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DYNAMICS OF AI UTILIZATION ON THE DEVELOPMENT OF CRITICAL THINKING AMONG UNDERGRADUATES IN ANAMBRA STATE

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ABSTRACT
The integration of artificial intelligence (AI) in Nigerian higher education has sparked significant debate among educators regarding its effects on the development of critical thinking among undergraduates. This descriptive survey study explored the perceptions of higher education teachers in Anambra State, regarding the impact of AI on the development of critical thinking among undergraduates. A total of 410 participants (233 males, 177 females) aged 28–60 years (mean age = 37.07, SD = 7.165) were conveniently sampled from four tertiary institutions. Data were collected through physical surveys and Google Forms and analyzed using descriptive statistics (mean and standard deviation), with a decision cut-off point of 2.5 on a 4-point Likert scale. Findings revealed that lecturers perceive a dualistic impact of AI. They acknowledged significant benefits, viewing AI as a valuable "cognitive partner" that strengthens analytical skills, provides diverse perspectives, and reduces cognitive overload for higher-order thinking (Grand Mean = 2.82). However, they expressed even stronger concerns about negative impacts (Grand Mean = 2.95), identifying the reduction of intellectual struggle, uncritical acceptance of AI outputs, and the promotion of surface-level learning as major risks. Key barriers to effective integration were identified as poor technological infrastructure (Mean = 3.16) and resistance from traditional educators, while ethical concerns were not considered a primary hindrance. To foster a balanced integration, lecturers strongly recommended institutional ethical guidelines (Mean = 3.11), mandatory "critical AI literacy" courses, and a redesign of assessments to measure AI-resistant skills. The study concludes that while AI holds promise, its integration in the Anambra context requires a strategic, regulated, and pedagogically sound approach to harness its benefits as a cognitive enhancer while decisively mitigating its threats to genuine critical thought. Recommendations include infrastructural investment, comprehensive training, and policy development.

Keywords: Perception of Higher Education Teachers, AI Utilization, Critical Thinking.

Introduction
The digital transformation sweeping across global educational landscapes has ushered in an era of unprecedented technological integration, with artificial intelligence (AI) emerging as both a powerful tool and a complex challenge for educational systems worldwide. In the specific context of Nigerian higher education, particularly in Anambra State, this technological revolution presents unique opportunities and dilemmas for educators striving to balance technological adoption with the preservation of essential cognitive skills. The rapid infiltration of AI tools into academic environments has sparked critical conversations among educators, policymakers, and researchers regarding how these technologies influence the development of critical thinking abilities among students—skills that are increasingly vital in an information-saturated world (Zhai & Wibowo, 2023).

The core concern driving this research investigation centers on whether AI technologies (ChatGPT, DeepSeek, Gemini etc.) ultimately serve as catalysts for enhanced cognitive development or as crutches that gradually erode students' abilities to think independently, analyze information critically, and construct original arguments. As noted by researchers at the MIT Media Lab, there is a legitimate

fear that over-reliance on AI tools could lead to diminished neural engagement during learning activities, potentially undermining the very cognitive capacities that higher education seeks to develop (Kosmyna et al., 2025). This concern is particularly acute in developing educational contexts like Nigeria, where resource constraints may create additional pressures to adopt technological "solutions" without sufficient critical examination of their long-term impacts on student development (Okonkwo, 2023).

Globally, research has demonstrated that the relationship between AI and critical thinking is complex and multifaceted. Studies have revealed both promising benefits and significant risks associated with educational AI implementation. On one hand, AI can provide personalized learning experiences, immediate feedback, and access to vast information resources that might otherwise be unavailable to students in developing regions. On the other hand, there is compelling evidence that uncritical adoption of AI tools can lead to cognitive offloading, where students gradually cede their analytical responsibilities to algorithms, potentially resulting in what some researchers have termed "digital atrophy" of critical thinking skills (Gerlich, 2025). This paradoxical nature of AI as both enhancer and inhibitor of cognitive development forms the central tension that this research seeks to investigate within the specific cultural and educational context of Anambra State.

