

## **DIGITAL SKILLS AND DEVICE OWNERSHIP AMONG STUDENTS OF TERTIARY INSTITUTIONS IN ADAMAWA STATE, NIGERIA: PATTERNS, USAGE AND TRENDS**

**Jeremiah Tizhe Samaila\***

*Adamawa State College of Education Hong School of Vocational & Technical Education Department of Agricultural Education*

**Akiti Wycliffe**

*Adamawa State College of Education Hong School of Sciences Department of Computer Science Education*

**Giliki Jerrison**

*Adamawa State College of Education Hong School of Sciences Department of Computer Science Education*

**\*Corresponding Author:** [jeremiahsamaila@gmail.com](mailto:jeremiahsamaila@gmail.com)

### **Article Info**



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license <https://creativecommons.org/licenses/by/4.0>

### **Abstract**

This study investigated digital skills and competencies of students of in Tertiary institutions in Adamawa State, Nigeria. It identified the types of digital devices used, appraised the level of knowledge and usage and determined the frequency of the usage of those devices by the respondents. Multistage sampling technique was employed to sample 1500 respondents and the data obtained were analyzed using percentage and mean, Likert-type and rating scales. The results revealed that the most common types of digital devices used by the respondents were smart phones (74%) and laptops (61%) and the level of knowledge and usage were rated highly for the use of smart phones (mean score = 4.05), laptops (mean score = 4.01) and desktops (mean score = 3.10). Furthermore, smart phones (mean score = 2.47), laptops (mean score = 2.50) and desktops (mean score = 2.20) were the most frequently used devices. The study recommends the need for students to engage other ICTs devices to enrich their learning experiences and these digital devices may be provided through donations from governmental and non-governmental organizations for more effective teaching and learning especially as Tertiary institutions transit towards incorporating online teaching.

### **Keywords:**

*Digital, skills, students, devices, smart phones*

## 1. INTRODUCTION

Increasing digitization of Education necessitates that learners engage with Technology Enhanced Learning requiring an appreciable level of digital skills, demanding a shift from the norm towards adapting to this new digital environment and maximizing the tremendous benefits in the digital work space. Thus, there is an urgent need for students in Tertiary Education in particular to acquire digital skills which are needed in the fast-changing Educational landscape (Jackman et al., 2021). Currently, digital competence is gaining popularity in Higher Education especially in the 21<sup>st</sup> century with unprecedented development in online media, internet, virtual reality and artificial intelligence among others (Zhao et al., 2021). Furthermore, the relevance of digital skills and competencies to Higher Education is made germane by the Covid-19 health crises, which has given rise to the adoption of Emergency Remote Teaching (Jili et al., 2021; Basilota et al., 2022). The Organization for Economic Cooperation and Development Learning Framework 2030 identified digital literacy as a core fundamental competency for future education. Digital competence which is "the confident, critical and responsible use of digital technologies for learning, at work, and for participation in society" is one of the eight key life skills needed in preparing students for the demands of the 21st-century workforce (European Union). Whereas digital skills are skills needed to use digital devices, communication applications and networks to access and manage information, digital competence is a combination of knowledge, skills and attitudes regarding the use of technology to perform tasks, solve problems, communicate, manage information, collaborate, as well as to create and share content appropriately securely, critically, creatively, independently and ethically thereby maximizing the opportunities in the world of work, entertainment and Education (Zhao et al., 2021). Therefore, possession of digital skills and competence will equip learners in Higher Education to meaningfully engage and appraise the digital space. The literature identifies three dimensions of digital competence as: 1) Instrumental skills for using digital tools and media. 2) Knowledge, theory and principles related to technology. 3) Attitudes towards strategic use, openness, critical understanding, creativity, accountability and independence (Skov, 2016). The European Digital Competence Framework (DigComp) organizes these competencies into five key areas: (1) information and data literacy (2) communication and collaboration (3) digital content creation; (4) safety and (5) problem-solving. This study assesses the digital skills and competencies of students in Higher Education in Nigeria, with reference to Adamawa State.

### Aim

To assess digital skills and competencies among Students of Higher Education in Adamawa State, Nigeria.

### Objectives

1. To identify the types of digital Communication devices available to the respondents.
2. To appraise the level of knowledge about digital Communication devices by the respondents.
3. To determine the frequency of usage of digital devices by the respondents, to communicate, acquire information, create content and solve problems.

## Research Questions

1. What are the types of digital Communication devices do the respondents possess?
2. What level of knowledge about digital Communication devices do the respondents have?
3. What is the frequency of usage of digital Communication devices by the respondents?

