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Undergraduate Students' Use of Artificial Intelligence Tools for Learning: Patterns, Perceived Benefits and Concerns

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Abstract

This study examined how undergraduates use artificial intelligence (AI) tools for learning, the benefits they perceive and their concerns. A descriptive survey design was used. A researcher-developed questionnaire was completed online by a convenience sample of 86 undergraduates aged 18 and above, mostly Science students (69.8%), at two public universities in North-West Nigeria. Data were analysed with descriptive statistics, 95% confidence intervals, t-tests, ANOVA and Spearman correlations. Of the respondents, 84.9% had used AI tools, mainly ChatGPT (87.7% of users) and Meta AI (50.7%), 71.2% of users used them at least several times a week, chiefly to explain difficult topics (86.3%). Users agreed that AI tools are beneficial (mean = 4.07), and perceived usefulness was moderately related to frequency of use ($\rho = .33$). Respondents were undecided about concerns overall (mean = 3.32) but agreed that AI tools sometimes give wrong answers, and most did not regard using AI for assignments as cheating. No significant differences in perceived benefits were detected by gender or level of study, although small subgroups limit these comparisons. Clear institutional guidelines and AI-literacy training are recommended.

Keywords: artificial intelligence, ChatGPT, undergraduate students, science education, technology acceptance, Nigeria

1 Introduction

Artificial intelligence (AI) has moved quickly from research laboratories into the daily lives of students. Since the public release of ChatGPT in November 2022, generative AI tools such as ChatGPT, Gemini, Meta AI and Claude have become freely available on ordinary smartphones. These tools can explain concepts, solve problems step by step, summarise texts and write computer code within seconds. As a result, they are changing how students study, prepare for examinations and complete assignments (Kasneci et al., 2023). For science and mathematics education, these tools offer real opportunities. Students who struggle with abstract concepts can request a simpler explanation, a worked example or a different method at any time. This is especially valuable in Nigerian universities, where large class sizes and high student-to-lecturer ratios often limit individual attention. At the same time, educators have raised concerns that AI tools can give wrong answers, weaken independent thinking and make academic dishonesty easier (Cotton et al., 2024; Miao & Holmes, 2023).

Policy has not kept pace with this change. Nigeria's National Artificial Intelligence Strategy was still at the draft stage in 2024 (Federal Ministry of Communications, Innovation and Digital Economy [FMCIDE], 2024), and reviews of AI adoption in Nigerian and African higher education identify the absence of institutional policies and guidelines as a major barrier, alongside weak digital infrastructure and poor internet connectivity (Christopher et al., 2026; Maluleke, 2025). Lecturers and administrators therefore make decisions with limited local evidence about what students actually do with these tools. Most survey evidence on students' use of generative AI comes from Asia, Europe and the Middle East (Chan & Hu, 2023; Gasaymeh et al., 2025; Stöhr et al., 2024; Strzelecki, 2024). The Nigerian survey studies identified in our search focused mainly on ChatGPT alone and on universities in the southern part of the country (Abdulmumin & Abdulrahman, 2025; Nnaemeka & Ogunbadejo, 2024). Little is known about how undergraduates in North-West Nigeria,

particularly science and education students, use the range of AI tools now available, what benefits they see, and what difficulties they face. This study addresses that gap.

The main purpose of this study was to investigate undergraduate students' use of AI tools for learning. Specifically, the study sought to:

1. Determine how often and for what purposes undergraduates use AI tools for learning, and whether these patterns differ by gender and faculty.
2. Identify the benefits undergraduates perceive in using AI tools for learning.
3. Identify the concerns and challenges undergraduates have about using AI tools.
4. Examine whether perceived usefulness and ease of use are related to how often students use AI tools.
5. Compare the concerns of students who use AI tools with those of students who do not.
6. Determine whether male and female undergraduates differ in their perceived benefits of AI tools.
7. Determine whether undergraduates at different levels of study differ in their perceived benefits of AI tools.

1.1 Research Questions and Hypotheses

This study sought to answer the following research questions:

1. How often, and for what purposes, do undergraduates use AI tools for learning, and do these patterns differ by gender and faculty?
2. What benefits do undergraduates perceive in using AI tools for learning?
3. What concerns and challenges do undergraduates have about using AI tools for learning?
4. Are perceived usefulness and perceived ease of use related to how often students use AI tools?
5. Do AI users and non-users differ in their concerns about AI tools?

The following null hypotheses were tested at the 0.05 level of significance:

H_{01}: There is no significant difference between male and female undergraduates in their perceived benefits of AI tools for learning.

H_{02}: There is no significant difference among undergraduates at different levels of study in their perceived benefits of AI tools for learning.

Non-directional (two-tailed) tests were used because previous findings on gender are inconsistent. Some studies report higher use and more positive attitudes among male students (Morell-Mengual et al., 2025; Stöhr et al., 2024), while others find no significant gender difference (Gasaymeh et al., 2025). No study identified in our search reported a consistent direction of difference by level of study.

1.2 Significance of the Study

The findings will help university management and Senate committees draft evidence-based guidelines on the use of AI tools in teaching, learning and assessment. Lecturers will gain insight into how their students already use AI, which can guide the design of assignments that test genuine understanding. Students will benefit from training programmes that address the concerns identified, such as wrong answers and over-dependence. The study also adds data from North-West Nigeria to the growing international literature on AI in education.

2 Literature Review/Theoretical Framework

Literature for this review was identified through keyword searches of online scholarly databases and journal websites, using terms such as "ChatGPT", "generative AI", "university students", "Nigeria", "Africa", "gender" and "academic integrity", with a focus on studies published from 2019 onwards.

