



Generative AI in classrooms: Impact of Chat GPT, Gemini, and Claude on critical thinking, academic integrity, and teacher workload in selected federal government colleges in Nigeria

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Abstract

This study examined the impact of generative artificial intelligence (Gen AI), particularly Chat GPT, Gemini, and Claude, on students' critical thinking, academic integrity, and teacher workload in selected Federal Government Colleges in Nigeria. A quantitative survey design was adopted, involving 950 respondents comprising 700 senior secondary school students and 250 teachers. Data were collected using a structured questionnaire based on a five-point Likert scale. All study constructs demonstrated strong internal consistency, with Cronbach's alpha coefficients above 0.80. Descriptive statistics and regression analyses were employed for data analysis. Results showed high student use of Chat GPT ($M = 3.68$, $SD = 0.82$), while Gemini ($M = 3.21$, $SD = 0.89$) and Claude ($M = 2.94$, $SD = 0.93$) recorded moderate usage. Students demonstrated a high critical-thinking score ($M = 3.85$, $SD = 0.71$), whereas academic integrity presented moderate concern ($M = 3.12$, $SD = 0.88$). Chat GPT, Gemini, Claude, and AI training jointly explained 48.2% of the variance in critical thinking, $F(4, 695) = 161.3$, $p < .001$, with Chat GPT emerging as the strongest predictor ($\beta = .361$, $p < .001$). Increased Gen AI use was significantly associated with lower academic integrity scores, with the model explaining 21.4% of the variance. Among teachers, Gen AI use was high ($M = 3.55$, $SD = 0.76$), while workload impact was moderate and mixed ($M = 3.41$, $SD = 0.84$). Gen AI reduced lesson-planning and instructional-material preparation demands but increased responsibilities associated with detecting inappropriate AI use. The study concludes that Gen AI offers considerable pedagogical benefits but requires clear institutional policies, AI literacy training, ethical-use guidelines, and redesigned assessment practices to protect academic integrity while improving teaching and learning outcomes.

Keywords: Generative artificial intelligence, Chat GPT, critical thinking, academic integrity, teacher workload, AI literacy, secondary education

Introduction

The rapid emergence of generative artificial intelligence (Gen AI) has become one of the most consequential technological developments affecting contemporary education. Generative AI refers broadly to artificial intelligence systems capable of producing new content—including text, images, computer code, audio, summaries, explanations, and other forms of information—in response to natural-language prompts. Unlike conventional educational technologies that largely retrieve, store, or present predetermined information, Gen AI systems can engage users conversationally, generate context-sensitive responses, explain complex concepts, suggest solutions, produce drafts, and provide individualized feedback. The public release and rapid adoption of Chat GPT from late 2022 accelerated global interest in these technologies and stimulated the development and expansion of competing large language model applications, including Google Gemini and Anthropic Claude. Consequently, teachers and students increasingly operate in an educational environment in which sophisticated AI-generated information can be obtained within seconds using smartphones, tablets, and computers (UNESCO, 2023).

The significance of this technological transition extends beyond the introduction of another digital learning resource. Gen AI potentially alters how knowledge is accessed,

assignments are completed, feedback is obtained, lessons are prepared, and students interact with academic content. UNESCO (2023) observes that the speed with which Gen AI applications are developing has exceeded the capacity of many educational systems and regulatory structures to establish appropriate mechanisms for their use. This creates a situation in which students and teachers may already be extensively using AI while educational institutions are still determining what constitutes acceptable, ethical, safe, and pedagogically productive usage. UNESCO therefore advocates a human-centred approach in which AI supports rather than displaces human agency, intellectual development, teacher professionalism, ethical responsibility, and meaningful interaction between learners and educators (UNESCO, 2023).