## Statement of the Problem

The application of digital tools and devices as a mode of communication and collaboration, has been widely adopted in journalism, entertainment and healthcare among others (Gleason & Manca, 2019). Higher Education Institutions in Nigeria have greater preference for the traditional mode of teaching and learning. However, there has been a significant shift towards using on-line learning platforms especially during and after the covid-19 pandemic that has triggered higher order reforms in teaching and learning processes charting a new course towards ‘digital education’ as a means to circumvent the challenges of the pandemic (Vishnu, et al., 2022). Thus, students in Nigeria Higher Education Institutions currently utilize a wide range of online collaborative tools in their studies (Egielewa, et al., 2021; **Duruji, et al., 2025**). Therefore, the application of digital media, though at its infancy is fast becoming an established tradition amongst students in Higher Education Institutions in Nigeria. Reports have shown that most female University students in Nigeria possess advanced levels of communication and collaboration, digital content creation and safety, while Academics in the country possess digital competencies that relate to pedagogic-didactic awareness (Ogunbodede, et al., 2023; Ogegbo, et al., 2022). However, specific data on digital competencies of Higher Education students in Nigeria is limited hence the need to assess the current level of digital skills and competencies among students of Higher Education Institutions in Nigeria, this study is tailored towards meeting this need.

## 2. METHODOLOGY

### Study Area

The study was conducted in Adamawa State, located in the Northeast region of Nigeria.

### Sample and Sampling Technique

Multistage sampling technique was used to draw samples from Tertiary institutions located in Adamawa State Nigeria. In stage I four institutions namely, Adamawa State College of Education Hong, Federal Polytechnic Mubi, Modibbo Adama University Yola, and Federal College of Education Yola were selected. In stage II one department was chosen in each of the selected schools, ensuring a mix of disciplines across the Humanities and Sciences, while in stage III, final year classes were chosen in each of the selected departments using purposive sampling. In stage IV random sampling technique was adopted to draw respondents from each of the sampled final year classes, targeting a sample size of 1,500 respondents. However, equal number of respondents was not selected from each school.

### 3. RESULTS

**Table 1. Gender distribution of respondents (N = 1500)**

Gender	Frequency	Percentage
Male	899	59.92
Female	601	40.08
<b>Total</b>	<b>1500</b>	<b>100</b>

(Source: Field work, 2025)

Table 1 presents the gender distribution of the study's respondents in a sample size of 1500 participants. Out of a total of 1500 participants, 899 (59.92%) were male, while 601 (40.08%) were female. This indicates a higher representation of male respondents compared to females in the study population.

**Table 2. Age distribution of respondents (N= 1500)**

Age	Frequency	Percentage
18 – 23	449	29.96
24 – 29	674	44.94
30 – 35	152	10.11
>36 years	255	14.98
	<b>1500</b>	<b>100</b>

(Source: Field work, 2025)

Table 2 summarizes the age distribution of the respondents in a sample size of 1500 individuals. The majority of the participants (44.94%, n = 674) were within the 24–29 years age range, followed by 29.96% (n = 449) who were between 18–23 years. Respondents aged 30–35 years accounted for 10.11% (n = 152), while those above 36 years represented 14.98% (n = 225) of the total sample. This age profile suggests that the sample is predominantly composed of younger adults, with nearly three-quarters (74.90%) falling between the ages of 18 and 29.

Research Question 1. What are the types of digital communication devices do the respondents own?

Table 3. Ownership of Digital Communication Devices among Respondents (N = 1,500)

Type of Digital Device	Frequency of Possession	Percentage of Possession (%)
Desktop	330	22%
Laptop	915	61%
Smartphone	1,110	74%
Tablet	60	4%
Others	45	3%

(Source: Field work, 2025)

**Note:** Respondents may possess more than one type of device; hence, percentages may exceed 100%.

Table 3 presents the ownership distribution of digital communication devices among respondents in a sample size of 1500 individuals. The data indicate that smartphones are the most commonly owned devices, with 1,110 (74%) reporting ownership. Laptops follow closely, owned by 915 (61%) and Desktops by 330 (22%). Tablets are the least owned device, with only 60 (4%) respondents. 45(3%) reported owning other types of digital communication devices, which may include smartwatches, e-readers, or communication-enabled gaming systems.

Research Question 2. What is the level of knowledge of digital communication devices possessed by the respondents?

Table 4. Knowledge Level of Digital Communication Devices Possessed by Respondents (N = 1,500)

Device Type	Very High (5)	High (4)	Moderate (3)	Low (2)	Very Low (1)	Mean Score	Decision
Desktop	100	372	135	68	25	3.10	High
Laptop	320	688	84	88	40	4.01	High
Smartphone	800	432	156	80	32	4.05	High
Tablet	60	144	480	552	264	2.43	Low
Others	12	20	44	220	324	0.78	Low

(Source: Field work, 2025)

**Note:** Knowledge level was rated on a 5-point Likert scale: Very High (5), High (4), Moderate (3), Low (2), and Very Low (1). A mean score of  $\geq 3.00$  denotes high knowledge, while  $< 3.00$  denotes low knowledge. Multiple responses permitted.