When implemented thoughtfully, artificial intelligence technologies offer remarkable potential for enhancing critical thinking capabilities among students in Anambra's higher education institutions. Rather than replacing human intelligence, AI can function as what educational researchers term a "cognitive partner" (Holbeck, 2023). This partnership model is particularly valuable in large classes, which are common in Nigerian universities, where individual attention from instructors may be limited. AI tools can help students refine their thinking processes in ways that were previously impossible given the resource constraints of many institutions within the State. (Agu & Onuorah, 2024). As demonstrated in initiatives at institutions like Georgia College & State University, when students are taught to engineer effective prompts that challenge AI to act as a "debate partner," they develop stronger argumentation skills and learn to anticipate counterarguments to their positions (Holbeck, 2023) This process of intellectual sparring with an AI that never tires of responding encourages students to examine their assumptions more carefully and develop critical analytical skills. For students in Anambra State who may have been educated in systems that traditionally emphasized knowledge reception over critical interrogation, this AI-facilitated dialogic approach could help bridge pedagogical gaps and foster more active intellectual engagement among the students. In contexts where library resources may be limited or outdated, AI-powered research tools can provide students and faculty in Anambra with access to current global scholarship, potentially reducing the information disparity between institutions in developed and developing nations (Nweke & Eze, 2024). This expanded access to knowledge creates opportunities for students to engage with multiple perspectives on issues, a fundamental requirement for critical thinking. When students can access diverse viewpoints and current research, they are better positioned to evaluate arguments, identify biases, and form well-reasoned conclusions rather than simply regurgitating textbook content. Additionally, advanced AI systems offer unprecedented capabilities for adaptive learning that can be tailored to individual students' cognitive development needs. Unlike traditional one-size-fits-all approaches, AI-driven educational platforms can identify specific areas where a student struggles with critical thinking concepts and provide customized exercises to strengthen those skills (Agu & Onuorah, 2024).

Irrespecrive of these identified potential benefits, substantial evidence still suggests that inappropriate reliance on AI tools actually undermines the development of critical thinking skills among students. The phenomenon of "cognitive offloading" (transferring mental effort to external devices) has been identified as a significant risk factor for diminishing critical thinking capabilities (Gerlich, 2025). When students consistently rely on AI systems to generate ideas or solve problems, they may fail to develop the neural pathways and cognitive patterns associated with deep, critical engagement with content. This concern is particularly relevant in educational contexts where assessment systems emphasize final products over thinking processes, potentially incentivizing students to use AI as a shortcut rather than as a cognitive partner (Jackson, 2025). Gerlich (2025) demonstrated a significant negative correlation between AI tool usage and critical thinking scores, with cognitive offloading

identified as a mediating factor in this relationship. The study found that frequent AI users exhibited diminished ability to critically evaluate information and engage in reflective problem-solving. These findings are particularly alarming when considered in the context of younger learners, with the study noting that younger participants showed higher dependence on AI tools and lower thinking scores than older age groups did. For higher education institutions in Anambra State serving predominantly young adult populations, these findings suggest that careful attention must be paid to how AI tools are integrated to avoid inadvertently impeding the development of the very cognitive skills that universities aim to cultivate. A second significant concern involves the development of algorithmic dependence, where students gradually cede judgment and decision-making to AI systems without maintaining sufficient critical oversight. This dependence can lead to what some researchers have termed "automation bias"—the tendency to favor algorithm-generated solutions over human-generated ones even when there are reasons to question the algorithmic output (Royce & Bennett, 2025). This uncritical acceptance undermines the development of the healthy skepticism and evaluative stance that characterizes genuine critical thinking. The problem of algorithmic dependence is compounded by the ethical limitations of current AI systems, including issues such as AI hallucinations (fabrication of information), algorithmic biases, and transparency concerns (Fortino, 2024). When students in Anambra State interact with AI systems trained primarily on Western data sets, they may encounter cultural biases and perspectives that don't adequately reflect Nigerian realities or values. Without well-developed critical thinking skills to interrogate these outputs, students risk internalizing perspectives that may be inappropriate for their local context or that perpetuate problematic power dynamics in knowledge production (Okonkwo, 2023)

