



IMPACT OF GENERATIVE AI ON STUDENT ENGAGEMENT: CRITICAL THINKING VERSUS ACADEMIC INTEGRITY

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Abstract

The pervasive integration of Generative Artificial Intelligence (AI) tools, such as ChatGPT, into higher education has fundamentally altered student engagement with academic tasks, critical thinking, and writing processes. While GenAI platforms offer unprecedented efficiency, idea generation, and linguistic assistance, their overuse has sparked significant debates regarding cognitive depth versus ethical compliance. This paper investigates the impact of Generative AI on multidimensional student engagement, focusing on the tension between critical thinking development and academic integrity. Employing a qualitative systematic literature review methodology, the study analyzed peer-reviewed scholarly articles published between 2020 and 2025 across major indexed databases, including Scopus, Web of Science, and ScienceDirect. The synthesized findings indicate that while GenAI enhances initial task engagement and structural writing speed, excessive reliance promotes cognitive offloading, leading to superficial content processing, reduced analytical problem-solving, and a diminished capacity for independent reasoning. Furthermore, the study highlights critical academic integrity challenges, including uncredited AI usage, blurred boundaries of authorship, assessment disparities, and the technical limitations of current AI detection mechanisms. Although Generative AI serves as a valuable scaffold for academic mechanics, unchecked usage threatens student intellectual autonomy and deep learning. The paper emphasizes the imperative for robust AI literacy, adaptive pedagogical strategies, and updated institutional frameworks to balance innovative student engagement with academic rigor and ethical standards.

Keywords: *Generative AI, Student engagement, Cognitive offloading, Critical thinking, Academic integrity, Higher education*

Introduction

In the rapidly evolving landscape of higher education, the integration of Generative Artificial Intelligence (GenAI) technologies, such as ChatGPT, has introduced a transformative paradigm shift in pedagogical practices. These advanced AI tools provide unprecedented opportunities for students by expediting information retrieval, offering dynamic drafting assistance, and optimizing overall productivity. Consequently, GenAI platforms have significantly redefined multidimensional student engagement—altering how learners behaviorally, cognitively, and

affectively interact with academic tasks and scholarly writing. However, alongside the enthusiasm surrounding enhanced efficiency and automated learning support, the educational community faces growing apprehension regarding the long-term cognitive and ethical ramifications of unmonitored AI dependency. Despite the evident advantages of GenAI in streamlining idea generation and task execution, excessive reliance on automated outputs threatens core academic competencies. Prolonged cognitive offloading to AI models can hinder the cultivation of high-order critical thinking, analytical reasoning, and independent problem-solving skills. When students prioritize speed and convenience over deep cognitive processing, their active engagement with complex educational material declines, leading to superficial comprehension and reduced intellectual autonomy. Furthermore, the pervasive adoption of AI tools in academic writing has intensified ethical dilemmas surrounding academic integrity, including blurred authorship, uncredited content generation, equity issues in assessment, and the inadequacy of current institutional detection frameworks. Therefore, this paper aims to critically investigate the impact of Generative AI on student engagement within higher education, specifically focusing on the ongoing tension between cognitive development—such as critical thinking—and ethical compliance regarding academic integrity. By synthesizing current empirical literature, this study seeks to provide a nuanced understanding of how GenAI shapes student learning behaviours and to offer actionable insights for educators, researchers, and policy-makers aiming to maintain academic rigor in the digital age. The corresponding research aims and research questions guiding this investigation are detailed below.

Research Objectives

- **RO1:** To evaluate the impact of Generative AI usage on students' behavioral, cognitive, and affective engagement in academic tasks.
- **RO2:** To explore how reliance on Generative AI tools influences students' critical thinking and analytical reasoning skills.
- **RO3:** To identify and analyze the academic integrity concerns and ethical dilemmas associated with students' utilization of Generative AI in higher education.

Research Questions:

- **RQ1:** How does the integration of Generative AI tools affect overall student engagement in academic learning and writing processes?
- **RQ2:** In what ways does reliance on Generative AI influence students' development of critical thinking and independent problem-solving skills?
- **RQ3:** What are the key academic integrity concerns, ethical challenges, and policy gaps arising from student usage of Generative AI in academic contexts?

Methodology

This study adopts a qualitative, systematic literature-based research design to address the established research objectives and corresponding research questions regarding the impact of Generative Artificial Intelligence (GenAI) on student engagement, critical thinking, and academic integrity. A systematic literature review (SLR) and thematic synthesis approach were employed to examine recent empirical findings and conceptual frameworks in higher education. To ensure comprehensive coverage and academic rigor, a structured literature search was conducted across prominent peer-reviewed databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar. The review targeted scholarly articles published between 2020 and 2025, capturing the period of accelerated GenAI integration in academia.