2.1 Technology Acceptance Model (TAM) as an Interpretive Lens

The study draws on the Technology Acceptance Model (TAM) proposed by Davis (1989). TAM states that people's decision to adopt a technology depends mainly on two beliefs. The first is perceived usefulness, which is the degree to which a

person believes the technology will improve their performance. The second is perceived ease of use, which is the degree to which a person believes using it will be free of effort. When both are high, people form a positive attitude and are more likely to use the technology regularly. Strzelecki (2024) found that expected performance gains and habit strongly predicted university students' intention to use ChatGPT. In this study, TAM is used mainly as an interpretive lens rather than as a model to be fully tested. The benefits scale includes items on perceived usefulness (for example, "AI tools help me understand difficult topics better") and one item on perceived ease of use ("AI tools are easy to use"). Attitude and behavioural intention were not measured as separate TAM constructs. However, the study does examine one core TAM proposition: whether perceived usefulness and ease of use are related to frequency of use (Research Question 4). Because the benefits scale was answered only by users, the study cannot examine why non-users have not adopted AI tools.

2.2 AI Tools in Higher Education and STEM

AI in education is not new. Zawacki-Richter et al. (2019) reviewed AI applications in higher education and identified four main uses: profiling and prediction, assessment and evaluation, adaptive systems and personalisation, and intelligent tutoring systems. Generative AI tools have since made tutoring-like support available to any student with a phone. Kasneci et al. (2023) noted that large language models can support personalised learning, problem solving and writing, but warned that they can produce confident but wrong answers and may reduce critical thinking if used without guidance. Field of study matters, in a survey of 5,894 Swedish university students, those in technology and engineering reported higher use and more optimism about AI chatbots than students in the humanities and medicine (Stöhr et al., 2024).

2.3 Students' Perceptions of Benefits and Concerns

Chan and Hu (2023) surveyed 399 university students in Hong Kong. Students were generally willing to use generative AI for personalised learning support, writing, brainstorming and research, but were concerned about accuracy, privacy, plagiarism, over-reliance and the lack of institutional policy. In Spain, Morell-Mengual et al. (2025) found that 61.4% of 974 students used generative chatbots for their studies, and the most common motivation was understanding difficult topics. In Jordan, education students reported moderate use of ChatGPT for both academic and personal purposes (Gasaymeh et al., 2025).

2.4 Gender and Group Differences

Evidence on gender differences is mixed. Stöhr et al. (2024) found that male students reported higher use and more optimism, while female students expressed more concern about AI in learning and assessment. Morell-Mengual et al. (2025) similarly found higher use among men (69.0% vs 59.6%), and that women were more concerned about over-reliance. In Nigeria, Abdulmumin and Abdulrahman (2025) reported that gender influenced perceptions and use of ChatGPT. In contrast, Gasaymeh et al. (2025) found no significant gender difference, although their comparison rested on only 15 male students. This pattern suggests that group comparisons in small samples should be interpreted with caution.

2.5 Academic Integrity in the African Context

Concerns about academic integrity predate generative AI. In a study of 131 STEM students at a Ghanaian polytechnic, most students were aware of institutional rules on academic dishonesty, but only 31% rated their understanding of them as high, and copying with permission was seen as far less serious than copying without it (Saana et al., 2016). Cotton et al. (2024), in a commentary on ChatGPT, argued that such tools make copied work harder to detect and that universities should redesign assessments instead of relying only on detection. A systematic review of 113 studies on AI in African higher education identified threats to academic honesty, data privacy risks, unequal connectivity and weak institutional policy readiness as the main ethical concerns (Maluleke, 2025).

2.6 Infrastructure, Cost and Studies in Nigeria

Access is a long-standing challenge for Nigerian students. Ani (2010) found that undergraduates in three Nigerian universities relied mainly on commercial cybercafés because institutional internet access was poor and unreliable. More recent reviews still list inadequate digital infrastructure and poor connectivity as major barriers to the adoption of generative AI in Nigerian higher education (Christopher et al., 2026). Nigerian survey studies report high awareness and positive views

of ChatGPT. Nnaemeka and Ogunbadejo (2024) found high awareness and knowledge of ChatGPT among undergraduates of Nnamdi Azikiwe University, Awka, alongside concerns about plagiarism and weakened critical thinking. Abdulmumin and Abdulrahman (2025) found that Nigerian undergraduates viewed ChatGPT favourably for simplifying learning and completing assignments. Gogo (2025) reported that undergraduates in Enugu widely used AI tools for paraphrasing, grammar correction and research support.

2.7 Gap in the Literature

Most previous studies focused on ChatGPT alone, or were carried out outside Nigeria or in southern Nigerian universities. Few have examined the full range of AI tools now used by students, including Meta AI on WhatsApp, among science and education undergraduates in North-West Nigeria. Findings on gender differences are mixed (Gasaymeh et al., 2025; Stöhr et al., 2024), and little Nigerian evidence links students' perceived benefits to how often they use AI tools. The present study addresses these gaps.

3 Materials and Methods

3.1 Research Design

The study adopted a descriptive survey design. This design suits studies that collect data from a group of people to describe their current practices and opinions without manipulating any variable.

