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Perception and Attitude of Secondary School Students towards the Use of AI Generative Tools for Improved Academic Performance in Osun State, Nigeria

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Abstract

This study examined secondary school students' perception and attitude toward the use of generative artificial intelligence (AI) tools and their influence on academic performance and transformative skill development in Osun State, Nigeria. Despite the growing integration of AI technologies in education, empirical evidence on students' acceptance and its implications for learning outcomes within Nigerian secondary schools remains limited. The study adopted a sequential explanatory mixed-methods design. Data for this study were collected using a self-designed structured questionnaire and a Key Informant Interview (KII) guide. The instruments were properly validated and reliability coefficient obtained through Cronbach alpha formula was 0.71. Quantitative data were collected from 390 students using a structured questionnaire, while Key Informant Interviews (KII) were conducted with teachers to complement and explain the quantitative findings. Descriptive statistics, independent t-tests, and correlation analysis were used to analyse the quantitative data. The findings revealed that 71.8% of the students demonstrated a positive perception of generative AI tools, whereas only 27.43% exhibited a positive attitude toward their academic use. Students who relied on home tutoring performed significantly better academically than those who used generative AI tools ($p < .05$). However, students who used AI tools significantly outperformed both self-prepared and home-tutored students in coding skills ($p < .05$). Correlation analysis further revealed a strong positive relationship between AI perception and skill acquisition ($r = 0.89$) and a strong negative relationship between AI perception and academic performance ($r = –0.82$). A hybrid learning approach that integrates AI tools with structured academic support and teacher guidance is therefore recommended to enhance both academic achievement and skill development among secondary school students.

Keywords: Perception; Attitude; Generative tools; Academic performance assessment; Transformative skill

Introduction

Generative AI has emerged as a transformative innovation in education, offering personalized learning experiences, real-time feedback, and adaptive instructional support. Empirical studies indicate that students generally perceive generative AI tools as beneficial for enhancing engagement and cognitive development (Sreylet, 2025; Pellas, 2024; Sun & Zhou, 2024). These tools provide customized academic assistance that supports independent learning and problem-solving abilities (Oliveira & Hebebci, 2024). The rapid advancement of generative artificial intelligence (AI) tools has significantly reshaped contemporary educational practices. These tools are increasingly accessible to students and are perceived as capable of enhancing creativity, problem-solving, and digital adaptability. However, debates persist regarding whether generative AI genuinely promotes transformative skills or undermines critical thinking and academic integrity (Kaban & Polat, 2024; Nidhisree et al., 2024).

The favourable perspective posits that generative AI facilitates personalized learning, enabling students to engage with customized academic content that enhances deeper understanding and skill acquisition. Kaban, Taş, and Polat (2024) argue that AI-powered platforms improve creativity and analytical reasoning. Similarly, Eno Obot Jackson et al. (2024) emphasize its relevance in Nigeria's Technical and Vocational Education and Training (TVET) sector, where it supports practical and digital competencies. Studies conducted in Nigerian tertiary institutions further suggest that AI-driven tools can positively influence academic performance (Ngonso et al., 2025).

Conversely, critics highlight concerns regarding misinformation, reduced originality, academic dishonesty, and diminished critical thinking (Nidhisree et al., 2024). Nnaemeke and Ogunbadejo (2024) report that although students recognize the usefulness of tools such as ChatGPT, apprehensions about overdependence remain significant. Adelegan (2024) further notes that misuse of generative AI for academic shortcuts may negatively affect students' performance and skill development. Students' attitudes toward generative AI influence their adoption and effective utilization. Kanont et al. (2024) identify perceived usefulness, ease of use, and ethical concerns as major determinants of acceptance. Similarly, Li et al. (2024) argue that user experience significantly affects sustained engagement with AI tools. These findings align with technology acceptance frameworks, which posit that positive perception does not always translate into favorable attitude or behavioural intention. Although many

students acknowledge the potential of AI tools, concerns regarding reliability, academic integrity, and over-dependence persist, potentially limiting positive attitudes toward consistent usage.

