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Article

Perceptions, Use, and Challenges of AI in Nigerian Public and Private Universities

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Abstract

This mixed-method study investigated undergraduate students' perceptions, use, and challenges of artificial intelligence tools in Nigerian public and private universities during the 2024–2025 academic year. Data were collected from 272 students through a mixed-format survey. Quantitative data were analyzed using descriptive statistics, t-tests, and chi-square tests; qualitative data were analyzed through thematic coding. Results indicated high AI familiarity (88%). Public university students reported slightly more favorable perceptions of AI's impact on learning. Primary barriers included lack of technological resources, funds, and skills as well as concerns about reliability and academic integrity. Qualitative findings highlighted AI's role in
improving access to information and time management.

Keywords: Nigerian universities; artificial intelligence; private universities; public universities; ChatGPT; Meta AI

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1. Introduction

Artificial intelligence (AI), a branch of computer science, enables machines to perform tasks that typically require human intelligence, including learning from experience and improving over time (Ghosh & Arunachalam, 2021). AI can create new content, such as music, text, and speech, based on learned patterns from large datasets. Furthermore, it has shown promising results in improving student engagement, increasing knowledge retention, and fostering a supportive learning environment (Bali et al., 2024). Studies have reported a significant correlation between AI utilization and improved student learning outcomes (Bali et al., 2024; Olatunde-Aiyedun, 2024).

In recent years, the quality of university education in Nigeria has significantly declined due to various challenges, including frequent strikes by university staff that often disrupt academic calendars; this results in incomplete work and a lack of innovative teaching approaches among lecturers (Ssh-Umeora & Ogunode, 2020). This decline is further worsened by the mismanagement of education funds (Okeke et al., 2024) and a lack of commitment among some instructors (Ehioghiren & Efosa-Ehioghiren, 2023). Another predominant issue is the excessive workload placed on lecturers, which limits their lesson preparation time, diminishes instructional quality, and adversely affects teacher productivity (Amini-Philips & Okonmah, 2020). Additionally, the absence of personalized learning strategies to address disparities in student learning capabilities has led to disengagement and poor motivation among students (Gunawardena et al., 2024). Many students are also dissatisfied with unmet expectations and perceived ineffective educational experiences (Ehioghiren & Efosa-Ehioghiren, 2023). Collectively, these challenges have created a significant learning void in Nigerian higher education.

These systemic challenges have had a profound impact on students and Nigerian society as a whole, prompting urgent calls for reform. Given these ongoing and significant challenges in Nigeria's higher education system, there is a critical need for innovative and technology-driven solutions. AI can help address challenges with teaching and learning by reducing gaps in learning outcomes and improving the personalization of learning (Temitope et al., 2025).

This study contributes to understanding AI use among students in Nigerian public and private universities. With the advancement of AI tools, it is essential to understand how students engage with them. This knowledge is crucial for effectively integrating these tools into teaching, learning, and research (Almassaad et al., 2024). Furthermore, this research can help inform efforts to strengthen digital literacy and improve teaching and learning outcomes by utilizing AI in practical and beneficial ways that effectively support student learning. Although research (see Essien et al., 2024; Ibrahim et al., 2024; Ogunode et al., 2023) has been conducted on AI in the Nigerian higher education context, gaps in the research remain. This study helps to shed light specifically on the differences in students' use of AI in public and private universities in Nigeria. Although previous studies have examined university students' perceptions and use of AI in Nigeria, fewer studies have compared the experiences of students in public and private

universities. This comparison is important because access to technology, Internet connectivity and costs, AI skills, and institutional support may differ across university settings. Additionally, this study includes both qualitative and quantitative data to further enhance understanding of students' familiarity with AI, perceptions of AI, use of AI, and barriers to adoption. Finally, the results can aid the Nigerian government in more effectively strengthening educational goals and policy development pertaining to AI use in higher education. These policies could prioritize effective curriculum development, teacher training, and the provision of resources to universities to ensure that AI tools are accessible and effectively utilized. By providing a clearer understanding of how AI is being used and perceived by students, this study also contributes to the global conversation on equitable and effective AI integration in higher education. This study adds to the existing research by comparing students in Nigerian public and private universities and examining the barriers they experience when using AI.

The purpose of this study is to gain insights into students' familiarity with and perceptions of AI tools used in public and private universities in Nigeria. Specifically, it examines the extent of students' familiarity with and perceptions of AI, identifies the AI tools most commonly used, and explores the barriers to their effective use.

Research Questions

The following research questions guided the study:

1. How familiar are students in private and public universities in Nigeria with AI tools?
2. What are the students' perceptions of the use of AI tools for learning in private and public universities in Nigeria?
3. Which AI tools are most commonly used among students in private and public universities in Nigeria?
4. What are the barriers to the effective adoption of AI tools in private and public universities in Nigeria?