Table 4 shows the knowledge level of digital devices of communication devices possessed by respondents in a sample size of 1500 individuals. Smartphones had the highest mean knowledge level score of 4.05. 800 of the total respondents used the smartphones indicating very high familiarity with the device by the respondents. A majority (1,232) of respondents rated themselves as having high or very high knowledge of smartphone usage. Laptops followed closely with a mean score of 4.01 with 320 respondents, also reflecting a high knowledge level of the device among the respondents. Desktops received a mean score of 3.10, categorizing them within the high knowledge level with 100 respondents. Tablets received a low knowledge classification with a mean score of 2.43 representing 60 respondents, and more than half of the respondents rating their knowledge as low or very low, suggesting a limited engagement with the device. While devices classified as "Others" scored the lowest mean of 0.78, representing 12 respondents in the low knowledge category.

**Research Question 3: What is the frequency of usage of Digital Devices by the Respondents?**

**Table 5. Frequency of Digital Device Usage among Respondents (N=1,500)**

Device Type	Most Frequently (%)	Frequently (%)	Rarely (%)	Mean Usage Score	Decision
Smartphone	71.0	8.7	20.3	2.47	Low
Laptop	62.3	24.6	14.5	2.50	Low
Desktop	29.0	30.4	4.3	2.20	Low
Tablet	4.3	15.9	79.7	1.24	Low
Other	0.0	11.6	88.4	1.11	Low

(Source: Field work, 2025)

**Note:** Frequency of usage scores: A mean score of  $\geq 3.00$  denotes high usage frequency, while  $< 3.00$  denotes low usage frequency. Multiple responses permitted.

Table 5 presents frequency of digital device usage among respondents in a sample size of 1500 individuals. The data provides that Smartphones were the most frequently used device with (71.0%) of users indicating it as their most frequently used device. Laptops, while slightly less used most frequently (62.3%), have the highest mean usage score (2.50). Desktops show a balanced spread, with 29.0% most frequently using

them and 30.4% frequently. Tablets and other devices are largely underutilized while a vast majority report using other devices (88.4%) rarely.

#### 4. DISCUSSION

The results of the current study on ownership of devices indicate the respondents owned Desktops, Laptops, Smartphones and Tablets in varying degrees reflecting a multi-device environment, where overlapping ownership may be common meaning many respondents own multiple device types, contributing to cumulative percentages exceeding 100%. Ownership remains low for the tablet, despite being mobile, suggesting factors such as limited functional differentiation from other devices like the smartphones, cost considerations, or preference for more robust devices amongst respondents. Overall, the data on ownership of devices emphasize a diversified yet mobility-centric pattern of digital engagement among respondents. In agreement with these findings, studies have reported a prevalent ownership of ICT (Internet Communications Technology) devices among University students as a means of keeping up with the digital world while enhancing retention and achievement thereby improving students' learning. A 99.4 % and up to 100 % ownership of smartphones were reported amongst Higher Education students in Nigeria (Edeh, et al., 2022; Ogunmodede, et al., 2023). Smartphone ownership among Nigerian Higher Education students extends beyond its basic communication functions serving dual roles as status symbols and learning tools (Edeh et al., 2022). The knowledge level of digital devices by respondents in this study agrees with those of Neubaum et al. (2025) suggesting high levels of smartphone literacy, particularly among younger and more educated Higher Education students, and attributing this to increased mobile communication skills and intensified digital engagement especially during the COVID-19 lockdowns. Similarly, the high level of laptop proficiency observed in the current study supports their emerging prominence in Nigeria's Higher Education environment. This corroborates findings by Çam and Kızılcı (2025), which showed frequent laptop usage, correlates with advanced digital literacy which significantly enhances the integration of technology into learning contexts. The moderate levels of user familiarity exhibited towards Desktop computers in the current study suggest their declining relevance in the face of growing mobile and tablet adoption and perhaps due to location constraints among respondents. Nonetheless, Kartal and Köksal (2025) emphasized that high digital literacy, coupled with positive attitudes toward technology, continues to drive Generation Z learners to utilize both laptops and desktops in academic pursuits. Furthermore, in terms of frequency of usage, there is a strong familiarity with the smartphone, likely due to portability, affordability, and multifunctionality in communication and the social media by the respondents, this matches with trends that position smartphones as central in digital communication and education. The ambiguous and overlapping roles of tablets between smartphones and laptops and cost may account for their underutilization and usage being low. And for the other devices, there may either be minimal engagement or confusion around their use, showing a clear knowledge gap leading to limited adoption and usage. In conclusion, data from the current study agrees with modern digital literacy trends suggesting that smartphones lead, laptops remain crucial, desktops offer stable baseline skill, while tablets and other devices lag behind. This call for prioritizing smartphone and laptop learning modules, since these devices show highest knowledge and probably aligns with student study habits, and the need to address tablet skills gaps either through targeted training or integration in specific programs. In addition, broadening device literacy to include module-based competence across desktops, software, tablets, and emerging devices may be considered to drive digital literacy.