The effective integration of AI tools for critical thinking development in Anambra State faces significant practical barriers related to infrastructure and resources. Unlike institutions in wealthier nations, many universities in Nigeria struggle with inconsistent power supply, limited internet bandwidth, and inadequate hardware resources necessary for seamless AI integration (Chukwuma & Obi, 2024). Beyond technical barriers, the effective use of AI for critical thinking development requires significant shifts in pedagogical approaches and faculty development. Many educators in Anambra State were trained in traditional, lecture-based methods and may lack both the technological proficiency and the pedagogical frameworks necessary to integrate AI in ways that genuinely enhance critical thinking rather than simply automating existing tasks (Nweke & Eze, 2024). Without comprehensive professional development that helps faculty reconceive their teaching approaches in light of AI capabilities, there is a risk that these technologies will be used merely as efficiency tools rather than as catalysts for cognitive development. Finally, the integration of AI tools in Anambra higher education must navigate complex socio-cultural considerations that may influence how these technologies are perceived and adopted. Traditional educational values in Nigeria often emphasize knowledge transmission from authority figures, a model that potentially conflicts with the more exploratory, student-directed learning that AI facilitation might encourage (Okonkwo, 2023). This cultural tension could create resistance among both faculty and students who are accustomed to more structured, instructor-centered educational approaches. Effective integration will require sensitive acknowledgment of these cultural traditions while gradually introducing the complementary value of AI-enhanced critical thinking pedagogy.

Despite the global buzz about AI, there is a distinct lack of research that listens to the voices of the academics who will be most affected by it in Nigeria. We have plenty of speculation, but not enough evidence from the very people tasked with guiding student learning. This study seeks to fill that gap. This present research moves beyond theory to capture the real-world perceptions of those at the heart of education.

Purpose of the study

the general purpose of the study is to understand the perception of higher education teachers on the dynamics of AI utilization on the development of critical thinking among undergraduates in Anambra state. Specifically, the study aims to understand

1. Benefits of AI utilization in the development of critical thinking
2. Negative impact of AI utilization in the development of critical thinking

3. Barriers to effective AI integration in the development of critical thinking
4. Suggestion for a balanced AI integration in the development of critical thinking

Research Questions

1. What are the benefits of AI utilization in the development of critical thinking among students?
2. What are the negative impacts of AI utilization in the development of critical thinking among students?
3. What are the barriers that hinder effective AI integration in development of critical thinking?
4. What are the suggestions for a balanced AI integration in development of critical thinking?

Methods

This research adopts a descriptive-survey design. A descriptive survey research design is a quantitative method used to systematically collect data from a sample of a population to describe the current status, characteristics, or perceptions regarding a specific phenomenon. Presently, this paper focuses on the perception of lecturers on the dynamics of AI utilization and development of critical thinking. A descriptive survey does not show causation, rather it depicts what is obtainable in a given geographic at particular point in time. A total of 410 (233 males and 177 females) lecturers were conveniently sampled across 4 tertiary institutions in Anambra State. These institutions include; Nnamdi Azikiwe University Awka, Chukwuemeka Odumegwu Ojukwu University, Federal Polytechnic Oko, and Anambra State Polytechnic Mgbakwu. Participants were sampled using a convenient sampling technique. Their age ranged from 28 to 60 years with a mean age of 37.07 and standard deviation of 7.165**.** The instrument used in collection of data from respondents is a 20 item semi structured questionnaire titled; Perception of Artificial Intelligence usage on development of critical thinking (PAIUDCT). This instrument is a 4 point Likert response scale divided in four sections assessing the perception of teacher on perceived AI benefit to critical thinking (Section A), perceived negative impact of AI on critical thinking (Section B), perceived barriers of AI integration in critical thinking (Section C) and Suggestions for balance integration (Section D). The PAIUDCT is internally consistent having achieved Cronbach's alpha coefficient of 0.91. Data was collected physically and remotely using google form versions of the instrument. The study used the arithmetic mean to interpret the responses on a 4-point Likert scale. The cutoff point for agreement was correctly established at 2.5, derived from the calculation (4+3+2+1)/4 = 2.5. Therefore, any item with a mean score of 2.5 or above was interpreted as the respondent group, on average, "agreeing" with the statement.

