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Generative AI and Critical Thinking in Higher Education: Students' Narratives of Cognitive Offloading

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ABSTRACT

The rapid integration of generative artificial intelligence (AI) in higher education has raised important questions about its impact on students' critical thinking. This study aims to explore how higher education students perceive the impact of generative AI use on their critical thinking. A phenomenological qualitative design was employed in this study. Data were collected through semi-structured interviews with 12 university students in Bangladesh and analyzed using thematic analysis. The findings indicate that generative AI use is associated with superficial engagement with academic content, diminished self-regulation of cognitive effort, increasing reliance on AI-supported thinking, and heightened awareness of related cognitive risks and internal conflict. These findings highlight the urgent need for structured AI-integrated pedagogy that actively safeguards and strengthens students' critical thinking.

Keywords: Generative AI, Critical Thinking, Cognitive Offloading, Higher Education, Student Perceptions

INTRODUCTION

The rapid advancement of artificial intelligence (AI) has significantly influenced human cognition, particularly in information processing, decision-making, and problem-solving (Rashid & Kausik, 2024). In educational contexts, AI integration has enabled innovative pedagogical approaches and enhanced learning experiences, with generative AI competence shown to improve student engagement when used effectively (Ifenthaler et al., 2024; Pavlenko & Syzenko, 2024; Sampah et al., 2026). In contrast, despite these benefits, concerns have emerged regarding the uncritical reliance on AI-generated content and academic integrity (Pattier, 2026), and data privacy, security, and reliability (Cardona et al., 2023; Çela et al., 2024). However, limited qualitative research has explored students' lived experiences with AI and how such use shapes their critical thinking in real-world learning contexts.

Critical thinking is widely recognized as a core component of cognitive development, essential for evaluating information, solving problems, and making informed decisions in both academic and everyday contexts (Quinn et al., 2020; Shanta & Wells, 2022). It involves reflective and reasoned judgment as well as the disciplined analysis of ideas based on standards such as clarity, accuracy, and logic (Ennis, 1987; Paul & Elder, 2008). Beyond academic performance, critical thinking supports meaningful reflection, effective problem-solving, and the ability to construct well-reasoned arguments (Halpern, 1998; Fisher, 2001; Abrami, 2008).

However, the increasing reliance on AI tools introduces cognitive challenges. Cognitive offloading, defined as the use of external aids to reduce working memory demands (Risko & Gilbert, 2016), can conserve mental effort but may also limit deeper engagement and hinder the development of higher-order thinking skills. The availability of AI-generated instant answers may reduce motivation for independent cognitive processing and critical evaluation. Studies suggest that greater trust in AI systems is associated with increased offloading (Gerlich, 2025a) and reduced active engagement in critical thinking (Gerlich, 2024). Similar patterns were reported by Sparrow et al. (2011). Moreover, excessive reliance on generative AI has been linked to weaker analytical reasoning, reduced independent decision-making, and diminished problem-solving persistence, particularly when outputs are accepted without scrutiny (Çela et al.,

2024; Zhai et al., 2024; Athanassopoulos et al., 2026). Similarly, unstructured use of large language models may weaken critical thinking through cognitive offloading and reduced metacognitive engagement (Vendrell & Johnston, 2026).

The relationship between AI use and critical thinking remains complex and context-dependent. While AI can support learning and idea generation, uncritical use may reduce originality, limit deep processing, and weaken long-term retention (Zou et al., 2023; Darwin et al., 2024; Benavides et al., 2025). Research indicates that structured and guided AI integration can enhance critical thinking (Liu & Wang, 2024), whereas unstructured or frequent use tends to support only lower-order cognitive skills (Essien et al., 2024). Interventions focused on critical thinking have shown potential to reduce uncritical AI reliance and foster creativity, even when perceived improvements in critical thinking remain modest (Hou et al., 2026). Given these mixed findings, scholars emphasize the need for frameworks that integrate ethical reasoning and reflective engagement in AI-assisted learning (Gonsalves, 2026). Addressing these challenges requires human-centered and policy-driven approaches to AI integration (Jogezai et al., 2025), including curriculum redesign, ethical alignment, and reflective human–AI collaboration (Sitepu et al., 2025).

