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META AI ADOPTION AND EDUCATIONAL USE AMONG UNDERGRADUATE STUDENTS IN NORTH-CENTRAL NIGERIA: THE LIMITED ROLE OF DEMOGRAPHIC FACTORS

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ABSTRACT

The increasing adoption of generative artificial intelligence (AI) in higher education has transformed teaching and learning by providing intelligent tools that support academic activities. However, empirical evidence on whether undergraduate students' demographic characteristics influence Meta AI adoption and educational use remains limited, particularly in Nigeria. This study examined the level of Meta AI adoption among undergraduate students in selected universities in North-Central Nigeria and investigated whether selected demographic characteristics significantly influenced Meta AI adoption and educational use. A cross-sectional survey research design was adopted. A sample of 382 undergraduate students was selected using a multistage sampling procedure from a population of 83,106 students. Data were collected using the researcher-developed Meta AI Adoption and Use for Learning Questionnaire (MAAULQ), which yielded a Cronbach's alpha reliability coefficient of 0.89. Descriptive statistics and multiple linear regression were employed for data analysis at the 0.05 significance level. The findings revealed a high level of Meta AI adoption (Grand Mean = 3.91, SD = 0.98). However, gender, age, level of study, device ownership, and internet access did not significantly predict either Meta AI adoption, $F(5, 376) = 0.74$, $p = .599$, $R^2 = .010$, or Meta AI educational use, $F(5, 376) = 0.98$, $p = .430$, $R^2 = .013$. The study concludes that undergraduate students' demographic characteristics explain little variation in Meta AI adoption and educational use, suggesting that AI integration strategies should prioritise inclusive access and responsible educational use rather than demographic targeting.

Keywords: Educational Technology; Generative Artificial Intelligence; Higher Education; Meta AI; Technology Adoption; Undergraduate Students.

Introduction

Generative artificial intelligence (AI) has rapidly transformed teaching and learning in higher education by providing students with immediate access to information, personalized learning support, academic writing assistance, and interactive problem-solving opportunities. Unlike earlier AI applications that required dedicated software or institutional learning platforms, recent generative AI systems have become increasingly accessible through digital tools that students use in their everyday lives. Among these innovations, Meta AI has emerged as one of the most widely available conversational AI assistants because it is integrated into commonly used Meta platforms, enabling students to access AI-supported learning without installing additional applications or acquiring specialised technical skills. Its widespread accessibility has increased students' opportunities to engage with AI for searching information, generating ideas, explaining concepts, and supporting academic learning.

The growing availability of Meta AI has generated considerable interest among researchers and educators regarding its educational potential. Studies have shown that generative AI can enhance students' learning experiences by improving access to information, facilitating independent learning, supporting writing and problem-solving, and encouraging personalised learning pathways. Nevertheless, researchers have also cautioned that concerns relating to academic integrity, overreliance on AI-generated content, privacy, algorithmic bias, and ethical use require appropriate institutional policies and responsible pedagogical guidance to ensure that these technologies are used effectively in educational settings (Iorhemen et al., 2025). Consequently, understanding not only students' access to Meta AI but also the factors associated with its adoption and educational use has become increasingly important.

One factor that has received growing attention is the influence of students' demographic characteristics on the adoption of educational technologies. Variables such as gender, age, level of study, device ownership, and internet access have frequently been examined as possible determinants of technology adoption. However, empirical findings remain inconsistent. While some studies have reported significant demographic differences in AI adoption and educational technology use, others have found that technology readiness, perceived usefulness, digital competence, and facilitating conditions are stronger predictors than demographic characteristics. These inconsistent findings indicate that the influence of demographic factors on students' engagement with generative AI remains inconclusive, particularly in developing country contexts.

Despite the rapid diffusion of Meta AI across social media platforms, empirical evidence concerning its adoption and educational use among university students in Nigeria remains limited. Most existing studies have concentrated on other generative AI applications, particularly ChatGPT, or have examined artificial intelligence adoption in general without distinguishing Meta AI as a readily accessible educational tool. Furthermore, relatively few studies have simultaneously examined whether demographic characteristics significantly predict both Meta AI adoption and its educational use among undergraduate students in Nigerian universities. This represents an important empirical gap because understanding whether demographic characteristics influence students' engagement with Meta AI can inform institutional policies, digital inclusion strategies, and AI integration initiatives within higher education.