3.2 Population and Sample

The population comprised undergraduate students in universities in North-West Nigeria. An online convenience sampling technique was used, the questionnaire link was shared on departmental and class WhatsApp groups, and students who chose to respond formed the sample. Data were collected between 19 and 22 October 2026. The number of groups and students who received the link was not recorded, so a response rate cannot be calculated. A total of 90 responses were received. Four respondents who reported being below 18 years of age were excluded, because the implied-consent procedure used was not appropriate for minors (see Section 5.5). The final sample was therefore 86. Respondents came from two public universities in North-West Nigeria. University A (n = 76, 88.4%) and University B (n = 6, 7.0%), four respondents (4.7%) did not name their institution. University names are withheld for blind review. The form did not require sign-in, so duplicate entries could not be fully prevented, however, the data were checked and no duplicate responses were found.

Because participation depended on who saw the link and chose to respond, the sample is likely to over-represent students who are active online and on WhatsApp. It was also not balanced, most respondents were male (84.9%) and from the Faculty of Science (69.8%), and only two were in 500L. The sample size was set by the time available rather than by a power calculation, it is adequate for describing the respondents but too small for reliable subgroup comparisons. The findings therefore describe the students who responded rather than all undergraduates in the region. Table 1 shows the profile of the respondents.

Table **1**

Demographic Profile of Respondents (N = 86)

Variable	Category	Frequency	Percentage (%)
Gender	Male	73	84.9
	Female	13	15.1
Age	18–21	42	48.8
	22–25	32	37.2
	26 and above	12	14.0
Level	100L	15	17.4
	200L	24	27.9
	300L	22	25.6
	400L	23	26.7
	500L	2	2.3

Variable	Category	Frequency	Percentage (%)
Faculty	Science	60	69.8
	Education	19	22.1
	Engineering	5	5.8
	Social Sciences	2	2.3
Institution	University A	76	88.4
	University B	6	7.0
	Not stated	4	4.7
Ever used AI for learning	Yes	73	84.9
	No	13	15.1

3.3 Instrument

Data were collected with a researcher-developed questionnaire titled *Students' Use of AI Tools for Learning Questionnaire* (SUAITLQ). The items were written by the researchers, guided by the TAM constructs of perceived usefulness and ease of use (Davis, 1989) and by the benefits and concerns reported in earlier studies (Chan & Hu, 2023; Kasneci et al., 2023). The full questionnaire is given in Appendix A. It had five sections. Section A collected demographic information. Section B asked whether students had used AI tools, which tools, how often and for what purposes (multiple responses allowed). Section C contained seven items on perceived benefits, and Section D contained seven items on concerns and challenges, all on a five-point Likert scale: Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1). Section E was an optional open-ended question on how universities should handle students' use of AI tools. Students who had never used AI tools skipped Sections B and C and answered Sections D and E only.

3.4 Validity and Reliability

The instrument was given face and content validation by four experts, two lecturers in educational technology and two in measurement and evaluation, whose suggestions were used to refine the wording of the items. A content-validity index was not computed. No separate pilot study was conducted before the main data collection, owing to the short time available, and this is acknowledged as a limitation. Internal consistency was estimated with Cronbach's alpha using the main sample. The benefits scale gave $\alpha = 0.93$ ($n = 73$ users) and the concerns scale gave $\alpha = 0.78$ ($N = 86$). Both values exceed the commonly used threshold of 0.70 (Tavakol & Dennick, 2011). The very high alpha for the benefits scale, whose items are all positively worded, suggests some item redundancy, and the scale may largely measure a general positive attitude towards AI tools. The concerns scale covers different kinds of concern, so a single total score has limited meaning. The sample was too small for a factor analysis, so the concern items were grouped on conceptual grounds into three sub-scales, accuracy and integrity (items 1-3, $\alpha = 0.73$), policy and privacy (items 4 and 7, $\alpha = 0.65$) and access and cost (items 5-6, $\alpha = 0.62$). The two-item sub-scales have modest reliability and are reported as exploratory.

3.5 Ethical Considerations

Formal ethical approval was not sought from an institutional ethics committee, as the study was an anonymous, voluntary online survey of adult students that collected no identifying information and posed minimal risk to participants. The study followed standard ethical principles of informed consent, voluntary participation and confidentiality. The first page of the questionnaire explained the purpose of the study. Participation was voluntary, no names, matriculation numbers or email addresses were collected, and respondents could stop at any time. Continuing to the questions was taken as informed consent. Because implied consent is not sufficient for minors, the four respondents who reported being below 18 were removed before analysis. Responses were stored in a password-protected account accessible only to the research team.

3.6 Method of Data Analysis

Research Question 1 was answered with frequencies and percentages. Research Questions 2 and 3 were answered with means, standard deviations, 95% confidence intervals and the percentage of respondents agreeing (Agree plus Strongly Agree) with each item. Item means were interpreted using real-limit bands (Lindner & Lindner, 2024), 1.00-1.49 Strongly Disagree, 1.50-2.49 Disagree, 2.50-3.49 Undecided, 3.50-4.49 Agree, and 4.50-5.00 Strongly Agree. For Research Question 4, perceived usefulness was taken as the mean of the five usefulness items (items 1, 2, 3, 5 and 6 of the benefits

scale, α = 0.88) and ease of use as item 4. Their relationship with frequency of use (coded 1 = Rarely to 5 = Daily) was tested with Spearman's rank correlation (ρ). For Research Question 5, the concerns of users and non-users were compared with the Mann-Whitney U test, because the non-user group was small (n = 13), rank-biserial r is reported as the effect size.