Results:

Table 1: Sociodemographic information of participants

Variables	Frequency (N = 410)	Percent (%)
Age		
Mean & SD	37.07 ± 7.17	
20 - 30 years	56	13.7%
31 - 40 years	244	59.5%
41 - 50 years	80	19.5%
51 - 60 years	30	7.3%
Gender		
Male	233	56.8%
Female	177	43.2%
Marital Status		
Single	60	14.6%
Married	260	63.4%
Separated	26	6.3%
Divorced	44	10.7%
Widowed	20	4.9%
Years of Experience		
Less than 5 years	35	8.5%
5 - 10 years	229	55.9%
10 - 20 years	107	26.1%
21 - 30 years	37	9.0%
31 - 40 years	2	0.5%
Religion		

Christianity	302	73.7%
Islam	46	11.2%
Traditionalist	34	8.3%
Others	28	6.8%

Findings in **Table 1** revealed that the surveyed higher education teachers were predominantly mid-career professionals, with a mean age of 37.1 years and a majority (59.5%) between 31 and 40 years old. Most respondents were male (56.8%), married (63.4%), and identified as Christian (73.7%). In terms of experience, the respondents were highly experienced, with over half (55.9%) having 5–10 years of teaching experience and another 26.1% possessing 10–20 years, collectively accounting for 82% of the sample

Research Question 1: What are the benefits of AI utilization in the development of critical thinking among students?

Table 2: Perception of higher institution teachers on the benefits of AI utilization in the development of critical thinking among students

Variable	Mean	SD	Decision
AI tools (e.g., ChatGPT, DeepSeek, Gemini) help students develop stronger analytical skills.	2.82	1.06	Agreed
AI-assisted research allows students to engage with a wider range of perspectives, deepening their critical analysis	2.83	1.04	Agreed
AI can serve as a useful "thought partner" to stimulate deeper reasoning	2.82	1.07	Agreed
AI reduces cognitive overload by automating routine tasks, allowing students to focus on higher-order thinking	2.79	1.09	Agreed
Students who use AI for brainstorming produce more innovative and well-structured ideas.	2.88	1.04	Agreed
Grand Mean	**2.82**	**0.07**	

Based on **Table 2**, higher institution teacher agreed that AI utilization benefits he development of critical thinking in students with a strong consensus reflected in a grand mean of 2.82. Teachers affirmed that AI tools help strengthen analytical skills (2.82), serve as a thought partner to stimulate deeper reasoning (2.82) and reduce cognitive overload by automating routine tasks, thereby freeing students to engage in high order thinking (2.79). Additionally, respondents agreed that AI assisted research exposes students to diverse perspectives, enriching their critical analysis (2.83) and that using AI for brainstorming leads to more innovative and well-structured ideas (2.88).

Research question 2: What are the negative impacts of AI utilization in the development of critical thinking among students?

Table 3: Perception of higher institution teachers on negative impacts of AI utilization in the development of critical thinking among students

Variable	Mean	SD	Decision
AI-generated content discourages students from engaging in deep, original thought.	2.96	1.04	Agreed
AI makes it harder to assess whether a student's work reflects their own critical thinking	2.79	1.14	Agreed
Many students accept AI outputs uncritically without verifying accuracy or bias	3.05	1.02	Agreed
AI-generated answers promote surface-level learning rather than deep critical engagement	2.89	1.08	Agreed
AI tools reduce students' motivation to engage in intellectual struggle,	3.06	0.98	Agreed

which is essential for critical thought		
Grand Mean	**2.95**	**0.11**

Based on the findings in **Table 3**, higher institution teachers expressed a strong consensus (Grand Mean = 2.95) that AI utilization carries significant negative impacts for developing critical thinking. The most severe concerns were the reduction of student motivation, with the highest mean of 3.06, indicating that AI tools diminish the essential "intellectual struggle," and the uncritical acceptance of AI outputs, which had a mean of 3.05. Teachers also agreed (Mean = 2.96) that AI-generated content discourages deep, original thought. Furthermore, they perceived that AI promotes surface-level learning (Mean = 2.89) and complicates the assessment of a student's genuine critical thinking (Mean = 2.79).