Accordingly, this study examined the level of Meta AI adoption among undergraduate students in selected universities in North-Central Nigeria and investigated whether selected demographic characteristics gender, age, level of study, device ownership, and internet access

significantly influence Meta AI adoption and educational use. By providing empirical evidence from three categories of Nigerian universities, the study contributes to the growing body of literature on generative AI adoption in higher education and offers evidence to support policy formulation and responsible educational integration of Meta AI.

Statement of the Problem

Generative artificial intelligence (AI) is increasingly becoming part of higher education by supporting students' learning, academic writing, information retrieval, and problem-solving. Among these technologies, Meta AI is particularly accessible because it is integrated into widely used platforms such as WhatsApp, Facebook, Instagram, and Messenger. Although its availability presents new opportunities for enhancing teaching and learning, it remains unclear whether students' demographic characteristics influence its adoption and educational use.

Despite the growing integration of generative AI in universities, there is limited empirical evidence on Meta AI within the Nigerian higher education context. Existing evidence provides insufficient information on whether characteristics such as gender, age, level of study, device ownership, and internet access are associated with differences in students' adoption and educational use of Meta AI. This lack of context-specific evidence limits informed institutional planning for equitable and effective AI integration.

Therefore, this study examined the level of Meta AI adoption among undergraduate students in selected universities in North-Central Nigeria and investigated whether selected demographic characteristics significantly influence its adoption and educational use. The findings are expected to provide empirical evidence to guide institutional policies, AI literacy initiatives, and the responsible integration of generative AI into higher education.

Literature Review

Generative artificial intelligence has emerged as a transformative technology in higher education by supporting personalized learning, academic writing, information retrieval, problem-solving, and self-directed learning. Unlike conventional educational technologies, generative AI enables learners to generate human-like content, receive instant feedback, and engage in interactive learning experiences. Among these technologies, Meta AI is distinctive because it is embedded within widely used platforms such as WhatsApp, Facebook, Instagram, and Messenger, allowing students to access AI-assisted learning through applications they already use for everyday communication.

Recent empirical studies consistently demonstrate that generative AI enhances students' learning engagement, academic performance, critical thinking, and learning efficiency when used appropriately (Dwivedi et al., 2023; Kasneci et al., 2023; Lo, 2023; Tlili et al., 2023). Systematic reviews and meta-analyses further indicate that AI-supported learning improves academic achievement, learner motivation, and personalized learning while emphasizing the importance of responsible use, AI literacy, and institutional support (Chen & Cheung, 2025; Wu & Yu, 2024; Liang et al., 2026). Nevertheless, researchers have cautioned that concerns relating to academic integrity, overreliance on AI-generated content, privacy, and ethical use require clear institutional policies and appropriate pedagogical guidance (Yan, L. et al., 2024; UNESCO, 2023).

Despite its educational potential, generative AI has attracted considerable criticism. Researchers caution that these systems may generate plausible but inaccurate information (hallucinations), facilitate the spread of misinformation, reinforce algorithmic biases inherited from training data, encourage excessive dependence that may weaken students' critical thinking and problem-solving skills, and create challenges for academic integrity by blurring the

distinction between original and AI-assisted work in assessments. These concerns underscore the need for AI literacy, human verification of AI-generated outputs, responsible use, and institutional policies that preserve the integrity and quality of teaching, learning, and assessment.

Research examining the determinants of AI adoption presents mixed findings. The Technology Acceptance Model (TAM) explains technology adoption primarily through perceived usefulness and perceived ease of use (Davis, 1989), whereas the Unified Theory of Acceptance and Use of Technology (UTAUT2) extends this explanation by incorporating facilitating conditions, social influence, habit, and demographic moderators such as age and gender (Venkatesh et al., 2012). Although some studies report significant demographic differences in AI adoption, increasing evidence suggests that technology-related factors including digital competence, perceived usefulness, facilitating conditions, and institutional support are stronger predictors of AI adoption and continued use than demographic characteristics alone (Kasneci et al., 2023; Lo, 2023; Liang et al., 2026).

