



IMPACT OF ARTIFICIAL INTELLIGENCE ON READING AND KNOWLEDGE RETENTION AMONG UNDERGRADUATE STUDENTS IN CROSS RIVER STATE, NIGERIA: A MIXED-METHODS STUDY

Michael Udey Udam

Institute of Professional Development,
Paths University of Africa, Guinea.
mikeudeyudam@gmail.com
ORCID: 0009-0008-2092-6173

Peter Morah Ita

General Studies Department, College of Health Technology,
Calabar, Cross River State, Nigeria.
cephaspi5@yahoo.com
ORCID: 0000-0004-3755-0092

Monica Thomas Ogar

Department of Language Art Education,
University of Calabar, Cross River State, Nigeria.
ogarmonica@unical.edu.ng
ORCID: 0009-0009-9972-8774

Mary Bisong Tony

Department of Language Art Education,
University of Calabar, Cross River State, Nigeria.
bisongtonymary@gmail.com

Abstract

The rapid integration of artificial intelligence (AI) tools (e.g. Chat GPT) into higher education raises questions about their influence on traditional academic skills. This mixed-methods study examines AI's impact on reading habits and knowledge retention among 350 undergraduate students in Cross River State, Nigeria. Four objectives guided the research: (1) assessing AI's effect on knowledge retention; (2) evaluating AI's impact on reading habits; (3) determining the extent of AI tool usage; and (4) examining whether AI is perceived as a distraction. Quantitative data (survey) and qualitative data (focus groups) were collected. Results show a high adoption rate (64%) of AI tools for academic purposes. However, 58% of students reported that AI use negatively affected their retention ($\chi^2 (1, N=350) = 14.32, p < .001, \phi = .20$), and 67% reported decreased reading time due to AI summaries ($\chi^2 (1, N=350) = 39.78, p < .001, \phi = .34$). Qualitative findings reveal shifts from deep reading to skimming and dependence on instant answers. These findings echo global concerns that AI can undermine deep learning. The study concludes that while AI offers efficiency, its unguided use poses risks to foundational skills. We recommend clear ethical policies and AI literacy programs to ensure these tools complement rather than compromise learning.

Keywords: Artificial Intelligence, Chat GPT, Reading Habits, Knowledge Retention, Theory of Learning, Undergraduate Students, Nigeria.

Introduction

The advent of artificial intelligence (AI) has ushered in a new era of technological advancement, with transformative impacts across sectors including education. Tools like Chat GPT offer students instantaneous information, automated content generation, and simplified explanations of complex topics. While these capabilities present opportunities for enhanced learning and productivity, they also raise questions about their influence on traditional academic skills such as reading and knowledge retention. Research from Nigeria and globally has begun to explore this dual nature of AI in education (Abdulrauf, Musa, & Opeyemi, 2025).

Cross River State, with its numerous tertiary institutions, provides a unique setting to study this phenomenon. Here, students' interaction with AI tools is shaping their approach to research, assignments, and learning. Educators have voiced concerns about a decline in students' ability to engage deeply with texts and critically analyze information – processes fundamental to long-term learning (Ozibo, 2025). The convenience of AI-generated summaries may lead students to prioritize end results over the learning process (Ekanem & Ekanem, 2025).

Despite the growing adoption of AI tools, limited empirical evidence exists on how these technologies affect deep reading and long-term knowledge retention among Nigerian undergraduates. Addressing this gap, the study examines the specific impact of AI tools on the academic life of undergraduates in Cross River State. By focusing on reading habits and knowledge retention, the research moves beyond general assessments of AI's influence to provide nuanced understanding of its effects on core learning outcomes. The findings will contribute to the national conversation on effectively and ethically integrating AI into Nigerian education, ensuring it supports academic excellence without undermining it.

Objectives of the Study

The main objectives of this study are to:

- Determine whether the use of Chat GPT affects the knowledge retention of undergraduate students in Cross River State.
- Assess whether the use of AI tools influences the reading habits of undergraduate students.