Among available Gen AI platforms, Chat GPT has acquired particular educational prominence because of its conversational interface and capacity to explain concepts, generate essays, summarize texts, answer questions, brainstorm ideas, and provide individualized academic assistance. Gemini similarly combines generative capabilities with a broad ecosystem of digital information and services, while Claude has attracted attention for conversational reasoning and working with substantial amounts of textual information. Although these platforms differ technologically, their educational significance arises

from their ability to produce apparently coherent responses to academic prompts. Their increasing availability raises fundamental questions concerning whether Gen AI strengthens learning by extending students' intellectual capabilities or weakens learning when students substitute machine-generated responses for independent reasoning.

One major issue in this debate concerns critical thinking. Critical thinking involves purposeful analysis, interpretation, evaluation, inference, reasoning, questioning of assumptions, consideration of alternative explanations, and evidence-based judgement. These competencies are fundamental to meaningful education because students should not merely reproduce information but should develop the ability to interrogate claims, distinguish reliable from unreliable evidence, identify bias, solve problems, and justify conclusions. Gen AI potentially promotes these abilities when students use it to generate alternative perspectives, ask follow-up questions, compare explanations, identify gaps in arguments, test hypotheses, or evaluate AI-generated responses against textbooks and authoritative sources.

Emerging empirical evidence indicates that the relationship between Gen AI and critical thinking is neither entirely beneficial nor inherently harmful. Essel *et al.* (2024) ^[2] found that Chat GPT-supported learning can influence critical, creative, and reflective thinking skills, suggesting that conversational AI can contribute to cognitive development when integrated appropriately into learning activities. Other studies similarly suggest that responsible engagement with Chat GPT can promote higher-order thinking, particularly when students possess sufficient AI knowledge and actively engage with rather than passively accept AI-generated information.

Nevertheless, positive cognitive outcomes cannot be assumed simply because students have access to Gen AI. Recent reviews indicate that Chat GPT offers opportunities for analytical, interpretive, reasoning, and self-regulatory skills when appropriately incorporated into curricula and feedback systems, but evidence regarding sustained development of critical-thinking dispositions remains mixed. The educational effects of Gen AI depend substantially on pedagogical context, instructional scaffolding, and the manner in which learners interact with the technology. Thus, asking students to interrogate, verify, compare, and critique AI responses may enhance critical thinking, whereas using AI simply to obtain ready-made answers could reduce the intellectual effort required for independent reasoning.

A second major concern is academic integrity. Academic integrity encompasses honesty, responsibility, fairness, trust, transparency, and ethical conduct in teaching, learning, assessment, and research. Gen AI complicates established understandings of plagiarism and authorship because it can generate original-looking text that may not correspond directly to material copied from an identifiable source. Students can consequently produce essays, reports, homework, answers, summaries, and other academic submissions with limited personal intellectual contribution. Traditional plagiarism-detection systems may therefore be insufficient for addressing all forms of AI-assisted academic misconduct.

The academic-integrity challenge is especially complex because the use of Gen AI cannot automatically be classified as cheating. A student who asks Chat GPT to

explain a difficult concept, uses Gemini to generate questions for revision, or asks Claude to critique an argument is engaging with AI differently from a student who generates an entire assignment and submits it as personal work. Consequently, educational institutions require policies capable of distinguishing legitimate AI-supported learning from misrepresentation of authorship and unauthorized assistance. UNESCO (2023) stresses that educational institutions need appropriate ethical validation, human oversight, privacy protection, and pedagogical frameworks to ensure meaningful and responsible use of Gen AI.

Evidence from Nigeria demonstrates the immediacy of this concern. Ighodalo (2025) ^[3], studying Gen AI and academic integrity in Nigerian higher education, reported that although many students employed Gen AI for legitimate academic activities such as summarizing learning materials, a substantial proportion acknowledged using AI in assignments without appropriate disclosure. The study identified plagiarism, weakened critical engagement, and inadequate institutional policy as important concerns surrounding the increasing adoption of Gen AI in Nigerian education. Although much existing Nigerian research has concentrated on tertiary institutions, secondary-school students increasingly possess smartphones and access to internet-based AI tools. This makes academic integrity at the secondary level an equally important empirical and policy question.