Research examining the influence of demographic characteristics on the adoption of generative artificial intelligence has produced mixed findings. Some studies have reported significant differences in AI adoption across demographic groups, suggesting that characteristics such as gender, age, and educational level may shape users' willingness to adopt emerging technologies. For example, younger users and males have sometimes been found to report higher levels of technology acceptance and AI use, largely because of greater digital familiarity and confidence in using emerging technologies (Venkatesh et al., 2012; Sallam, 2023). Similarly, access to digital resources, including internet connectivity and suitable devices, has been associated with technology adoption in contexts where digital infrastructure is uneven.

Conversely, an increasing body of evidence suggests that demographic characteristics play a limited role in explaining the adoption of generative AI. Recent systematic reviews and meta-analyses indicate that technology-related factors particularly perceived usefulness, perceived ease of use, digital competence, facilitating conditions, and institutional support are more consistent predictors of AI adoption and educational use than demographic characteristics alone (Chen & Cheung, 2025; Liang et al., 2026). As generative AI becomes increasingly integrated into widely used digital platforms, traditional demographic differences may diminish because users experience similar levels of exposure and accessibility.

Cumulatively, the empirical evidence remains inconsistent regarding whether demographic characteristics significantly influence the adoption and educational use of generative AI. This inconsistency highlights the need for context-specific studies, particularly in Nigerian universities, where differences in digital infrastructure, internet accessibility, and institutional support may shape students' engagement with Meta AI.

Despite the rapid growth of research on generative AI, the literature remains dominated by studies on ChatGPT and similar large language models, with comparatively little empirical attention devoted to Meta AI. Moreover, evidence from sub-Saharan Africa, particularly Nigeria, remains limited despite contextual differences in digital infrastructure, internet accessibility, and institutional readiness that may influence students' engagement with AI-supported learning. Consequently, there is limited empirical evidence on whether undergraduate students' demographic and technological characteristics significantly influence the adoption and educational use of Meta AI. Addressing this gap is important for informing AI integration strategies, promoting responsible educational use, and extending technology adoption theories within the Nigerian higher education context.

Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh et al., 2012). TAM explains that students are more likely to adopt Meta AI when they perceive it as useful and easy to use for learning. UTAUT2 complements this perspective by recognising that technology adoption and use are influenced by factors such as performance expectancy, facilitating conditions, social influence, and habit, while demographic characteristics may shape technology acceptance under certain conditions.

The two theories provide an appropriate framework for examining Meta AI adoption and educational use among undergraduate students. While TAM explains the psychological drivers of technology adoption, UTAUT2 provides a broader contextual perspective by recognising the potential role of demographic characteristics. However, if demographic characteristics do not significantly influence Meta AI adoption or educational use, this should not be interpreted as contradicting UTAUT2. Rather, it may indicate that the widespread availability and increasing familiarity of generative AI have reduced traditional demographic differences, making technology-related perceptions and contextual factors more influential than demographic characteristics in explaining students' engagement with Meta AI.

Objectives of the Study

The main objective of this study was to examine Meta AI adoption and educational use among undergraduate students in North-Central Nigeria: the limited role of demographic factors. The specific objectives were to:

1. determine the level of Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria;
2. examine the influence of selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) on Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria; and
3. examine the influence of selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) on Meta AI educational use among undergraduate students in selected universities in North-Central Nigeria.

Research Questions

The following research questions guided the study:

RQ1. What is the level of Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria?

RQ2. To what extent do selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) influence Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria?

RQ3. To what extent do selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) influence Meta AI educational use among undergraduate students in selected universities in North-Central Nigeria?

Hypotheses

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

H_{01}: Selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) do not significantly influence Meta AI adoption

for learning among undergraduate students in selected universities in North-Central Nigeria.

H_{02}: Selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) do not significantly influence Meta AI educational use among undergraduate students in selected universities in North-Central Nigeria.

Methodology

This study adopted a cross-sectional survey research design to determine the level of Meta AI adoption among undergraduate students in selected universities in North-Central Nigeria and to examine whether selected demographic characteristics significantly influenced Meta AI adoption and educational use. The study was conducted in three accredited universities representing the federal, state, and private university categories within the region. The target population comprised 83,106 full-time undergraduate students enrolled during the 2025/2026 academic session.

