



## Assessing the Awareness and Use of ICT Tools among University Students in Nigeria: Implications for Digital Literacy

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### Abstract

The study examined assessing the awareness and use of ICT tools among university students in Nigeria: Implications for digital literacy. ICT tools in the case of higher education denote a vast array of technological tools utilized in communication, creation, dissemination, storage, and management of information. The research design used was a descriptive survey research. The study population consisted of undergraduate students in the Nigerian universities. Currently, according to the National Universities Commission (NUC) data, more than 2.3 million undergraduates study at 43 federal universities, 48 state universities, and 79 private universities of the country. A sample population of 585 respondents was picked out of an estimated population of 656 qualified students who had undergone or had access to institutional ICT facilities in the chosen universities, or participated in ICT-related courses. The findings indicate that ICT use in communication, internet use, and social networking were highly used by students and academic ICT use was less prevalent (data analysis, reference management, and e-library access). The results have wide implications on the development of digital-literacy in universities in Nigeria. The study concluded that ICT awareness among the Nigerian university students is high, but not evenly distributed among the institutions. Most students are conversant with the general ICT tools yet they have inadequate skills on academic-specific technologies that are vital in academics interaction. It was recommended that ICT cannot be isolated to be taught in computer science departments but it must be mainstreamed to all courses. The course evaluation may incorporate the Internet-based elements, online portfolios or e-projects submission to promote active ICT use.

**Keywords:** Awareness, ICT, University Students, Nigeria, Digital Literacy

### 1. Introduction

The 21 st century has seen a radical change in the production, access and sharing of knowledge. To a great extent, this change has been propagated by the Information and

Communication Technology (ICT) which has transformed the way people operate and institutions conduct their operations in all the sectors of contemporary society. ICT has been inextricably integrated in education in areas of teaching, learning, research, and administration. In the modern global context, universities are not merely supposed to graduate graduates who not only have knowledge in their respective fields but are also digitally savvy, flexible, and adaptable to utilizing new technologies to address problems and learn throughout their lives.

ICT tools in the case of higher education denote a vast array of technological tools utilized in communication, creation, dissemination, storage, and management of information. Such tools are hardware (computers, laptops, tablets and smartphones), applications software and internet-based tools such as digital libraries, Learning Management Systems (LMS), databases and academic networking platforms. Successful adoption of these technologies in the learning settings enhances student learning and encourages autonomy, collaborative projects, and a better academic result (Ekuase-Anwansedo, & Smith, 2019; Tafesse, 2022).

Diffusion of ICT in higher education in Nigeria has been accelerating since the beginning of the 21st century, as a result of efforts like the National Information Technology Policy (2001) and the ICT for Education Project of the National Universities Commission (NUC). These structures were supposed to close the gap that existed between the technological aspect of the Nigerian universities and the global universities. Nevertheless, the extent of ICT uptake among students is not evenly distributed despite the major advances as the challenge is exacerbated by infrastructural factors, insufficient funding, poor ICT literacy and disparity in access to digital tools (Oluwatayo & Ojo, 2018; Adetimirin, 2011).

The advent of online learning solutions especially during and after COVID-19 pandemic has highlighted the importance of students having proper ICT skills. The sudden shift to online education revealed digital inequalities between the population of the Nigerian universities with many students having no access to the stable internet connection, personal devices, or the necessary digital literacy level to effectively use the online materials (Okebukola, 2021). As a result, the analysis of the level of awareness of students and their ICT usage trends has been the key step towards determining whether the higher education sector of the Nigerian society is ready to make a complete transition into a fully digital environment.

The ICT awareness can be defined as the knowledge of students about the presence of the digital tools and their purpose, whereas the ICT usage refers to the frequency and effectiveness of, how often and effectively, the tools are used in the academic and non-academic settings (Al-Rahmi et al., 2020; Dambo & Uranta, 2022). The awareness is the initial step of adoption, but the lack of awareness does not ensure the good utilization or the ability to master. Thus, it is essential to comprehend how the Nigerian university students shift towards being ICT tools aware to the point of using these tools to engage in academic activities in order to design specific digital literacy programs.

Digital literacy is not limited to the skills to work with the devices; it is also critical thinking, information assessment, communication, and ethical engagement in the digital environments (Ng, 2012; UNESCO, 2018). Digitally literate students are able to navigate the intricate information environment, filter credible sources and use technology to develop

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academically and professionally. ICT awareness, patterns of its use and digital literacy are thus symbiotic relationship in that each affects the other in moulding the ability of the students to learn effectively in the digital era.

