của trí tuệ nhân tạo. Tạp chí Giáo dục,2023:23(19):45–50.
7. Phạm MT, Lê HN. Vai trò của trí tuệ nhân tạo trong giảng dạy đại học và động cơ học tập của sinh viên. Tạp chí Khoa học Trường Đại học Mở Hà Nội,2024:18(2):66–75.
8. Pintrich PR. A conceptual framework for assessing motivation and self-regulated learning in college students. Educational Psychology Review,2004:16(4):385–407. https://doi.org/10.1007/s10648-004-0006-x
9. Rahimi E, van den Berg J, Veenman MVJ. A systematic review exploring artificial intelligence's role in self-regulated learning within educational contexts. Educational Psychology Review,2024:36(2):45–72. https://doi.org/10.1007/s10648-024-09810-2
10. Schroeder NL, Adesope OO. Metacognition and learning with intelligent tutoring systems. Educational Psychology Review,2021:33(1):145–172. https://doi.org/10.1007/s10648-020-09554-9
11. Taub M, Azevedo R, Mudrick N. A conceptual SRLbot model for higher education based on Zimmerman's self-regulated learning framework. Computers & Education: Artificial Intelligence,2023:4:100117. https://doi.org/10.1016/j.caeai.2023.100117
12. Wang X, Wang Y, Li L. Artificial intelligence literacy, self-regulated learning, and academic performance among university students. Behavioral Sciences,2024:14(5):705. https://doi.org/10.3390/bs14050705
13. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – Where are the educators? International Journal of Educational Technology in Higher Education,2019:16(1):39. https://doi.org/10.1186/s41239-019-0171-0
14. Zimmerman BJ. Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, M. Zeidner (Eds.), Handbook of self-regulation, 2000, 13–39. Academic Press. https://doi.org/10.1016/B978-012109890-2/50031-7