A sample of 382 respondents was determined using Cochran's (1977) finite population correction formula at a 95% confidence level and a 5% margin of error, consistent with the recommendation of Krejcie and Morgan (1970). Respondents were selected through a multistage sampling procedure involving stratification by university ownership, proportionate selection of faculties, random selection of departments, and systematic random sampling of students.

Data were collected using the Meta AI Adoption and Use for Learning Questionnaire (MAAULQ), a researcher-developed instrument comprising two sections. Section A elicited respondents' demographic characteristics, while Section B consisted of two distinct subscales measuring Meta AI Adoption (10 items) and Meta AI Educational Use (10 items). Each item was rated on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The instrument was developed based on the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). Content validity was established by three experts in Educational Technology, Measurement and Evaluation, and Artificial Intelligence in Education, yielding a Content Validity Index (CVI) of 0.92. A pilot study produced a Cronbach's alpha coefficient of 0.89 for adoption and 0.90 for education use, indicating satisfactory internal consistency (Hair et al., 2022).

The two constructs were scored independently. The Meta AI Adoption construct was measured using ten items (Adp1–Adp10), while the Meta AI Educational Use construct was measured using ten items (Use1–Use10). Responses were coded on a five-point Likert scale, with higher scores indicating higher levels of the respective construct. Following data screening, composite mean scores were computed separately for each construct in IBM SPSS Statistics Version 29. The Meta AI Adoption composite score served as the dependent variable in the first regression model, whereas the Meta AI Educational Use composite score served as the dependent variable in the second regression model.

Prior to the regression analyses, all predictor variables were coded numerically in IBM SPSS Statistics Version 29. Gender, device ownership, and internet access were entered as binary coded variables, while age and level of study were entered as ordinal predictors using their natural ordering. The latter approach was adopted because both variables represent progressive ordered categories, and the study sought to examine overall linear trends across categories rather than category-specific differences. Although age and level of study were modelled as ordinal predictors, future studies may consider dummy coding these variables to examine potential non-linear or category-specific effects. The coding scheme used in the regression analyses is presented in Table 1.

Table 1
Coding Scheme for Predictor Variables Used in the Multiple Regression Analyses

Variable	Coding Scheme	Measurement Level
Gender	Male = 1; Female = 2	Binary (Numerically coded)
Age	15–19 = 1; 20–24 = 2; 25–29 = 3; 30–34 = 4; ≥35 = 5	Ordinal
Level of Study	100 Level = 1; 200 Level = 2; 300 Level = 3; 400 Level = 4; 500 Level = 5	Ordinal
Device Ownership	Smartphone = 1; Laptop = 2	Binary (Numerically coded)
Internet Access	Reliable = 1; Unreliable = 2	Binary (Numerically coded)

Note. Gender, device ownership, and internet access were treated as binary predictor variables and coded numerically for inclusion in the regression models. Age and level of study were treated as ordinal variables and retained their natural ordering. The regression coefficients should therefore be interpreted in accordance with the coding scheme presented above.

A total of 400 questionnaires were administered through face-to-face distribution and Google Forms, of which 382 were correctly completed and returned, representing a 95.5% response rate. Completed questionnaires were screened for completeness prior to analysis. Cases with substantial missing responses were excluded, while the retained dataset contained no missing values requiring imputation. Outliers were assessed using standardized residuals, boxplots, and Mahalanobis distance, and no influential outliers were identified. To minimise common method bias associated with self-reported data, respondent anonymity was assured, item wording was varied, and participants were informed that there were no right or wrong answers. Harman's single-factor test further indicated that common method bias was not a serious concern because no single factor accounted for the majority of the total variance.

Two separate multiple linear regression models were estimated to examine whether undergraduate students' demographic characteristics predicted Meta AI Adoption and Meta AI Educational Use, respectively. The regression model was specified as:

[Y=\beta_0+\beta_1(\text{Gender})+\beta_2(\text{Age})+\beta_3(\text{LevelofStudy})+\beta_4(\text{DeviceOwnership})+\beta_5(\text{InternetAccess})+\varepsilon]

where *Y* represents Meta AI Adoption (Model 1) or Meta AI Educational Use (Model 2); (\beta_0) is the intercept; (\beta_1)–(\beta_5) are the regression coefficients; and (\varepsilon) is the random error term. Both models were estimated simultaneously using the Enter method.