Although Nigerian universities have a number of ICT initiatives, the level of gap between the presence of ICT infrastructure and its proper use among students can be observed (Omotosho et al., 2015). Most undergraduates have laptops and smartphones, but it is their use that is more social networking than academic enrichment. The lack of such balance highlights an important point: the possession and knowledge of ICT tools do not always mean productive or educational use. The question is, then, to comprehend what motivates the students to use ICT tools, what are the impediments to meaningful engagement and how these elements influence their digital literacy levels.

The proposed study is based on the assumption that a precise evaluation of the ICT awareness and patterns of ICT use among students can help institutional policies to enhance digital literacy, improve academic performance, and facilitate the use of technologies in learning within the Nigerian universities.

### **1.2 Statement of the Problem**

Digital transformation of the Nigerian higher education system is going through many challenges. Although universities have strived to incorporate the ICT in teaching and learning, there exists a gap between the desired level of ICT application and the situation in the university campuses. Research (Adetimirin, 2011; Adedokun & Babalola, 2017/2018) has found that most of the students are conversant with ICT tools, but they are incompetent to use them in their academic activities like accessing online databases, utilizing digital libraries, or engaging in online learning smoothly.

Moreover, the infrastructural lagging behind, such as poor internet connectivity, unreliable electricity supply, limited access to computers, and high-priced data, have been a major limitation of meaningful use of ICT tools by students. In addition to the infrastructural issue, the digital divide in Nigeria has socio-economic and educational aspects with students with privileged urban upbringing exhibiting more exposure to ICT resources than students in rural or underfunded schools.

As a result, the issue at hand is not merely providing ICT tools but their efficient awareness, access and use in developing digital literacy. To implement specific interventions that would close the gap between ICT access and literacy, there is a necessity to have a thorough awareness of students, their use patterns, and the perceived barriers. This proposed research endeavors, therefore, to close this gap by evaluating the ICT tools awareness and usage among university students in Nigeria, and more specifically to evaluate the implication of the research on the development of digital literacy.

### **1.3 Objectives of the Study**

The primary aim of the study will be to determine the level of awareness and usage of ICT tools among university students in Nigeria and to also analyze what it means to being digitally literate.

The targeted purposes are to:

1. Identify the awareness of ICT tools among undergraduate students in the Nigerian universities.
2. Investigate the levels and trends of ICT tool academic utilization.
3. Determine the barriers to the efficient use of ICT tools among the students of universities.
4. Determine the connection between ICT use and digital literacy of students.
5. Present suggestions on how to enhance digital literacy by increasing the ICT integration in universities.

#### **1.4 Research Questions**

In order to realize the above objectives, the research questions to be used in the study will be the following:

1. To what extent do the undergraduate students of Nigerian universities know more about ICT tools?
2. What is the use of ICT tools in the academic activity of undergraduate students?
3. What are the problems of successful use of ICT tools by students?
4. How is the level of digital literacy linked with the use of ICT tools by students?
5. How can digital literacy be improved by better ICT utilization in Universities in Nigeria?

#### **1.5 Research Hypotheses**

In order to test the research questions, the null hypotheses will be tested as follows:

**H01:** There is no significant relationship between the awareness of ICT tools and the usage of such tools by students.

**H02:** The use of ICT tools and digital literacy of students are not significantly related.

**H03:** There is no difference between the ICT usage patterns in the various universities (federal, state, and private) found to be significant.

#### **1.6 Significance of the Study**

This research is both theoretical and practical in nature.

Theoretically, it adds to the expanding body of literature on the topic of ICT integration and digital literacy within the framework of the developing countries. It confirms also the application of the technology acceptance theories like the Technology Acceptance Model (TAM) and the Diffusion of Innovation Theory and how users arrive at acceptance and effective use of the newly introduced technologies.

In practice, the research will give empirical evidence that will help:

University administrators in developing ICT policies that facilitate digital competence in students;

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- a) Government agencies like the National Universities Commission (NUC) and the National Information Technology Development Agency (NITDA) in the development and implementation of ICT development programs;
- b) Teachers and librarians in designing specific digital literacy instructional programs based on the needs of students; and
- c) Students themselves in realizing the value of ICT tools in other areas than entertainment in self-directed learning and academic progress.

### **1.7 Scope and Limitation of the Study**

This research paper aims at the population of undergraduate students in some of the Nigerian universities. It will evaluate their awareness and use of ICT tools in academic activities on the basis of awareness and use of overall technology in their lives. The ICT tools to be included are digital learning platforms, computers, smart phones, internet based applications and institutional ICT resources like e-libraries and LMS.

This research is not done with postgraduate students or academic employees, and their viewpoints may provide valuable information. Also, as much as the study covers a wide geographical area of Nigeria through the sampling of universities within the geopolitical regions of Nigeria, it does not purport to have an all inclusive representation of all tertiary institutions in Nigeria.