The third dimension of Gen AI's educational impact concerns teacher workload. Teachers perform numerous activities beyond direct classroom instruction, including lesson preparation, development of instructional materials, preparation and marking of assessments, record keeping, student feedback, administrative reporting, and individualized learning support. Gen AI can potentially reduce the time required for several of these tasks. Teachers can employ AI to develop lesson outlines, generate examples and classroom exercises, formulate quizzes, differentiate learning materials, simplify difficult concepts, prepare marking rubrics, and generate preliminary feedback. Such capabilities could be particularly valuable in educational systems where teachers manage large classes and considerable administrative responsibilities.

International evidence provides support for these potential efficiency gains. OECD (2025) reports experimental evidence in which teachers using Chat GPT spent approximately 31% less time preparing lessons and resources than teachers in a control group without a corresponding reduction in the assessed quality of the materials. The OECD nevertheless emphasizes that these benefits depend on adequate teacher training, implementation support, experimentation, and appropriate integration of AI into educational systems. Poorly coordinated digital technologies can increase rather than decrease teacher workload.

This apparent contradiction is particularly relevant to Gen AI. While teachers may save time preparing lessons, questions, notes, and feedback, they may simultaneously spend additional time verifying AI-generated information, redesigning assignments, checking suspected AI-generated student work, teaching responsible AI use, and resolving questions concerning plagiarism and authorship. Teachers must also develop new competencies in prompt design, AI-output evaluation, ethical decision-making, digital safety,

and assessment design. Consequently, Gen AI may redistribute rather than simply reduce teacher workload. Its actual effect must therefore be investigated empirically rather than inferred solely from its technological capabilities.

The Nigerian educational environment provides an important context for such investigation. Nigeria continues to experience uneven access to digital technologies, differences in internet connectivity, disparities in device ownership, variations in digital literacy, and institutional differences in the availability of ICT infrastructure. These factors can influence whether teachers and students are able to use Chat GPT, Gemini, Claude, and related applications effectively. They may also create new forms of educational inequality if students with reliable internet access, advanced devices, stronger digital competencies, or paid AI subscriptions acquire advantages over those without comparable access. UNESCO's work on AI and education similarly emphasizes that equity, inclusion, cultural and linguistic diversity, human agency, and capacity development must remain central considerations when integrating AI into educational systems, particularly within developing contexts (UNESCO, 2023)^[11].

Federal Government Colleges occupy a distinctive position within Nigerian secondary education. As federal unity schools drawing students from diverse social, cultural, geographical, and economic backgrounds, they provide a relevant setting for examining emerging technological practices among secondary-school students and teachers. Senior secondary students are increasingly preparing for high-stakes examinations, tertiary education, and digitally mediated workplaces. Their ability to use AI responsibly, critically, and ethically is therefore becoming an important component of contemporary educational preparedness. Teachers similarly require competencies that enable them to exploit Gen AI for instructional improvement without compromising professional judgement, student independence, or assessment credibility.

Despite the rapidly expanding international literature on Gen AI in education, important contextual and empirical gaps remain. Much of the existing evidence has focused on universities and other higher-education environments. Studies examining Gen AI and critical thinking have also disproportionately concentrated on Chat GPT, while relatively less empirical attention has been directed towards comparative patterns of student engagement with Gemini and Claude. Furthermore, critical thinking, academic integrity, and teacher workload are frequently investigated separately, although they represent interconnected consequences of the same technological transformation. Evidence specifically addressing these dimensions among teachers and senior secondary students in Nigerian Federal Government Colleges remains limited. This creates a significant knowledge gap because findings obtained from universities or technologically advanced educational systems cannot automatically be generalized to Nigerian secondary schools.