Prior to estimating the regression models, the assumptions of multiple linear regression were examined separately for both the Meta AI Adoption and Meta AI Educational Use models. Normality was assessed using histograms, Normal P–P plots, and standardized residuals; linearity and homoscedasticity were evaluated using scatterplots of standardized residuals against standardized predicted values; independence of errors was assessed using the Durbin–Watson statistic; and multicollinearity was evaluated using Tolerance and Variance Inflation Factor (VIF) statistics. The diagnostic results confirmed that the assumptions of normality, linearity, homoscedasticity, independence of errors, and multicollinearity were satisfied for both regression models.

Ethical approval and institutional permissions were obtained before data collection. Participation was voluntary, and respondents were assured of confidentiality, anonymity, and the right to withdraw from the study at any stage without penalty.

Data were analysed using IBM SPSS Statistics Version 29. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise respondents' demographic characteristics and determine the level of Meta AI adoption. Two separate multiple linear regression analyses were subsequently conducted to examine the influence of gender, age, level of study, device ownership, and internet access on Meta AI Adoption and Meta AI Educational Use, respectively. Statistical significance was evaluated at the 0.05 level.

Result

Table 2: *Demographic Characteristics of Respondents (N = 382)*

Variables	Category	Frequency (*f*)	Percentage (%)
Gender	**Male**	203	53.1
	Female	179	46.9
	Total	**382**	**100.0**
Age (years)	15-19	140	36.6
	20-24	94	24.6
	25-29	32	8.4
	30-34	45	11.8
	35 years and above	71	18.6
	Total	**382**	**100.0**
Level of Study	100 Level	145	38.0
	200 Level	132	34.6
	300 Level	40	10.5
	400 Level	28	7.3
	500 Level	37	9.7
	Total	**382**	**100.0**
Main Device Used	Smartphone	245	64.1
	Laptop	137	35.9
	Total	**382**	**100.0**
Internet	Unreliable	231	60.5
	Reliable	151	39.5
	Total	**382**	**100.0**

Table 2 presents the demographic characteristics of the 382 respondents. Male students constituted 53.1%**,** while females accounted for 46.9%**.** Most respondents were aged 15–24 years (61.2%)**,** with the majority in 100 Level (38.0%) and 200 Level (34.6%)**.** Smartphones were the primary learning device for 64.1% of the students, compared with 35.9% who used laptops. Although all respondents had internet access, 60.5% reported unreliable connectivity, while 39.5% reported reliable access.

RQ1. What is the level of Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria?

Table *3*: *Level of Meta AI Adoption for Learning among Undergraduate Students (N = 382)*

Item	Mean	SD	Rank	Decision
Meta AI is useful for my studies.	3.99	1.03	1	High
I am aware of Meta AI.	3.98	1.04	2	High
Meta AI is easy to learn.	3.94	1.03	3	High
My lecturers encourage the use of Meta AI.	3.94	1.06	4	High
I have used Meta AI before.	3.93	1.03	5	High
I intend to continue using Meta AI.	3.93	1.03	6	High
I frequently use Meta AI for academic tasks	3.88	1.14	7	High
I adopted Meta AI because it saves time.	3.85	1.14	8	High
I adopted Meta AI because of its usefulness	3.84	1.09	9	High
My classmates influence my use of Meta AI.	3.77	1.20	10	High
Grand Mean	**3.91**	**0.98**		**High**

Decision Rule: 1.00–1.80 = Very Low; 1.81–2.60 = Low; 2.61–3.40 = Moderate; 3.41–4.20 = High; 4.21–5.00 = Very High.

Table 3 shows that undergraduate students reported a high level of Meta AI adoption, with a grand mean of 3.91 (SD = 0.98). All ten adoption indicators recorded mean scores within the high category (M = 3.77–3.99), indicating consistently high levels of Meta AI adoption across the measured dimensions. Overall, the findings suggest that Meta AI has been widely adopted as a learning resource by undergraduate students in the selected universities.

RQ2. To what extent do selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) influence Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria?