However, existing research on AI in education largely relies on quantitative approaches, offering limited insight into students' subjective experiences with generative AI. Although existing literature highlights concerns about cognitive offloading and its potential impact on critical thinking and engagement, it largely overlooks how students perceive and interpret these changes in their thinking processes. This creates a gap in understanding students' lived experiences in higher education contexts. To address this, the present study explores how students perceive the impact of generative AI on their critical thinking, with a focus on cognitive offloading. This study moves beyond outcome-based evaluations to uncover how AI meaningfully influences students' cognitive engagement through their lived experiences.

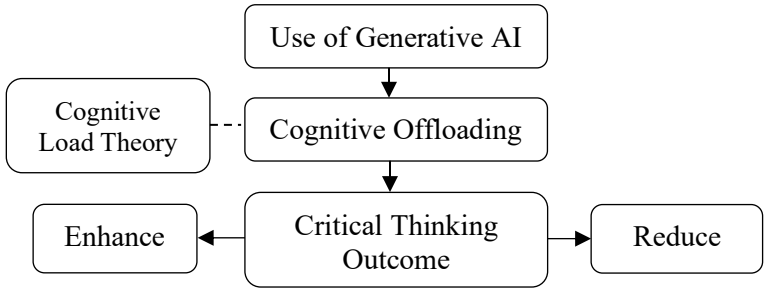
Theoretical Framework

The proposed framework, informed by the work of Abrami et al. (2015) and Bezanilla et al. (2019), conceptualizes critical thinking as a multidimensional construct encompassing cognitive abilities such as analysis, contextual understanding, and the evaluation of evidence. In this framework, critical thinking is understood not as a fixed skill but as a process shaped by learners' engagement with different learning contexts and tools. Recognizing the growing influence of technology in education and the challenges posed by artificial intelligence, the framework incorporates AI and digital tools into its structure (Octaberlina et al., 2024). Generative AI use can be understood as a form of cognitive offloading, where cognitive tasks such as idea generation and evaluation are transferred to external tools, potentially diminishing users' active cognitive engagement and

affecting the development of critical thinking skills (Risko & Gilbert, 2016; Firth et al., 2019).

The framework also draws on Cognitive Load Theory (Sweller, 1988), which posits that the human cognitive system has limited capacity and that reducing cognitive load can enhance learning and performance. In this context, AI tools may reduce cognitive demands by automating aspects of information processing, potentially freeing cognitive resources for higher-order thinking (Gerlich, 2025a). However, this redistribution of cognitive effort may also influence the depth of analytical and evaluative engagement. Accordingly, the framework guides the present study in exploring how students perceive the impact of generative AI on their critical thinking, particularly through the lens of cognitive offloading.

Figure 1: *Conceptual framework of the study*



RESEARCH METHOD

Research Design

This study employed a phenomenological qualitative design to explore how higher education students perceive the impact of generative artificial intelligence (AI) on their critical thinking, with a focus on cognitive offloading. Phenomenology was chosen because it enables the exploration of lived experiences and the meanings individuals assign to them (Moustakas, 1994; Creswell & Poth, 2018). It emphasizes understanding experience from the individual's perspective (Lester, 1999), thereby aligning with the aim of capturing students' subjective interpretations. Accordingly, this study adopts a descriptive phenomenological approach, grounded in Husserl's tradition, which focuses on describing the essence of experiences while minimizing researcher assumptions (Moustakas, 1994). This approach is particularly suitable for capturing the essence and structure of lived experience as it appears to consciousness (Husserl, 1983; Giorgi, 2009).

Context and participants

The study was conducted at the higher education level due to students' greater engagement with AI-based learning, and a prominent university in Bangladesh was purposively selected for its strong integration of digital technologies. Participants were selected based on clearly defined eligibility criteria. Specifically, students were required to have used AI for educational purposes for at least two years and to have practical experience with generative AI tools, such as ChatGPT and similar platforms, for academic activities including writing assignments, generating ideas, summarizing readings, and preparing for examinations.

Purposive sampling was employed to select a sample of 12 participants who actively used generative AI in their academic work and were able to provide insights aligned with the study's objectives. This sample size is supported by qualitative research guidelines, which suggest that 6 to 12 interviews are sufficient to achieve data saturation in focused qualitative inquiries (Guest et al., 2006). A structured participant selection process was followed, in which eligible individuals were identified based on the inclusion criteria and approached directly through in-person communication.

