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Internet Usage Patterns and Their Association with Academic Performance among Undergraduates in Three Nigerian Universities

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ABSTRACT
This study examined patterns of internet use and their association with academic performance among undergraduates at three federal universities in North-Central Nigeria. An explanatory sequential mixed-methods design was reported, comprising a questionnaire distributed to 1,000 students and interviews with 30 purposively selected students. Of the questionnaires distributed, 867 valid responses were analysed (86.7% response rate); data collection took place from January to June 2025. The reported results show a positive correlation between the proportion of internet time devoted to academic activities and cumulative grade point average (CGPA; $r = .34$, $p < .01$), and a negative correlation between time spent on social media and CGPA ($r = -.28$, $p < .01$). Respondents also reported barriers including unstable electricity, data costs, network connectivity, and limited institutional internet provision. These findings describe associations within the participating universities and should not be interpreted as evidence that internet use caused changes in academic performance. Interpretation is limited by the cross-sectional design, self-reported usage measures, and the study's geographic and institutional scope. The findings point to the potential value of digital-literacy support and more reliable institutional connectivity, subject to verification of the reported analyses.

Keywords: Internet Use, Academic Performance, Higher Education, Nigeria, Digital Literacy, Social Media

INTRODUCTION

The internet has become an important part of higher education, providing access to research materials, online learning resources, communication, and collaborative study. At the same time, frequent engagement with non-academic content may compete with study time and concentration. The relationship between internet use and academic performance is therefore not necessarily uniform; it may depend on the purpose of use, students' digital literacy and self-regulation, and the availability and affordability of connectivity.

In the Nigerian higher-education context, unstable electricity, high data costs, uneven network coverage, and differences in access to devices may shape how students use online resources. Previous work cited in the submitted manuscript addresses a mixture of secondary-school populations, university students, and studies conducted outside Nigeria. Such studies provide context, but their findings cannot automatically be generalized to undergraduates in Nigerian universities. The present study's stated contribution is its examination of survey and interview evidence from three federal universities in North-Central Nigeria; however, the strength of that contribution depends on transparent reporting of sampling, measurement, and analysis.

Uses and Gratifications Theory provides a way to consider how students select online activities to meet needs such as information seeking, communication, or entertainment. The Technology Acceptance Model focuses on perceived usefulness and ease of use as influences on technology adoption. In this study, these perspectives are relevant to students' reported purposes of internet use and their use of academic resources. The manuscript does not, however, report direct measures of all theoretical constructs or formal hypotheses; these should not be inferred from the framework alone.

Study aim. This study aimed to describe internet-use patterns among undergraduates at three federal universities in North-Central Nigeria and examine their associations with CGPA, while identifying students' reported barriers to academic internet use.

Literature Review

Internet Access and Digital Infrastructure in Nigerian Higher Education

The availability and quality of internet access can shape students' opportunities to use online resources for learning. Nigerian studies published in FUDMA Journal of Sciences have examined learning management systems, social media for teaching and learning, and ICT-supported learning activities (Balogun et al., 2022; Dada et al., 2024; Omotehinwa et al., 2021). Together, these studies show that access to digital tools should be considered alongside learners' engagement, perceptions, and the educational setting. However, they do not directly establish the association between overall internet-use patterns and CGPA among undergraduates across the three universities examined here.

Patterns and Purposes of Internet Usage

Students' internet-use patterns can vary by frequency, access point, and purpose. In the present survey, respondents reported using the internet for academic research, social media, entertainment, and communication. These activities may coexist within the same day, so overall time online should not be treated as a single measure of educational use. Prior FUDMA Journal of Sciences research on social media for teaching and learning also illustrates the importance of distinguishing educational use from general platform use (Omotehinwa et al., 2021).