AI in Higher Education

AI's integration into higher education has transformed teaching, learning, and administrative processes. Through machine learning algorithms, natural language processing, and data analytics, AI facilitates personalized learning tailored to individual students' needs, preferences, and learning trajectories (Bhutoria, 2022). AI-driven recommendation systems suggest resources based on students' interests, while AI-powered chatbots enable real-time communication and collaboration (Akinrinola et al., 2024). Additionally, AI enhances administrative efficiency by automating routine tasks, such as grading and scheduling, allowing educators to focus more on instruction (Deep et al., 2024). AI has the potential to revolutionize education by offering personalized instruction and enhancing student engagement (Zhihan, 2023). It also provides innovative solutions for personalized learning, fostering creativity, and streamlining administrative tasks (Zhihan, 2023). Educational institutions benefit from improved learning experiences and student academic outcomes. Nevertheless, there are fears about the negative aspects of AI, which can hinder adoption (Ibrahim et al., 2024).

AI tools are specifically being used to augment academic experiences and outcomes. ChatGPT generates content in varied ways and enhances student understanding and creativity (Zhihan, 2023). Engaging AI tools can improve students' comprehension and critical thinking, which could lead to increased academic performance (Naamati-Schneider & Alt, 2024). Students can use AI tools to ask questions about course content they do not understand and receive immediate feedback (Naamati-Schneider & Alt, 2024). AI can also improve cognitive skills and critical thinking (Olatunde-Aiyedun, 2024). AI is effective in enhancing data visualization by generating data such as charts, graphs, or infographics and provides focused experiences that make it easier for students to understand topics (Ye et al., 2024).

Students' Perceptions of AI in Higher Education

Understanding students' perceptions of AI within the higher education context is crucial for designing supportive, effective, and equitable learning environments. Within the Nigerian higher educational context, Abubakar et al. (2024) conducted a quantitative study and found that undergraduate students (n = 421) are aware of the possibilities of AI use in higher education in improving learning outcomes; however, they indicated concerns pertaining to technical and privacy issues and not having ample training or resources to guide use more effectively. Abubakar et al.'s (2024) findings align with other international and Nigerian higher education studies on students' perceptions of AI.

A qualitative study (Nwagbara, 2025) on the use of AI for academic writing in the Nigerian context found that university students perceive AI tools to be beneficial for writing support and information retrieval, but there were concerns regarding academic ethics and over-reliance on AI. Another study by Oladokun et al. (2024) surveyed Nigerian university students on AI perceptions and use and found that the students believed ChatGPT can enhance their learning through quick and easy access to information. Furthermore, ChatGPT was reported as easy to use. However, there were concerns about accuracy, over-reliance, and misuse of ChatGPT. This study found that while ChatGPT offers benefits including time efficiency and access to a wide range of information, challenges remain such as accessing unreliable information and content becoming dated (Oladokun et al., 2024). Being aware of students' perceptions is critical for educators and higher education administrators to ensure that AI is being used appropriately and effectively, while addressing potential ethical and misuse concerns.

Barriers to the Adoption of AI in Higher Education

Despite its transformative potential, the adoption of AI in higher education faces several challenges. Some view it as a threat due to a lack of understanding of its capabilities, while others leverage it extensively to overcome academic challenges (Deep et al., 2024). Its excessive usage is worrisome as students depend on it solely for academic work; this deprives them of the opportunities to develop academic writing skills and creative thinking abilities (Yeo, 2023).

Effective integration of AI into the educational system faces challenges emanating from infrastructure limitations, technological considerations, financial constraints, and ethical concerns (Jose & Jose, 2024; Nuryadin & Marlina, 2023). Another aspect of the challenge is over-reliance on AI, which can result in laziness, misinformation, and loss of human interaction, while posing threats to academic integrity and widening the digital divide (Jose & Jose, 2024). In addition, AI tools have been found to perform poorly in data visualization, specifically, where the AI algorithms could not recognize subtle patterns that human analysts identified (Devineni, 2024). Devineni (2024) suggests that limitations in current AI technology may contribute to these inaccuracies.

Both public and private universities require AI to ensure equitable and inclusive access to education, particularly for marginalized groups (UNESCO, 2025). Unfortunately, the Nigerian educational system is challenged by significant financial constraints and large class sizes, specifically in public universities (Akinyemi et al., 2021; Bali et al., 2024). Consequently, studies have identified low awareness and limited access to AI tools among students in public universities in Nigeria (Alimi et al., 2021; Anih & Ukeh, 2024), while research in many developed countries indicates a high level of awareness (Chan & Hu,

2023). Although AI has significant potential to improve universities in Nigeria, challenges persist.

