"AI Dependency and Decline in Critical Thinking Among Generation Z: A Behavioural Study"

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Abstract : The rapid proliferation of Artificial Intelligence (AI), particularly Generative Artificial Intelligence (GenAI) tools such as ChatGPT, Gemini, Copilot, and AI-powered recommendation systems, has significantly transformed the behavioural, academic, and cognitive practices of Generation Z. While AI technologies provide efficiency, convenience, personalization, and accelerated access to information, increasing concerns have emerged regarding excessive dependency on AI systems and their possible impact on critical thinking abilities. This study investigates the relationship between AI dependency and the decline in critical thinking among Generation Z users. The research adopts a quantitative primary-data-based approach using a structured questionnaire administered to 320 respondents belonging to Generation Z, primarily university students and early professionals. Statistical tools including descriptive statistics, correlation analysis, regression analysis, and factor analysis were employed for data interpretation. The findings indicate that higher dependency on AI tools is associated with reduced independent problem-solving behaviour, lower analytical engagement, decreased information verification practices, and reduced cognitive effort. The study further identifies convenience orientation, academic pressure, technological trust, and instant information accessibility as major contributors to AI dependency among Gen Z users. Simultaneously, moderate AI usage for collaborative learning and creativity enhancement demonstrates certain positive impacts when accompanied by reflective and evaluative thinking practices.
The study contributes to emerging literature concerning behavioural implications of AI adoption among digital-native populations. The research also provides implications for educators, policymakers, educational institutions, and technology developers regarding responsible AI integration and critical thinking preservation strategies.
Keywords: Artificial Intelligence, Generative AI, Generation Z, Critical Thinking, AI Dependency, Behavioural Study, Cognitive Skills, Higher Education, Digital Behaviour.

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1. INTRODUCTION

Artificial Intelligence (AI) has become one of the most transformative technologies of the twenty-first century. The emergence of Generative Artificial Intelligence tools such as ChatGPT, Google Gemini, Claude, Microsoft Copilot, and AI-enabled search systems has fundamentally altered the manner in which individuals search, consume, analyze, and produce information. Generation Z, generally defined as individuals born between 1997 and 2012, represents the first fully digital-native generation exposed to algorithmic systems, intelligent automation, and AI-assisted platforms from an early stage of life. The integration of AI into educational, professional, and personal contexts has accelerated rapidly after the widespread public availability of generative AI technologies in 2022.

The growing dependence on AI tools among Generation Z has generated both optimism and concern. On one hand, AI enhances productivity, supports personalized learning, simplifies routine tasks, and facilitates rapid information retrieval. On the other hand, scholars and educators increasingly question whether overreliance on AI may weaken independent cognitive processing, reduce analytical engagement, and diminish critical thinking abilities. Recent studies have highlighted concerns regarding cognitive offloading, reduced verification behaviour, and passive acceptance of AI-generated responses (Lee et al., 2025).

Critical thinking refers to the ability to evaluate information objectively, analyze evidence, identify logical inconsistencies, and make reasoned judgments. In educational and professional environments, critical thinking is considered essential for creativity, decision-making, innovation, and problem-solving. However, continuous reliance on AI-generated outputs may reduce opportunities for cognitive effort, analytical reasoning, and reflective learning. The concern is especially significant for Generation Z because of their extensive engagement with digital technologies and high exposure to AI-assisted environments.

The behavioural shift from active information processing to AI-assisted content consumption has introduced new academic and social dynamics. Students increasingly utilize AI tools for assignments, research summaries, idea generation, coding assistance, and communication drafting. While such tools enhance efficiency, the habitual acceptance of AI-generated content without verification may weaken analytical scrutiny. Researchers have identified that confidence in AI systems often correlates with lower levels of independent cognitive engagement (Lee et al., 2025).

Furthermore, the phenomenon of "cognitive outsourcing" has gained prominence in discussions surrounding AI dependency. Cognitive outsourcing occurs when individuals delegate memory, analysis, evaluation, or problem-solving responsibilities to external technologies rather than performing such processes independently. This dependency may gradually alter learning patterns, decision-making behaviour, and information evaluation practices.