The Academic Performance Nexus

The relationship between internet use and academic performance is likely to depend on the purpose and context of use. Online resources can support information seeking and collaborative study, while non-academic activity may compete with time allocated to coursework. Research published in FUDMA Journal of Sciences has examined students' perceptions of learning management systems and study habits (Balogun et al., 2022), as well as ICT resources and student interest (Dada et al., 2024). These studies provide relevant context, but differences in population, design, and measures mean that their results should not be treated as direct confirmation of the correlations reported in the present study. Related studies published in the FUDMA Journal of Sciences provide relevant Nigerian evidence on digital learning. Balogun et al. (2022) examined students' perceptions of learning management systems and reported perceived benefits for study habits during the COVID-19 period. Omotehinwa et al. (2021) investigated lecturers' and students' perceptions of social media for teaching and learning and found differences in perceived usefulness and ease of use. Dada et al. (2024) examined self-regulated ICT resources and students' interest across achievement groups. These studies support the relevance of examining not merely access to digital technologies but also the purpose of use, students' engagement, and the learning context. Their populations and measures differ from the present study, so their findings are contextual evidence rather than direct confirmation of the present estimates.

Theoretical Framework

This study is grounded in the Uses and Gratifications Theory (UGT), which posits that individuals actively select and use media to satisfy specific needs and goals. In the context of internet usage, UGT helps explain why students may choose academic versus non-academic internet activities based on their perceived needs and the gratifications they expect to receive. Students seeking information and knowledge may engage in academic internet use, while those seeking entertainment or social connection may gravitate toward social media platforms. Additionally, the study draws on the Technology Acceptance Model (TAM), which suggests that perceived useful-
ness and perceived ease of use influence technology adoption and utilization. Students who perceive the internet as useful for academic purposes and find it easy to use for educational activities may be more likely to employ it productively, leading to positive academic outcomes.

MATERIALS AND METHODS

Research Design and Sampling

This study employed a mixed-methods sequential explanatory design, integrating quantitative survey data with qualitative interviews. The quantitative phase aimed to establish patterns of internet usage and their correlation with academic performance, while the qualitative phase explored the contextual factors underlying these patterns. A stratified random sampling technique was used to select 1,000 undergraduate students from three federal universities in North-Central Nigeria: Federal University,Lafia; Federal University of Technology, Minna; and University of Ilorin. Stratification was based on academic year (100-400 level), gender, and field of study (STEM, humanities, and social sciences). The sample size was determined using Yamane's formula with a 95% confidence level and 5% margin of error.

Data Collection Instruments

Two instruments were employed for data collection: 1. Structured Questionnaire: A 45-item selfadministered questionnaire was developed, covering demographic information (8 items), internet access and resources (10 items), patterns of internet usage (12 items), perceived impact on academics (10 items), and challenges faced (5 items). The questionnaire utilized Likert scales and multiplechoice questions. 2. Semi-structured Interview Guide: In-depth interviews were conducted with 30 students purposively selected from the survey respondents (10 from each institution). Interviews explored factors influencing internet usage decisions, strategies for managing academic and non-academic internet use, and perceptions of institutional support. Academic performance data, specifically semester CGPA, were obtained from institutional records with appropriate permissions, and triangulated with students' self-reported academic standing.

Data Collection Procedure

Data collection occurred over a six-month period (January–June 2025). Questionnaires were administered through both online platforms (Google Forms) and paper-based distribution to accommodate students with limited internet connectivity. Prior to data collection, ethical approval was obtained from institutional research ethics committees, and informed consent was secured from all participants.

Interviews were conducted in person, audio-recorded with participant consent, and transcribed verbatim. Data collection continued until theoretical saturation was reached.

Data Analysis

Quantitative data analysis employed SPSS (Version 26.0). Descriptive statistics summarized patterns of internet usage and demographic characteristics. Inferential statistics, including independent samples t-tests, ANOVA, and multiple regression analysis, were used to examine relationships between variables. Assumption testing was conducted prior to parametric analyses. Qualitative data were analyzed using thematic analysis following Braun and Clarke's (2006) framework. Initial coding was followed by theme development, with themes reviewed and refined through an iterative process.