Theoretical Framework

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. (2003). It is used to better understand how and why individuals use new technologies. There are four primary factors associated with technology adoption, which include (1) performance expectancy, (2) effort expectancy, (3) social influence, and (4) facilitating conditions. Venkatesh et al. (2003) defined these as:

1) Performance Expectancy

"The degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447).

2) Effort Expectancy

"The degree of ease associated with the use of the system" (Venkatesh et al., 2003, p. 450).

3) Social Influence

"The degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451).

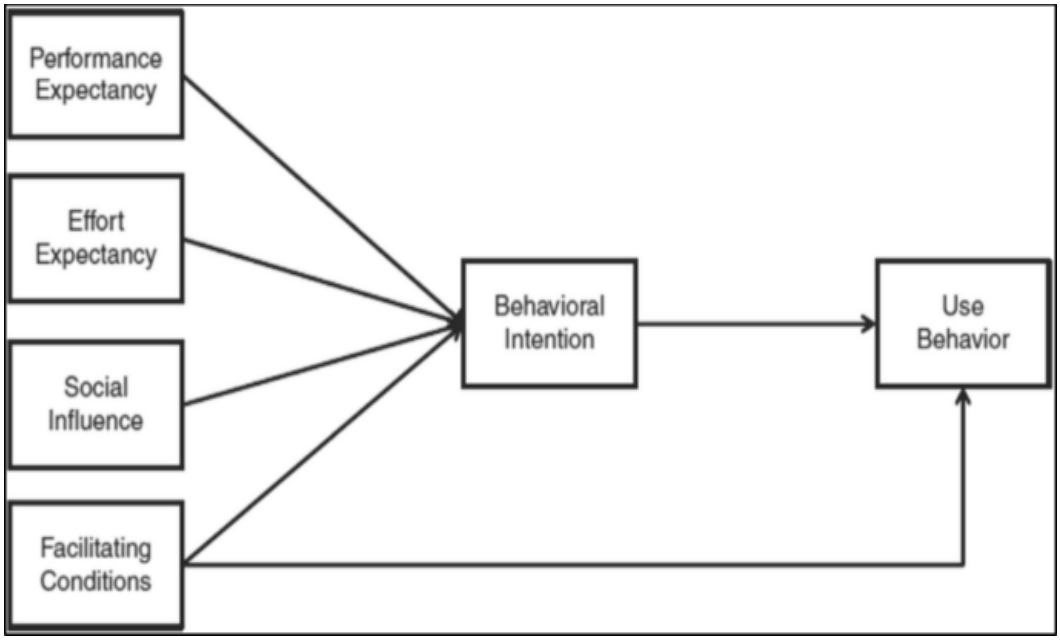
4) Facilitating Conditions

"The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453).

Figure 1 displays the UTAUT model. This model was developed and refined based on other models and theories, including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behaviour (TPB), a combined model of TPB and TAM, the innovation diffusion theory (IDT), the social cognitive theory (SCT), and the model of PC utilization (MPCU).

Figure 1

UTAUT Model



Note. UTAUT Model (Venkatesh et al., 2003)

The UTAUT model has been used in studies pertaining to AI within the higher education context (see Chatterjee & Bhattacharjee, 2020; Du & Lv, 2024; Kim et al., 2025; Sergeeva et al., 2025). In the Nigerian higher education context, a study by Yakubu et al. (2025) found that performance expectancy, effort expectancy, and social influence are determinants of plans to utilize AI tools whereas the remaining factors of UTAUT showed no significant impact on students' intention to use AI tools. There is a wide range of factors to consider in terms of technology acceptance and integration. With the advent of generative AI in particular, further studies are warranted to better understand use and perceptions. The UTAUT is used as a conceptual lens for interpreting the findings of the study. The study did not intend to measure each UTAUT construct independently; instead, the framework provides a structure to better understand students' perceptions of AI use.

2. Research Methods

This study employed a cross-sectional design utilizing a convergent mixed-method approach to explore Nigerian university students' perceptions and experiences with AI tools during the first semester of the 2024–2025 academic session. A mixed-method approach was adopted to examine the complex nature of students' perceptions that can be better captured through qualitative and quantitative data. Mixed-method research allows for a deeper understanding of both quantitative trends and qualitative insights (Creswell & Plano Clark, 2018), which is ideal for this study seeking to provide a more comprehensive understanding of AI in the Nigerian higher education context. Furthermore, a convergent approach was used, which involved collecting and analyzing both quantitative and qualitative data concurrently to provide a more holistic understanding of the phenomenon being explored. Participants comprised university undergraduate students in both private and public universities in Nigeria. The convenience sampling approach was used to select respondents across multiple academic disciplines (clinical science, arts, social sciences, engineering, education, and sciences). The study included a sample of 272 undergraduate students from six universities in Nigeria. Participants were informed of the purpose of the study and that participation was voluntary.