## **2. Literature Review**

### **2.1 Conceptual Clarifications**

#### **2.1.1 Information and Communication Technology (ICT) Tools.**

The Information and Communication Technology (ICT) can be defined as all the technologies that can be used to create, store, retrieve, transmit, and manipulate information. ICT tools include a broad spectrum of tools, such as computers, laptops, smartphones, tablets, projectors, interactive whiteboards, learning management systems (LMS), digital libraries, academic databases, software, like Microsoft office, SPSS, Turnitin, and reference manager tools, e.g., Mendeley or Zotero (National Institute of Standards and Technology, 2015).

ICT tools are very important in promoting teaching, learning and research within the university context. They facilitate access to learning materials on the internet, facilitate collaborative learning via the virtual world, and sustain the work of research by the students on their own (Salihu & Umar, 2020). Daramola & Aladesusi, (2022) suggest that ICT tools do not only improve academic productivity but also build digital competence to be able to take part in the global knowledge economy.

Nevertheless, ICT effectiveness in education relies majorly on its awareness, access, and competency by users. The availability of technology infrastructure and lack of awareness and skills among its users frequently lead to underutilization, a phenomenon common in most of the Nigerian universities (Dambo & Uranta, 2022).

### **2.1.2 ICT Awareness**

ICT awareness has been defined as the degree at which people are aware of the existence, the purpose and potentiality of the ICT tools (Makinde et al., 2023). Awareness takes both cognitive and affective aspects: cognitive awareness is associated with the knowledge of ICT tools, and affective awareness is associated with the attitudes and readiness to use them (Adetimirin, 2011).

Oye et al. (2019) state that the initial phase of technology adoption is awareness. It dictates how users will search or disregard tools available. In tertiary education, awareness levels of students in the ICT area are determined by various factors that include; prior exposure to technology, ICT policy in institutions, training opportunities, and socio-economic status of students.

Most of the Nigerian students know the basics of ICT tools, including smartphones and laptops and the use of internet application, but they are not familiar with academic ICT tools, such as LMS, e-libraries, and online academic databases (Okebukola, 2021). This disjuncture highlights the significance of institutional programs that facilitate the knowledge of academic ICT tools, but not the general technology.

### **2.1.3 ICT Usage Patterns**

ICT usage pattern is the rate of use and utilization of ICT tool by students in learning, research, communication and social interaction. The usage patterns may be viewed as academic (e.g., searching online databases, using LMS, or working on assignments) and non-academic (e.g., social networking, entertainment) (Amosa, 2017).

Findings in research are conducted in African universities, which show that students use ICT to skew towards non-academic purposes, despite having a relatively high access and awareness (Ashraf, 2022). Such disparity is explained by the lack of motivation, training on academic use of ICT and organized ICT-based learning activities in curricula (George & Ige, 2022).

The use of ICT tools does not only need access, but purposeful application of the technology. Okebukola, (2021) discovered that structured trainings about the e-learning systems had more academic ICT use and digital literacy among the students who participated in the trainings when compared to the students who gained the learning informally. Therefore, the patterns of usage indicate the access and educational culture of ICT integration in universities.

### **2.1.4 Digital Literacy**

Digital literacy is the capacity to view, analyze, apply and produce information responsibly and ethically through the use of digital technologies (UNESCO, 2018). It is not only operational competence but also cognitive and social aspects of the use of technologies. Ng (2012) argues that digital literacy is multidimensional, and it involves:

1. Technical literacy: the skill to use digital instruments;
2. Information literacy: skill in processing, analyzing, and using information efficiently;
3. Communication literacy: the skill of teaming and communicating via the digital medium;

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4. Socio-emotional literacy: the skill to be responsible, ethical, and safe when using technology.

Digital literacy in the Nigerian environment has emerged as a key factor of employability and lifelong learning of students (Okebukola, 2021). Nevertheless, the digital literacy is often uneven that is, it is based on disparities in exposure, institutionalization, and the socio-economic background. Academically active ICT tool users are more likely to have higher digital literacy levels compared to students whose academic process relies on the use of the tool limited to social interactions only (Adeoye & Adeoye, 2017).

### **2.1.5 Barriers to ICT Utilization**

Multiple factors limit the effective application of the ICT tools in the Nigerian universities:

- a) Development of infrastructure shortages: Irregular power supply, lack of computer labs and insufficient internet connectivity are still significant challenges (Okebukola, 2021).
- b) Economic obstacles: Exorbitant internet data and digital devices are also barriers to unbiased access by low-income students (Musa, 2018).
- c) Skill gaps: Several students and even lecturers do not have enough technical knowledge to utilize the advanced digital tools (George & Ige, 2022).
- d) Institutional barriers: Digital initiatives are not sustainable because of weak ICT policies, the inability to embrace the maintenance culture, and bad ICT governance structures (Okebukola, 2021).

