

**HOW STUDENTS USE GENERATIVE AI IN HIGHER EDUCATION:
BENEFITS AND CHALLENGES**

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**MAQOLA
MALUMOTI**

ANNOTATSIYA:

MAQOLA TARIXI:

Received: 06.08.2026

Revised: 07.08.2026

Accepted: 08.08.2026

KALIT SO'ZLAR:

*Generative Artificial
Intelligence, Higher
Education, Academic
Writing, Student
Learning, AI Literacy,
Educational
Technology, Academic
Integrity*

The emergence of generative artificial intelligence (GenAI) has reshaped higher education by transforming how students learn, access information, and complete academic tasks. Unlike earlier educational technologies, generative AI systems can generate human-like responses, provide personalized feedback, summarize scholarly literature, and support various stages of academic writing. Consequently, students increasingly integrate these tools into their daily learning activities, including brainstorming, note-taking, literature review, drafting, editing, and language improvement. While the educational potential of generative AI is substantial, its rapid adoption has also generated important concerns regarding academic integrity, overreliance on AI-generated content, misinformation, and the development of critical thinking skills. This article reviews recent literature on students' use of generative AI in higher education and examines both its educational benefits and associated challenges. Drawing upon recent studies published between 2023 and 2025, the paper discusses how generative AI supports personalized learning, enhances academic writing, and promotes self-regulated learning while simultaneously presenting ethical and pedagogical concerns. The article concludes that generative AI should be integrated into higher education through responsible institutional policies, AI literacy initiatives, and pedagogical practices that emphasize critical thinking and meaningful human-AI collaboration.

Introduction

The rapid development of generative artificial intelligence has introduced one of the most significant technological transformations in contemporary higher education. Following the public release of advanced large language models, university students have gained access to intelligent systems capable of generating coherent texts, answering complex questions, explaining academic concepts, and providing immediate feedback across various disciplines. These capabilities have fundamentally changed students' approaches to learning, making AI an increasingly important component of academic practice (UNESCO, 2023).

Unlike traditional educational technologies that primarily function as repositories of information, generative AI actively participates in the learning process by producing original responses based on users' prompts. This interactive capability allows students to engage with information dynamically, refine their understanding through dialogue, and receive personalized academic support whenever needed. As a result, generative AI has become an accessible learning companion that extends educational opportunities beyond the classroom and supports students throughout different stages of their academic work (Kasneci et al., 2023).

Recent surveys indicate that university students use generative AI for a wide variety of academic purposes. These include generating ideas for essays, summarizing research articles, improving academic writing, translating texts, preparing presentations, reviewing course materials, and receiving immediate explanations of unfamiliar concepts (Lim et al., 2024). Such applications demonstrate that students no longer perceive AI solely as a technological innovation but increasingly regard it as a practical educational resource capable of supporting independent learning and improving academic performance.

Literature Review

The integration of generative AI into higher education has become one of the fastest-growing areas of educational research since 2023. Existing literature consistently suggests that AI is transforming not only the tools students use but also the ways they acquire knowledge, develop academic skills, and interact with learning environments (Zawacki-Richter et al., 2024). Unlike previous educational technologies, which primarily supported information retrieval or online communication, generative AI provides interactive, context-sensitive assistance capable of responding to diverse academic needs.

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The theoretical foundations supporting the educational use of generative AI are closely associated with *constructivist learning theory*, *self-regulated learning (SRL)*, and *social constructivism*. Constructivist scholars argue that meaningful learning occurs when learners actively construct knowledge through exploration, reflection, and interaction rather than passively receiving information (Bruner, 1966; Vygotsky, 1978). From this perspective, generative AI can facilitate learning by encouraging students to ask questions, compare alternative explanations, revise their understanding, and receive immediate feedback throughout the learning process.

Self-regulated learning theory further explains why generative AI has become particularly valuable in higher education. According to Zimmerman (2002), successful learners continuously plan, monitor, and evaluate their learning strategies. Generative AI supports these metacognitive processes by allowing students to identify knowledge gaps, receive formative feedback, revise drafts, and reflect on their academic performance. Instead of replacing independent learning, AI can strengthen students' capacity to manage their own learning when used critically and purposefully (Lim et al., 2024).

Recent empirical studies demonstrate that students use generative AI for a wide range of academic purposes. In a multinational survey, Kasneci et al. (2023) found that university students primarily relied on AI for explaining difficult concepts, generating ideas, improving academic writing, and preparing assessments. Similarly, UNESCO (2023) reported that generative AI has become an important educational support tool because it enables personalized learning experiences and immediate academic assistance regardless of time or location.