H_{01} was tested with the independent-samples t-test, together with Levene's test, Cohen's d, the 95% confidence interval of the mean difference and a Mann-Whitney U test as a robustness check. A sensitivity analysis estimated the smallest effect the test could detect with 80% power. H_{02} was tested with one-way analysis of variance (ANOVA), with Levene's test, eta squared (η^2), Welch's ANOVA, the Kruskal-Wallis test and a linear trend contrast as further checks. Because only one AI user was in 500L, that respondent was merged with 400L. Effect sizes were interpreted using Cohen's (1988) guidelines. Analysis of benefits was based on the 73 students who had used AI tools, and analysis of concerns on all 86 respondents. The open-ended responses (Section E) were analysed with a simple thematic analysis (Braun & Clarke, 2006): responses were read, coded into themes by the researchers, and theme frequencies were counted, with one response allowed to contribute to more than one theme. All hypotheses were tested at the 0.05 level of significance.

4 Results

4.1 Research Question 1: Frequency, Purposes and Patterns of Use

Of the 86 respondents, 73 (84.9%) had used AI tools for learning. Tables 2 to 4 are based on these 73 users. Multiple responses were allowed for tools and purposes, so percentages do not add up to 100.

Table **2**

AI Tools Used by Respondents (Users, n = 73)

AI Tool	Frequency	Percentage (%)
ChatGPT	64	87.7
Meta AI (WhatsApp)	37	50.7
Gemini	27	37.0
Claude	20	27.4
Microsoft Copilot	10	13.7
Others (DeepSeek, Grok, Kimi, etc.)	4	5.5

Table **3**

Frequency of Use of AI Tools for Learning (Users, n = 73)

Frequency of Use	Frequency	Percentage (%)
Daily	30	41.1
Several times a week	22	30.1
Weekly	9	12.3
Monthly	0	0.0
Rarely (less often than monthly)	12	16.4
Total	73	100.0

Categories are ordered from most to least frequent. "Rarely" was the least frequent option on the questionnaire.

Table **4**

Purposes for Which Respondents Use AI Tools (Users, n = 73)

Purpose	Frequency	Percentage (%)
Explaining topics I don't understand	63	86.3
Solving maths or calculation problems	40	54.8
Preparing for tests and exams	38	52.1
Summarising notes or lecture materials	34	46.6
Writing or checking assignments	33	45.2
Finding information for projects or research	31	42.5
Writing or fixing computer code	20	27.4

Purpose	Frequency	Percentage (%)
Others (business ideas, video editing)	2	2.7

ChatGPT was by far the most used tool among the respondents, followed by Meta AI on WhatsApp. Most users (71.2%) used AI tools daily or several times a week. The main purpose was getting explanations of difficult topics, followed by solving mathematics problems and preparing for examinations. Patterns of use were similar across groups. All 13 female respondents had used AI tools, compared with 60 of the 73 male respondents (82.2%), this difference was not significant (Fisher's exact test, p = .202). Among users, 76.9% of females and 70.0% of males used AI tools at least several times a week. Use was almost identical in the two largest faculties, 83.3% of Science students (50 of 60) and 84.2% of Education students (16 of 19) had used AI tools. Users in the two faculties also gave similar benefit ratings (Science: M = 4.04, SD = 0.63, Education: M = 4.05, SD = 0.92, Mann-Whitney U = 352.0, p = .473). The Engineering (n = 5) and Social Sciences (n = 2) groups were too small for comparison.

4.2 Research Question 2: Perceived Benefits

Table **5**

Mean Ratings of Perceived Benefits of AI Tools (Users, n = 73)

S/N	Item	SA	A	U	D	SD	Mean (SD)	95% CI	% Agree	Decision
1	AI tools help me understand difficult topics better	32	37	2	1	1	4.34 (0.73)	4.17–4.51	94.5	Agree
2	AI tools save me time when studying	16	49	5	1	2	4.04 (0.77)	3.86–4.22	89.0	Agree
3	AI tools have improved my grades	11	43	14	3	2	3.79 (0.85)	3.60–3.99	74.0	Agree
4	AI tools are easy to use	25	44	1	1	2	4.22 (0.79)	4.04–4.40	94.5	Agree
5	AI tools help me learn when my lecturer is not available	20	41	5	4	3	3.97 (0.97)	3.75–4.20	83.6	Agree
6	AI tools make me more confident in my studies	20	46	3	2	2	4.10 (0.82)	3.90–4.29	90.4	Agree
7	I would recommend AI tools to other students for learning	17	46	7	1	2	4.03 (0.80)	3.84–4.21	86.3	Agree
	Grand Mean						**4.07 (0.69)**	**3.91–4.23**		**Agree**

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree. % Agree = Agree + Strongly Agree. Decision bands: 3.50-4.49 Agree, 4.50-5.00 Strongly Agree.

All seven benefit items fell in the Agree band, with a grand mean of 4.07 (95% CI 3.91-4.23). No item reached the Strongly Agree band. The highest-rated benefits were understanding difficult topics (4.34, 94.5% agreeing) and ease of use (4.22, 94.5% agreeing). The lowest was the self-reported item on improved grades (3.79), where 14 users (19.2%) were undecided.