Educational institutions globally are now confronting the challenge of balancing AI integration with the preservation of human intellectual competencies. Several studies have argued that while AI can support learning, excessive dependence may negatively influence curiosity, originality, attention span, and reasoning capabilities. Simultaneously, some scholars suggest that AI can augment critical thinking when used reflectively and responsibly.

The present study seeks to examine the relationship between AI dependency and critical thinking decline among Generation Z users. The research attempts to understand behavioural patterns associated with AI usage, identify major dependency factors, and evaluate whether excessive AI reliance influences independent analytical thinking.

1.1 Background of the Study

The post-pandemic digital transformation accelerated the adoption of AI-enabled educational technologies, remote collaboration platforms, and algorithmic content systems. The release of accessible generative AI tools significantly expanded AI usage among students and young professionals. AI systems now perform tasks such as essay drafting, summarization, content recommendation, data analysis, coding assistance, language translation, and conversational interaction.

Generation Z demonstrates exceptionally high technology adoption rates because of digital familiarity and continuous internet connectivity. Unlike previous generations, Gen Z learners frequently engage with intelligent systems for educational and social purposes. The integration of AI into everyday routines has normalized instant information access and automated assistance.

However, educators and researchers increasingly report behavioural concerns associated with overdependence on AI. Several academic institutions have observed declining engagement in independent research, reduced originality in assignments, and lower attention toward information validation. Studies also suggest that students using AI extensively may exhibit reduced persistence in solving complex tasks independently.

The emergence of AI-generated misinformation, hallucinations, and algorithmic bias further complicates the issue. Individuals lacking strong critical thinking skills may fail to identify inaccuracies in AI-generated content, thereby increasing vulnerability to misinformation and manipulation.

1.2 Statement of the Problem

The growing use of AI technologies among Generation Z has created concerns regarding declining independent thinking and analytical reasoning abilities. While AI tools improve convenience and efficiency, excessive dependency may reduce cognitive effort and critical engagement. Existing literature primarily focuses on AI adoption, educational applications, and technological acceptance; however, limited empirical research examines the behavioural consequences of AI dependency on critical thinking among Gen Z users in emerging economies.

Therefore, this study seeks to address the following problem:

Does increasing dependency on AI technologies contribute to a decline in critical thinking abilities among Generation Z users?

1.3 Objectives of the Study

1. To examine the extent of AI dependency among Generation Z users.
2. To identify behavioural factors contributing to AI dependency.
3. To analyze the relationship between AI dependency and critical thinking decline.
4. To evaluate the impact of AI-assisted learning on independent problem-solving behaviour.
5. To provide recommendations for responsible AI usage among Generation Z.

1.4 Research Questions

1. What is the level of AI dependency among Generation Z?
2. Which factors contribute most significantly to AI dependency?
3. Does AI dependency negatively affect critical thinking abilities?
4. How does AI usage influence independent learning and decision-making?
5. What measures can reduce unhealthy AI dependency?

1.5 Hypotheses of the Study

H1: AI dependency has a significant negative relationship with critical thinking among Generation Z.
H2: Increased use of AI tools significantly reduces independent problem-solving behaviour.
H3: Convenience orientation positively influences AI dependency.
H4: Information verification behaviour decreases with increasing AI reliance.

1.6 Significance of the Study

The study contributes theoretically and practically to the emerging discourse on AI behaviour and digital cognition. The findings may assist educators, educational institutions, policymakers, and AI developers in understanding the behavioural implications of excessive AI reliance.

The research is significant because:

- It addresses an emerging research gap related to behavioural consequences of AI dependency.
- It contributes empirical evidence from Generation Z users.
- It provides practical implications for educational policy and responsible AI integration.
- It enhances understanding regarding digital cognition and critical thinking preservation.