Accordingly, the present study investigates Generative AI in Classrooms: Impact of Chat GPT, Gemini, and Claude on Critical Thinking, Academic Integrity, and Teacher Workload in Selected Federal Government Colleges in Nigeria. The study examines patterns of Gen AI utilization among teachers and students and assesses how the use of Chat GPT, Gemini, and Claude relates to students' critical-thinking abilities and academic integrity while

simultaneously examining the implications of Gen AI use for teacher workload. By integrating student and teacher perspectives within one empirical framework, the study seeks to provide evidence capable of informing institutional AI policies, teacher professional development, assessment redesign, AI literacy programmes, and responsible classroom adoption of generative technologies. Ultimately, the central educational challenge is not merely whether Nigerian schools should permit or prohibit Gen AI, but how these technologies can be governed and pedagogically integrated so that they strengthen human reasoning, protect academic integrity, promote equitable learning opportunities, and enhance rather than undermine the professional work of teachers.

Review of Related Literature

Concept of Generative Artificial Intelligence in Education

Generative artificial intelligence (Gen AI) represents a rapidly evolving category of artificial intelligence capable of generating new content in response to human instructions or prompts. Unlike traditional information and communication technologies that primarily retrieve, store, or transmit existing information, generative AI applications can create text, images, computer code, summaries, explanations, assessment questions, lesson plans, and other forms of content. The emergence of large language models such as Chat GPT, Gemini, and Claude has consequently expanded the possibilities for technology-supported teaching and learning. UNESCO (2024) notes that the public emergence of widely accessible generative AI accelerated the penetration of artificial intelligence into education and created both significant opportunities and risks for students and teachers.

Gen AI is particularly relevant to education because its conversational interface allows learners to interact with information in ways that resemble individualized tutoring. Students can request explanations, ask follow-up questions, summarize difficult materials, generate examples, translate concepts into simpler language, and receive immediate responses. Teachers can similarly use these applications to develop instructional materials, generate assessment questions, prepare lesson plans, differentiate instruction, and produce preliminary feedback. Albadarin *et al.* (2024)^[1] indicate that empirical studies of Chat GPT in education have demonstrated benefits for student learning and teacher productivity, although concerns regarding excessive dependence, academic integrity, and inadequate institutional guidance remain substantial.

The educational significance of Gen AI therefore rests not simply on its capacity to produce information but on how teachers and students interact with that information. Appropriate integration may support personalized learning, creativity, accessibility, and knowledge construction, while inappropriate use can encourage dependency and undermine independent intellectual effort. This dual character makes Gen AI fundamentally different from many earlier educational technologies and necessitates empirical investigation of both its benefits and unintended consequences.

Chat GPT, Gemini and Claude as Educational Tools

Chat GPT, Gemini, and Claude represent prominent contemporary Gen AI platforms, although their levels of

adoption and educational applications vary. Chat GPT has received the greatest research attention because of its early widespread public adoption and conversational functionality. It can answer academic questions, generate explanations, summarize materials, produce drafts, assist brainstorming, and provide feedback. Systematic evidence suggests that Chat GPT can enhance access to information and support learning and productivity, while inappropriate or uncritical dependence may impede independent learning (Albadarin *et al.*, 2024) ^[1].

Gemini and Claude provide broadly comparable conversational AI capabilities and expand the range of Gen AI resources available to students. Their presence is important because the educational effects of generative AI should not be conceptualized exclusively through Chat GPT. Students may use multiple platforms according to accessibility, perceived response quality, familiarity, device compatibility, or the nature of particular academic tasks. However, the existing empirical literature remains heavily concentrated on Chat GPT. This gap is particularly relevant to secondary education, where comparative evidence concerning multiple Gen AI tools remains limited.

Generative AI and Students' Critical Thinking

Critical thinking refers to the ability to analyze information, question assumptions, evaluate evidence, identify inconsistencies, compare alternatives, solve problems, and arrive at reasoned conclusions. It is a core educational outcome because meaningful learning requires students to move beyond memorization toward interpretation, evaluation, application, and knowledge creation. Gen AI can potentially strengthen critical thinking by functioning as an intellectual dialogue partner. Students may ask an AI system to present alternative explanations, critique an argument, provide counterarguments, identify weaknesses in reasoning, or suggest multiple approaches to a problem.