All of these challenges contribute to the existence of the so-called digital divide, a phenomenon that introduces asymmetries of access, competency and achievement between students who are able to use ICT resources to their fullest limits, and those who cannot.

## **2.2 Theoretical Framework**

The two theories, which will inform this study, are the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) theory.

### **2.2.1 Technology Acceptance Model (TAM)**

The Technology Acceptance Model was developed by Davis (1989) and it assumes the intention of an individual to use a technology depends on two important perceptions the perceived usefulness (PU) and perceived ease of use (PEOU). PU is the extent to which the individual is convinced that exploiting a specific technology will result in a performance increase, whereas PEOU is the extent to which the individual believes that the utilization of the technology is painless.

TAM suggests that the easier and useful ICT tools are to their users, the more positive their attitudes to the adoption of these tools, and the greater the actual use. Within the framework of university students, TAM can be used to understand why a certain number of students make extensive use of the ICT tools in their academics and other students use it in their social lives only. The literature on Nigeria (Okebukola, 2021; Daramola, 2022) supports

the idea that the perceptions of usefulness of ICT by students, in particular, to achieve academic success, determine the level of usage to a significant degree.

TAM is applicable in this research since it is based on perceiving the awareness and value of the perceived value in creating real ICT use and thus development of digital literacy.

### **2.2.2. Diffusion of Innovation (DOI) Theory**

The Diffusion of Innovation Theory, which is one of the instruments that Rogers (2003) introduced, describes the process of diffusion of innovations through time, with the help of particular social systems. According to Rogers, there are five phases of adoption including awareness, interest, evaluation, trial, and adoption. People pass through these phases with their learning and practicing with a new technology.

The DOI theory also divides adopters to innovators, early adopters, early majority, late majority and laggards based on their pace of adoption of innovations. These categories can be used to explain the different adoption of ICT tools by the students in a university setting. Indicatively, early adopters who are also tech-savvy students can have the power to persuade their colleagues to accept and make use of digital learning platforms.

DOI will be practical in this research in determining the relationship between awareness (stage one) and subsequent stages of ICT adoption and regular usage. It also offers a prism through which institutional processes of diffusion may be considered, and in whose case, the culture of ICT diffuses in universities via formal (trainings, policy) and informal (peer influence) means.

## **2.3 Empirical Review**

Many studies have been conducted on the ICT awareness and use among university students in Nigeria and other developing nations and findings have been consistent with high awareness and moderate or low academic use.

Adetimirin (2011) explored the concept of ICT literacy among undergraduates in Nigerian universities and discovered that out of 90 percent of the students had knowledge on basic devices such as smart phones and computers, only 40 percent of them used it to conduct academic research. Equally, Oye et al. (2011) found that awareness level was high among the population, but there were obstacles that could not enable maximum use to take place, including poor infrastructure, high cost, and institutional support.

Adeleke and Afolabi (2021) studied the topic of ICT adoption and learning outcomes in a sample of Nigerian undergraduates in a more recent study. They have found a high level of correlation between ICT proficiency and performance in academics, and thus, structured ICT training resulted in a high level of digital literacy in students. Nevertheless, they also concluded that not all students had an opportunity to use such advanced tools like virtual learning environments, e-journals, and statistical software.

George and Ige (2022) examined ICT utilization and academic performance in southwestern Nigerian universities and found out that though the vast majority of students possessed both smartphone and laptop computers, 70 percent of them utilized them to watch

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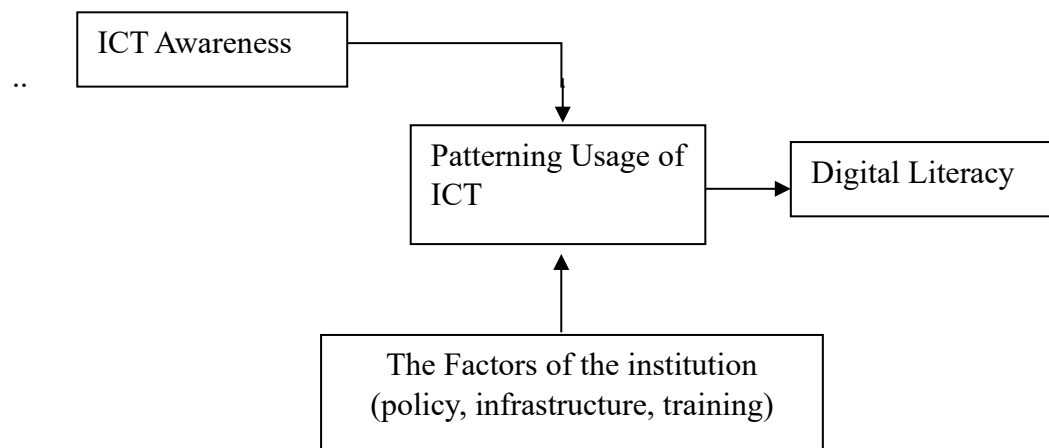
movies or access social media. In their research, they suggested institutional changes to shift the ICT use to academic productiveness.