Research Participants

Table 1 provides the demographic characteristics of the participants, including age, gender, university type (private or public), and college assigned (field of study). The majority of the respondents were in the age range of 18–24. The sample size consisted of more female students than male, and public universities had more respondents than private. The majority of the participants were from the clinical sciences, which reflects the voluntary nature of respondents.

Table 1

Participants' Demographic Characteristics

	Frequency	Percentage
Age		
Under 18	43	15.8
18–24	213	78.3
25–30	16	5.9
Total	272	100
Gender		
Male	128	47.1
Female	144	52.9
Total	272	100
University Type		
Private	62	22.8
Public	208	76.5
Missing	2	0.7
Total	272	100
College (Field of Study)		
Clinical Sciences	77	28.3
Social Sciences	10	3.7
Education	54	19.9
Sciences	44	16.2
Engineering	60	22.1
Arts	21	7.7
Others	6	2.2
Total	272	100.0

Note. N = 272. University type data were available for 270 participants; two participants did not report university type.

Instrument

The researchers utilized a self-developed closed-ended questionnaire with three open-ended questions. For the closed-ended survey, students were asked if they were familiar with AI tools, if they had ever used AI, and to indicate which AI tools they had used. For the impact of AI on learning, the Likert scale was used. Each item was scored on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). To find out the students' perceptions of the barriers to AI, eight items were included. For the open-ended questionnaire, students were asked to specify other barriers not listed above, to recommend additional features that could make AI more effective, and to give additional information on how AI could enrich their learning experience. The questionnaire instrument was validated by four specialists in the faculty of education and computer science to assess relevance, clarity, and appropriateness of items. The reliability of the instrument was ascertained by administering copies of the questionnaires to 24 students in universities not included in the studied areas. The data collected from the pilot test were subjected to internal consistency reliability testing.

Data Collection

Both the closed-ended and open-ended surveys were administered simultaneously using Google Forms. Established ethical standards were followed in data collection. The instrument was distributed through students' departmental WhatsApp platforms in November 2024. The course representatives of various

sampled departments were consulted and asked to post the survey on their WhatsApp platforms. Responses were collected anonymously. In addition, students were not pressured to participate in the study. The study sample consisted of 272 students (except for university type which was $N = 270$), distributed across various academic disciplines in public and private universities in Nigeria. However, two responses contained missing data for university type; therefore, 270 responses were included in the final analysis.

The open-ended survey responses were utilized as a supplementary component to provide additional context for the quantitative results. The open-ended survey responses were generally terse, so the qualitative data were not intended to lead to an in-depth analysis. The data were collected to better inform recurring views and better contextualize the quantitative data.

Data Analysis

The researchers used SPSS statistical analysis software to analyze the data. To establish the reliability of the research instrument, Cronbach's alpha was utilized to test the internal consistency of the data collected from the pilot test. The results indicated strong internal consistency for the AI-enhanced learning scale ($\alpha = .910$) and marginal internal consistency for the barriers scale ($\alpha = .690$).

Thematic coding was used to analyze the qualitative open-ended survey results. Thematic coding involved identifying and analyzing participant responses, which led to the generation of themes and patterns (Braun & Clarke, 2006). The responses were reviewed multiple times, and line-by-line coding was conducted to highlight emerging ideas. Initial codes were grouped into related categories and were then organized into broader themes. Final themes were determined based on recurring patterns across participant responses and their connection to the research questions. Key concepts that emerged were organized into sub-themes, which were grouped under broader themes.

3. Results

Quantitative Data

Descriptive statistics were used to summarize usage patterns. Perceptions, frequency distributions, percentages, means, and standard deviations were used for research questions, while the *t*-test was used to examine differences across school types, and chi-square examined the relationship in familiarity levels between public and private university students. The study interpreted 2.5 mean scores as the benchmark of acceptance in a 4-point Likert scale because scores greater than 2.5 indicate a general tendency toward agreement. The reason for using both groups of universities was to conduct a comparative analysis of AI's impact on learning in both university types.

Table 2

Students' Familiarity with AI Tools in Nigerian Universities

	Are you familiar with AI	*n*	%
1	Yes	237	88
2	No	24	9
3	Not sure	9	3
	Total	270	100

Note. $N = 270$.

Table 2 provides data on students' familiarity with AI in Nigerian universities. The results indicate that most students (87.8%) were familiar with AI, 8.9% were not familiar with AI, and 3.3% were unsure about their familiarity.