The literature search utilized boolean logic combining primary search strings and relevant keywords:

- ("Generative AI" OR "ChatGPT")
- AND ("Student Engagement" OR "Cognitive Engagement")
- AND ("Critical Thinking" OR "Analytical Reasoning")
- AND ("Academic Integrity" OR "Plagiarism" OR "Ethical AI Use")

A total of 25 peer-reviewed studies were selected through a rigorous inclusion and exclusion screening process. Included studies were evaluated based on their explicit focus on higher education, methodological soundness, and direct alignment with the study's core thematic pillars: behavioral and cognitive student engagement, critical reasoning outcomes, and institutional academic ethics. The selected corpus encompasses diverse methodological designs, including empirical quantitative surveys, qualitative case studies, and mixed-method evaluations, providing a robust empirical foundation for the qualitative synthesis presented in

this paper.

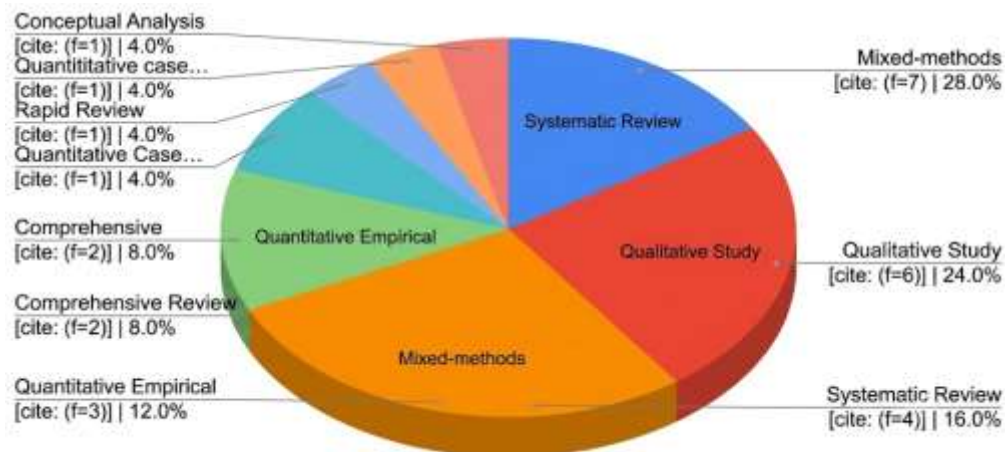


Figure 1: Methodological Breakdown of Analyzed Corpus (N=25) for 'Impact of Generative AI on Student Engagement'

Key Terms & Phrases Describing Negative Impacts of Generative AI

1. Cognitive & Critical Thinking Decline

- Cognitive offloading
- Critical thinking impairment
- Superficial content engagement
- Erosion of analytical reasoning
- Diminished independent problem-solving
- Uncritical acceptance of AI outputs
- Impaired synthesis capability
- Passive cognitive reception

2. Student Engagement & Learning Process

- Reduced behavioral & cognitive engagement
- Suppression of deep learning processes
- Surface-level task completion
- Loss of authorial voice and original thought
- Dampened creative autonomy
- Academic apathy and reduced motivation

- Dependency-driven learning habits
- Loss of authentic student-instructor interaction

3. Academic Integrity & Ethical Concerns

- Blurred boundaries of authorship
- Uncredited AI-generated content
- Plagiarism and ethical non-compliance
- Hallucinated citations and false accuracy
- Equity gaps in AI-assisted assessments
- Inadequacy of AI detection mechanisms
- Institutional policy deficits
- Irresponsible AI usage and academic dishonesty

Key Terms & Phrases Describing Positive Impacts of Generative AI

1. Engagement Boost & Learning Efficiency

- Personalized learning support
- Accelerated task initiation and brainstorming
- Interactive scaffolding and continuous dynamic dialogue
- Production efficiency in content structuring
- Elevated behavioral and affective student engagement
- Reduced cognitive barrier for complex writing tasks

2. Writing Mechanics & Analytical Support

- Automated formative feedback and grammar refinement
- Enhanced structural cohesion and linguistic polish
- Adaptive feedback loops for iterative drafting
- Conceptual clarity and rapid information synthesis
- Expanded access to diverse learning perspectives

3. Pedagogical Integration & Skill Augmentation

- Integration as an intelligent learning assistant
- Stimulating creative ideation and concept mapping
- Non-adversarial cognitive partner
- Support for non-native language articulation and expression

Hindrance of Critical Thinking Skills Development

- The rapid integration of Generative Artificial Intelligence (GenAI) tools, such as ChatGPT, into higher education has sparked significant scholarly debate regarding its implications for students' higher-order cognitive capabilities and critical reasoning. Proponents argue that GenAI platforms serve as effective cognitive scaffolds, enabling students to streamline literature synthesis, automate repetitive writing mechanics, and optimize task management efficiency, thereby reducing extraneous cognitive load. However, an emerging body of empirical evidence highlights profound concerns regarding the unintended consequences of chronic AI dependency on deep intellectual engagement.
- Recent studies emphasize that overreliance on automated GenAI outputs significantly disrupts reflective reasoning and impedes the cultivation of high-order critical thinking skills among higher education students. This observation aligns with empirical findings indicating an inverse relationship between student reliance on AI tools during academic assignment completion and their independent problem-solving competence. A primary

driver of this intellectual compromise is the pervasive issue of "hallucinated" credibility; students frequently exhibit uncritical acceptance of AI-generated content without evaluating the underlying validity, accuracy, or contextual relevance of the information provided.