Table 1: Demography of Participants

Variable	Category	Frequency (f)	Percentage (%)
Sex	Male	7	58.3%
	Female	5	41.7%
Level of Study	Undergraduate	8	66.7%
	Postgraduate	4	33.3%
Years of AI Use	2 years	7	58.3%
	3 years	5	41.7%

Data Collection Tool and Process

A semi-structured interview guide was developed to collect data from participants. Expert feedback was obtained on the interview questions, and the guide was refined to ensure clarity and alignment with the study's objectives. The guide included eight open-ended questions designed to elicit students' narratives of cognitive offloading in their use of generative AI, as follows:

a) Can you describe your experience of using generative AI in your academic work?
b) Can you recall a specific situation where you used AI while completing a task, and describe what that experience was like for you?
c) How do you feel the use of AI has changed the way you think or approach academic tasks?
d) In what ways, if any, does AI affect the effort you put into thinking through a problem or assignment?

e) How do you engage with the responses or answers provided by AI?
f) Can you describe how using AI has influenced your ability to analyze, question, or evaluate information?
g) What thoughts or feelings do you have about relying on AI for your academic work?
h) How would you describe the role of AI in shaping your learning and critical thinking overall?

Prior to each interview, participants were approached in a quiet and familiar academic setting. The purpose of the study was clearly explained, and participants were informed that the data would be used solely for research purposes. They were assured of confidentiality and reminded that participation was entirely voluntary. Informed consent was obtained before the commencement of each interview, including explicit permission for audio recording. The interviews were conducted face-to-face in Bangla, the participants' native language, to facilitate comfortable and in-depth expression of their experiences. Data collection took place between May and August 2025, with each interview lasting approximately 35–40 minutes.

Data Analysis

Interview recordings were transcribed verbatim in Bangla and translated into English using professional translation services, after which the researcher reviewed the translations to ensure accuracy and preservation of meaning and context. To enhance translation rigor, a peer-checking process was employed in which selected transcripts were independently reviewed and compared by two researchers to verify the accuracy and consistency between the original and translated versions. Any discrepancies were discussed and resolved through mutual agreement, ensuring the trustworthiness of the translated data. Following translation, the data were analyzed using Braun and Clarke's (2006) thematic analysis framework to identify meaningful patterns across participants' narratives. An inductive approach was adopted, allowing themes to emerge directly from the data rather than being predetermined (Fereday & Muir-Cochrane, 2006). Data saturation was determined when consecutive interviews and coding cycles produced no new codes or themes, indicating that the data had reached conceptual depth and redundancy.

The analysis proceeded through a series of systematic stages. First, the researcher engaged in familiarization by repeatedly reading the transcripts to develop a deep understanding of participants' experiences. Second, initial codes were generated through open coding, where meaningful segments of the data were labeled based on their core ideas. To enhance credibility, another researcher reviewed the coded data, facilitating triangulation and peer debriefing (Creswell & Miller, 2010). Third, related codes were grouped to identify potential themes and subthemes that reflected patterns across the dataset. Fourth, these themes were

reviewed and compared against the entire dataset to ensure consistency, coherence, and accurate representation of participants' narratives. Fifth, the themes were refined, clearly defined, and named in relation to the study's focus on cognitive offloading and critical thinking. Finally, the themes were synthesized, interpreted, and organized into a coherent analytical narrative for reporting. This collaborative analytical process strengthened the rigor and credibility of the thematic analysis.

Table 2: Themes and Subthemes

Theme	Sub-theme
Surface-Level Knowledge Processing	(a) Unverified acceptance of AI outputs (b) Summary-based reading over analysis (c) Weak integration with prior knowledge
Diminished Cognitive Effort and Initiative	(a) Avoidance of effortful thinking (b) Reduced confidence in independent reasoning (c) Decline in self-initiated inquiry
AI-Driven Cognitive Dependence	(a) AI as the primary source of idea generation (b) Habitual reliance on AI tools (c) Substitution of personal thinking with AI outputs
Metacognitive Awareness and Internal Conflict	(a) Feelings of guilt and discomfort (b) Fear of losing originality (c) Ethical dilemmas

RESULTS

The findings are organized into four themes reflecting students' experiences of cognitive offloading in the context of generative artificial intelligence (AI) use. *Surface-level knowledge processing* reflects a shift toward reduced depth and quality of information processing. *Diminished cognitive effort and initiative* capture a decline in sustained effort, persistence, and independent thinking. *AI-driven cognitive dependence* highlights the increasing transfer of idea generation and problem-solving processes to AI. Finally, *metacognitive awareness and internal conflict* reflect students' recognition of feelings of guilt, concerns about authenticity, ethical dilemmas, and the perceived impact on their intellectual development.