Table 3

Commonly Used AI Tools for Learning Purposes

S/N	AI tools	Frequency		Percentage		Remark
		Yes	No	% yes	% no	
1	ChatGPT	209	61	77.4	22.6	Used
2	Grammarly	66	204	24.4	75.6	Not Used
3	Virtual Tutor	2	268	0.7	99.3	Not Used
4	QuillBot	46	224	17.0	83.0	Not Used
5	Meta AI	178	92	65.9	34.1	Used
6	DALL-E	11	259	4.1	95.9	Not Used
7	Notion	15	255	5.6	94.4	Not Used
8	Copyscape	0	270	0	100.0	Not Used
9	Tutor AI	10	260	3.7	96.3	Not Used
10	Others	10	260	3.7	96.3	Not Used

Note. Others include Claude, Gemini, Perplexity, Copilot, and Zura AI as identified by respondents.

Table 3 reveals that the most frequently used tool for learning purposes was ChatGPT (77.4%), making it the most popular tool for learning. Meta AI was the

second most popular tool used by students (65.9%). The moderately used tool was Grammarly, recording 24.4% usage, while the remaining tools, including DALL-E, Notion, Tutor AI, Virtual Tutor, Claude, Gemini, Perplexity, Copilot, Zura AI, and Copyscape recorded usage rates below 20%. Overall, the findings suggest that students' engagement with AI tools for learning is concentrated around ChatGPT and Meta AI while more specialized AI tools remain underutilized.

Table 4

Mean Responses of Students' Perceptions of AI Tools Usage for Enhanced Learning

S/N	AI Tools	Public University (N = 208)			Private university (N = 62)		
		$\bar{x}$	SD	Decision	$\bar{x}$	SD	Decision
1	Make learning more engaging	3.25	0.586	Agree	3.35	0.482	Agree
2	Improve comprehension	3.26	0.540	Agree	3.06	0.248	Agree
3	Help me understand complex subjects	3.31	0.566	Agree	3.24	0.432	Agree
4	Save time while studying	3.25	0.569	Agree	3.26	0.441	Agree
5	Improve the quality of my assignment	3.25	0.496	Agree	3.13	0.424	Agree
6	Are easy for me to use	3.32	0.562	Agree	3.21	0.410	Agree
7	Help me to complete assignments	3.33	0.531	Agree	3.23	0.493	Agree
8	Enhance the quality of my work	3.23	0.516	Agree	3.16	0.451	Agree
9	Motivate me to explore more	3.13	0.552	Agree	2.69	0.612	Agree
10	Improve my critical thinking skills	2.97	0.645	Agree	2.52	0.565	Agree
11	Increase my problem-solving skills	3.01	0.619	Agree	2.58	0.560	Agree
12	Improve my research efficiency	3.26	0.564	Agree	2.87	0.713	Agree
13	Provide helpful feedback	3.25	0.495	Agree	2.94	0.624	Agree
14	Help develop my communication skills	3.19	0.594	Agree	2.94	0.624	Agree
15	Provide occasional clarification	3.26	0.482	Agree	3.16	0.371	Agree
	Total Mean	3.21		Agree	3.02		Agree

Table 4 shows that public university students have a grand mean of 3.21, while private university students have a total mean of 3.02, indicating overall agreement that AI tools enhance learning. Both groups recognized that AI tools make learning more engaging, with public university students reporting a mean of 3.25 and private university students reporting 3.35. For completing assignments, the mean was 3.33 for public students and 3.23 for private students, while both groups agreed that AI tools save time (3.25 for public and 3.26 for private). However, private university students reported lower means for the following items: "improves critical thinking skills" (2.52 for private vs. 2.97 for public), "boosts problem-solving skills" (2.58 for private vs. 3.01 for public), and "motivates exploration" (2.69 for private vs. 3.13 for public). The standard deviations, ranging from 0.482 to 0.645 for public universities and 0.248 to 0.713 for private universities, suggest consistency in the data and relatively low variability.

Table 5

Barriers to AI Usage by Students Based on University Type

S/N	Barriers to effective use of AI	Public University			Private University		
1	I lack the technological resources for AI	3.01	0.653	Agree	2.97	0.404	Agree
2	I don’t have funds to buy data to use AI	2.97	0.802	Agree	2.52	0.565	Agree
3	I lack the skills to use AI	2.92	0.680	Agree	3.00	0.444	Agree
4	I refuse to adopt AI tools	2.26	0.730	Disagree	2.55	0.803	Agree
5	AI could give wrong information	2.86	0.768	Agree	2.77	0.556	Agree
6	AI lacks clear directives on usage	2.69	0.736	Agree	2.65	0.603	Agree
7	I am not familiar with AI	2.16	0.764	Disagree	2.26	0.723	Disagree
8	I overdepend on AI tools	3.05	0.757	Agree	3.10	0.524	Agree
	Total Mean	2.74			2.72		Agree

Table 5 reveals several barriers to the use of AI tools across both public and private universities. For example, both groups reported a similar level of agreement on barriers such as the lack of technological resources for AI (public: 3.01, private: 2.97), lack of funds for AI tools (public: 2.97, private: 2.52), and lack of skills to use AI (public: 2.92, private: 3.00). Both groups agreed on AI providing incorrect information (public: 2.86, private: 2.77) and lack of clear directives on AI usage (public: 2.69, private: 2.65).