Research suggests that generative AI can enhance academic achievement through personalized feedback and adaptive learning systems (Pellas, 2024; Sun & Zhou, 2024). In subject-specific contexts such as mathematics and physics, AI tools support problem-solving and conceptual reinforcement (Busuttil & Calleja, 2025; Kotsis, 2024). However, concerns remain that excessive reliance may weaken deep conceptual understanding without proper teacher guidance. Importantly, most empirical investigations have been conducted in tertiary institutions, with limited evidence regarding academic performance outcomes among secondary school students, particularly within the Nigerian educational context.

Beyond academic achievement, generative AI is credited with fostering transformative skills such as digital literacy, adaptability, and creative thinking. These competencies are essential in preparing students for participation in the digital economy. Nevertheless, scholars caution that skill acquisition depends on structured implementation and guided use rather than unregulated exposure. While generative AI presents opportunities, scholars argue that it cannot replace the pedagogical, emotional, and mentorship roles of teachers (Chan & Tsi, 2024; Yu, 2024). Instead, AI should function as a complementary instructional tool (Wang, 2024). Strategic implementation frameworks are necessary to balance automation with human-centered instruction (Ng, Chan, & Lo, 2025).

Despite extensive international scholarship, limited empirical studies have examined the combined influence of perception and attitude toward generative AI on both academic performance and transformative skills among secondary school students in Nigeria. Most existing studies focus on tertiary education or isolated dimensions of AI integration. There is therefore a need to investigate how secondary school students perceive and respond to generative AI tools and how these perceptions and attitudes relate to measurable academic and skill outcomes. This gap necessitates the present study conducted among secondary school students in Osun State, Nigeria.

Objectives of the Study

The specific objectives of the study are to:

1. examine the perception and attitude of selected Nigerian secondary school students in Osun State towards adoption and usage of generative AI tools towards transforming their skills;

2. determine the efficacy of using generative AI tools in improving both skills and academic performance of selected secondary schools in Osun State.

Research questions

Two research questions and five hypotheses were generated; they are:

1. What is the perception of secondary school students in Osun State, Nigeria toward the use of generative AI tools?
2. What is the level of attitude of secondary school students toward the use of generative AI tools?

Hypotheses

H_{01}: There is no significant difference in academic performance between students who use generative AI tools and those who rely on home tutoring.

H_{02}: There is no significant difference in academic performance between self-preparatory students and home tutoring students.

H_{03}: There is no significant difference in academic performance between students who use generative AI tools and self-preparatory students.

H_{04}: There is no significant difference in coding skills among students who use generative AI tools, self-preparatory students, and home tutoring students.

H_{05}: There is no significant relationship among students' perception, attitude towards the use of generative tools, academic performance, and skills.

Methodology

The target population for this study comprised junior and senior secondary school students in Osun State, Nigeria**.** Junior Secondary School (JSS) spans three years for students aged 11–14, covering

foundational subjects such as Mathematics, English, Basic Science, and introductory vocational courses as part of the Universal Basic Education (UBE) programme. Senior Secondary School (SSS) also spans three years for students aged 15-18, where students select subject combinations in Science, Arts, or Commercial studies and complete national examinations such as WASSCE and NECO for higher education eligibility. The accessible population consisted of students enrolled in selected public and private secondary schools in the Osun East Senatorial District, where increasing ICT initiatives, smartphone access, and digital literacy programmes provide opportunities to interact with generative AI tools. The population frame was obtained from school administrative records and relevant education authorities, and only students currently enrolled in JSS or SSS and who consented to participate were included.

Data for this study were collected using a self-designed structured questionnaire and a Key Informant Interview (KII) guide. The questionnaire gathered information on students' demographic characteristics, as well as their perception, attitude, and use of generative artificial intelligence tools for learning. It also examined students' learning approaches, including the use of AI tools, home tutoring, and self-preparation. Students' academic performance records were obtained from their teachers to provide objective measures of academic achievement and coding skills. These records enabled comparison among students who used generative AI tools, those who relied on home tutoring, and those who engaged in self-preparation. For the qualitative aspect, the KII guide was used to obtain teachers' perspectives on students' use of generative AI tools, their attitudes toward these technologies, and their perceived effects on students' academic performance and skill development.

To ensure the validity of the research instruments, the questionnaire and interview guide were subjected to expert review. Specialists in Educational Technology and Measurement and Evaluation examined the instruments to assess the clarity, relevance, and adequacy of the items in relation to the objectives of the study**.** Their suggestions and corrections were incorporated into the final version of the instruments to ensure content validity.