4.3 Research Question 3: Concerns and Challenges

Table **6**

Mean Ratings of Concerns and Challenges About AI Tools (All Respondents, N = 86)

S/N	Item	SA	A	U	D	SD	Mean (SD)	95% CI	% Agree	Decision
1	AI tools sometimes give wrong answers	9	51	11	13	2	3.60 (0.95)	3.40–3.81	69.8	Agree
2	Using AI tools may make students lazy or too dependent	8	46	10	17	5	3.41 (1.09)	3.17–3.64	62.8	Undecided
3	Using AI tools for assignments can be a form of cheating	0	22	19	32	13	2.58 (1.03)	2.36–2.80	25.6	Undecided
4	Lecturers have not given clear rules on using AI tools	6	44	15	16	5	3.35 (1.05)	3.12–3.57	58.1	Undecided
5	Poor internet access limits my use of AI tools	5	55	9	12	5	3.50 (1.00)	3.28–3.72	69.8	Agree
6	The cost of data or subscriptions limits my use of AI tools	9	46	12	12	7	3.44 (1.11)	3.20–3.68	64.0	Undecided
7	I worry about the privacy of the information I type into AI tools	4	48	15	13	6	3.36 (1.03)	3.14–3.58	60.5	Undecided
	Grand Mean						**3.32 (0.69)**	**3.17–3.47**		**Undecided**

% Agree = Agree + Strongly Agree. Decision bands: 2.50-3.49 Undecided, 3.50-4.49 Agree.

Using the real-limit bands, respondents agreed with two concerns, that AI tools sometimes give wrong answers (3.60, 69.8% agreeing) and that poor internet access limits their use (3.50, 69.8% agreeing). The other items fell in the Undecided band, although a majority of respondents (58.1% to 64.0%) agreed with each of them, which shows that opinion was divided rather than neutral. The item that using AI tools for assignments is a form of cheating had the lowest mean (2.58), only 25.6% agreed, while 52.3% disagreed.

Table **7**

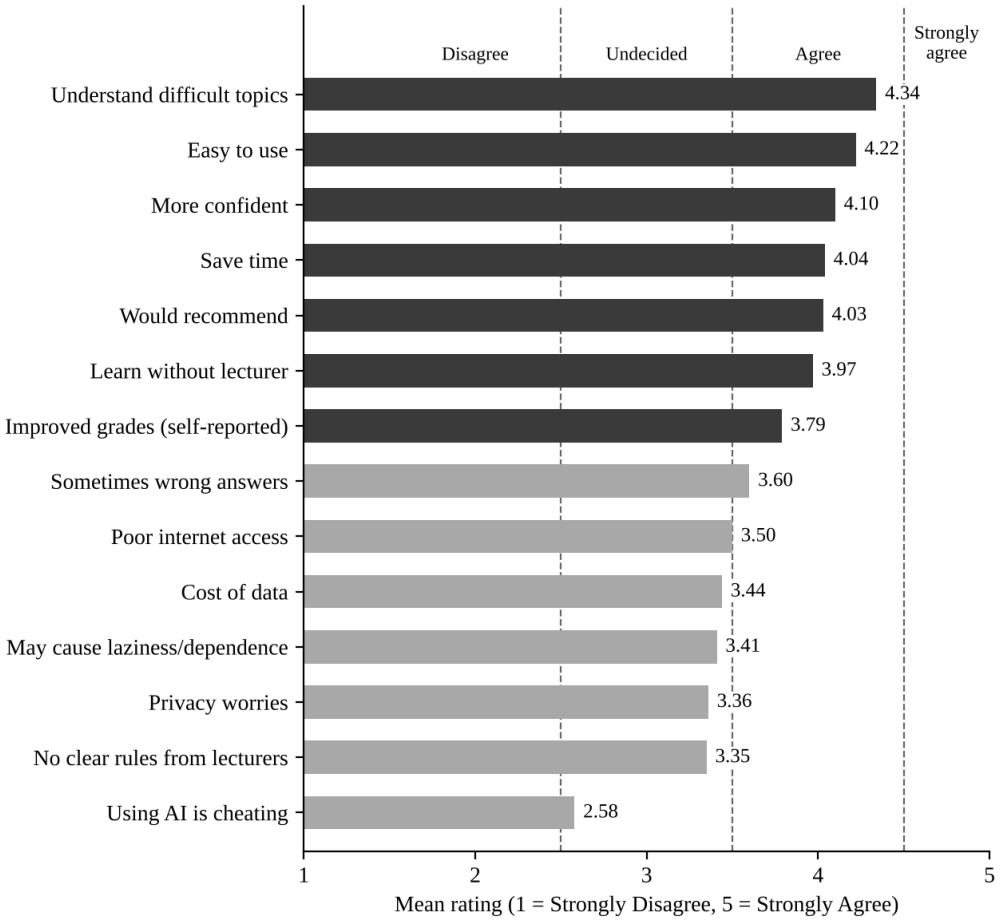
Concern Sub-Scales (All Respondents, N = 86)

Sub-scale	Items	α	Mean (SD)	95% CI	Decision
Accuracy and integrity	1-3	0.73	3.20 (0.83)	3.02–3.38	Undecided
Policy and privacy	4, 7	0.65	3.35 (0.89)	3.16–3.55	Undecided
Access and cost	5-6	0.62	3.47 (0.90)	3.28–3.66	Undecided

Access and cost was the strongest area of concern, followed by policy and privacy, and then accuracy and integrity, which was pulled down by the low rating of the cheating item. Figure 1 shows the mean of every benefit and concern item against the interpretation bands.

Figure **1**

Mean Ratings of Perceived Benefits (Dark Bars, Users, n = 73) and Concerns (Light Bars, All Respondents, N = 86)



4.4 Research Question 4: Perceived Usefulness, Ease of Use and Frequency of Use

Table **8**

Spearman Correlations Between TAM-Related Perceptions and Frequency of Use (Users, n = 73)

Variables	ρ	p-value	Strength
Perceived usefulness and frequency of use	.33	.005	Moderate
Perceived ease of use and frequency of use	.23	.051	Small, not significant
Perceived ease of use and perceived usefulness	.70	< .001	Strong
Perceived usefulness and willingness to recommend	.68	< .001	Strong

Students who found AI tools more useful tended to use them more often (ρ = .33, p = .005). The relationship between ease of use and frequency of use was smaller and only borderline (ρ = .23, p = .051). Ease of use was strongly related to perceived usefulness (ρ = .70), as TAM would predict. These are correlations, so they do not show that perceived usefulness causes more frequent use.