1.7 Scope of the Study

The study focuses on Generation Z individuals aged between 18 and 28 years. The research primarily examines students and early professionals who regularly use AI tools for academic, professional, or personal purposes. The study is limited to behavioural and cognitive dimensions associated with AI dependency.

2. REVIEW OF LITERATURE

The increasing integration of Artificial Intelligence into education, communication, and professional activities has generated extensive scholarly interest. Existing literature indicates that AI technologies simultaneously create opportunities for productivity enhancement and risks associated with cognitive dependency.

Lee et al. (2025) examined the impact of generative AI on critical thinking among knowledge workers and found that higher confidence in AI systems was associated with reduced cognitive effort. The researchers highlighted that AI-assisted workflows often shift human engagement from analytical reasoning toward verification and monitoring functions.

Gonsalves (2024) argued that excessive dependence on generative AI tools may suppress the development of higher-order cognitive skills. The study emphasized that educational frameworks must evolve to integrate AI-specific competencies while preserving analytical and evaluative thinking.

A systematic literature review conducted in 2026 regarding the pedagogical implications of generative AI found mixed evidence concerning AI's influence on critical thinking. While AI-supported learning environments may facilitate personalized instruction, concerns remain regarding passive learning behaviour and reduced reflective engagement.

Catayoc (2026) critically analyzed generative AI use among Generation Z learners and suggested that AI may redistribute rather than entirely diminish cognitive effort. However, the study acknowledged risks associated with overdependence and reduced independent inquiry.

Research by Zhou et al. (2025) demonstrated that critical thinking and AI self-efficacy mediate the relationship between AI usage competence and creativity among engineering students. The findings indicated that balanced AI engagement combined with analytical reasoning can positively influence creativity.

Studies focusing on educational settings increasingly report concerns regarding academic integrity and cognitive outsourcing. Faculty surveys conducted in higher education institutions indicate that educators perceive growing AI reliance as a threat to originality, analytical writing, and independent learning.

The concept of "cognitive offloading" has become increasingly relevant in discussions concerning AI dependency. Cognitive offloading refers to delegating memory, reasoning, and analytical functions to external technologies. Historically, technologies such as calculators and search engines influenced cognitive behaviour; however, generative AI systems differ because they actively generate human-like content and recommendations.

Theoretical perspectives such as Cognitive Load Theory suggest that AI may reduce extraneous cognitive load and enhance learning efficiency when appropriately used. However, critics argue that excessive automation may reduce opportunities for productive cognitive struggle necessary for intellectual development.

Human-AI collaboration research also indicates that AI can support creativity and ideation when users critically evaluate outputs rather than accepting them passively. Studies examining metacognitive prompts found that reflective questioning mechanisms improve analytical engagement during AI-assisted learning.

Despite growing literature concerning AI adoption and educational technology, limited empirical studies specifically examine behavioural dependency patterns among Generation Z users in emerging economies. Existing studies predominantly focus on AI acceptance, technological adoption models, or educational outcomes rather than cognitive consequences.

The present study attempts to bridge this research gap by investigating the relationship between AI dependency and critical thinking decline among Generation Z users using primary quantitative data.

2.1 Theoretical Framework

2.1.1 Cognitive Load Theory

Cognitive Load Theory suggests that learning effectiveness depends upon efficient management of mental effort. AI systems may reduce extraneous cognitive load by simplifying information retrieval and task execution. However, excessive simplification may also reduce opportunities for deep cognitive processing.

2.1.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model explains technology adoption through perceived usefulness and perceived ease of use. Generation Z users may develop dependency because AI systems provide immediate convenience, speed, and accessibility.

2.1.3 Cognitive Offloading Theory

Cognitive offloading theory explains how individuals delegate cognitive responsibilities to external systems. Excessive reliance on AI-generated responses may reduce memory retention, analytical reasoning, and independent problem-solving.

2.2 Research Gap

The literature review reveals several research gaps:

1. Most studies focus on AI adoption rather than behavioural dependency.
2. Limited empirical studies examine the relationship between AI dependency and critical thinking decline.
3. Few studies specifically investigate Generation Z populations.
4. Research from emerging economies remains insufficient.
5. Existing studies emphasize educational outcomes but rarely analyze behavioural cognition.