Table 4: *Assumption Tests for the Multiple Regression Models Predicting Meta AI Adoption and Meta AI Educational Use (N = 382)*

Assumption	Test/Statistic	Meta AI Adoption	Meta AI Use	Decision
Normality of residuals	Histogram, Normal P–P Plot, Standardized Residuals	Residuals approximately normally distributed	Residuals approximately normally distributed	Assumption satisfied
Linearity	Scatterplot of standardized residuals versus predicted values	Linear relationship observed	Linear relationship observed	Assumption satisfied
Homoscedasticity	Scatterplot of standardized residuals	Random dispersion with no discernible pattern	Random dispersion with no discernible pattern	Assumption satisfied
Independence of errors	Durbin–Watson statistic	**2.01**	**2.03**	Assumption satisfied (acceptable range = 1.50–2.50)
Multicollinearity	Tolerance > 0.10; VIF < 10.00	All predictors satisfied the criteria	All predictors satisfied the criteria	Assumption satisfied

Note. Assumption tests were conducted separately for the multiple regression models predicting Meta AI Adoption and Meta AI Educational Use. Both models satisfied the assumptions of multiple linear regression.

Prior to the multiple regression analyses, the assumptions of normality, linearity, homoscedasticity, independence of errors, and multicollinearity were assessed separately for the Meta AI Adoption and Meta AI Educational Use models. Visual inspection of histograms, Normal P–P plots, and scatterplots indicated no substantial violations of normality, linearity, or homoscedasticity. The Durbin–Watson statistics (**2.01** for Meta AI Adoption and **2.03** for Meta AI Educational Use) indicated independence of errors, while tolerance values greater than **0.10** and Variance Inflation Factor (VIF) values below **10.00** confirmed the absence of multicollinearity. These results indicate that both regression models satisfied the assumptions required for multiple linear regression and were appropriate for subsequent analysis.

Table 5: Model Summary for the Multiple Regression Model Predicting Meta AI Adoption

(N=382)

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.099	.010	-.004	0.980

Predictors: Gender, Age, Level of Study, Device Ownership, and Internet Access.

Dependent Variable: Meta AI Adoption.

Table 5 shows that undergraduate students' characteristics had a very weak relationship with Meta AI adoption (R = .099**)** and explained only 1.0% of its variance **(**R^2 = .010; Adjusted R^2 = –.004). The Standard Error of the Estimate (0.980) indicates minimal predictive accuracy, suggesting that the selected characteristics contributed negligibly to explaining Meta AI adoption.

Table 6: *ANOVA for Multiple Regression Predicting Meta AI Adoption (N = 382)*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.58	5	0.72	0.74	.599
Residual	363.85	376	0.97		
Total	367.43	381			

Dependent Variable: Meta AI Adoption

Predictors: Gender, Age, Level of Study, Device Ownership, and Internet Access.

The overall multiple regression model was not statistically significant, $F(5, 376) = 0.74$, $p = .599$, explaining only 1.0% of the variance in Meta AI adoption ($R^2 = .010$). This indicates that the selected demographic characteristics did not jointly predict Meta AI adoption. Therefore, the null hypothesis was not rejected.

Test of Hypothesis

H_{01}: Selected undergraduate students' characteristics (gender, age, level of study, device ownership, and internet access) do not significantly influence the adoption of Meta AI for learning among undergraduate students in universities in North-Central Nigeria.

Table 7: *Multiple Regression Coefficients for Predicting Meta AI Adoption*

Predictor	B	Std. Error	t	Sig.	95% CI
Constant	4.069	0.249	16.326	< .001	[3.58, 4.56]
Gender	-0.068	0.102	-0.664	.507	[-0.268, 0.133]
Age	0.046	0.039	1.186	.236	[-0.030, 0.122]
Level of Study	-0.025	0.040	-0.624	.533	[-0.103, 0.054]
Device Ownership	0.035	0.105	0.332	.740	[-0.172, 0.242]
Internet Access	-0.076	0.048	-1.568	.118	[-0.170, 0.019]

Dependent Variable: Meta AI Adoption.