6.5 Research Question 5: Concerns of Users and Non-Users

Table **9**

Comparison of Concerns Between AI Users (n = 73) and Non-Users (n = 13)

Measure	Users Mean (SD)	Non-users Mean (SD)	U	p-value	r
Overall concerns	3.29 (0.68)	3.49 (0.72)	389.5	.306	.18
Accuracy and integrity	3.12 (0.84)	3.62 (0.61)	319.0	.058	.33
Policy and privacy	3.32 (0.89)	3.58 (0.93)	385.0	.265	.19
Access and cost	3.51 (0.88)	3.23 (1.03)	568.5	.236	−.20
Using AI for assignments is cheating (item 3)	2.48 (1.02)	3.15 (0.99)	301.0	.029	.37

r = rank-biserial correlation, positive values indicate higher concern among non-users.

Overall, users and non-users did not differ significantly in their concerns. The one significant difference was on the cheating item: non-users were more likely than users to regard using AI for assignments as cheating (3.15 vs 2.48, U = 301.0, p = .029, r = .37, a medium effect). Given the small non-user group, this result should be treated as tentative.

6.6 Hypothesis One: Gender and Perceived Benefits

H_{01}: There is no significant difference between male and female undergraduates in their perceived benefits of AI tools for learning.

Table **10**

Independent-Samples t-test of Perceived Benefits by Gender (Users, n = 73)

Gender	N	Mean	SD	df	t	p-value	Mean difference [95% CI]	Cohen's d	Decision
Male	60	4.07	0.73	71	−0.10	.920	−0.02 [−0.44, 0.40]	−0.03	Not significant, H_{01} retained
Female	13	4.09	0.45						

Levene's test showed equal variances, F = 0.76, p = .388.

Male and female users gave almost identical ratings, t(71) = −0.10, p = .920, d = −0.03. A Mann-Whitney U test gave the same result (U = 422.0, p = .647). H_{01} was therefore retained. However, this result should be read with caution. With only 13 female users, the 95% confidence interval for the difference runs from −0.44 to 0.40, so differences of up to about 0.4 of a scale point in either direction cannot be ruled out. A sensitivity analysis showed that, with these group sizes, the test could detect only a large difference (d ≈ 0.87) with 80% power, and had only about 36% power to detect a medium difference (d = 0.5). The result therefore means that no difference was detected in this sample, it does not show that male and female students hold the same views.

6.7 Hypothesis Two: Level of Study and Perceived Benefits

H_{02}: There is no significant difference among undergraduates at different levels of study in their perceived benefits of AI tools for learning.

Table **11a**

Mean Perceived Benefits by Level of Study (Users, n = 73)

Level	N	Mean	SD
100L	11	3.88	0.87
200L	20	4.01	0.66
300L	21	4.03	0.82
400L and above	21	4.27	0.42

Table **11b**

One-Way ANOVA of Perceived Benefits by Level of Study

Source	Sum of Squares	df	Mean Square	F	p-value	η^2	Decision
Between Groups	1.36	3	0.45	0.96	.419	.04	Not significant, H_{02} retained
Within Groups	32.73	69	0.47				
Total	34.09	72					

Levene's test: F(3, 69) = 0.38, p = .770. Welch's ANOVA: F(3, 30.3) = 1.36, p = .275. Kruskal-Wallis: H(3) = 2.30, p = .512. Linear trend contrast: t(69) = 1.49, p = .142.

Mean ratings rose steadily from 100L (3.88) to 400L and above (4.27), but the differences were not significant, F(3, 69) = 0.96, p = .419, η^2 = .04, a small effect. The robustness checks (Welch's ANOVA, Kruskal-Wallis and the linear trend test) gave the same conclusion. H_{02} was therefore retained. Because the 100L group had only 11 students, and the difference between 100L and 400L and above was of medium size (d = 0.64), this result is best described as inconclusive rather than as evidence of no difference.

6.8 Open-Ended Responses: How Universities Should Handle AI Use

Of the 86 respondents, 58 (67.4%) answered the optional open-ended question. Fourteen responses were too brief or unclear to code (for example, "Yes" or "Per month"), leaving 44 codable responses. Table 12 shows the themes.

Table **12**

Themes in Responses on How Universities Should Handle Students' Use of AI Tools (n = 58)

Theme	Frequency	Percentage of responses (%)	Example response
Allow or encourage AI as a learning aid	19	32.8	"They can't stop them from using it, so they should allow and encourage them."
Teach responsible and ethical use	17	29.3	"By introducing ethical use of AI tools to train students on how to work with AI, not AI work for them."
Prevent cheating or ban AI in tests and exams	8	13.8	"Only in terms of explaining some topic/course, not in assignment or test."
Restrict, limit or discourage use	8	13.8	"They should minimize the use of it."
Set clear rules or guidelines	6	10.3	"Universities should allow students to use AI tools for learning and research, but they should set clear rules to prevent cheating."
Redesign assessment	2	3.4	"Redesign assessments instead of just policing use."
Unclear or not codable	14	24.1	—

One response could contribute to more than one theme. Quotations are lightly edited for spelling.

The most common views were that universities should allow or encourage AI use (32.8%) and teach students to use it responsibly and ethically (29.3%). Smaller groups wanted AI kept out of tests and examinations (13.8%), wanted its use limited (13.8%), or called for clear rules (10.3%).