Ethical Considerations

This study adhered to established ethical guidelines for research with human participants. Ethical clearance was obtained from institutional review boards, and all participants provided informed consent. Anonymity and confidentiality were maintained throughout the research process.

RESULTS AND DISCUSSION

Results and Findings

Demographic Characteristics of Respondents

Of the 1,000 questionnaires distributed, 867 valid responses were obtained, yielding a response rate of 86.7%. Respondent demographics are presented in Table 1.

Table 1: Demographic Characteristics of Respondents (N = 867)

Characteristic	Category	Frequency	Percentage
Gender	Male	498	57.4%
Gender	Female	369	42.6%
Academic year	100 Level	197	22.7%
Academic year	200 Level	223	25.7%
Academic year	300 Level	234	27.0%
Academic year	400 Level	213	24.6%
Field of study	STEM	341	39.3%
Field of study	Humanities	268	30.9%
Field of study	Social Sciences	258	29.8%
Smart-device ownership	Yes	792	91.4%
Smart-device ownership	No	75	8.6%

Patterns of Internet Usage

The analysis revealed diverse patterns of internet usage among students. Key findings include:

1. Frequency of Internet Access: The majority of students (72.3%) reported accessing the internet daily, with 23.7% accessing multiple times daily. Only 4.0% reported weekly or less frequent access. This high frequency is consistent with findings from other Nigerian studies (Olatokun, 2008). 2. Primary Access Points: Mobile devices were the predominant access point, with 78.9% of students primarily using smartphones for internet access. This was followed by personal laptops (12.3%), institutional computer laboratories (5.2%), and cybercafés (3.6%). 3. Principal Uses of Internet: Students reported using the internet for multiple purposes, with the most frequent being social media engagement (89.4%), academic research (76.5%), entertainment (72.1%), and communication (68.3%). These findings indicate a tendency toward nonacademic usage, which is consistent with prior research [3,6]. 4. Time Allocation: Students reported spending an average of 4.7 hours daily on the internet. Of this, an average of 2.1 hours was allocated to non-academic activities (social media, entertainment), while 1.8 hours was dedicated to academic purposes, with remaining time for other activities. 5. Academic Internet Activities: Among students using the internet for academic purposes, the most common activities included searching for course materials (83.2%), accessing online academic resources (67.8%), participating in academic discussions (42.3%), completing online assignments (38.7%), and watching educational videos (34.1%).

Relationship Between Internet Usage and Academic Performance

Analysis of the relationship between internet usage patterns and CGPA revealed several significant findings: Academic vs. Non-Academic Usage: A significant positive correlation was found between the proportion of internet time dedicated to academic activities and CGPA ($r = .34$, $p < .01$). Conversely, time spent on social media showed a moderate negative correlation with CGPA ($r = -.28$, $p < .01$). This pattern of non-academic usage potentially leading to poorer outcomes is consistent with previous research (Friday, 2025; citation requiring verification). Frequency of Use: Moderate daily internet usage (2-4 hours) was associated with the highest mean CGPA (3.24), followed by heavy usage (>6 hours) with a mean CGPA of 2.89, and low usage (<1 hour) with a mean CGPA of 2.67. This suggests that limited usage may restrict academic benefits, while excessive usage may lead to academic costs. Access and Resources: Students who owned personal devices and had consistent internet access demonstrated significantly higher CGPAs ($M = 3.12$, $SD = .45$) compared to those without consistent access ($M = 2.68$, $SD = .52$), $t(865) = 8.42$, $p < .001$. This finding supports research establishing the importance of access for academic success [10,13]. Social Media Platforms: The analysis indicated varying impacts by platform. Students who primarily used WhatsApp and Telegram for academic communication showed better outcomes, while those who predominantly used entertainment-oriented platforms (TikTok, Instagram) demonstrated poorer academic outcomes, consistent with findings on the dual role of such platforms.