As noted above, both groups also disagreed that unfamiliarity with AI was a significant barrier (public: 2.16, private: 2.26). The total mean scores (public: 2.74, private: 2.72) suggest that while there are some slight variations, both groups generally agree on the barriers to the effective use of AI tools. The standard deviations show a degree of homogeneity in the responses.

Hypothesis 1
There is no significant relationship between AI familiarity and university type.

Table 6

Chi-Square Tests of Independence

	Value	*df*	Asymptotic Significance (2-sided)
Pearson X^2	4.146	2	0.126
Likelihood Ratio	6.036	2	0.049
Linear-by-Linear Association	0.513	1	0.474
Number of Valid Cases	270		

Note. 1 cell (16.7%) has an expected count of less than 5. The minimum expected count is 2.07 at .05 level of significance.

Table 6 reveals a discrepancy between the two chi-square estimates. The Likelihood Ratio test was statistically significant, $\chi^2(2, N = 270) = 6.036$, $p = .049$, whereas the Pearson chi-square test was not, $\chi^2(2, N = 270) = 4.146$, $p = .126$. This divergence is likely due to the presence of one cell (16.7%) with an expected count of 2.07, which is below the conventional minimum of 5. This percentage falls within Cochran's guideline that no more than 20% of cells should have expected counts below 5. In addition, a cell this close to the benchmark can still cause the two tests to diverge, especially since the Likelihood Ratio test is more affected by low expected frequencies than the Pearson test. Hence, the Pearson result was taken as the basis for testing the hypothesis, and the result indicates no significant relationship between university type and AI familiarity. However, the marginal Likelihood Ratio result warrants some caution in this interpretation.

Table 7

Mean Score Perceptions of Public and Private University Students on AI

School Type	*n*	*M*	*SD*	*t*	*df*	*p*	*95% CI*	*d*
Public	208	3.21	0.377	3.660	268	< .001	(0.08, 0.29)	0.52
Private	62	3.02	0.322					

Note. CI = confidence interval for the mean difference; *d* = Cohen's d, while *t, df, p,* and *CI* describe the comparison between groups.

Table 7 provides the result of an independent-samples *t*-test conducted to compare the mean perception scores of students on AI tools for enhanced learning between public universities and private universities ($n = 270$). Levene's test indicated the assumption of homogeneity of variance was met, $F(1, 268) = 0.61$, $p = .434$, so equal variances were assumed. Shapiro-Wilk tests indicated both groups' scores deviated from normality (both p values $< .01$). The Mann-Whitney U test confirmed the same ($U = 8314.0$, $p < .001$).

As shown in Table 7, public university students reported higher perceptions of generative AI than private university students ($t(268) = 3.66$, $p < .001$, $d = 0.52$). Also, the average score for public university students was about half a standard deviation above the average score for private university students, and the two groups' distributions overlapped by approximately 80%. The 0.19-point difference on the 4-point scale, together with a 95% confidence interval that excluded zero by a comfortable margin, indicates a difference that is statistically reliable.

Qualitative Data

AI Impacting Learning

For the qualitative data, students were asked to provide additional ways AI could impact learning. Two areas of impact were identified, which include (1) access to a wide range of information and (2) efficiency and time management. Participants noted that AI can provide access to a wide range of information. For example, it can "make things understandable to students," "create more insights on topics," and "boost vocabulary." Participants also mentioned that it "makes learning more engaging," "provides straightforward answers," and helps "break down explanations" for better clarity. Additionally, participants highlighted how AI can make learning more convenient and quickly find resources to improve learning. In terms of efficiency and time management, participants stated that AI improved efficiency and time management. Some representative examples include that it "reduces stress of visiting the library," "allows me to finish my projects on time," "helps in summarizing specific topics," and "simplifies my work."

Barriers to AI Adoption

Participants were asked to mention additional barriers to AI adoption; from their responses, two themes emerged, which include concerns about reliability and accuracy and impact on learning and academic integrity. Participants highlighted concerns with reliability and accuracy when using AI. Representative examples include: "it tends to make errors," "I am afraid of being wrongly informed," "provides wrong answers most times," and "cannot give all the information needed." Additionally, participants underscored the impact of AI on learning and academic integrity. For example, students indicated: "It limits students to do further research," "lecturers are not happy when students overuse of AI," "it diminishes their hard work," and "students fail to research more because of generative AI tools."