5 Discussion

Among the respondents, AI tools were part of everyday learning, 84.9% had used them, and 71.2% of users did so at least several times a week. This is higher than the 61.4% reported in a Spanish sample by Morell-Mengual et al. (2025) and in line with the high awareness and use of ChatGPT reported among Nigerian undergraduates by Nnaemeka and Ogunbadejo (2024). Part of this difference may reflect our sample, which was mostly Science students, Stöhr et al. (2024) also found higher use among technology and engineering students. It may also partly reflect our recruitment through WhatsApp, which

is likely to favour students who are active online. ChatGPT was the leading tool, but the strong showing of Meta AI (50.7%) is notable. One possible explanation is that Meta AI is built into WhatsApp, which most Nigerian students already use, so it needs no new app or account. This is consistent with the ease-of-use idea in TAM (Davis, 1989), but it was not tested directly and may also be partly due to the WhatsApp-based recruitment.

For respondents that used AI tools mainly as a tutor to explain difficult topics constitutes (86.3%), to solve mathematics problems (54.8%) and prepare for examinations (52.1%). This matches Chan and Hu (2023) and Morell-Mengual et al. (2025), who found that understanding difficult topics was students' most common reason for using AI. It is especially relevant for science and mathematics, where many students need repeated explanation and worked examples that large classes cannot always provide. Users agreed with all benefit items (grand mean = 4.07), with the highest ratings for understanding difficult topics and ease of use. Consistent with TAM, perceived usefulness was moderately related to how often students used AI tools ($\rho = .33$), and ease of use was strongly related to perceived usefulness ($\rho = .70$). These correlations support TAM's central idea that people use technologies they find useful, although they cannot show cause and effect. The item on improved grades received the lowest rating (3.79). This item measures students' own perception, no examination results or other objective performance data were collected. It therefore cannot be taken as evidence that AI tools improve academic performance, only that many students believe they do. Abdulmumin and Abdulrahman (2025) and Gogo (2025) similarly reported that Nigerian undergraduates view AI tools as helpful for comprehension and efficiency.

Students were not entirely uncritical of AI tools. Using the real-limit bands, they agreed that AI tools sometimes give wrong answers and that poor internet access limits their use, on the other concerns, overall opinion was undecided, although more than half agreed with each. This mix of positive use and specific concerns echoes the findings of Chan and Hu (2023) and the warnings of Kasneci et al. (2023). Access and cost was the strongest area of concern, which reflects long-standing infrastructure problems in Nigerian universities (Ani, 2010; Christopher et al., 2026) and should be considered in any institutional plan for AI use. More than half of the respondents (58.1%) agreed that lecturers had not given clear rules on AI use, which supports calls for clear institutional guidance (Maluleke, 2025; Miao & Holmes, 2023).

A notable finding is that most respondents did not regard using AI tools for assignments as cheating (mean = 2.58, only 25.6% agreed). This contrasts with the integrity concerns raised in Cotton et al.'s (2024) commentary. Users held this view more strongly than non-users (2.48 vs 3.15, $p = .029$), although the non-user group was small and the design cannot show whether using AI changes students' views or whether students with more lenient views are more likely to use it. One possible explanation is the absence of clear rules, when no policy defines acceptable use, students may be left to set their own boundaries. Saana et al. (2016) similarly found that Ghanaian STEM students were aware of integrity rules but did not fully understand them. This study did not test this explanation directly, so it should be treated as a hypothesis for future research rather than a conclusion. The open-ended responses are consistent with it, the most common suggestions were to allow AI use while teaching responsible use, and a smaller group asked for clear rules or for AI to be kept out of tests and examinations.

Regarding gender and level of study, no significant differences were detected in perceived benefits. Male and female users had almost identical means, which differs from studies that found higher use and more positive views among men (Morell-Mengual et al., 2025; Stöhr et al., 2024) and from Abdulmumin and Abdulrahman (2025), who reported gender effects in Nigeria. However, only 13 female users took part, so the test could detect only a large difference, and a smaller real difference may have been missed. Gasaymeh et al. (2025) faced the same problem with a small male subgroup. Similarly, ratings rose steadily from 100L to 400L and above, with a medium-sized difference between the lowest and highest levels, but the small 100L group means this trend could not be confirmed. Within this sample, perceptions of AI tools appeared broadly similar across groups, but larger and more balanced samples are needed before concluding that gender and level make no difference.

6 Recommendations

Based on the findings, the following are recommended:

1. Because 58.1% of respondents reported that lecturers had not given clear rules, and most did not regard using AI for assignments as cheating (mean = 2.58), university management should develop and publish clear guidelines that state which uses of AI tools are acceptable in learning, assignments and examinations, and how AI assistance should be acknowledged in submitted work.

2. Because respondents agreed that AI tools sometimes give wrong answers (mean = 3.60), and many were concerned about over-dependence (62.8% agreeing), universities should introduce short orientation courses or workshops that teach students to check AI answers against textbooks and lecture notes and to use AI responsibly. This also responds to the most common suggestion in the open-ended answers.
3. Because 45.2% of users used AI tools to write or check assignments, and most did not see this as cheating, lecturers, especially in science and mathematics, should design assessments that test understanding and reasoning, such as oral explanations, in-class problem solving and reflective tasks, rather than relying only on take-home work.
4. Because the most common uses were getting explanations of difficult topics (86.3%) and solving mathematics problems (54.8%), lecturers should guide students to use AI tools as a supplement for explanation and practice, alongside, not instead of, their own problem solving.
5. Because poor internet access (mean = 3.50) and the cost of data (64.0% agreeing) limited students' use of AI tools, universities and government should improve campus internet access and explore affordable data arrangements so that all students can benefit equally.