Table 7 presents the multiple regression coefficients for predicting Meta AI adoption. The overall regression model was not statistically significant, $F(5, 376) = 0.74$, $p = .599$, indicating that the selected demographic characteristics did not jointly predict Meta AI adoption. Furthermore, none of the individual predictor variables was statistically significant ($p > .05$). Therefore, the null hypothesis was not rejected.

Test of Hypothesis One

H_{01}: Selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) do not significantly influence Meta AI adoption for learning among undergraduate students in selected universities in North-Central Nigeria.

Table 7 presents the multiple regression coefficients for the influence of undergraduate students' demographic characteristics on Meta AI adoption for learning. The overall regression model was not statistically significant, $F(5, 376) = 0.74$, $p = .599$, explaining only 1.0% of the variance in Meta AI adoption ($R^2 = .010$). Furthermore, none of the demographic variables significantly predicted Meta AI adoption ($p > .05$).

Decision: Since the overall regression model was not statistically significant ($p > .05$), the null hypothesis was not rejected. Therefore, undergraduate students' demographic characteristics did not significantly influence Meta AI adoption for learning in the selected universities.

RQ3. To what extent do selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) influence Meta AI educational use among undergraduate students in selected universities in North-Central Nigeria?

Table 8*: Model Summary for the Multiple Regression Model Predicting Meta AI Educational Use*

(N = 382)

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.114	.013	.000	1.034

Predictors: Gender, Age, Level of Study, Device Ownership, and Internet Access.

Dependent Variable: Meta AI Use.

Table 8 presents the model summary for the multiple regression analysis predicting Meta AI educational use. The model showed a very weak relationship between the predictor variables and Meta AI educational use (R = .114). The predictors jointly explained 1.3% of the variance in Meta AI educational use (R^2 = .013; Adjusted R^2 = .000), indicating that undergraduate students' demographic characteristics had negligible explanatory power for Meta AI educational use.

Table 9: *ANOVA for the Multiple Regression Model Predicting Meta AI Educational Use (N = 382)*

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	5.37	5	1.07	0.98	.430
Residual	411.20	376	1.09		
Total	416.57	381			

Dependent Variable: Meta AI Use.

Predictors: Gender, Age, Level of Study, Device Ownership, and Internet Access.

The overall multiple regression model predicting Meta AI use was not statistically significant**,** F**(**5, 376**) =** 0.98**,** p = .430. The model explained only 1.3% of the variance in Meta AI use ***(***R^2 = .013), indicating that undergraduate students' characteristics jointly did not significantly predict Meta AI use. Therefore, the null hypothesis was retained.

Table 10: *Regression Coefficients Predicting Meta AI Educational Use*

Predictor	B	Std. Error	t	Sig.	95% CI for B
Constant	4.069	0.263	16.009	< .001	[3.692, 4.725]
Gender	-0.087	0.107	-0.814	.416	[-0.299, 0.124]
Age	0.019	0.041	0.468	.640	[-0.061, 0.099]
Level of Study	-0.023	0.042	-0.537	.591	[-0.105, 0.060]
Device Ownership	-0.035	0.111	-0.313	.755	[-0.253, 0.184]
Internet Access	-0.096	0.051	-1.894	.059	[-0.196, 0.004]

Dependent Variable: Meta AI Use.

Similarly, undergraduate students' characteristics did not significantly predict Meta AI use. Gender (t = −0.814, p = .416), age (t = 0.468, p = .640), level of study (t = −0.537, p = .591), and device ownership (t = −0.313, p = .755) were not statistically significant predictors. Although Internet access showed the strongest relationship with educational use (t = −1.894, p = .059), and approached statistical significance, suggesting that connectivity may remain an important contextual factor deserving further investigation.

Test of Hypothesis Two

H_{02}: *Selected undergraduate students' demographic characteristics (gender, age, level of study, device ownership, and internet access) do not significantly influence Meta AI educational use among undergraduate students in selected universities in North-Central Nigeria.*

Table 10 presents the multiple regression coefficients for the influence of undergraduate students' demographic characteristics on Meta AI educational use. The overall regression model

was not statistically significant, $F(5, 376) = 0.98$, $p = .430$, explaining only 1.3% of the variance in Meta AI educational use ($R^2 = .013$). Furthermore, none of the demographic variables significantly predicted Meta AI educational use ($p > .05$).