The present study addresses these gaps through a primary-data-based behavioural investigation.

3. RESEARCH METHODOLOGY

3.1 Research Design

The study adopts a descriptive and analytical research design. A quantitative approach was used to examine behavioural patterns associated with AI dependency and critical thinking among Generation Z respondents. The study utilizes both primary and

secondary data. Primary Data is Collected through structured questionnaires and secondary Data is Collected from journals, research papers, reports, books, and online databases. The population consists of Generation Z individuals aged between 18 and 28 years, including university students and early-stage professionals. Convenience sampling and purposive sampling techniques were employed to select respondents who regularly use AI tools. A total of 320 valid responses were collected. A structured questionnaire based on a five-point Likert scale was used. The questionnaire included sections related to Frequency of AI usage, Purpose of AI usage, Dependency behaviour, Information verification habits, Problem-solving behaviour, Critical thinking indicators.
Percentage analysis, Mean and standard deviation, Correlation analysis, Regression analysis, Factor analysis, Reliability analysis using Cronbach's Alpha are used as statistical tools for statistical analysis.

3.2 Reliability Test

Cronbach's Alpha value for the questionnaire was found to be 0.87, indicating strong reliability.

3.3 Limitation of the Study

1. The study focuses only on Generation Z respondents.
2. Responses are self-reported and may contain personal bias.
3. The sample size is geographically limited.
4. The study examines behavioural perceptions rather than clinical cognitive assessment.

4. DATA ANALYSIS

4.1 Demographic Profile of Respondents

1. Among the 320 respondents:
2. 54% were female and 46% were male.
3. 72% were students.
4. 28% were early professionals.
5. 81% reported daily use of AI tools.
6. 67% primarily used AI for academic purposes.

4.2 Frequency of AI Usage

The analysis revealed that:

- 81% used AI daily.
- 12% used AI several times a week.
- 5% used AI occasionally.
- Only 2% reported rare usage.

This indicates high AI exposure among Generation Z respondents.

4.3 Purpose of AI Usage

Respondents used AI for:

- Assignment writing
- Summarization
- Information search
- Coding assistance
- Idea generation
- Language correction
- Social media content creation

Academic assistance emerged as the dominant purpose.

4.4 Dependency Indicators

Several indicators revealed behavioural dependency:

- 69% reported difficulty completing tasks without AI support.
- 61% preferred AI-generated summaries over reading full texts.
- 57% trusted AI-generated responses without verification.
- 63% used AI before attempting independent problem-solving.

These findings indicate growing behavioural reliance on AI systems.

4.5 Critical Thinking Indicators

The study assessed critical thinking through behavioural variables such as:

- Information verification
- Independent analysis
- Cross-checking sources
- Reflective evaluation
- Problem-solving persistence

The findings indicated declining independent analytical engagement among highly dependent AI users.

4.6 Correlation Analysis

Correlation analysis revealed a significant negative relationship between AI dependency and critical thinking.

Variables	Correlation Coefficient
AI Dependency and Critical Thinking	-0.68
AI Dependency and Information Verification	-0.59
AI Dependency and Independent Problem Solving	-0.63

The negative correlation indicates that increased AI dependency is associated with reduced critical thinking behaviour.

4.7 Regression Analysis

Regression analysis revealed that AI dependency significantly predicts decline in critical thinking.

Variable	Beta Value	Significance
AI Dependency	-0.61	0.001
Convenience Orientation	0.49	0.002
Academic Pressure	0.37	0.005

The model explained approximately 52% variation in critical thinking behaviour.