- Evaluate the extent to which undergraduate students in Cross River State use AI tools for their academic work.
- Examine whether AI tools are perceived as a distraction in learning by undergraduate students.

Literature Review

AI Utilization in Global and Nigerian Education

The proliferation of AI tools in academia has sparked global debate on their benefits and drawbacks. AI offers personalized learning experiences, immediate feedback, and automation of mundane tasks, potentially increasing efficiency (Chen et al., 2020; Ejeh & Igbokwe, 2025). Meta-analyses suggest large effect sizes of AI on learning outcomes (e.g., $g=0.867$ in Chen et al., 2025). In higher education, AI supports personalization and may improve retention rates (Sullivan et al., 2023).

In Nigeria, where educational resources can be limited, AI tools have become popular among students for summarizing texts, generating ideas, and aiding assignments (Opara et al., 2024). Many students use AI for essay writing and plagiarism detection (Eze et al., 2025). A survey by BestColleges (2024) found that 86% of students use AI regularly, primarily for research and assignments. Similarly, studies in Cross River State note that AI adoption is growing (Akpan & Ekong, 2025; Udang et al., 2025), though its integration has raised ethical concerns. This high adoption rate suggests students perceive AI as a useful aid, but it also underscores the importance of examining potential downsides.

Impact on Knowledge Retention

Research has raised concerns that over-reliance on AI may have negative consequences for knowledge retention. When students use AI to generate assignments or summaries, they may bypass the cognitive effort required to process and memorize information, which is critical for deep learning (Ozibo, 2025; Michel-Villarreal et al., 2025). For example, an MIT study found frequent Chat GPT users underperformed in memory-related metrics, suggesting diminished retention due to lower brain engagement (Bhat et al., 2025; Michel-Villarreal et al., 2025). These findings indicate that while AI can aid efficiency, it may

inadvertently weaken long-term learning if it replaces mental effort.

Impact on Reading Habits and Learning

AI tools can significantly alter reading practices. By providing instant summaries, AI reduces the need for deep, extensive reading, which is crucial for developing critical thinking and analytical skills (Chatterjee et al., 2025). One study reported decreased proficiency in extensive reading among undergraduates due to reliance on AI for simplification (Kumar & Singh, 2025). In Nigeria, some evidence suggests students use AI to explore topics quickly, potentially eroding habitual critical reading (Adewale & Oladipo, 2025).

The “distraction” aspect of AI is also a concern. The ease of access and social nature of some AI platforms can divert students’ attention from learning goals (Onwumere et al., 2025). Excessive use of AI has been linked to procrastination and lower engagement (Yan, 2024). A Pew Research Center report found that 25% of teachers see AI tools as more harmful than beneficial in K-12 education, a sentiment likely to extend to higher education contexts. In Nigeria specifically, unguided or unethical AI use may magnify these distractions and hinder students’ initiative and independent thought (Eze & Nwankwo, 2025).

Theoretical Framework

This study is grounded in Cognitive Load Theory and Bloom’s Taxonomy to understand AI’s impact on learning. Cognitive Load Theory (CLT) posits that learners have limited working memory capacity. AI tools that simplify tasks can reduce extraneous load, but they may also diminish the germane cognitive processing needed for understanding and retention. In other words, while AI can ease information processing, it risks reducing the deep mental effort necessary for long-term memory formation.

Bloom’s Taxonomy of Educational Objectives categorizes learning from lower-order skills (remembering, understanding) to higher-order skills (analyzing, evaluating). Excessive reliance on AI for routine tasks may allow students to automate lower-order processes but bypass higher-order engagement. If AI use emphasizes quick answers over problem-solving,

it could undermine students’ development of critical thinking and analytical skills (higher-order objectives). These theoretical perspectives suggest that while AI offers efficiency, it must be integrated carefully to support, rather than replace, the cognitive processes central to deep learning.