Surface-Level Knowledge Processing

Participants reported that the use of generative AI was associated with a shift toward more superficial handling of academic content. Beyond observable behavioral changes, these patterns indicate a tendency toward surface-level knowledge processing rather than deep cognitive processing during learning.

Drawing on the concept of cognitive offloading, students appeared to delegate key analytical processes such as evaluation, synthesis, and verification to AI systems, thereby reducing their active cognitive processing of learning materials, such as academic books and research articles. This shift reflects not only reduced depth of processing but also a preference for quick understanding over deeper knowledge construction.

Within the sub-theme of unverified acceptance of AI outputs, participants described a tendency to rely on AI-generated responses without systematically checking their accuracy or consulting academic sources. As one participant explained, *"Most of the time, if the AI gives me a nicely organized answer, I just modify some wording and use it. I don't always go back to any books or journals to verify unless something feels clearly doubtful"* (Participant 6*).* This illustrates a pattern of uncritical acceptance, where validation is conditionally performed rather than consistently practiced. As a result, critical evaluation becomes reactive instead of being embedded in the learning process, which may weaken students' capacity to independently assess the credibility of information.

Regarding summary-based reading over analysis, participants noted that AI-generated summaries reduced their motivation to engage deeply with primary texts. Instead of critically examining arguments, they often relied on condensed interpretations. Participant 7 stated, *"When a book or reading is very long, I usually copy it into AI and read the summary. I feel like I understand the main idea, but honestly, I don't go through it line by line as I used to before."* This reflects a shift from analytical reading to summary-driven processing, where efficiency is prioritized over cognitive depth. While summaries facilitate quicker access to information, they can limit opportunities for critical evaluation, nuanced interpretation, and sustained processing of complex ideas.

Finally, weak integration with prior knowledge emerged as participants reported a lower tendency to connect new information with previously learned concepts. AI-generated responses were often perceived as complete and self-contained, reducing the need for personal synthesis. As Participant 9 noted, *"AI gives a full explanation in one place, so I don't really think about how it connects with what I learned before. I just take the answer as it is instead of linking it with my previous knowledge."* This suggests a fragmented pattern of knowledge processing, where learning becomes isolated rather than cumulative. From a theoretical perspective, cognitive offloading in this context not only minimizes effort but also constrains the active linking of concepts, which is essential for deeper understanding and long-term retention.

Diminished Cognitive Effort and Initiative

Participants described noticeable changes in their independent thinking abilities when using generative AI, particularly in how they approached reasoning and problem-solving. These accounts suggest a reduction in cognitive effort and

personal initiative, with students increasingly relying on AI to perform tasks that previously required sustained mental processing. From a cognitive offloading perspective, this reflects a diminished inclination to engage in effortful thinking and initiate independent cognitive work, especially when facing intellectual challenges.

Under the sub-theme of avoidance of effortful thinking, students described a lower tolerance for cognitive struggle and a tendency to seek immediate assistance rather than working through difficulties independently. Participant 1 remarked, *"When I use AI tools, I usually go for quick answers instead of spending time thinking deeply, so I don't really push myself to work through difficult ideas or stay focused on complex tasks."* This reflects a shift from sustained cognitive effort toward effort-avoidant and efficiency-oriented processing. Avoiding prolonged processing of complex tasks may limit opportunities for deeper reasoning, potentially constraining the development of analytical thinking skills.

Closely related was a reduction in confidence in independent reasoning, where participants expressed uncertainty in constructing arguments without AI support. Participant 11 admitted, *"Sometimes I try to write without using AI, but I feel uncertain about whether my reasoning is strong enough. I usually depend on it to organize my thoughts properly and make them sound more logical."* This indicates increasing reliance on AI as a cognitive support mechanism, where structuring and evaluating reasoning are externally facilitated rather than internally developed. Over time, such reliance may weaken confidence in one's own reasoning ability and reduce autonomy in thinking processes.