4.8 Factor Analysis

Factor analysis identified four major dimensions influencing AI dependency:

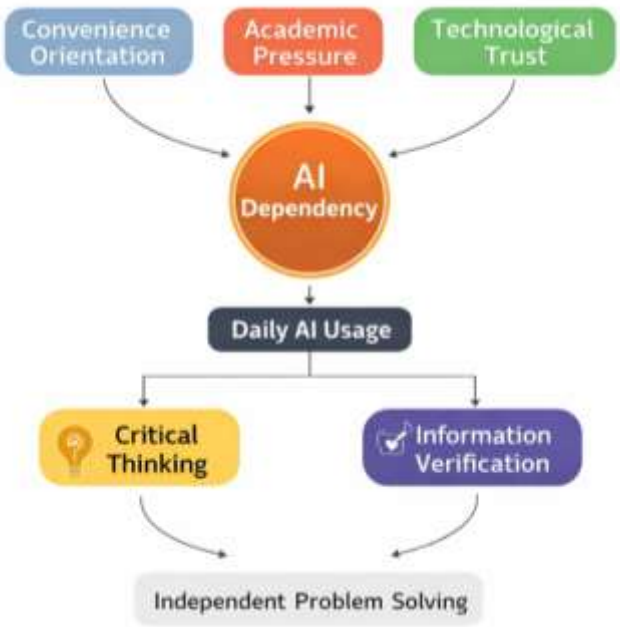
1. Convenience and speed
2. Academic workload pressure
3. Technological trust
4. Reduced cognitive effort

These factors collectively contribute to dependency behaviour.

4.9 Hypothesis Testing

Hypothesis	Result
H1: AI dependency negatively affects critical thinking	Accepted
H2: AI usage reduces independent problem-solving	Accepted
H3: Convenience orientation influences AI dependency	Accepted
H4: Information verification decreases with AI reliance	Accepted

RESEARCH MODEL



5. FINDINGS AND DISCUSSION

The findings demonstrate that Generation Z exhibits substantial dependence on AI systems for academic and cognitive tasks. The majority of respondents reported daily engagement with AI tools, primarily for educational and informational purposes.

One of the most significant findings concerns the relationship between AI dependency and reduced critical thinking behaviour. Respondents who demonstrated higher reliance on AI tools reported lower engagement in independent analysis, reduced verification behaviour, and decreased persistence in solving problems independently.

The results align with concerns raised by educators and researchers regarding cognitive outsourcing and analytical decline. AI systems provide instant solutions, thereby reducing opportunities for reflective reasoning and intellectual struggle. While efficiency improves, overreliance may weaken critical evaluation habits.

The study also indicates that convenience orientation significantly contributes to dependency behaviour. Gen Z users prefer AI because of speed, accessibility, and reduced effort requirements. Academic pressure and multitasking culture further intensify reliance on AI-assisted shortcuts.

Interestingly, the findings also suggest that moderate and reflective AI usage may positively support creativity, idea generation, and learning efficiency. Therefore, the issue may not involve AI usage itself but rather uncritical and excessive dependence.

The study supports Cognitive Offloading Theory by demonstrating how individuals increasingly delegate analytical responsibilities to AI systems. The findings additionally reinforce concerns regarding passive learning and algorithmic trust.

At the same time, the research acknowledges that AI technologies can enhance educational experiences when combined with metacognitive reflection and information verification practices.

6. SUGGESTIONS AND RECOMMENDATIONS

1. Educational institutions should integrate critical thinking training into AI-assisted learning environments.
2. Students should be encouraged to verify AI-generated information through multiple sources.
3. Universities should design assessment systems emphasizing reasoning and interpretation.
4. AI literacy awareness programs should be conducted regularly.
5. Students should use AI as a supportive tool rather than a substitute for thinking.
6. Developers should incorporate explainability features within AI systems.
7. Educators should encourage project-based and inquiry-based learning methods.
8. Institutions should establish ethical AI usage policies.
9. Users should consciously balance convenience with cognitive engagement.
10. Further interdisciplinary research should examine long-term cognitive implications of AI dependency.

7. CONCLUSION

Artificial Intelligence has become deeply embedded in the behavioural and academic routines of Generation Z. AI systems provide convenience, efficiency, personalization, and accessibility, transforming how young individuals learn, communicate, and solve problems. However, the findings of the present study indicate that excessive dependency on AI may negatively influence critical thinking behaviour.