This has not only been happening in Nigeria, but also in other developing areas. Due to an example of A Case Study of the University of Cape Coast, Nyaaba (2025) discovered a large ICT awareness and a low rate of academic applications related to infrastructure and cost. Similarly, Mwangi, J. (2024) found that awareness of digital literacy was high but digital literacy was not actual because of poor integration of ICT in the curriculums in Kenyan universities.

### **2.5 Conceptual Framework**

The study has a conceptual framework that is formed by adopting components of Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) theory to demonstrate the relationship between ICT awareness, ICT use, and digital literacy.

Acknowledgments of this idea, the conceptual framework of ICT awareness, use, and digital literacy is depicted in Figure 1.



**Figure 1:** Conceptual framework of ICT awareness, use, and digital literacy

In Figure model interpretation:

- ICT awareness affects the use of ICTs, i.e., students who have knowledge of different ICT tools tend to use them more.
- Digital literacy is directly related to the patterns of ICT use (frequency, purpose, and amount of engagement) because academic repetition leads to competence and confidence.
- Institutional factors, including availability of infrastructure, support of policy, and training in digital form moderate the interrelationship between awareness and usage.

This model assumes that awareness does not suffice but constant use, which should be facilitated by institutional enablers, is the main factor of digital literacy development among university students.

### **3. Research method**

#### **3.1 Research Design**

The research design used was a descriptive survey research. The choice of this design was considered the best as it will enable the systematic gathering of the information about the opinions, attitudes, and behaviors of the participants on the ICT awareness and use. The quantitative measurement of relations between variables, including ICT awareness, ICT patterns of use, and digital literacy, can be conducted with the help of a survey design (Creswell, 2018).

Another reason why the descriptive survey method was selected was due to its ability to generalize results of a wide population. It will help the researcher to measure the diversity of ICT experience among the students in federal, state, and private universities in Nigeria.

#### **3.2 Population of the Study**

The study population consisted of undergraduate students in the Nigerian universities. Currently, according to the National Universities Commission (NUC) data, more than 2.3 million undergraduates study at 43 federal universities, 48 state universities, and 79 private universities of the country (NUC, 2019).

Considering this huge population, the study was limited to the sampled universities in the six geopolitical zones of Nigeria in order to be representative. The target population therefore comprised of students of:

1. University of Lagos (South-West).
2. The University of Nigeria, Nsukka (South-East).
3. University of Ilorin (North-Central)
4. Ahmadu Bello University, Zaria (North-West).
5. University of Port Said (South-East)
6. Babcock University (South-West, Private).

These Universities were selected due to their diversity in regions and different rates of ICT infrastructure and enable the research to give the big picture of ICT awareness and usage trends among the Nigerian undergraduates.

#### **3.3 Sample Size and Sampling Procedure**

A sample population of 585 respondents was picked out of an estimated population of 656 qualified students who had undergone or had access to institutional ICT facilities in the chosen universities, or participated in ICT-related courses. Yamane (1967) formula of the sample size was used to determine the sample size which offers a statistically reliable sample at a 95 percent confidence interval and 5 percent margin of error.

#### **The multi-stage sampling method was used:**

1. Stage one: Six institutions of higher learning were chosen purposely to represent federal, state, and private institutions in the six geopolitical zones in Nigeria.

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2. Stage Two: Three faculties were selected randomly in every university (Education, Social Sciences, and Science/Engineering).
3. Stage Three: 100 students of every faculty were randomly selected in a proportionate manner and both genders and levels were balanced.

Such sampling method increased external validity of the study as diverse sample of students of different disciplines and types of institutions was obtained.

### **3.4 Research Instrument**

The structured questionnaire was used to collect data and is called ICT Awareness and Usage Survey (ICTAUS). The researcher developed the instrument based on the study of the literature sources (Adetimirin, 2011; Oye et al., 2011; Adeleke & Afolabi, 2021). It comprised four sections:

Section A: Demographic (gender, age, level of study, university type).