Recommendations for Improvement

In the third question, students were asked to make suggestions for possible improvement of AI tools. Three themes were identified, which include

improvement through precision, enhancing understanding through visualization, and establishing clear guidelines. Participants noted that "AI should be refined to improve on its accuracy," "make reliable in practical application," "it should be improved to solve more complex mathematical problems," "it should have less errors," "improved accuracy," "it should be updated with correct information," and "be able to calculate." Participants also discussed the role of AI in enhancing understanding through visualization. They stated that AI should be "upgraded to use videos for better learning," "upload pictures and use it properly," "search out (find) pictures and tell their meaning," "generate clear images," and the "ability to access files and use diagrammatic representation to solve mathematical problems." Participants also noted that AI should have more regulatory structures to help students use it properly and "have rules on the correct use of AI."

4. Discussion

Findings indicated that 88% of Nigerian students were familiar with AI, 3.3% were unsure about their familiarity with AI, and 8.9% were not familiar with AI. From the table analysis, the majority of Nigerian university students were familiar with AI. This finding is in disagreement with the observation of Alimi et al. (2021) that Nigerian students were not aware of AI. The differences observed between the two studies may be attributed to the time frame. Alimi et al.'s study was carried out in 2021, a time when AI tools were not widely used as they are now. Findings also indicate that 183 (77.2%) public university student participants were familiar with AI tools while 54 (22.8%) of private university student participants were familiar with AI tools indicating that public university students were more likely to indicate familiarity with AI tools compared to private university students. There is minimal uncertainty about AI familiarity among students, and those unsure (n = 9) were only from public universities. The finding aligns with Chan and Hu (2023) who found that students were generally familiar with AI and that the level of familiarity is influenced by other factors.

The findings reveal that ChatGPT was the most frequently used AI tool, used by 209 students (77.4%). Meta AI was the second most frequently used tool, reported by 178 students (65.9%). Grammarly was moderately used by 66 (24.4%) students, indicating lower adoption despite its relevance in education. QuillBot, DALL-E, and Notion indicated low adoption with 17.0%, 4.1%, and 5.6%, respectively. These findings show that ChatGPT and Meta AI were high-usage AI tools, while those with limited adoption suggest a lack of student awareness and accessibility. Although Grammarly and QuillBot are important for academic purposes, their moderate usage rates indicate a need for better integration.

Public university students reported a higher grand mean (3.21) than private university students (3.02), indicating overall agreement that AI tools enhance learning. Public university students generally reported higher mean scores, although differences varied across individual items. Private university students reported lower means for improving critical thinking skills (2.52 vs. 2.97), increasing problem-solving skills (2.58 vs. 3.01), and motivating exploration (2.69 vs. 3.13). Public university students perceive AI tools as slightly more beneficial for learning than private university students. This finding aligns with the observation of Naamati-Schneider and Alt (2024) who describe AI tools as engaging and suggest they can improve students' comprehension and critical thinking, which could lead to increased academic performance.

The qualitative findings helped provide deeper insights into the quantitative results. Students at both public and private universities indicated that AI helped support their learning through better comprehension, assignment completion, and time management. Examples of open-ended responses include AI helps to "make things understandable," "create more insights on topics," and "break down explanations." These responses support the quantitative findings while providing examples of how students experienced the perceived benefits of AI in their academic work.

Table 5 presents the barriers to using AI; results show that the lack of technological resources for AI tools is a barrier in both university types with public (3.01), private (2.97); "lack of funds to buy data" public (2.97), private (2.52); "lack of skills to use AI" public (2.92), private (3.00); "AI could give wrong information" public (2.86), private (2.77); "lack of guidelines on AI usage" public (2.69), private (2.65); and "overdependence on AI tools" public (3.05), private (3.10). Both groups disagreed that unfamiliarity with AI was a significant barrier (public: 2.16, private: 2.26). Public university students disagreed that refusal to adopt AI tools was a barrier (2.26), whereas private university students agreed (2.55). A grand mean of 2.74 for public universities and 2.72 for private universities suggests that students in both university types generally agree on the barriers to using AI tools with slight variations in their perceptions. Research has noted that AI can foster laziness, misinformation and bias, and loss of human interaction (Jose & Jose, 2024). In addition, the adoption of AI faces challenges emanating from infrastructure limitations, technological considerations, technical gaps, financial constraints, and ethical concerns (Jose & Jose, 2024; Nuryadin & Marlina, 2023).

The qualitative responses also supported the quantitative findings related to barriers to AI use. Students in both university types reported concerns about inaccurate information, lack of clear guidance, and overdependence on AI. Examples of open-ended responses include statements that AI "tends to make errors" and concerns were also raised about being "wrongly informed." Other responses indicated that reliance on AI could discourage students from conducting further research. These responses provide additional context for the quantitative findings. They highlight how concerns about reliability and overdependence may affect students' academic experiences.