UNESCO's AI Competency Framework for Students emphasizes that students should not merely become users of AI but should develop the ability to examine AI critically and understand its ethical, social, and technical dimensions (Miao *et al.*, 2024) ^[4]. Nevertheless, Gen AI may also negatively affect critical thinking when it replaces rather than supports cognitive activity. If students routinely obtain ready-made answers without analysing how those answers were generated, they may reduce the mental effort associated with independent inquiry, problem solving, synthesis, and evaluation. The educational outcome therefore appears to depend substantially on the manner of use. Using Gen AI to question, compare, verify, explore, and critique information may support higher-order thinking, whereas using it primarily to bypass reading, reasoning, and problem solving may produce cognitive dependency.

Generative AI and Academic Integrity

Academic integrity encompasses honesty, fairness, responsibility, transparency, trust, and appropriate acknowledgement of intellectual contributions. Generative AI complicates conventional categories of plagiarism because students can generate apparently original academic work without directly copying an identifiable source. The ability of Gen AI to produce essays, assignments, reports, solutions, and other academic outputs raises questions about authorship and the authenticity of assessment.

However, academic use of Gen AI cannot automatically be equated with academic misconduct. A distinction exists between using AI as a learning aid and using it as an unauthorized substitute for one's own intellectual work. Asking Chat GPT to explain a difficult concept, using Gemini to generate revision questions, or requesting Claude to critique a draft may support learning. Conversely, submitting substantially AI-generated material as one's independent work without disclosure may constitute misrepresentation.

Evidence from Nigeria reinforces these concerns. Ighodalo (2025) ^[3] found that Nigerian students used Gen AI for legitimate academic activities such as summarizing materials, while a substantial proportion also reported using AI for assignments without appropriate acknowledgement. These findings illustrate the dual nature of Gen AI and reinforce the need for clear institutional policies, ethical education, and assessment redesign.

Generative AI and Teacher Workload

Teacher workload comprises the intellectual, instructional, administrative, and emotional demands associated with professional teaching. These include lesson preparation, classroom instruction, preparation and marking of assessments, development of instructional resources, feedback, record keeping, communication, student support, and administrative responsibilities. Gen AI possesses the potential to automate or accelerate several of these activities.

Teachers can use generative AI to produce preliminary lesson plans, teaching notes, quizzes, examination questions, classroom activities, differentiated learning materials, examples, summaries, and feedback templates. Such applications can reduce repetitive work and allow teachers to redirect time toward direct interaction with students, mentoring, instructional decision-making, and other professional responsibilities. Yet workload reduction is not automatic. Teachers must evaluate AI-generated content for factual accuracy, appropriateness, bias, and alignment with curriculum requirements. They increasingly have to determine whether students have used AI appropriately, redesign assessments, and teach students ethical AI practices. Consequently, Gen AI may redistribute rather than simply reduce teacher workload.

AI Literacy and Training as Moderating Factors

AI literacy refers to the knowledge, skills, ethical awareness, and critical capabilities necessary to interact meaningfully with artificial intelligence. It includes understanding what AI can and cannot do, writing effective prompts, evaluating generated information, recognizing hallucinations and biases, protecting privacy, and using AI transparently and ethically. Training is particularly relevant because access to Gen AI does not necessarily imply competence in using it.

UNESCO's complementary frameworks for students and teachers recognize this need. The student framework emphasizes progressive competencies at the levels of understanding, applying, and creating, while the teacher framework organizes professional development around acquiring, deepening, and creating AI competencies (UNESCO, 2024) ^[8]. Educational institutions should therefore move beyond debates over whether AI should

simply be allowed or prohibited and instead develop systematic AI literacy programmes.

Theoretical Framework

This study is anchored in Constructivist Learning Theory and Cognitive Load Theory. Constructivism holds that learners actively construct knowledge through interaction with information, prior experience, questioning, reflection, and problem solving rather than passively receiving information. From a constructivist perspective, Gen AI can provide interactive scaffolding through explanations, questions, examples, alternative perspectives, and feedback. When students critically engage with these outputs, Gen AI may facilitate knowledge construction and higher-order thinking.