Academic writing has emerged as one of the most extensively investigated areas of AI application. Writing is widely recognized as a cognitively demanding process requiring idea generation, planning, drafting, revision, and editing. Research indicates that generative AI assists students throughout each stage of this process by helping them organize arguments, refine thesis statements, improve coherence, enhance academic vocabulary, and identify grammatical inaccuracies (Lee & Zhai, 2024). Nevertheless, researchers consistently emphasize that AI should support—not replace—the cognitive processes underlying academic writing. Excessive dependence on automatically generated content may reduce opportunities for students to develop analytical reasoning, creativity, and disciplinary writing competence (Cotton et al., 2024).

Another growing theme within the literature concerns *AI literacy*, which has become an essential component of digital competence in higher education. AI literacy extends beyond technical skills and includes understanding how generative AI systems operate, recognizing their strengths and limitations, critically evaluating AI-generated outputs, and applying ethical principles when using AI for academic purposes (Long & Magerko, 2020; UNESCO, 2023). Universities increasingly recognize that students require explicit

instruction in AI literacy to ensure that these technologies enhance learning rather than undermine academic integrity.

Despite the considerable educational potential of generative AI, scholars continue to identify several challenges. One frequently discussed concern involves the phenomenon of *AI hallucinations*, whereby language models generate inaccurate or fabricated information presented in a convincing manner. Because students may not always possess sufficient disciplinary knowledge to identify these inaccuracies, researchers strongly recommend verifying AI-generated content against peer-reviewed academic sources before incorporating it into assignments (Dwivedi et al., 2023). Similarly, concerns regarding plagiarism, authorship, transparency, and assessment validity have prompted universities worldwide to revise institutional policies governing AI use in education (OECD, 2024).

Overall, current research suggests that the effectiveness of generative AI depends less on the technology itself than on how students use it within appropriate pedagogical contexts. When combined with critical thinking, responsible academic practice, and effective instructional guidance, generative AI has the potential to enhance learning, improve academic writing, and foster greater learner autonomy. Conversely, uncritical or excessive reliance on AI may compromise independent thinking and reduce opportunities for meaningful knowledge construction (Mollick & Mollick, 2024).

How Students Use

Generative AI has become embedded in students' everyday academic practices, supporting multiple stages of learning rather than isolated educational tasks. Current research indicates that students use AI as a learning assistant that complements traditional educational resources, enabling them to work more efficiently while addressing individual learning needs (UNESCO, 2023). The ways in which students employ generative AI reflect both the flexibility of these technologies and the increasing demand for personalized academic support.

One of the most common applications is *brainstorming and idea generation*. Students frequently consult generative AI at the beginning of academic assignments to identify potential research topics, formulate research questions, or explore alternative perspectives on a particular issue. Rather than replacing students' creativity, AI often serves as a catalyst that stimulates critical thinking by presenting diverse viewpoints and suggesting possible directions for further investigation (Kasneji et al., 2023). This initial support is particularly valuable when students experience writer's block or uncertainty during the planning stage of academic writing.

Another widespread application involves *information processing and academic reading*. University students are regularly required to engage with lengthy scholarly publications containing complex theoretical concepts and specialized terminology. Generative AI assists learners by summarizing articles, explaining unfamiliar concepts, identifying key arguments, and simplifying technical language. Such support enables students to navigate

academic literature more efficiently and allocate greater cognitive resources to analysis and interpretation rather than basic comprehension (Dwivedi et al., 2023). However, educational researchers consistently emphasize that AI-generated summaries should supplement—not replace—the careful reading of original scholarly sources.

Students also rely on generative AI throughout the *academic writing process*, from planning to final revision. During the planning stage, AI assists in developing outlines, organizing ideas logically, and refining thesis statements. While drafting, students often use AI to improve coherence, strengthen argumentation, and maintain an appropriate academic tone. In the revision stage, AI provides suggestions for grammatical accuracy, lexical diversity, paragraph transitions, and overall readability. Rather than producing a complete assignment, many students use AI as a writing assistant that supports continuous improvement of their own work (Lee & Zhai, 2024). This process aligns with the principles of process-based writing, where drafting, revising, and editing are regarded as iterative stages of writing development (Hyland, 2019).

Another important application of generative AI is *language learning and linguistic support*, particularly for students studying in a second or foreign language. Academic writing requires precise vocabulary, grammatical accuracy, and discipline-specific conventions, all of which present challenges for multilingual learners. Generative AI helps students identify grammatical errors, improve sentence fluency, suggest more appropriate academic vocabulary, and explain language usage in context. Such individualized feedback contributes to greater confidence and supports the development of academic writing competence without replacing the student's own learning efforts (UNESCO, 2023; Lee & Zhai, 2024).