- Furthermore, the phenomenon of cognitive offloading—where learners transfer complex analytical, evaluative, and synthesis processes to automated algorithms—acts as a major catalyst for the degradation of critical reasoning. Empirical investigations demonstrate that heightened dependence on GenAI tools corresponds with measurable declines in critical thinking performance scores, particularly among undergraduate student populations. While GenAI can scaffold linguistic precision and sentence mechanics, it frequently induces superficial content processing, causing students to disengage from deep reading and analytical evaluation. Consequently, continuous exposure to unmonitored AI assistance risks eroding authorial authenticity, dampening creative ideation, and diminishing autonomous scholarly inquiry.

Disruption of Language Acquisition and Linguistic Autonomy

- Beyond its cognitive implications, chronic reliance on Generative AI tools like ChatGPT substantially alters the dynamics of independent language acquisition and communicative engagement. Proponents of digital pedagogy argue that AI-driven language models, leveraging advanced machine-learning algorithms, modernize conventional language instruction by providing structured, human-like linguistic outputs. However, empirical evaluations demonstrate that automated AI tools exhibit significant structural limitations in facilitating deep, context-sensitive language learning. A primary constraint lies in ChatGPT's inability to deliver truly personalized pedagogical feedback, often generating standardized, generic responses that lack the nuanced instructional scaffolding necessary for authentic language development.
- Furthermore, successful language acquisition is inherently an interpersonal and culturally embedded process that extends beyond syntactic correctness. Scholars emphasize that AI models lack the capacity for affective engagement, empathy, and moral comprehension—essential elements of effective teaching and care-based instructional interactions. Because Generative AI merely simulates conversational fluency without underlying socio-emotional understanding, it fails to fulfill students' emotional and communicative requirements during the learning process. Over-dependence on automated interfaces consequently reduces opportunities for authentic human-to-human interaction, which remains critical for building socio-linguistic competence and communicative confidence.
- Additionally, the reliance on AI platforms presents challenges when addressing complex linguistic nuances, pragmatic variations, and localized cultural contexts. Unlike human educators who possess comprehensive contextual awareness, Generative AI models frequently generate superficial or culturally detached linguistic constructs. As a result, excessive reliance on AI-mediated communication risks diminishing the overall richness, depth, and effectiveness of the student learning experience, ultimately compromising their capacity for independent linguistic expression and long-term language mastery.

Emergence of Academic Integrity Concerns and Ethical Vulnerabilities

- The excessive reliance on Generative AI platforms, particularly ChatGPT, has catalyzed intense scrutiny regarding academic integrity, ethical compliance, and institutional assessment frameworks. While these technologies were originally intended to serve as formative aids for ideation and structural drafting, their pervasive adoption has led to widespread assignment completion with minimal student cognitive contribution. This shift from collaborative utilization to automated execution compromises core skill acquisition, as students increasingly prioritize operational speed and efficiency over rigorous intellectual engagement. Furthermore, higher education institutions face substantial administrative challenges, including outdated plagiarism detection systems and an insufficient institutional capacity to identify sophisticated AI-generated content, thereby highlighting critical policy gaps in contemporary academic governance.
- Beyond traditional definitions of plagiarism, Generative AI fundamentally complicates the boundaries of authorial voice and intellectual ownership. Advanced large language models generate synthesized prose that closely mirrors human writing, rendering the demarcation between authentic student composition and algorithmic generation increasingly ambiguous. Because these models generate text by aggregating patterns from vast, uncredited databases, their usage frequently results in the unintentional appropriation of ideas and uncredited sourcing. When students submit AI-generated outputs without meaningful critical synthesis or personal voice, the submissions no longer reflect genuine intellectual work or personal scholarship. Unchecked reliance on these platforms ultimately circumvents the fundamental objective of higher education: fostering independent scholarship, original critical inquiry, and authentic knowledge creation.
- In addition to authorial ambiguity, the widespread availability of AI tools introduces significant equity disparities in academic assessment. Discrepancies in digital literacy and technological access create an uneven playing field; students proficient in prompt engineering and advanced AI utilization often achieve higher grades with lower cognitive investment compared to peers who rely solely on traditional, independent research methods. This technical asymmetry distorts assessment validity and undermines academic fairness. Consequently, addressing these integrity challenges requires modernized pedagogical evaluation metrics, proactive policy updates, and explicit guidelines for ethical AI integration.