Finally, a decline in self-initiated inquiry was evident in participants' reflections on reduced curiosity and independent questioning. Rather than actively exploring multiple perspectives, they often accepted AI-generated directions. Participant 4 reflected thoughtfully, *"Earlier, I used to search different sources and compare ideas on my own. Now, once AI gives me some points, I don't feel that same curiosity to dig deeper or explore more by myself."* This highlights a shift from internally driven inquiry to externally prompted and AI-guided knowledge exploration. From a cognitive offloading perspective, not only are answers delegated to AI, but the initiation of inquiry itself becomes diminished, which is fundamental to critical and independent thinking.

AI-Driven Cognitive Dependence

Participants described generative AI as central to their cognitive processes, shaping not only how tasks are completed but also how ideas are formed. Rather than serving merely as support, AI was often seen as an authoritative source that guides thinking, particularly in generating ideas, organizing arguments, and interpreting complex material. This reflects a shift in which AI becomes embedded in the thinking process, influencing both the starting point and progression of reasoning. From a cognitive offloading perspective, this indicates increasing

dependence on AI for core cognitive functions, leading to a partial externalization of cognitive ownership, where AI plays a key role in shaping learners' intellectual work.

Under the sub-theme of AI as the primary source of idea generation, participants reported frequently relying on AI to generate initial ideas and organize their assignments rather than constructing arguments independently. One student captured this shift clearly: *"Now, when I get an assignment, I first ask AI to give me an outline. I feel like it does the main thinking part, and then I just adjust it according to my requirements"* (Participant 3). This suggests that AI extends beyond a supportive role to serving as the main source from which ideas originate, actively shaping both the direction and structure of students' thinking processes. As a result, the initial stages of reasoning, where critical engagement typically begins, are increasingly outsourced, thereby constraining opportunities for original idea development.

The sub-theme of habitual reliance on AI tools highlights how repeated use has normalized this dependency over time. As one participant noted, *"Over time, using AI has become a regular habit for me, where I automatically turn to it during my study process, even for tasks I could manage on my own without necessarily needing assistance"* (Participant 11). This reflects the development of automatic reliance patterns, in which consulting AI becomes a default response rather than a conscious decision. Such habitual offloading can increase dependence on AI and reduce the deliberate use of independent thinking, even when students are capable of thinking on their own.

Finally, the pattern of substitution of personal thinking with AI outputs further reinforces this delegation dynamic. Participants described turning to AI at the first sign of difficulty instead of engaging in extended reasoning. Participant 12 stated succinctly, *"If I don't understand a topic immediately, I don't try to struggle with it like before. I just open AI and see what explanation it gives. It feels easier than sitting with the confusion and trying to solve it on my own."* This indicates a reduced tolerance for cognitive uncertainty, in which the discomfort of not knowing is quickly resolved through the use of AI. From a cognitive perspective, this reflects a shift from internal reasoning to externally generated outputs, limiting engagement in reflective thinking and sustained problem-solving, which are essential for deeper learning.

Metacognitive Awareness and Internal Conflict

Despite extensive reliance on generative AI, participants demonstrated a clear awareness of its potential implications for their intellectual development. Their reflections reveal an ongoing internal conflict between the efficiency provided by AI and concerns about authenticity, originality, and independent thinking. From a cognitive offloading perspective, this indicates that while

students delegate cognitive tasks, they remain consciously aware of the associated trade-offs.

Under the sub-theme of guilt and discomfort, students reported feeling uneasy about the authenticity of AI-assisted work. Participant 1 reflected, *"After I submit an assignment where I used AI a lot, I sometimes feel a kind of discomfort. It feels like the ideas are not fully mine, even though I edited and arranged everything. I keep thinking whether I actually understood the topic properly or just relied too much on the AI."* This reflects a perceived disconnect between output and understanding, where students question the legitimacy of their own learning. Analytically, this discomfort suggests that although cognitive effort is offloaded, expectations of intellectual ownership persist, creating internal psychological conflict.

The sub-theme of fear of losing originality highlights concerns about the long-term impact of AI on students' academic identity. Participant 10 noted, *"If I keep depending on AI for generating ideas and organizing my answers, I'm afraid that slowly my own voice will disappear. It feels like I'm becoming more dependent on its way of thinking instead of developing my own."* This suggests an awareness that repeated reliance on AI may standardize thinking patterns, potentially constraining the development of a distinct intellectual voice. Here, cognitive offloading extends beyond task execution to shape how students perceive and construct their originality.