Cognitive Load Theory complements this perspective by explaining how technologies can reduce unnecessary cognitive demands and allow learners or teachers to concentrate on higher-value intellectual tasks. Gen AI may reduce extraneous workload by summarizing information, generating preliminary instructional resources, or automating routine tasks. Nevertheless, excessive outsourcing of cognitive processes may produce dependency and reduce productive intellectual effort. The theoretical expectation is therefore that the effects of Gen AI depend on whether it functions as cognitive scaffolding or cognitive substitution.

Empirical Gap and Relevance of the Present Study

The reviewed literature demonstrates growing scholarly recognition of both the opportunities and risks associated with generative AI. Existing studies show potential improvements in access to information, individualized learning, productivity, and critical engagement while simultaneously identifying academic-integrity concerns, over-reliance, reduced independent learning, and new professional demands for teachers.

However, significant gaps remain. Much of the empirical literature concerns universities rather than secondary schools; existing studies overwhelmingly emphasize Chat GPT, with less comparative evidence concerning Gemini and Claude; and relatively few studies simultaneously examine critical thinking, academic integrity, and teacher workload within a single framework. The present study addresses these gaps by examining Chat GPT, Gemini, and Claude use among 700 students and 250 teachers in selected Federal Government Colleges in Nigeria.

Methodology

The study adopted a quantitative cross-sectional survey research design to investigate the impact of generative artificial intelligence (Gen AI), particularly Chat GPT, Gemini, and Claude, on students' critical thinking, academic integrity, and teacher workload in selected Federal Government Colleges (FGCs) in Nigeria. The survey design was considered appropriate because it enabled the researchers to obtain standardized quantitative information from a relatively large number of teachers and students concerning their Gen AI usage, experiences, perceptions, and behavioural outcomes at a particular period.

The target population comprised teachers and senior secondary school students in selected Federal Government Colleges in Nigeria. A total sample of 950 respondents participated in the study, comprising 700 students and 250 teachers. The student respondents were drawn from SS1, SS2, and SS3, while the teachers represented different teaching experience categories and subject areas. A multistage sampling procedure was adopted. Respondents were stratified according to their status as teachers or students, with further representation across student class levels, teacher experience, and subject areas.

Data were collected using a structured questionnaire titled "Generative Artificial Intelligence in Classrooms Questionnaire (GAICQ)." Section A obtained demographic information; Section B measured the frequency of academic use of Chat GPT, Gemini, and Claude and exposure to AI training; Section C measured critical thinking among students; Section D assessed academic integrity among students; and Section E examined teacher workload. Except for categorical demographic variables, responses were measured predominantly on a five-point Likert scale ranging from 1 = Strongly Disagree/Never to 5 = Strongly Agree/Very Frequently.

To establish content and face validity, the questionnaire was subjected to expert review in education management, educational technology, measurement and evaluation, and artificial intelligence-supported education. Internal consistency reliability was determined using Cronbach's alpha coefficient. All major constructs recorded coefficients above 0.80, indicating good internal consistency.

The researchers obtained appropriate administrative permission from the participating schools before questionnaire administration. Respondents were informed about the purpose of the research and assured that participation was voluntary. Confidentiality and anonymity were maintained. Given the participation of secondary-school students, data collection was conducted in accordance with applicable school procedures and ethical safeguards for research involving minors.

Data were coded and analyzed using descriptive and inferential statistics. Frequencies, percentages, means, and standard deviations were used to summarize respondents' characteristics, Gen AI usage, critical thinking, academic integrity, and teacher workload. Multiple regression analysis was employed to determine the predictive effects of Chat GPT use, Gemini use, Claude use, and AI training on students' critical thinking. A separate regression model examined the relationship between Gen AI use and academic integrity. For teachers, regression analysis assessed the extent to which Gen AI use predicted changes in teacher workload and efficiency. Statistical hypotheses were evaluated at the 5% level of significance ($\alpha = .05$).