The research demonstrates that higher AI dependency is associated with reduced information verification, lower analytical engagement, and decreased independent problem-solving behaviour. Convenience orientation, academic pressure, and technological trust emerged as significant contributors to dependency.

Despite these concerns, the study also acknowledges that AI can positively support learning and creativity when used responsibly and reflectively. Therefore, the challenge lies not in rejecting AI technologies but in promoting balanced and conscious usage.

The future of education and digital society depends upon maintaining equilibrium between technological assistance and human intellectual autonomy. Critical thinking, creativity, ethical judgment, and reflective reasoning remain essential human competencies that cannot be entirely outsourced to machines.

Consequently, educators, policymakers, technology developers, and users must collectively ensure that AI functions as a cognitive partner rather than a replacement for human thought.

REFERENCES

Catayoc, R. (2026). Augmentation or atrophy? A critical analysis of Gen Z's use of generative AI in learning contexts. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.6450919

Gonsalves, C. (2024). Generative AI's impact on critical thinking: Revisiting Bloom's taxonomy. Journal of Education for Business, 48(1), 1–9. https://doi.org/10.1177/02734753241305980

Lee, H. P., Sarkar, A., Tankelevitch, L., Drosos, I., Rintel, S., Banks, R., & Wilson, N. (2025). The impact of generative AI on critical thinking: Self-reported reductions in cognitive effort and confidence effects from a survey of knowledge workers. Proceedings of the CHI Conference on Human Factors in Computing Systems, 1–22. https://doi.org/10.1145/3706598.3713778

Mahanty, C., Manjeti, V. B., Bollapragada, S. A., Mahanthi, B. L., Devi, S. S., & Tripathy, S. (2026). Shaping future engineers inquiry-based learning with Generation Z curiosity and critical thinking. Journal of Engineering Education Transformations, 39(2), 1–10.

Pramod, D. (2026). Human–AI co-creation among Gen Z to build knowledge and learning effectiveness. Scientific Reports, 15, 1–15. https://doi.org/10.1038/s41598-026-52962-1

Singh, A., Guan, Z., & Rieh, S. Y. (2025). Enhancing critical thinking in generative AI search with metacognitive prompts. arXiv. https://arxiv.org/abs/2505.24014

von Davier, T. S., Lee, H. P., Forlizzi, J., & Das, S. (2026). Promoting critical thinking with domain-specific generative AI provocations. arXiv. https://arxiv.org/abs/2603.19975

Zhou, Z., Guo, H., Ma, F., Yang, C., & Gao, Y. (2025). The chain mediating role of critical thinking and AI self-efficacy in GenAI usage competence and engineering students' creativity. Scientific Reports, 15, 35945. https://doi.org/10.1038/s41598-025-21132-0

Algorithms Editorial Team. (2026). A systematic literature review on the pedagogical implications and impact of GenAI on students' critical thinking. Algorithms, 19(3), 179. https://doi.org/10.3390/a19030179

Lamberti, W. F., Lawrence, S. R., White, D., Kim, S., & Abdullah, S. (2025). Pilot study on generative AI and critical thinking in higher education classrooms. arXiv. https://arxiv.org/abs/2509.00167

Business Insider. (2025). Gen Z is anxious about using AI, too. https://www.businessinsider.com/genz-young-americans-anxious-ai-schools-career-gallup-survey-2025-4

Time Magazine. (2025). ChatGPT may be eroding critical thinking skills, according to a new MIT study. https://time.com/7295195/ai-chatgpt-google-learning-school/

The Guardian. (2025). Gen Z faces 'job-pocalypse' as global firms prioritise AI over new hires. https://www.theguardian.com/money/2025/oct/09/gen-z-face-job-pocalypse-as-global-firms-prioritise-ai-over-new-hires-report-says

Washington Post. (2025). AI is supercharging Gen Z workers—if they can land a job. https://www.washingtonpost.com/business/2025/09/08/