The reliability of the questionnaire was determined through a pilot study conducted among fifty secondary school students from Government Day Secondary School, Offa, Kwara State**,** who were not part of the main study sample. The responses obtained from the pilot study were analyzed using

Cronbach's Alpha reliability test**.** A reliability coefficient of 0.71 was obtained, indicating a high level of internal consistency and confirming that the instrument was reliable for the study.

The study adopted a sequential explanatory mixed-methods design, in which quantitative data were collected first**,** followed by qualitative data to explain the findings. Data collection was conducted in three phases: At phase 1 for quantitative survey: A structured paper-and-pencil questionnaire was administered to students to assess their perception, attitude, and use of generative AI tools. Students were classified into three groups: those who used AI tools at home, those who relied on home tutoring, and those who engaged in self-preparation without AI or tutors. At phase 2 for academic performance assessment: Teachers provided students' academic records and coding skill assessments, enabling comparisons of academic and non-academic outcomes across the three groups and at final phase for qualitative inquiry: Key Informant Interviews (KII) were conducted with teachers to explore their perspectives on students' use of AI tools, attitudes toward the technology, and its impact on academic performance and skill development. These insights helped explain and contextualize the quantitative findings**.** This phased procedure allowed the study to comprehensively examine students' perception, attitude, academic performance, and transformative skill development in relation to generative AI use.

Quantitative data were analyzed using descriptive and inferential statistics. Descriptive statistics - frequencies, percentages, means, and standard deviations - summarized students' perception and attitude toward generative AI tools. Inferential analyses included independent sample t-tests to compare academic performance and coding skills among students who used AI tools, relied on home tutoring, or engaged in self-preparation, and Pearson correlation to examine relationships between AI perception, academic performance, and skill acquisition. Qualitative data from Key Informant Interviews were analyzed using thematic analysis, where teachers' responses were reviewed, coded, and organized into themes to provide deeper explanations for the quantitative findings.

Results

Table 1: Socio-demographic Characteristics Respondents

S/N	Variable	Category	Frequency (N=390)	Percentage (%)
1	Gender	Male	200	51.3
		Female	190	48.7
2	Age Group (years)	10 – 12	90	23.1
		13 – 15	180	46.2
		16 – 18	120	30.7
3	Class Level	Junior Secondary (JSS 1 – 3)	192	49.2
		Senior Secondary (SSS 1 – 3)	198	50.8
4	School Type	Public	195	50.0
		Private	195	50.0
5	Access to Generative Tools	Yes	280	71.8
		No	110	28.2
6	Frequency of Usage	Rarely	130	33.3
		Occasionally	140	35.9
		Frequently	120	30.8
7	Parental Education Level	No Formal Education	50	12.8
		Primary	80	20.5
		Secondary	150	38.5
		Tertiary	110	28.2
8	Internet Access at Home	Yes	270	69.2
		No	120	30.8
9	Exam Mode of Preparation	Generative tools	26	6.67
		Home tutoring	246	63.08
		Self-Preparatory	118	30.25

The perception and attitude of the selected secondary school students was determined using the mean obtained from set of questionnaires addressing the variables. The mean obtained were 30.54 for perception and 34.21 for attitude. Scores less than the mean was labeled negative perception or attitude while score above these means were labeled positive perception or attitude. Table 2 present the outcome of the analysis:

Research question 1: What is the perception of secondary school students in Osun State, Nigeria toward the use of generative AI tools?

Table 2: Perception and Attitude of Secondary School Students toward Adoption and Usage of Generative AI

Variable	Categories	Frequency	Percentage
Perception	Positive	280	71.80
	Negative	110	28.20
	Total	**390**	**100.00**
Attitude	Positive	107	27.43
	Negative	283	72.57
	Total	**390**	**100.00**

The perception of secondary school students toward adopting generative AI is predominantly positive, with 71.8% viewing it favourably, while 28.2% hold a negative perception.

Research question 2: What is the attitude of secondary school students toward the use of generative AI tools?

The attitude toward usage reflects a contrasting trend, as only 27.43% exhibit a positive attitude, whereas 72.57% demonstrate a negative attitude. This suggests that while many students recognize the potential benefits of generative AI, a significant portion had negative attitude towards its usage.