Section B: ICT Tools Knowledge (10 items) - the familiarity with the particular ICT devices and platforms (e.g., LMS, e-library, Mendeley, Zoom).

Section C: Use of ICT Tools (15 items): The section determines how often, why, and how long ICT is used to perform academic and non-academic activities.

Section D: Digital Literacy Skills (10 items) - assessing the self-reported competence of the students in their search, evaluation, and responsible application of digital information.

Each of the items in Sections B-D was scaled on a five-point Likert scale with the 1 = Strongly Disagree to 5 = Strongly Agree indicators. This design made it easier to quantify the knowledge and usage pattern of the students so as to use it in statistical analysis.

### **3.5 Validity of the Instrument**

Questionnaire content validity was determined by examining the questionnaires by experts. The instrument was tested by three professionals including professor of Library and Information Science, specialist in ICT education and statistician who tested the instrument on clarity, relevancy and suitability to objectives of the study. According to their response, ambiguous questions were reformulated or reformatted to be precise and construct valid.

As an additional measure of face validity, a pilot test was administered to 30 students of a non-sampled institution (the Federal University of Technology, Minna). The results of the pilot research provided the confirmation that items were clear, understandable, and related to the ICT experience of students.

The instrument is reliable because it has been utilized in a comparable study and its results are also reliably obtained. 3.7 Reliability of the Instrument The instrument is reliable due to the fact that it has been used in a similar study and that the results of this tool are also reliably acquired.

The Cronbachs Alpha method was used to determine the reliability of the instrument. The information provided in the pilot test was used to establish the internal consistency of every section of the questionnaire. The following were the reliability coefficients obtained:

**Table 1.** Reliability Coefficients

Section	Variable Measured	Cronbach's Alpha
B	ICT Awareness	0.83
C	ICT Use	0.89
D	Digital Literacy	0.87
<b>Overall Reliability</b>	-	<b>0.86</b>

**Source:** Authors Computation (2025)

According to Nunnally (1978), a Cronbach's Alpha coefficient of 0.70 or higher indicates acceptable reliability. Therefore, the instrument was deemed reliable for full-scale administration.

### **3.6 Method of Data Collection**

The researcher released the questionnaires with the help of trained research workers after giving the respective university authorities their consent. This was done through both online and paper-based distribution to be as far-reaching and convenient as possible.

The respondents had ample time to fill the questionnaires and their privacy was guaranteed. Among the 585 copies that were sent, 567 valid responses were returned and analyzed, which is a response rate of 97 percent- acceptable in survey research (Cohen et al., 2018).

### **3.7 Method of Data Analysis**

The data collected was coded and analyzed by using the Statistical Package of the social Sciences (SPSS) version 26. Descriptive and inferential statistics were used:

1. Descriptive Statistics: Demographic data were summarized using frequencies, mean and standard deviation that were used to characterize the patterns of ICT awareness, and ICT use.
2. Inferential Statistics:
  - a) Pearson Product Moment Correlation (PPMC) was employed to test the relationship between ICT awareness and ICT use.
  - b) Linear Regression Analysis was done to find the effects of ICT use on digital literacy.
  - c) The differences in ICT awareness and use between the types of universities (federal, state, and private) were tested in the one-way ANOVA.

All the hypotheses were tested at the level of significance of 0.05.

## **4. Result and Analysis**

### **4.1 Respondent Demographic Characteristics.**

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**Table 2:** Demographic Characteristics of the Respondents (n = 567)

Variable	Category	Frequency	Percentage (%)
<b>Gender</b>	Male	273	48.1
	Female	294	51.9
<b>Age Range</b>	16–20 years	182	32.1
	21–25 years	248	43.7
	26–30 years	105	18.5
	31 years & above	32	5.6
<b>Level of Study</b>	100–200 Level	179	31.6
	300–400 Level	318	56.1
	500 Level & above	70	12.3
<b>University Type</b>	Federal	287	50.6
	State	183	32.3
	Private	97	17.1

**Source:** Authors Computation (2025)

The demographic data indicate a balanced gender distribution, with slightly more female respondents. Most respondents (43.7%) were aged between 21 and 25 years, and the majority (56.1%), were in their middle years of study (300-400 level). Federal university students constituted over half of the total respondents.

## 5. Discussion of Findings

### 5.1 Familiarity of ICT Tools in students of the Nigerian University.

The researchers have discovered that the average degree of ICT awareness among university students was high ( $\bar{x} = 3.91$ ). The awareness of general-use tools like computers, smartphone, or internet browsing was high, and the awareness of ICT tools of specific use in academic or research, such as reference managers, anti-plagiarism programs, and data-analysis software, was average.