Finally, participants' reflections revealed clear ethical dilemmas regarding their use of generative AI, particularly in relation to intellectual ownership and academic honesty. Students described an internal conflict about whether their work truly reflected their own thinking. As one participant expressed, *"Sometimes I feel conflicted about AI, because even if it helps me complete the work, I know I didn't fully come up with those ideas myself. It makes me question whether I'm being honest about my own abilities or just relying on something else to think for me."* This reflects a conflict between the efficiency of AI and expectations of authentic intellectual contribution. Despite relying on AI, students remained aware of issues related to authorship, fairness, and self-representation, highlighting that AI use involves not only cognitive but also ethical challenges.

DISCUSSION

This study examines how higher education students perceive the impact of generative artificial intelligence (AI) on their critical thinking through the lens of cognitive offloading. While prior quantitative research has shown that AI-driven offloading reduces cognitive load and may limit opportunities for deep cognitive engagement (Gerlich, 2025b), our findings extend that understanding by demonstrating how these processes are enacted in students' everyday academic practices. In line with this, our findings show that students actively delegate core

cognitive tasks such as idea generation, evaluation, and interpretation to AI, reshaping how they engage with learning. This suggests that AI not only reduces cognitive effort but also restructures thinking processes. Prior research similarly indicates that AI tools can enhance basic skills while potentially undermining deeper cognitive engagement (Firth et al., 2019). Importantly, Marshall (2026) argues that the impact of generative AI on critical thinking depends not on the technology itself but on how it is used, particularly the extent of cognitive offloading.

The findings indicate that AI use is associated with a shift toward surface-level knowledge processing, characterized by unverified acceptance of AI outputs, reliance on summaries over analysis, and weak integration with prior knowledge. These patterns suggest that AI is not merely assisting learning but reshaping how students engage with knowledge, often at the expense of analytical depth. This aligns with evidence that over-reliance on AI can weaken analytical reasoning and critical engagement (Zhai et al., 2024; Çela et al., 2024; Vieriu & Petrea, 2025). However, this study advances existing research by showing how these effects are enacted in practice, as students increasingly treat AI-generated responses as complete and sufficient, thereby bypassing critical evaluation. In doing so, AI use shifts learning from an active, interpretive process to a more passive mode of knowledge consumption. Unlike prior studies that focus on reduced outcomes, this study identifies a specific cognitive mechanism, namely passive acceptance and non-verification, through which higher-order thinking is constrained (Essien et al., 2024).

The findings further suggest that AI use reshapes cognitive effort regulation by encouraging avoidance of effortful thinking, reducing confidence in independent reasoning, and contributing to a decline in self-initiated inquiry. These findings align with research on cognitive offloading and reduced effort and decision-making autonomy (Zhai et al., 2024) as well as concerns about declining independent thinking (Zou et al., 2023; Benavides et al., 2025). Rather than focusing on knowledge outcomes, this study emphasizes shifts in learners' motivational and regulatory processes. While prior studies (Essien et al., 2024) emphasize limited gains in higher-order cognition, this study contributes a more process-oriented perspective by highlighting how students become less inclined to initiate and sustain independent cognitive processes. A key distinction in this study is the identification of reduced self-initiated inquiry as an emerging behavioral pattern, rather than simply reduced performance.

The findings suggest that AI-driven cognitive dependence is becoming normalized, as students increasingly rely on AI as the primary source of idea generation, develop habitual reliance on AI tools, and substitute personal thinking with AI outputs. This reflects cognitive offloading, where reasoning is delegated to AI systems, reinforcing dependence on external tools (Zhai et al., 2024; Tian & Zhang, 2025). Beyond confirming prior quantitative evidence, this study highlights

students' subjective awareness of their reliance, adding a qualitative dimension to existing research. However, the findings also indicate that the impact of AI is context-dependent. While structured interventions have been shown to enhance critical thinking (Liu & Wang, 2024), unstructured use tends to promote shortcut-driven engagement and overreliance. This reinforces evidence that generative AI can support critical thinking when used in guided, reflective ways, but may undermine it when such structures are absent (Ashar & Shensa, 2026).