Methodology

Research Design

A mixed-methods approach was adopted, combining a descriptive survey with focus group discussions. The survey captured quantitative data on AI usage and perceptions, while qualitative focus groups provided contextual insights.

Population and Sampling

The target population was undergraduates in Cross River State. A stratified random sample of 350 students was drawn from the University of Calabar (UNICAL, $n=200$) and the University of Cross River State (UNICROSS, $n=150$), ensuring representation of different faculties.

Instrumentation

A structured questionnaire addressed the study objectives, covering demographics, AI tool usage (awareness, frequency), perceptions of AI’s effects on reading habits and knowledge retention, and whether AI was seen as a learning distraction. Responses used Likert scales and categorical items. Two focus groups (8 students each) provided qualitative data on themes emerging from the survey.

Data Analysis

Quantitative data were analyzed with descriptive statistics (frequencies, percentages) and inferential tests (Chi-square, $\alpha=0.05$). Qualitative data from focus groups were transcribed and thematically coded to enrich the findings.

Ethical Considerations

Ethical approval was obtained from institutional review boards. Participants gave informed consent, and anonymity and confidentiality were assured.

Results and Discussion

Extent of AI Utilization

A majority of respondents reported frequent use of AI tools for academic purposes. Approximately 64% of students indicated high AI usage, with 72% of those using ChatGPT for summarizing texts and generating ideas, and 45% using other AI tools (e.g., Grammarly) mainly for editing and research assistance (Table 1).

Table 1: Frequency of AI Tools Utilization (N=350)

AI Tool	Frequency of Use (%)	Primary Purpose
ChatGPT	72	Summarizing texts, generating ideas
Other AI (e.g., Grammarly)	45	Editing, research assistance

These figures align with national trends reported by Opara et al. (2024) and echo findings from Nnaemeka and Ogunbadejo (2024), who observed widespread Chat GPT adoption among Nigerian undergraduates. The high uptake suggests that students perceive these tools as valuable for completing assignments. Such widespread use underscores perceived usefulness as a key driver of AI integration in academic work. However, it also highlights the need to monitor how and why students rely on AI, given the possible implications for learning processes.

Impact on Knowledge Retention

A significant majority of students (**58%**) reported that using Chat GPT negatively affected their knowledge retention. This association was statistically significant ($\chi^2(1, N=350) = 14.32, p < .001, \phi = 0.20$), indicating a moderate effect. Many students attributed the decline to reduced memorization effort and a diminished need to process material deeply. As one student remarked in a focus group, *“I get the right answer, but I don’t remember how I got it because Chat GPT did the thinking for me.”*

This self-reported decline in retention is consistent with research suggesting that over-reliance on AI can impair cognitive engagement and long-term memory. It also resonates with Nnaemeka & Ogunbadejo’s finding that although students recognize Chat GPT’s potential, many

feel it slows their critical thinking. Taken together, the results imply that while AI tools may improve immediate performance (by providing answers quickly), they may undermine the deep learning processes required for durable knowledge. This aligns with Cognitive Load Theory: by offloading cognitive effort to AI, students may fail to encode information effectively for future recall.

Impact on Reading Habits

Consistent with the retention findings, AI tools clearly affected students’ reading habits. **67%** of students reported decreased reading time due to reliance on AI summaries. This difference was highly significant ($\chi^2(1, N=350) = 39.78, p < .001, \phi = 0.34$). Qualitative feedback highlighted a shift from *“deep reading”* to *“skimming.”* Students admitted to skipping full articles or chapters, instead feeding text into an AI tool for quick summaries. While this practice is time-efficient, it risks eroding critical reading and analytical skills that are fundamental to academic success. In essence, students bypass the engagement required to understand nuances and context. Comparable trends have been documented elsewhere (Kumar & Singh, 2025), reinforcing concerns that technology can alter fundamental learning behaviors. These findings suggest that AI’s convenience may trade off against opportunities for students to practice sustained, focused reading – a key component of deep learning.