This trend can be associated with Adeleke and Afolabi (2021), who noted that Nigerian students tend to be more knowledgeable of popular communication technologies than of academic-focused ones. On the same note, Sawyerr-George and Agina-Obu (2023) found that students feel at ease using digital devices to socialize and entertain, but do not know much about academic software.

Under the discourse of the Technology Acceptance Model (Davis, 1989), awareness is the basis of perceived usefulness and perceived ease of use which ultimately influences behavioral intention to use technology. Hence, the high score of awareness in this research indicates that Nigerian students have the cognitive preparedness of successful ICT adoption, despite the fact that its practical implementation is unequal.

Nevertheless, the awareness of the institutional ICT resources (Learning Management Systems (LMS) and e-libraries) is relatively low, which points to a missing point of institutional communication and user training. Semlambo et al. (2022) notes that most universities implement e-learning solutions, lacking proper orientation, and without integrating them into coursework, thus ending up underutilized. In turn, awareness itself might not be converted into active engagement, unless it will be corrected by training and pedagogical alignment.

## **5.2 Trends of ICT Tool use amongst the students.**

Results obtained demonstrated a high yet skewed degree of ICT tool use ( $\bar{x} = 3.94$ ). ICT use in communication, internet use, and social networking were highly used by students and academic ICT use was less prevalent (data analysis, reference management, and e-library access).

This trend is similar to that of Wisdom (2025) who found that Nigerian undergraduates use smartphones and social media extensively in collaborating academically and rarely use application-specific to academics. George and Ige (2022) also stated that mobile phones and messaging applications were the most commonly used ICT tools by students and next were search engines and video-sharing sites.

The pre-eminence of social and entertainment-based ICT use implies that students are digitally active and not digitally literate in the academic dimension. Digital literacy involves being able to apply ICT to information access, appraisal, synthesis, and academic communication (UNESCO, 2018). Therefore, a high frequency of using ICTs does not necessarily mean high levels of digital literacy.

This discovery is consistent with the Diffusion of Innovation Theory (Rogers, 2003) which argues that the level of adoption of technology is also influenced not only by awareness but also on perceived compatibility and relative advantage. Learners can also find social media and entertainment sites more accessible, as well as satisfying in the short term, than multifaceted educational applications. Therefore, higher learning institutions must rebrand ICT tools as learning resources as opposed to research accessories.

## **5.3 Correlation among ICT Awareness and ICT Use.**

The results of the correlation analysis ( $r = 0.712$ ,  $p < 0.05$ ) showed positive strong relationship between ICT awareness and ICT use. The more aware of ICT tools, students were, the more they were likely to make use of them.

This association supports Dele-Ajayi (2021) and Omeluzor and Aluko-Arowolo (2024), who discovered that awareness is a notable predictor of ICT use in undergraduates. Confidence is achieved through awareness and it minimises anxiety which comes with using new technologies, making people adopt them more.

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Qingxiong and Liping, (2024) states that TAM awareness has an implication on the perceptions of users on how easy and useful a system is and this is what determines the behavior intention of users to use the system. Therefore, the high level of correlation in the current study supports the validity of the model in the Nigerian university setting.

Nevertheless, even though the level of awareness is high, some of the tools (e.g., reference managers and anti-plagiarism software) do not receive proper utilization. This implies that awareness needs to be supported by the institution, accessibility, and relevance. Students can not necessarily move on to mastery without guidance or necessity created by the curriculum.

The study revealed the impact of the use of ICT on digital literacy; the regression value ( $R^2 = 0.46$ ) showed that ICT use has an explanatory power of 46 percent of the digital literacy levels among students. This suggests that a regular and intentional use of ICT can have a major role in building the digital competence of students.

This outcome is consistent with those of Bharti et al. (2024), who discovered that regular use of the ICT tools enhances the ability of the students to solve problems, process information and communicate better. Correspondingly, Arnaud et al. (2024) have noted that the best route to the digital fluency is practical interaction with digital tools.

The discovery is significant in the Nigerian context where digital infrastructure is not uniformly spread, which implies the transformative power of ICT access. Active users of ICT tools are at an advantage to navigate the digital world, assess the sources of information, and develop digital content, which are essential elements of digital literacy.

What all this means to higher education is evident: the development of digital literacy must move beyond theoretical approaches to ICT training and towards models of experiential learning that span disciplines with ICT-driven learning models. ICT use can be supported by both project-based and inquiry-based approaches to learning and developing critical digital skills.

### **5.4 Variations in the ICT Awareness and Use by Type of University.**

The authors have reported that there are statistically significant differences in ICT awareness ( $F = 8.94, p < 0.05$ ) and ICT use ( $F = 6.84, p < 0.05$ ) between the types of universities. The awareness was found to be on the higher side of students in the private universities whereas the levels of ICT use were found to be higher among students in the federal universities.