Finally, the study demonstrates that AI use generates a form of metacognitive tension, where reliance coexists with awareness of its risks, expressed through guilt, fear of losing originality, and ethical concern. This partially aligns with prior findings that students remain aware of potential drawbacks despite frequent use (Zou et al., 2023), that awareness alone does not ensure responsible engagement (Ninghardjanti et al., 2025), that ethical concerns related to plagiarism, bias, and data privacy are prevalent (Threadgill et al., 2026), and that reliance on AI may lead to a loss of originality and academic integrity (Slimi, 2026). In this regard, Melisa et al. (2025) argue that excessive reliance on AI may undermine self-reflection and critical evaluation, even when users recognize its risks. Our study extends prior work by highlighting the emotional and ethical dimensions of this awareness. Unlike earlier studies that primarily document perceived benefits and risks (Darwin et al., 2024; Benavides et al., 2025), our findings demonstrate how these perceptions translate into internal conflict. This coexistence of dependence and discomfort points to a complex cognitive-emotional dynamic in students' engagement with AI. Such patterns reflect broader transformations in higher education, where generative AI is reshaping learning practices while introducing new challenges related to ethics, engagement, and academic integrity (Dai et al., 2026).

IMPLICATIONS

Theoretical Implications

Our study presents significant theoretical implications. Collectively, the findings reinforce existing concerns about cognitive offloading while extending prior research through qualitative depth. Extensive reliance on AI may reduce deep cognitive engagement and affect critical thinking. Consistent with Zhai et al. (2024) and Çela et al. (2024), heavy reliance on AI appears linked to diminished independent reasoning and reduced analytical persistence. At the same time, the findings refine earlier intervention-based optimism (Liu & Wang, 2024) by demonstrating that without structured pedagogical framing, AI use may gravitate toward substitution rather than scaffolding. The study's most distinctive contribution lies in identifying the erosion of inquiry motivation and internalized cognitive conflict as underexplored dimensions of AI use.

Practical Implications

The findings also carry important practical implications for educational settings, particularly in guiding how AI tools should be integrated into teaching and learning processes. While the adoption of GenAI and AI text generators can improve time efficiency (Essien et al., 2024), the results suggest that unstructured use may encourage cognitive delegation rather than active engagement. To address this, educators can design AI-assisted assignments that require critical evaluation, where students must verify, critique, or compare AI-generated responses instead of directly adopting them. Additionally, incorporating reflective journals on AI use can help students become more aware of their reliance patterns and encourage metacognitive regulation. Instructor-guided approaches are equally important; scaffolding strategies such as step-by-step prompting, questioning frameworks, and guided feedback can ensure that AI supports rather than replaces cognitive effort. Embedding active learning practices, where students are required to interpret, synthesize, and challenge AI-generated content, may further reduce passive engagement and promote deeper understanding. In this way, AI can be positioned not as a shortcut but as a tool that enhances critical thinking when used in structured, reflective learning environments.

CONCLUSION

To conclude, this study demonstrates that generative AI is reshaping not only how students complete academic tasks but also how they think and position themselves as independent learners. Although generative AI is often associated with increased efficiency, our findings indicate that it may also reduce cognitive depth, weaken analytical engagement, and shift aspects of intellectual control away from learners. Students' narratives further indicate that cognitive offloading is becoming normalized, with AI increasingly assuming the role of sustained reasoning, while the coexistence of reliance and self-awareness suggests that awareness alone is insufficient to mitigate dependency. These findings underscore the need for more deliberate and pedagogically grounded integration of AI in higher education. Curriculum design should incorporate structured AI use, critical evaluation tasks, and reflective practices that reinforce intellectual ownership, while policy frameworks and assessment strategies should prioritize cognitive processes over outputs. Ultimately, the challenge is not to restrict AI adoption but to guide its use in ways that preserve and strengthen deep critical thinking.

This research was conducted within a single institutional context, which may limit transferability to other cultural or educational settings. Additionally, the phenomenological design captures subjective perceptions rather than objectively measured cognitive performance, meaning that the findings reflect experienced shifts in thinking rather than experimentally verified declines or improvements. The relatively small sample size further constrains generalization. Future research

should adopt longitudinal designs to examine how cognitive offloading develops over time. Cross-cultural studies are also needed to explore variations across different contexts. In addition, experimental and mixed-method approaches should be used to empirically validate the cognitive effects of AI reliance, particularly on higher-order critical thinking skills.

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