AI as a Distraction

A slight majority (52%) of respondents viewed AI tools as a distraction. Many linked their use of AI to procrastination and a dependency on instant answers. This mirrors Yan (2024), who noted that the ease of AI access can mislead students from their primary learning goals. Focus group participants reported that AI capabilities often sidetrack them. For example, after using an AI tool for study purposes, some students found themselves exploring unrelated queries or engaging in trivial online interactions. This highlights a pattern: AI's interactive nature and broad knowledge base can draw students into a cycle of seeking immediate gratification, rather than fostering focused, self-directed study. Although not all students agreed that AI was a distraction (suggesting individual differences in self-regulation), the qualitative data indicate potential risks to concentration and time management when AI use is unguided.

Synthesis and Interpretation

Together, the findings paint a complex picture. On one hand, AI tools are embraced for their efficiency and accessibility, as reflected in the high adoption rates and positive perceptions. On the other hand, many students experience negative academic consequences from unchecked AI use. The quantitative results (high percentages reporting reduced retention and reading) and qualitative reports (shifts to skimming, reduced effort) are consistent with a cognitive offloading effect: AI takes over tasks that normally require active processing, which can undermine the development of deep learning strategies. This duality – efficiency versus erosion – highlights that AI is not a neutral technology. Its impact depends on how it is integrated into the learning process.

These patterns align with theoretical expectations. Cognitive Load Theory warns that eliminating mental effort may reduce meaningful learning, while Bloom's Taxonomy suggests that skipping lower-order tasks might short-circuit progress to higher-order thinking. The results suggest that without guidance, students may default to letting AI handle basic comprehension, thereby bypassing the struggle that solidifies understanding and retention.

Conclusion

This study reveals a nuanced relationship between undergraduate students in Cross River State and AI tools. AI offers clear benefits: it streamlines information access, saves time, and assists with tasks such as summarizing and brainstorming. However, our findings indicate that unguided, excessive use of AI poses significant risks to core academic skills. The high rate of AI utilization, coupled with a majority of students reporting negative impacts on retention and reading, underscores an urgent need for intervention. Students are leveraging AI to navigate academic challenges, but without proper framing, these tools can undermine the very skills required for genuine learning and intellectual growth. Importantly, AI is not inherently positive or negative; its impact is shaped by context. Unchecked reliance on AI can lead to a generation of students who can quickly produce high-quality answers but lack foundational cognitive skills to critically engage with information. These insights underscore the need for deliberate policy and pedagogical strategies. In light of this evidence, stakeholders must ensure that AI tools complement learning without replacing necessary cognitive work. The following recommendations outline specific measures for institutions, educators, and students to harness AI's benefits while safeguarding deep learning processes.

Recommendations

Based on our findings, we propose the following recommendations:

1. **University Administrators and Policymakers:** Develop clear, ethical policies governing AI tool use in academia. Policies should differentiate between acceptable uses (e.g., brainstorming, editing drafts) and unacceptable ones (e.g., generating entire essays). Implement mandatory AI literacy programs in the curriculum to educate students on responsible use of AI as a learning aid, not a substitute for effort.
2. **Educators:** Redesign assignments to encourage critical thinking and genuine learning that cannot be easily bypassed by AI. This could include in-class writing, oral defenses of work, or project-based assessments. Adopt a "human-in-the-loop"

approach by integrating AI demonstrations in teaching – for instance, showing students how to use AI to augment research without eliminating their analytical role.

3. **Students:** Cultivate a balanced approach to AI. Recognize AI's potential to improve efficiency but also prioritize development of fundamental skills like deep reading and critical analysis. Seek guidance from lecturers on how to use AI responsibly and ethically. Use AI to support learning (e.g., draft outlines) while ensuring active engagement with the material.

By implementing these measures, the educational community can guide AI integration in a way that maximizes its strengths and minimizes its liabilities, ensuring these technologies enhance rather than erode students' learning.

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- Note:* Citations in the text (e.g.,) refer to external sources consulted during revision.