Research question 3: What are the barriers that hinder effective AI integration in development of critical thinking?

Table 4: Perception of higher institution teachers on barriers that hinder effective AI integration in development of critical thinking

Variables	Mean	SD	Decision
Poor internet connectivity and inadequate technological infrastructure	3.16	0.91	Agreed
Lack sufficient training among Faculty member to effectively integrate AI into teaching	2.79	1.09	Agreed
Students' low digital literacy	2.54	1.13	Agreed
Resistance from traditional educators who prefer conventional teaching methods over AI-enhanced learning.	2.98	1.03	Agreed
Concerns about data privacy and ethical implications.	2.20	1.08	Disagreed
Grand Mean	**2.73**	**0.38**	

Based on the findings in **Table 4**, higher institution teachers identified several key barriers to the effective integration of AI for developing critical thinking, with the most pronounced obstacle being poor internet connectivity and inadequate technological infrastructure, which received the highest agreement (Mean = 3.16). This was closely followed by resistance from traditional educators who prefer conventional methods (Mean = 2.98). Teachers also agreed that a lack of sufficient faculty training (Mean = 2.79) and students' low digital literacy (Mean = 2.54) present significant challenges. However, they disagreed that concerns about data privacy and ethical implications are a major barrier (Mean = 2.20), suggesting that practical and pedagogical issues are more immediate concerns than ethical ones. Overall, a grand mean of 2.73 was obtained

Research question 4: What are the suggestions for a balanced AI integration in development of critical thinking

Table 5: Suggestions for a balanced AI integration in development of critical thinking

Variables	Mean	SD	Decision
AI tools should be introduced only after students have attempted critical thinking tasks independently	2.77	1.08	Agreed
Universities should mandate "critical AI literacy" courses to teach students how to evaluate AI outputs skeptically	3.06	0.97	Agreed
Faculty training programs should emphasize pedagogical strategies for using AI to enhance—not replace—critical thinking	3.05	0.98	Agreed
Assessments should be redesigned to measure higher-order thinking skills that AI cannot easily replicate	2.71	1.10	Agreed
Institutions should develop ethical guidelines on AI use to prevent over-reliance and academic misconduct	3.11	0.93	Agreed
Grand Mean	**2.94**	**0.19**	

Based on the findings in Table 5, higher institution teachers strongly support a multi-faceted strategy for the balanced integration of AI to develop critical thinking, with a grand mean of 2.94. The most strongly endorsed suggestion was for institutions to develop ethical guidelines on AI use (Mean = 3.11), highlighting a priority for structured oversight to prevent over-reliance and misconduct. This was closely followed by the recommendations to mandate "critical AI literacy" courses (Mean = 3.06) and to provide faculty training programs that emphasize pedagogical strategies for using AI to enhance—not replace—critical thinking (Mean = 3.05). Teachers also agreed, though slightly less strongly, that AI tools should be introduced only after students attempt tasks independently (Mean = 2.77) and that assessments should be redesigned to measure higher-order skills that AI cannot easily replicate (Mean = 2.71)

Discussion of Findings

Lecturers in Anambra State predominantly agreed that AI offers tangible benefits for cultivating critical thinking, with a grand mean of 2.82 across all measured benefits. They perceived AI as a valuable "cognitive partner" that can help strengthen students' analytical skills and stimulate deeper reasoning. This positive perception aligns strongly with the literature that frames AI as a "cognitive partner" or scaffold (Holbeck, 2023). Specifically, the finding that teachers see AI as a way to expose students to a wider range of perspectives directly supports the argument by Nweke and Eze (2024) that AI can reduce information disparity and provide access to global scholarship for students in developing regions. Furthermore, the agreement that AI automates routine tasks to free up cognitive space for higher-order thinking echoes the benefits highlighted by Agu and Onuorah (2024) regarding AI's utility in large, resource-constrained classrooms typical of the Nigerian system. The reason for this alignment is that the lecturers are witnessing firsthand the potential of AI to address specific pedagogical challenges they face, such large class sizes and limited resources. They appear to recognize the theoretical benefits posited by international scholars, confirming that these advantages are not merely abstract but are perceived as tangible and applicable to their own teaching environments.