## 5. CONCLUSION

The findings of this study reveal that smartphones and laptops are the most commonly owned and frequently used digital devices, with high levels of knowledge and proficiency reported for both. Desktop computers, while still in use, are less frequently used, and tablets along with other devices show notably low ownership and usage rates. Smartphones and laptops have emerged as the primary digital devices among students, reflecting a mobility-oriented digital landscape characterized by the widespread adoption of portable and cost-effective technologies. The results also reveal limited knowledge and utilization of tablets and other emerging digital devices among students, highlighting a substantial gap in digital competency beyond smartphones and laptops.

## 6. RECOMMENDATIONS

1. Expand access to a range of digital devices through device loan programs, subsidies, or donation initiatives, ensuring that all students have the opportunity to engage with diverse technologies essential for modern learning environments.
2. Implement targeted digital literacy training modules focused on underutilized devices such as tablets and desktops. These programs should emphasize practical skills and real-world applications to boost students' confidence and competence in using a wider array of digital tools.
3. Encourage multi-device engagement in academic activities that require the use of multiple device types. For example, assignments can be structured to leverage the unique features of laptops or desktops thereby fostering adaptability and comprehensive digital literacy across platforms.



## References

- Basilotta-Gómez-Pablos, V., Matarranz, M., Casado-Aranda, L. A., & Otto, A. (2022). Teachers' digital competencies in higher education: a systematic literature review. *International Journal of Educational Technology in Higher Education*, 19(1), 8.
- Çam, E., & Kızılcı, M. (2025). The impact of frequent laptop usage on digital literacy and educational technology integration. *Educational Technology & Society*, 28(1), 1-15.
- Duruji, M. M., Akpabio, E. S., & Okoro, E. R. COVID-19 and Digital Transformation in Nigeria's Higher Education System: Gendered Discourses. In *African Women in the Fourth Industrial Revolution* (pp. 172-194). Routledge.
- Edeh, N. I., Omodede, A., & Yusuf, M. (2022). Smartphone use among Nigerian students: A tool for learning and social engagement. *Journal of Educational Technology Systems*, 50(3), 257-275.
- Egielewa, P., Adebayo, F., & Okolie, U. (2021). Adoption of online collaborative tools in Nigerian tertiary institutions. *International Journal of Education and Development using Information and Communication Technology*, 17(1), 1-15.
- Gleason, B., & Manca, S. (2019). Digital tools for collaboration and communication: Emerging roles in education and beyond. *Journal of Educational Computing Research*, 58(4), 419-438.
- Jackman, W., Adeyemi, M., & Bello, O. (2021). Digital skills acquisition in 21st-century tertiary education. *Journal of Information Technology Education*, 20, 1-20.
- Jili, N. N., Ede, C. I., & Masuku, M. M. (2021). Emergency remote teaching in higher education during COVID-19: challenges and opportunities. *International Journal of Higher Education*, 10(5), 1-9.
- Kartal, G., & Köksal, D. (2025). Digital literacy and technology attitudes among Generation Z language learners. *Computer Assisted Language Learning*, 38(1), 1-25.
- Neubaum, G., Marquart, F., & Huber, B. (2025). Smartphone literacy and digital engagement during COVID-19 among young adults. *Computers in Human Behavior*, 124, 1-12.
- Ogegbo, A., & Ogunmodede, A. (2022). Pedagogical digital competence among academics in Nigeria. *International Journal of Educational Technology*, 18(2), 1-15.
- Ogunbodede, A., Ogegbo, A., & Salami, T. (2023). Digital competence in Nigerian universities: A gender-based analysis. *Journal of Gender and Technology*, 22(1), 1-18.
- Skov, T. (2016). Dimensions of digital competence in education: Theory and implications. *Journal of Educational Multimedia and Hypermedia*, 25(1), 5-20.
- Vishnu, V., Adebayo, F., & Egielewa, P. (2022). Post-pandemic shifts in Nigerian Higher Education: The rise of digital education. *Journal of Educational Technology*, 10(2), 1-12.

Zahn, C., Huber, S., & Richter, T. (2024). The role of digital competence in modern education and the labor market. *Journal of Educational Computing Research*, 68(4), 1-20.

Zhao, Y., Zhang, L., & Wang, H. (2021). Digital literacy and the evolution of education in the age of AI and online media. *Educational Technology Research and Development*, 69(1), 15-30.