H_{01}: There is no significant difference in academic performance between students who use generative AI tools and those who rely on home tutoring

Table 3 Independent t-test Showing difference between GAI users and HT users Academic Performance

Variables	Categories	N	Mean	S.D	Df	*T*	*P*
Academic Performance	GAI user	20	53.65	5.34	38	2.11	<.05
	HT user	20	60.43	3.34			

Table 3 shows the differences in academic performance among generative AI tool users and the traditional home tutoring users. The independent t-test results indicate a significant difference in academic performance between students who use generative AI tools and those who receive home tutoring. Home-tutored students (Mean = 60.43, SD = 3.34) demonstrated significantly higher academic performance than generative AI users (Mean = 53.65, SD = 5.34), with a t-value of 2.11 at a significance level of $p < .05$. This suggests that home tutoring may have a more structured and personalized approach

that positively impacts students' academic outcomes compared to generative AI tools, which may require more guidance for effective learning integration.

H_{02}: There is no significant difference in academic performance between self-preparatory students and home tutoring students.

Table 4 Independent t-test Showing difference between SPS and HT users Academic Performance

Variables	Categories	N	Mean	S.D	Df	*T*	*P*
Academic Performance	SPS	20	51.32	9.49	38	1.01	<.05
	HT user	20	60.43	3.34			

Table 4 presents the independent t-test results which showed a significant difference in academic performance between self-preparatory students and home-tutored students. Self-preparatory students (Mean = 51.32, SD = 9.49) had lower academic performance compared to home-tutored students (Mean = 60.43, SD = 3.34), with a t-value of 1.01 at a significance level of $p < .05$. This suggests that students who engage in self-preparation may face challenges such as limited guidance and structured learning, whereas home tutoring provides direct support, leading to better academic outcomes.

H_{03}: There is no significant difference in academic performance between students who use generative AI tools and self-preparatory students.

Table 5 Independent t-test Showing difference between GAI and SPS users Academic Performance

Variables	Categories	N	Mean	S.D	df	*T*	*P*
Academic Performance	GAI	20	51.32	9.49	38	2.01	<.05
	SPS	20	60.43	3.34			

The independent t-test results above indicate a significant difference in academic performance between Generative AI users and self-preparatory students. Generative AI users (Mean = 51.32, SD = 9.49) had

lower academic performance compared to self-preparatory students (Mean = 60.43, SD = 3.34), with a t-value of 2.01 at a significance level of $p < .05$. This suggests that reliance on Generative AI tools alone may not effectively enhance academic performance compared to self-preparatory methods, which may involve more active engagement, critical thinking, and self-discipline in learning.

H_{04}: There is no significant difference in coding skills among students who use generative AI tools, self-preparatory students, and home tutoring students.

Table 6 Independent t-test Showing difference in Coding Skill among Pairs of GAI, SPS, and HT groups of students

Variables	Compared Groups	Categories	N	Mean	S.D	Df	*t*	*P*
Coding Skill	GAI Vs SPS	GAI	20	23.36	1.49	38	3.98	<.05
		SPS	20	12.10	3.21			
	GAI Vs HT	GAI	20	23.36	1.49	38	2.15	<.05
		HT	20	9.12	0.89			
	SPS Vs HT	SPS	20	12.10	3.21	38	2.37	<.05
		HT	20	9.12	0.89			

Table 6 results show significant differences in coding skills among Generative AI users, self-preparatory students, and home-tutored students. Generative AI users (Mean = 23.36, SD = 1.49) demonstrated significantly higher coding skills than self-preparatory students (Mean = 12.10, SD = 3.21), with a t-value of 3.98 at $p < .05$. Similarly, Generative AI users outperformed home-tutored students (Mean = 9.12, SD = 0.89), with a t-value of 2.15 at $p < .05$. Additionally, self-preparatory students exhibited significantly higher coding skills than home-tutored students, with a t-value of 2.37 at $p < .05$. These findings suggest that exposure to generative AI tools may enhance coding skills more effectively than traditional self-preparatory and home tutoring methods.

H_{05}: There is no significant relationship among students' perception, attitude towards the use of generative tools, academic performance, and non-cognitive skills.