Results and Discussion

This section presents the findings obtained from the 950 respondents comprising 700 students and 250 teachers from selected Federal Government Colleges in Nigeria. Descriptive statistics and multiple regression analyses were used to address the study objectives.

Table 1: Descriptive Statistics of Generative AI Use and Major Study Variables

Variable	Group	N	Mean	SD	Interpretation
Chat GPT Use Index	Students	700	3.68	0.82	High
Gemini Use Index	Students	700	3.21	0.89	Moderate
Claude Use Index	Students	700	2.94	0.93	Moderate
Critical Thinking	Students	700	3.85	0.71	High
Academic Integrity	Students	700	3.12	0.88	Moderate concern
Gen AI Use Index	Teachers	250	3.55	0.76	High
Teacher Workload Impact	Teachers	250	3.41	0.84	Moderate/Mixed

Chat GPT was the most frequently used Gen AI platform among students, followed by Gemini and Claude. Students recorded a high critical-thinking mean score, while academic integrity indicated a moderate level of concern. Teachers recorded high Gen AI use, but the workload impact was moderate and mixed. All constructs recorded Cronbach's alpha coefficients above .80.

The critical-thinking regression model was statistically significant and explained 48.2% of the variance in students' critical-thinking scores. Chat GPT emerged as the strongest predictor, followed by Gemini, AI training, and Claude.

Table 2: Multiple Regression Analysis of Gen AI Use and Students' Critical Thinking

Predictor	B	Std. Error	β	t	p-value	VIF
Constant	1.842	0.118	—	15.61	< .001	—
Chat GPT Use	0.312	0.028	0.361	11.14	< .001	1.52
Gemini Use	0.189	0.025	0.237	7.56	< .001	1.48
Claude Use	0.104	0.023	0.136	4.52	< .001	1.41
AI Training	0.221	0.031	0.218	7.13	< .001	1.33

Model Summary: $R^2 = .482$; $F(4, 695) = 161.3$; $p < .001$.
Dependent Variable: Critical Thinking.

The positive relationship between Gen AI use and critical thinking supports the argument that AI can serve as cognitive scaffolding when learners use it to explore, interrogate, compare, and evaluate information. Chat GPT's stronger predictive effect may partly reflect its greater level of use and familiarity among respondents. The significant contribution of AI training further suggests that the cognitive benefits associated with Gen AI do not depend exclusively on access to technology; knowledge of how to use AI appropriately also matters.

The academic-integrity regression model produced an R^2 of .214, indicating that Gen AI use accounted for 21.4% of the variation in students' academic-integrity scores. Higher Gen AI use was significantly associated with lower academic-integrity scores ($p < .001$). This should not be interpreted to mean that all Gen AI use constitutes misconduct; rather, it demonstrates the need to distinguish legitimate uses such as explanations, brainstorming and feedback from practices in which students submit substantially AI-generated content as their independent academic work.

Table 3: Regression Summary for Gen AI Use and Academic Integrity

Model	R^2	Direction of Relationship	Significance	Interpretation
Gen AI Use → Academic Integrity	.214	Negative	$p < .001$	Significant negative relationship

Academic integrity represents one of the clearest challenges arising from the rapid integration of Gen AI into education. Students can now produce sophisticated essays, summaries and answers within seconds. Schools therefore require explicit policies defining acceptable and unacceptable AI practices and assessment approaches that provide authentic evidence of student learning.

Table 4: Regression Summary for Gen AI Use and Teacher Workload

Model	N	R^2	Significance	Overall Interpretation
Gen AI Use → Teacher Workload	250	.356	$p < .001$	Significant mixed workload effect

The teacher workload model indicated that Gen AI use explained 35.6% of the variation in workload outcomes. Gen AI facilitated lesson planning and preparation of instructional resources, while additional workload was associated with plagiarism checking and other AI-related supervisory responsibilities. The findings therefore suggest that Gen AI redistributes teacher workload rather than simply reducing it.