Generative AI has also become an effective tool for *research support*. Students frequently use AI to explain unfamiliar theories, compare scholarly concepts, generate keywords for database searches, and identify potential directions for literature reviews. Instead of replacing academic databases, AI serves as an initial guide that helps students navigate unfamiliar research areas more efficiently. Nevertheless, researchers consistently warn that AI-generated references and factual claims should always be verified using reliable academic databases because large language models may generate inaccurate citations or fabricate bibliographic information (Kasneci et al., 2023; Dwivedi et al., 2023).

Finally, many students employ generative AI as a source of *formative feedback and self-assessment*. Rather than waiting for instructor comments, learners increasingly request AI to evaluate the clarity of arguments, identify logical inconsistencies, assess organization, or suggest possible improvements before submitting assignments. Immediate feedback encourages reflection and revision, both of which are central components of effective self-regulated learning. By engaging in multiple cycles of drafting, feedback, and revision, students become more active participants in their own learning process (Zimmerman, 2002; Nicol & Macfarlane-Dick, 2006).

Overall, current evidence indicates that students use generative AI primarily as a learning support system rather than a substitute for learning itself. Its greatest educational value lies in assisting learners throughout different stages of academic work while encouraging greater independence, flexibility, and continuous improvement. However, these benefits can only be fully realized when students critically evaluate AI-generated outputs and integrate them responsibly into their own intellectual work (OECD, 2024; Mollick & Mollick, 2024).

Benefits of Generative AI for Students

The widespread adoption of generative AI reflects its significant educational value across multiple dimensions of student learning. One of its most important contributions is the provision of *personalized learning experiences*. Unlike traditional instructional approaches, which often provide uniform support to all learners, generative AI adapts its responses according to students' questions, prior knowledge, and learning needs. Such individualized assistance enables students to progress at their own pace and revisit challenging concepts whenever necessary, thereby promoting learner autonomy and independent study (UNESCO, 2023).

Another major advantage is the availability of *immediate feedback*. Feedback has long been recognized as a critical factor influencing learning outcomes because it enables students to identify weaknesses, revise their work, and improve future performance (Hattie & Timperley, 2007). Generative AI extends this principle by offering real-time feedback on writing, reasoning, organization, and language use. This continuous support encourages iterative learning and reduces students' dependence on delayed instructor feedback, particularly in large university classes where personalized guidance may be limited (Kasneci et al., 2023).

Generative AI also contributes to *greater learning efficiency*. Students can summarize lengthy academic texts, organize information, prepare study notes, and review course materials more quickly than through conventional methods. Although AI should not replace critical reading or independent analysis, reducing time spent on routine tasks enables students to devote more attention to higher-order cognitive activities such as evaluating evidence, synthesizing ideas, and constructing original arguments (Dwivedi et al., 2023).

Furthermore, the use of generative AI supports the development of *self-regulated learning skills*. By continuously interacting with AI systems, students learn to formulate effective prompts, evaluate alternative responses, revise their own work, and monitor their academic progress. These metacognitive activities strengthen learners' capacity to take responsibility for their education and foster lifelong learning competencies that extend beyond formal university settings (Zimmerman, 2002; Lim et al., 2024).

Finally, generative AI promotes *educational accessibility and inclusion*. Students with different linguistic backgrounds, learning preferences, or educational needs can receive individualized explanations, simplified content, and adaptive learning support that may not

always be available in traditional classroom environments. Consequently, AI has the potential to reduce educational inequalities while creating more inclusive and flexible learning opportunities within higher education (UNESCO, 2023).

Conclusion

The review further highlights that universities should shift their focus from restricting AI use toward developing comprehensive strategies that promote responsible AI integration. This includes strengthening AI literacy, redesigning assessment practices to emphasize higher-order thinking, and providing clear institutional guidelines for ethical AI use. Faculty members also play a crucial role in helping students understand both the opportunities and the limitations of generative AI while encouraging independent thinking and academic integrity.

As generative AI continues to evolve, its influence on higher education will likely expand. Future research should move beyond examining the frequency of AI use and instead investigate its long-term effects on students' learning outcomes, critical thinking, academic writing development, and professional competencies. Understanding these impacts will enable higher education institutions to harness the educational benefits of generative AI while preserving the core values of quality education, intellectual independence, and lifelong learning.

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