Findings and discussion

- Based on the systematic review and thematic synthesis of recent literature ($N = 25$), three key findings emerged that directly address the established research objectives and questions of this paper.

Cognitive Offloading versus Critical Engagement

- Firstly, the integration of Generative AI tools, particularly ChatGPT, exhibits a dual-edged effect on student engagement and critical thinking capabilities. While AI platforms effectively mitigate extraneous cognitive load by automating repetitive task mechanics, summarizing vast academic literature, and facilitating rapid initial ideation, chronic dependency significantly suppresses higher-order reasoning skills. The

synthesized findings demonstrate that excessive student reliance on automated outputs leads to "cognitive offloading," wherein learners transfer critical analysis, evaluative judgment, and problem-solving processes to the AI system. Consequently, students exhibit reduced behavioral and cognitive engagement with scholarly materials, frequently demonstrating an uncritical acceptance of algorithmically generated content without verifying its accuracy or contextual validity. This tendency promotes superficial content comprehension, erodes reflective thinking habits, and impairs autonomous analytical reasoning—particularly among undergraduate student cohorts.

Linguistic Autonomy and the Human-AI Pedagogical Gap

- Secondly, the synthesis reveals nuanced implications regarding the role of Generative AI in language learning and academic expression. Although GenAI platforms serve as useful scaffolds for structural grammar refinement, vocabulary expansion, and real-time sentence drafting, they present fundamental structural limitations in fostering deep linguistic mastery. Because large language models operate on pattern prediction rather than genuine socio-emotional understanding, their feedback often remains standardized, generic, and detached from localized cultural nuances. The literature underscores that language acquisition relies heavily on interpersonal dynamic interactions, empathetic engagement, and contextual adaptation—elements that automated tools cannot replicate. Overreliance on ChatGPT for linguistic tasks risks impoverishing the student's authentic authorial voice, substituting rich communicative practice with mechanical output generation, and limiting opportunities for independent language acquisition.

Synthesis: The Tension between Engagement Efficiency and Ethical Integrity

- Ultimately, the findings indicate a profound structural tension in contemporary higher education: while Generative AI enhances initial task execution speed and operational engagement, it concurrently introduces acute ethical vulnerabilities. Unmonitored usage blurs the boundaries of individual authorship, undermines traditional assessment metrics, and exacerbates academic integrity concerns such as implicit plagiarism and uncredited AI generation. Rather than fostering deep intellectual inquiry, unchecked reliance on GenAI risks transforming student engagement from active, critical knowledge construction into passive, output-driven task completion. Consequently, preserving academic rigor requires transitioning from passive AI acceptance to proactive AI literacy frameworks, modernized ethical guidelines, and pedagogical strategies that prioritize critical reasoning over task speed.

Conclusion and recommendations

- This systematic literature review critically evaluated the multifaceted impacts of Generative AI integration—specifically ChatGPT—on student engagement, critical thinking development, and academic integrity within higher education ($N = 25$). The synthesized findings underscore a fundamental tension in contemporary digital pedagogy: while Generative AI serves as an efficient cognitive scaffold that reduces routine workload and assists in initial content structuring, chronic reliance significantly undermines high-order learning outcomes. Specifically, unchecked AI dependency induces cognitive offloading, leading to a measurable decline in analytical reasoning, superficial engagement with academic literature, and the degradation of authentic

authorial voice in language acquisition. Furthermore, the capacity of large language models to output human-like text with minimal cognitive contribution from students fundamentally challenges traditional assessment frameworks, exacerbates plagiarism detection limitations, and creates systemic equity gaps.

- Addressing these challenges necessitates a paradigm shift from reactive technological restrictions to proactive, ethically grounded educational integration. Higher education institutions and educators must prioritize comprehensive AI literacy frameworks, equipping students to critically evaluate algorithmically generated outputs rather than accepting them passively. Furthermore, assessment strategies must be restructured to evaluate higher-order evaluative reasoning, reflective problem-solving, and authentic intellectual synthesis—processes that cannot be easily offloaded to automated platforms.

- **Future Research Directions**

Future empirical investigations should examine the longitudinal impacts of continuous AI exposure across diverse academic disciplines and varied educational contexts. Longitudinal tracking is particularly needed to assess how sustained exposure influences students' long-term intellectual habits, cognitive endurance, and independent research capabilities. By fostering ethical awareness, institutional agility, and balanced human-AI collaboration, higher education can leverage Generative AI as a supportive learning partner without compromising core standards of academic integrity and critical scholarship.

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