Challenges to Effective Academic Internet Usage

Qualitative and quantitative data identified several challenges that constrain students' ability to utilize the internet productively for academic purposes: 1. Infrastructure Barriers: The most frequently cited challenges included unstable electricity supply (84.3%), high cost of data (79.5%), poor network connectivity (71.8%), and limited institutional internet provision (62.4%). 2. Distraction Management: Many students (67.8%) acknowledged difficulty in managing internet-related distractions, particularly from social media and entertainment platforms. Interviewees described "being pulled away" from academic work by notifications and the temptation to engage in non-academic content. 3. Digital Literacy Gaps: A significant proportion of students (43.6%) reported inadequate skills in utilizing internet resources effectively for academic purposes, citing difficulties with effective search strategies, evaluating source credibility, and using academic databases. 4. Financial Constraints: Students from lower-income backgrounds expressed particular concern about the cost of internet access, describing how financial limitations constrained their ability to engage in extended academic internet usage.

Moderating Factors

Exploratory subgroup analyses reported different coefficients for students with higher and lower digital-literacy scores ($\beta = .42$, $p < .001$; $\beta = .18$, $p = .038$). These subgroup coefficients do not, by themselves, establish moderation. A formal interaction term and its confidence interval are required before any moderation claim can be made. The coefficients should be retained only after checking them against the original statistical output.ective academic internet utilization. 3. Self-Regulation: Students who reported practicing time management strategies for internet usage showed more positive academic outcomes, suggesting that self-regulation is a critical moderating factor.

Discussion

The findings of this study illuminate the complex relationship between internet usage and academic performance in Nigerian higher institutions, confirming and extending existing research on the paradox of digital connectivity in educational contexts.

The findings should also be read alongside Nigerian work published in FUDMA Journal of Sciences. Research on learning management systems has examined perceived changes in students' study habits (Balogun et al., 2022), while work on social media for teaching and learning has considered perceived usefulness and ease of use (Omotehinwa et al., 2021). Dada et al. (2024) further examined ICT-supported learning and student interest across achievement levels. The present study differs in its focus on reported internet-use purposes and CGPA across three universities; differences in study design and measurement mean that direct numerical comparisons are not warranted.

The Internet Usage Paradox

The reported results suggest that internet use has more than one relationship with academic life: academic-purpose use was positively associated with CGPA, whereas social-media time was negatively associated with CGPA. This interpretation is consistent with the distinction between purposeful educational use and general social-media engagement discussed in related Nigerian research (Balogun et al., 2022; Omotehinwa et al., 2021). Because the study is cross-sectional, these associations do not establish that one type of internet use caused higher or lower CGPA.

Infrastructure and Access Constraints

The prominent role of infrastructure challenges—electricity, data costs, network connectivity—emerges as a critical theme in shaping the academic impact of internet usage (Abubakar, 2025; Ejemeyowvi et al., 2019). These challenges create what might be termed "infrastructural friction"—obstacles that interrupt academic internet engagement and may push students toward non-academic usage patterns. When students face connectivity issues during academic work, they may default to more accessible nonacademic platforms, reinforcing patterns of distraction. This infrastructural dimension is particularly relevant in the Nigerian context, where institutional provision of internet services is often inadequate (Olatokun, 2008). The finding that students at institutions with better internet infrastructure demonstrate more effective academic internet usage suggests that institutional investment in connectivity and support can positively shape student behavior.

The Role of Digital Literacy and SelfRegulation

Digital literacy may help students locate, evaluate, and use online information effectively. The reported subgroup coefficients suggest a possible difference by digital-literacy level, but this interpretation must remain exploratory until the original model output is checked and a formal interaction test is reported. Institutional training should therefore be considered a practical recommendation, not a demonstrated causal effect of this study.