Despite the benefits, educators expressed even stronger concerns about AI's negative impacts (Grand Mean = 2.95). The most pressing issues were that AI tools reduce students' motivation for "intellectual struggle" and lead to the uncritical acceptance of AI outputs. These concerns are powerfully echoed in the literature. Gerlich (2025) empirically demonstrated a link between AI usage and diminished critical evaluation, attributing it to cognitive offloading, a concept that directly explains why lecturers observe students avoiding intellectual struggle. Similarly, the fear that AI promotes surface-level learning and discourages original thought aligns with what Royce and Bennett (2025) termed "automation bias," where students favour algorithmic outputs over their own reasoning. The high percentage of concern (78.5%) regarding uncritical acceptance of AI outputs may even be more pronounced in this study than in some international literature. A potential reason for this contrasting emphasis could be the specific concern raised by Okonkwo (2023) regarding cultural and algorithmic bias. Lecturers in Anambra may be particularly wary of students internalizing perspectives from AI models trained on Western data sets without the critical faculty to interrogate their relevance to the local Nigerian context, thus compounding the problem of uncritical acceptance.

The identified barriers highlight the significant practical challenges facing AI integration in Anambra State. The most strongly agreed-upon barrier was "poor internet connectivity and inadequate technological infrastructure" (Mean = 3.16). This finding directly echoes Chukwuma & Obi (2024), who identified inconsistent power supply and limited internet bandwidth as major constraints in Nigerian universities. The resistance from traditional educators and lack of faculty training further align with Nweke & Eze (2024), who noted that many educators lack the pedagogical frameworks to integrate AI effectively. Interestingly, teachers disagreed that data privacy and ethical implications were a major barrier, contrasting with global discourse but suggesting that in the Anambra context, foundational infrastructural and pedagogical issues are more immediate concerns than ethical ones.

In response to the identified risks and barriers, lecturers strongly endorsed a proactive and multi-pronged strategy for balanced integration (Grand Mean = 2.94). The top recommendation was for

institutions to develop clear ethical guidelines, followed closely by mandating "critical AI literacy" courses for students and providing specialized training for faculty. These suggestions provide a practical pathway to mitigate the risks of uncritical acceptance and algorithmic dependence highlighted by Royce & Bennett (2025). The call for redesigned assessments that measure higher-order thinking skills AI cannot replicate is a direct countermeasure to the problem of AI serving as a shortcut, a concern raised by Jackson (2025). Overall, these suggestions advocate for a model where AI is used to enhance and not replace critical thought, a principle consistent with the "cognitive partner" model supported by Holbeck (2023).

Conclusion

This study set out to capture the perceptions of higher education teachers in Anambra State, Nigeria, on the profound impact of Artificial Intelligence on the development of critical thinking among undergraduates. The perceptions of higher education teachers in Anambra State are not merely aligned with global literature. They confirm the dualistic nature of AI as both a benefit and a threat to critical thinking, but they ground these abstract concepts in the concrete realities of infrastructural deficits, cultural traditions, and an urgent need for localized training and ethical frameworks. Their collective wisdom points towards a solution that is not about rejecting AI, but about strategically integrating it with a deep commitment to fostering the irreplaceable human capacity for critical thought.

Recommendations

Relative to the findings of the study, it is recommended that:

1. There should be an implementation of mandatory training for students and faculty to critically evaluate AI outputs, countering uncritical acceptance and fostering skepticism.
2. There is need for the development and enforcement of clear institutional policies on AI use to define academic integrity, prevent over-reliance, and mitigate misconduct.
3. Overhaul evaluation methods to focus on process-oriented, higher-order thinking skills that AI cannot easily replicate, ensuring assessments measure genuine cognitive engagement.
4. Prioritize investment in reliable internet connectivity and technological resources to address the primary barrier of inadequate infrastructure and enable effective AI integration.

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