Taken together, the findings reveal the dual character of Gen AI integration in Nigerian secondary education. Chat GPT, Gemini, and Claude were positively associated with students' critical thinking, but increased Gen AI use was also associated with reduced academic-integrity scores. Teachers experienced productivity benefits alongside new AI-related responsibilities. Gen AI is therefore neither inherently beneficial nor inherently detrimental; its consequences depend substantially on how, why, and under what institutional conditions it is used.

Conclusion and Recommendations

This study investigated the impact of generative artificial intelligence, particularly Chat GPT, Gemini, and Claude, on students' critical thinking, academic integrity, and teacher workload in selected Federal Government Colleges in Nigeria. The findings demonstrate that Gen AI has become an important emerging component of teaching and learning within the selected schools.

Chat GPT was the most frequently used Gen AI platform among students, while Gemini and Claude recorded moderate levels of use. Chat GPT, Gemini, Claude, and AI training jointly explained 48.2% of the variance in students' critical-thinking scores, with Chat GPT emerging as the strongest predictor. These findings indicate that appropriately used Gen AI can support information analysis, questioning, source evaluation, exploration of alternative solutions, and other higher-order cognitive processes.

However, Gen AI use explained 21.4% of the variance in academic-integrity scores, with greater AI use associated with lower academic-integrity scores. Thus, while Gen AI can function as a legitimate learning resource, inappropriate dependence on AI-generated assignments, insufficient disclosure of AI assistance, plagiarism-related practices, and uncertainty regarding acceptable use can undermine the authenticity of students' academic work.

Teachers had a high level of Gen AI use, while its effect on workload was moderate and mixed. Gen AI facilitated lesson planning, development of instructional materials, preparation of quizzes and examinations, and personalized feedback, but teachers also faced additional responsibilities

involving verification of AI-generated information, detection of inappropriate student AI use, redesign of assessments, and instruction on responsible AI practices. Overall, the study concludes that the educational impact of Gen AI is determined less by the existence of the technology than by the conditions governing its use. Chat GPT, Gemini, Claude, and similar applications can contribute meaningfully to contemporary secondary education when they complement rather than replace independent thinking and teacher professional judgement.

Recommendations

1. Develop comprehensive Gen AI policies for Federal Government Colleges defining acceptable and unacceptable use, disclosure requirements, privacy expectations, authorship standards, and consequences for misuse.
2. Introduce structured AI literacy education for students, including prompt formulation, verification of AI-generated information, recognition of hallucinations and bias, source evaluation, privacy, and ethical use.
3. Prioritize critical-thinking-oriented use of Gen AI by requiring students to interrogate, compare, verify, critique, and defend AI-supported responses rather than merely reproduce them.
4. Redesign assessment practices through supervised writing, oral defence, classroom problem solving, practical activities, project logs, draft submissions, and reflective explanations.
5. Require appropriate disclosure of Gen AI use in assignments through a simple standardized AI-use declaration.
6. Provide continuous professional development for teachers on Gen AI applications, prompt engineering, assessment design, ethical issues, verification of generated content, and academic-integrity management.
7. Use Gen AI strategically to reduce routine teacher workload while retaining teacher responsibility for reviewing and validating all AI-generated instructional content.
8. Avoid excessive dependence on AI-detection software and emphasize authentic assessment, progressive drafts, oral verification, and transparent AI-use declarations.
9. Improve digital infrastructure and equitable access to reliable internet connectivity, ICT facilities, electricity, and appropriate digital devices.
10. Strengthen data privacy and child-safety measures, especially because secondary-school students include minors.
11. Establish school-level Gen AI monitoring and support committees to review emerging practices, policies, and ethical or pedagogical challenges.
12. Promote further research on Gen AI in Nigerian secondary education using broader samples, longitudinal or experimental designs, and comparative analyses of emerging AI platforms.

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