Socioeconomic Dimensions

The socioeconomic dimension of internet usage emerges as a significant factor in this study. Students from higher-income backgrounds, who can afford more consistent connectivity and personal devices, demonstrate more academic benefit from internet usage. This finding suggests that the "digital divide" persists in Nigerian higher education and that it affects academic outcomes (Olatokun, 2008; Ejemeyowvi et al., 2019). Without intervention, this divide may reinforce or exacerbate educational inequality.

Gender and Internet Usage

Although gender was included in the demographic profile, the information presented in the current results is insufficient to establish a statistically meaningful gender difference in internet access or academic benefit. Any gender-related interpretation should be added only if supported by the original subgroup analysis and appropriate inferential statistics.

Implications and Recommendations

Institutional and Policy Recommendations

1. Institutional Internet Infrastructure: Universities should prioritize the development of robust internet infrastructure, including campus-wide WiFi, computer laboratory expansion, and reliable power backup systems. Such investment can reduce the infrastructural friction that currently constrains academic internet usage. 2. Digital Literacy Programs: Higher institutions should implement structured digital literacy training for all students, focusing on effective search strategies, source evaluation, academic database utilization, and internet self-regulation skills. These programs should be integrated into orientation and ongoing student development. 3. Integration into Curriculum: The internet should be systematically integrated into formal curricula through online resources, research assignments, and collaborative learning platforms. Such integration can help reframe internet usage as an academic rather than primarily social tool. 4. Subsidized Access: Given the financial barriers many students face, universities and government agencies should consider subsidizing student internet access through discounted data plans or institutional internet provision, particularly for students from lower-income backgrounds.

Recommendations for Students

1. Self-Regulation Strategies: Students should develop explicit strategies for managing internet usage, including timeblocking for focused academic work, limiting social media engagement during study periods, and using productivity applications to track usage.

2. Purposeful Academic Engagement: Students should approach internet usage with intentionality, focusing on academic resources and skill development rather than passive entertainment. 3. Digital Literacy Development: Students should take advantage of available training opportunities to develop digital literacy skills.

Directions for Future Research

1. Longitudinal Studies: Future research should employ longitudinal designs to examine how internet usage patterns evolve throughout students' academic careers and how these patterns influence long-term academic and professional outcomes. 2. Intervention Studies: Research should evaluate the effectiveness of specific interventions—such as digital literacy programs or time-management training—in improving academic internet utilization. 3. Platform-Specific Research: Given differing impacts across platforms, further research should examine the specific mechanisms through which particular platforms influence academic engagement. 4. Comparative Studies: Comparative research across institutions, regions, and socioeconomic groups would enhance understanding of contextual factors in the internet-academic performance relationship.

Limitations and Conclusion

Limitations

This study has several limitations. First, the cross-sectional design limits causal inferences about the direction of relationships between internet usage and academic performance. Second, reliance on self-reported internet usage may introduce recall bias. Third, the focus on three federal universities limits generalizability to private institutions, polytechnics, or colleges of education. Fourth, the sample was drawn from North-Central Nigeria and may not fully represent the diversity of the Nigerian higher education landscape.

CONCLUSION

This study provides empirical evidence on the complex relationship between internet usage and academic performance in Nigerian higher institutions. The internet presents a paradox: it offers transformative educational resources while simultaneously providing distractions that can undermine academic engagement. Whether the internet serves as an academic tool or a distraction depends on multiple factors—usage patterns, digital literacy, institutional support, self-regulation, and socioeconomic context.

The findings underscore the need for a holistic approach to internet integration in Nigerian higher education. Simply providing access is insufficient; institutions must address digital literacy, infrastructure, and self-regulation to maximize educational benefits while mitigating potential harms. Students must develop intentional strategies for utilizing internet resources for academic advantage while managing distractions. The digital transformation of Nigerian higher education is inevitable and potentially beneficial. However, realizing this potential requires concerted effort from institutions, policymakers, educators, and students to ensure that the internet becomes a tool for academic empowerment rather than a source of academic detriment.

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