Decision: Since the overall regression model was not statistically significant ($p > .05$), the null hypothesis was not rejected. Therefore, undergraduate students' demographic characteristics did not significantly influence Meta AI educational use in the selected universities.

Discussion of Findings

The study found a high level of Meta AI adoption among undergraduate students in selected universities in North-Central Nigeria. This finding suggests that generative AI has become an increasingly accepted learning resource in higher education, likely due to its accessibility, ease of use, and perceived usefulness for academic tasks. The result is consistent with earlier studies reporting increased adoption of generative AI because of its potential to enhance learning efficiency and academic productivity (Dwivedi et al., 2023; Kasneci et al., 2023; UNESCO, 2023). It also aligns with the Technology Acceptance Model (TAM), which posits that technologies perceived as useful and easy to use are more likely to be adopted (Davis, 1989).

The study further revealed that gender, age, level of study, device ownership, and internet access did not significantly predict Meta AI adoption. Similarly, these demographic characteristics did not significantly predict Meta AI educational use. These findings suggest that demographic characteristics explained little variation in students' engagement with Meta AI, possibly because access to generative AI has become widespread among university students, thereby reducing traditional demographic differences in technology adoption. The findings are consistent with recent studies indicating that technology readiness, perceived usefulness, digital competence, and institutional support are stronger determinants of AI adoption than demographic characteristics (Kasneci et al., 2023; Sallam, 2023; Chen & Cheung, 2025; Wu & Yu, 2024).

From a theoretical perspective, the findings are broadly consistent with TAM but the theoretical mechanisms were not directly examined. While UTAUT2 recognises demographic characteristics as contextual moderators of technology acceptance and use, the present study found no significant influence of the selected demographic variables on either Meta AI adoption or educational use. Rather than contradicting the broader theory, these findings suggest that the moderating role of demographic characteristics may be less pronounced where generative AI has become widely accessible and familiar to students. This implies that technology-related perceptions and contextual factors may now play a greater role than demographic characteristics in explaining students' engagement with Meta AI. The findings also highlight the importance of promoting AI literacy and responsible use through institutional policies that address issues such as academic integrity, misinformation, algorithmic bias, privacy, and overreliance on AI-generated content (UNESCO, 2023; Yan et al., 2024).

Conclusion

The study concludes that although undergraduate students in selected universities in North-Central Nigeria reported a high level of Meta AI adoption for learning (Grand Mean = 3.91), selected demographic characteristics gender, age, level of study, device ownership, and internet access did not significantly predict either Meta AI adoption ($R^2 = .010$, $p = .599$) or Meta AI educational use ($R^2 = .013$, $p = .430$). The extremely low explanatory power suggests that demographic characteristics alone are insufficient for explaining Meta AI adoption. Future studies should incorporate theoretically grounded constructs from TAM and UTAUT2. The results imply that factors beyond demographics, such as technology-related perceptions, digital

competence, facilitating conditions, and institutional support, may play a more important role in shaping students' adoption and educational use of Meta AI. While the findings are consistent with the Technology Acceptance Model (TAM), they suggest that the moderating influence of demographic characteristics proposed in UTAUT2 may be less pronounced in contexts where generative AI has become widely accessible and familiar to students. Cumulatively, the study provides empirical evidence to support the development of institutional policies and educational practices that promote the responsible, inclusive, and effective integration of generative AI into higher education in Nigeria.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Since demographic characteristics did not significantly influence Meta AI adoption or educational use, universities should implement inclusive institution-wide AI integration strategies that provide all students, regardless of gender, age, level of study, device ownership, or internet access, with equal opportunities to benefit from AI-supported learning.
2. Given the high level of Meta AI adoption among undergraduate students, university management should provide regular AI literacy and digital skills training to strengthen students' ability to use generative AI effectively, critically, and responsibly for learning, research, academic writing, and problem-solving.
3. Higher education institutions should develop and implement clear institutional policies and guidelines on the ethical and responsible use of generative AI, with particular emphasis on academic integrity, critical evaluation of AI-generated content, data privacy, and appropriate attribution of AI-assisted work.
4. Although internet access was not statistically significant, its near-significant relationship with Meta AI educational use suggests that improving digital infrastructure may further facilitate equitable AI-supported learning.

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