Table 7: Correlation Matrix of Perception, Attitude, Academic Performance and Skill (Non-cognitive Performance)

Variable	Skills	Academic Performance	Perception	Attitude
Skills	-			
Academic Performance	.79	-		
Perception	.89	-.82	-	
Attitude	.86	.86	-.71	-

Table 7 shows the relationship among students' perception, attitude to school, academic performance and skills, as highlighted by the correlation matrix. The correlation between perception and skills is positive but strong (.89), which shows the existence of strong relationship between students who have a positive perception of generative AI with other's skills such as coding. Perception was also negatively correlated with academic performance (-.82), indicating that those favoring generative AI are maybe not on their way to higher academic success. Skills and academic performance correlate with attitude positively (skill .86, academic performance .86), indicating that attitude for learning regardless how is learned, predicts positive outcomes in both academic and nonacademic domains. Nevertheless, the inverse correlation between perception and attitude (-.71) points to the fact that although students perceive generative AI positively, that is not to say that they will fully accept it in practice and that perception alone does not necessarily lead to adoption or better academic results.

Discussion of findings

The results highlight key insights into students' perceptions, academic performance, and skill development in relation to generative AI, self-preparation, and home tutoring. While a majority of students (71.8%) perceive generative AI positively, their actual attitude toward its use is largely negative (72.57%), suggesting a gap between recognition of AI's potential and its practical application in learning. These reflects the two contrast views among studies like Eno Obot Jackson, et al. (2024); Ngonso, et al. (2025) showing the benefit of generative AI tool as against Nidhisree et al. (2024); Nnaemeke and Ogunbadejo (2024) also emphasizing its demerit.

To further confirm this stuffiness between the merit and demerit of generative tool. The result of academic performance comparisons indicate that home tutoring remains the most effective method, yielding the highest performance scores compared to generative AI and self-preparation. Home-tutored students significantly outperformed both generative AI users and self-preparatory students, emphasizing the role of structured, personalized instruction in enhancing academic success. Notably, self-preparatory students performed better than generative AI users, suggesting that independent learning strategies may foster deeper engagement compared to AI-assisted approaches that might lack structured guidance.

Despite these contrasting views, perception and skills have a consistent strong positive correlation indicating that the students who perceive generative AI positively also go on to develop good assaying skills (coding). Perception on the other hand is opposed to academic success (academic performance in this case) and has a good correlation, thus positively confirming initial findings that favoring AI does not necessarily contribute to raising academic performance. However, whereas skills are strongly positively correlated with each other and academic performance, they indicate a strong positive correlation to attitude towards learning. Students that have a better attitude towards learning (regardless of method) have better academic performance. As students noted perceived benefits of AI but also perceived lower levels of AI, perception and attitude are negatively correlated and so students may be unable to reconcile such perception with actual AI use in their academic activities.

Conclusion

The findings show that a nuanced relationship exists between generative AI, academic performance, and skill acquisition in secondary schools. A majority feels optimistic about generative AI, but its reluctance to use it for learning indicates the need for better integration. Reliance on generative AI alone is less effective than reliance on generative AI combined with traditional home tutoring or self-preparation. However, home tutoring is still the most effective method to improve academic performance. However, when it is about skill development, in particular, coding, generative AI is beating both self-preparation and home tutoring significantly, and it can potentially promote technical and transformative skills.

These insights imply that generative AI should not be regarded as a replacement for traditional learning methods because it is a supplemental tool that strengthens certain learning elements. Structured AI integration at schools and educators should be the focus that allows students to use AI effectively while at the same time retaining the advantages of conventional learning approaches. Tailored interventions and training programs to address students' negative attitudes towards AI would make AI more acceptable among students and maximize its usage in education.

Recommendation

Educators and policymakers need to bridge the gap between the positive perception of AI that students have and students' negative attitude to effectively for academic purposes. The curriculum should have structured guidance and digital literacy training so students can use AI tools for learning. Therefore, combining AI tools with personalized learning's blended approach may increase efficacy as they are pretty effective for yielding high academic performance. Schools should investigate hybrid learning models that involve generative AI with a teacher there to monitor and foster critical thinking and self-discipline. With such a massive influence of AI on learning non-academic skills (coding primarily) and in an attempt to prepare students for digital careers, AI tools should be given a prominent role in supporting the learning of technical skills. A balanced approach to encouraging generative AI as a supplementary learning method will generate better academic and transformative skill outcomes. This prompts the need to introduce an attitudinal change programme to tackle students' hesitancy in adopting AI, which would allow them to gain confidence in using AI while also enhancing their academic performance.

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