The Pearson chi-square test was not statistically significant, $\chi^2(2, N = 270) = 4.146$, $p = .126$. This means that the null hypothesis was not rejected, and we conclude that there is no statistically significant association between university type and AI familiarity.

Table 7 presents the t-test results comparing the mean scores of perceptions of public and private university students on AI. An independent-samples t-test revealed a statistically significant difference between public and private university students, $t(268) = 3.66$, $p < .001$. The p-value ($p < .001$) is less than the significance level (.05), indicating that there is a statistically significant difference in the mean perceptions of public and private university students on AI. These results align with the mean scores, with public university students (3.21) reporting more favorable perceptions than private university students (3.02).

AI is a versatile tool that enhances research and knowledge generation across disciplines (Dignum et al., 2024). Its broad applicability has made it an effective learning aid for students. Many reported that it makes learning more understandable, with comments like "makes things understandable," "creates

insights," and "boosts vocabulary." Students also appreciated its convenience, noting that it provides "straightforward answers," "breaks down explanations," and gives "resources at my fingertips." One student mentioned that it "expands views on a subject." This aligns with Russell and Norvig's (2016) observation that AI offers valuable information across various fields. AI is effective in improving work efficiency by enhancing data analysis, generating exercises, verifying data accuracy, and analyzing emerging trends (Tarasiuk, 2024). Its ability to create test questions and generate text reduces the time burden on teachers and students, creating opportunities for efficiency and time management (Tarasiuk, 2024). Lack of access to AI widens the digital divide (Sarkar & Sarkar, 2024). AI users should be able to have confidence in the tool to be able to use it frequently; issues regarding accuracy require the attention of developers to ensure accountability in AI systems (Sarkar & Sarkar, 2024).

Studies have reported that AI impacts learning, and the issue of academic integrity is a big concern since students can use ChatGPT to create original works with minimal input (Yeo, 2023). In support of these observations, Sarkar and Sarkar (2024) noted that AI developers should ensure accountability and transparency in AI systems. AI technology offers distinct advantages in learning. It is effective in visualization. For instance, the GenAI4vis (generative AI for visualization) application can be used for creating illustrations, data enhancement, virtual mapping generation, stylization, and interaction tasks (Ye et al., 2024). UNESCO (2025) developed an AI competency framework that guides students and teachers on how to use AI technology responsibly and make informed decisions on the tools; however, Nigeria has no specific law that regulates the use of AI.

The findings can also be considered through the UTAUT framework (Venkatesh et al., 2003). Students reported several perceived benefits of AI, including improved comprehension, time savings, support with assignments, and greater research efficiency, which relate to performance expectancy. Their familiarity with AI and perceptions of its ease of use relate to effort expectancy. Facilitating conditions are reflected in some of the barriers students reported, including limited technological resources, data costs, lack of skills, and limited guidance on AI use. Social influence was not directly measured in this study. While these findings relate to several UTAUT constructs, the framework was used to help interpret the findings rather than to formally test the UTAUT model.

5. Conclusions

There are practical implications that should be considered in light of the findings. It would be beneficial for Nigerian universities to better integrate AI into educational policies. Furthermore, the Nigerian government should prioritize funding for AI integration into universities and general technological infrastructure. In addition, having reliable Internet access is vital for students seeking to use AI; however, connectivity and access issues can be problematic. Nigerian universities should also prioritize the integration of AI into curriculum and training for students and faculty. AI literacy workshops and professional development sessions could be impactful. Although the benefits of AI were highlighted, participants discussed the ethical use of AI and academic integrity. Clear guidelines must be established at the university level and even within specific departments and colleges.

Although this study provides valuable insights into AI use and perceptions among public and private university students in Nigeria, limitations exist. The sample size may not represent the broader Nigerian university population. The data were collected in the 2024–2025 academic year; as time progresses, the data can potentially change. Finally, the depth of qualitative data was lacking; open-ended survey responses tended to be just a few words. In light of these limitations, suggestions for future research include more in-depth qualitative studies on Nigerian university students' perceptions and use of AI. In particular, more specific research on generative AI would be beneficial. In addition to gathering university students' perceptions, having more faculty and administrator data would also better inform policy and practice. Finally, efforts should be made to include participants from a broader geographic range, especially rural areas where Internet access remains a major obstacle.

Based on the findings, the study recommends that government policies be directed toward reducing data costs for educational use, as cost remains a major barrier for many students. Universities should also provide free Wi-Fi access to hostels, libraries, and lecture halls. At the institutional level, universities should develop clear, well-communicated policies on AI use in teaching and learning. In addition, universities should provide structured AI literacy training for students and lecturers covering both how to use AI tools effectively and the ethical boundaries guiding their use.

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