7 Limitations

This study has several limitations that affect how far its findings can be generalised. First, it used an online convenience sample of 86 students recruited through WhatsApp groups over four days. Most respondents were from one university and from the Faculty of Science (69.8%), and the response rate is unknown. Recruitment through WhatsApp is likely to over-represent students who are active online, which may have inflated the rate of AI use and the use of Meta AI. The results therefore describe the students who responded and should not be generalised to all Nigerian undergraduates, or even to all undergraduates in North-West Nigeria.

Second, the sample was strongly imbalanced by gender (84.9% male) and level of study (only 11 users in 100L and two respondents in 500L, one of whom was merged with 400L). With only 13 female users, the gender comparison had low statistical power and could detect only large differences, so the non-significant results for both hypotheses should not be read as evidence that groups hold the same views. Third, all data were self-reported. In particular, the item "AI tools have improved my grades" reflects students' beliefs, not their actual results, as no grades or other objective performance measures were collected. Students may also have under-reported behaviours, such as using AI for assignments, that they considered sensitive.

Fourth, the researcher-developed questionnaire was validated by experts and showed acceptable reliability, but it was not pilot-tested, no content-validity index was computed, and its factor structure was not examined, the concern sub-scales were formed on conceptual grounds and two of them had modest reliability. The benefits scale was answered only by users, which limits what the study can say about why non-users have not adopted AI tools. Finally, the open-ended responses were optional and brief, and the study was cross-sectional, capturing students' views at a single point in time while AI tools and university policies are changing quickly.

8 Future Research

Future studies should use larger, stratified random samples drawn from several universities and faculties, with a more balanced number of male and female students, so that group comparisons have adequate statistical power. Researchers should also link students' AI use to objective measures such as course grades, rather than relying on self-report alone. Studies using validated TAM or UTAUT instruments could test the full set of relationships between perceived usefulness, ease of use, attitude, intention and actual use, including among non-users. Mixed-methods designs with interviews or focus groups would allow a deeper understanding of students' views on academic integrity, and longitudinal designs could track how use and attitudes change as institutional policies develop. Finally, the possible link between unclear institutional rules and students' views on whether using AI for assignments is cheating should be tested directly, for example by comparing students in departments with and without written AI policies.

9 Conclusion

Among the undergraduates surveyed, AI tools have become a regular part of learning, especially for understanding difficult topics and solving mathematics problems. Users agreed that AI tools are beneficial, mainly for better understanding and ease of use, and those who found the tools more useful tended to use them more often. No significant differences in perceived benefits were detected by gender or level of study in this sample, although the small female and 100L groups limit these comparisons. Respondents agreed that AI tools can give wrong answers and that poor internet access limits their use, and were divided on other concerns. Most did not regard using AI for assignments as cheating, and more than half reported that lecturers had not given clear rules. Although this study cannot show that the lack of rules causes this view, the findings point to a need for clear institutional guidance and AI-literacy training. Because the sample was a small convenience sample, these conclusions apply to the students surveyed and should be confirmed in larger, more representative studies.

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Appendix A: Students' Use of AI Tools for Learning Questionnaire (SUAITLQ)

Introduction and consent. This survey is part of a research study on how students use AI tools (such as ChatGPT, Gemini, Meta AI) for learning. It takes about 5 minutes. Your answers are anonymous: no names or matric numbers are collected. Taking part is voluntary, and you can stop at any time. By continuing, you agree to take part.

Section A: About You

1. Gender: Male / Female
2. Age: Below 18 / 18–21 / 22–25 / 26 and above
3. Level: 100L / 200L / 300L / 400L / 500L

4. Faculty: Science / Engineering / Education / Social Sciences / Arts / Other
5. Name of your university (short answer)
6. Have you ever used an AI tool to help with your studies? Yes / No (respondents answering No proceed to Section D)

Section B: How You Use AI Tools

1. Which AI tools have you used? (tick all that apply): ChatGPT / Gemini / Meta AI (WhatsApp) / Claude / Microsoft Copilot / Other
2. How often do you use AI tools for learning? Rarely / Monthly / Weekly / Several times a week / Daily
3. What do you use AI tools for? (tick all that apply): Explaining topics I don't understand / Solving maths or calculation problems / Writing or checking assignments / Summarising notes or lecture materials / Preparing for tests and exams / Writing or fixing computer code / Finding information for projects or research / Other

Section C: Benefits of AI Tools (Strongly Disagree = 1 to Strongly Agree = 5)

1. AI tools help me understand difficult topics better.
2. AI tools save me time when studying.
3. AI tools have improved my grades.
4. AI tools are easy to use.
5. AI tools help me learn when my lecturer is not available.
6. AI tools make me more confident in my studies.
7. I would recommend AI tools to other students for learning.

Section D: Concerns and Challenges (Strongly Disagree = 1 to Strongly Agree = 5)

1. AI tools sometimes give wrong answers.
2. Using AI tools may make students lazy or too dependent.
3. Using AI tools for assignments can be a form of cheating.
4. Lecturers have not given clear rules on using AI tools.
5. Poor internet access limits my use of AI tools.
6. The cost of data or subscriptions limits my use of AI tools.
7. I worry about the privacy of the information I type into AI tools.

Section E: Your Opinion (optional)

1. In your own words, how should universities handle students' use of AI tools?

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