This is a two-pattern that can be viewed in terms of resource and pedagogical differences across institutions. In the case of private universities, the size of classes is usually smaller, the ICT curriculum is more organized, and the interactions between students and lecturers are more effective, leading to increased awareness. In contrast, federal universities,

which are frequently the beneficiaries of TETFund ICT interventions, are likely to offer more access to e-resources, which is more practical way of approaching ICT (Shah, 2022).

Nonetheless, state universities were at the back of the pack when it comes to awareness and usage. This is similar to findings by Abimbola, et al. (2025) that state-owned institutions have the issue of old ICT facilities and a low level of technical staffs. This translates to the fact that national ICT policy implementation has to be aligned to minimize institutional differences and provide equitable opportunities of digital learning.

### **5.5 Implications on the Development of Digital Literacy.**

The results have wide implications on the development of digital-literacy in universities in Nigeria:

1. **Curricular Integration:** ICT inhibitors must not be considered as isolated units of introductory computer courses but must be incorporated into all subjects by using digital assignments, research projects, and assessments.
2. **Institutional Support:** Universities should offer a steady supply of e-resources, reliable internet access and frequent ICT training seminars to both the students and the lecturers.
3. **Reinforcement of Policies:** NUC and TETFund should enforce regular audits and capacity-building programs, on the digital-skills level, among undergraduates to maintain the level of ICT competence in undergraduates.
4. **Social vs. Academic Use:** Gamification, collaborative tools, and social-learning platforms can be used to redirect the preference of students towards academic productivity instead of social applications.
5. **Equity and Accessibility:** There should be an effort to eliminate digital divide between federal, state and private institutions by investing in infrastructure and ensuring inclusive ICT policies.

All these implications imply that the digital potential is never converted into competence without awareness and usage of ICT tools, but that it is significant to continue engaging with institutions and pedagogical innovation to impact digital potential to competence.

## **6. Conclusions**

The research finds that the ICT awareness among the Nigerian university students is high, but not evenly distributed among the institutions. Most students are conversant with the general ICT tools yet they have inadequate skills on academic-specific technologies that are vital in academics interaction. This gap does not allow them to maximize the academic benefits of ICT. Moreover, knowledge of ICT is not always strong when a person uses it extensively. Although students have frequent interaction with ICT tools, its use is most of the time due to social communication, entertainment and not academic or intellectual learning. Consequently,

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there will be a large number of students who may be technologically active yet academically incompetent. Digital literacy should thus entail the quality utilization of ICT to learn or to conduct a research. It is also found that ICT awareness plays a critical role in determining ICT utilization. Awareness comes before use, students who are aware of the possible uses and capabilities of ICT tools are more likely to use them in their studies. This is in line with the Technology Acceptance Model that highlights that perceived usefulness and knowledge stimulate the use of technology. Besides, the application of ICT has a positive effect on the development of digital literacy. The beneficial continuous and deliberate engagement with digital technologies leads to the development of a higher level of cognitive and technical abilities that are required in learning, innovation, and problem-solving.

Lastly, institutional disparities have a great influence on access and proficiency in ICT. Inequality between federal, state and private universities is a manifestation of unequal infrastructure, implementation of policies and different ICT cultures. It is important to address these gaps in order to facilitate digital inclusion and equal learning outcomes. Thus, it can be observed that digital literacy among the students of Nigeria universities is determined not only by the availability of ICT tools but also by awareness, access, institutional support, and incorporation of ICT into the teaching and learning process. These aspects require a holistic solution to attain successful and inclusive online learning in institutions of higher learning.

### **7. Recommendations**

Judging by the conclusions made, the following recommendations would be put forward:

1. To train students in general and academic technologies, the universities ought to conduct an ICT orientation program regularly. The focus should be on such tools as reference manager software, anti-plagiarism programs, statistic analysis programs, and online collaboration tools.
2. ICT cannot be isolated to be taught in computer science departments but it must be mainstreamed to all courses. The course evaluation may incorporate the Internet-based elements, online portfolios or e-projects submission to promote active ICT use.
3. The federal, state and private universities ought to coordinate with the ICT providers in providing stable internet connectivity, adequate bandwidth and functional computer laboratories. A partnership with TETFund and private-sector can be very important in funding these facilities.
4. Given that students already actively use social platforms, universities can use social media to engage in academics through the creation of moderated discussion groups, online discussions, and collaborative learning groups via WhatsApp, Telegram, or Microsoft Teams.
5. There is need to offer on-going professional development trainings to the lecturers in the universities on the emerging educational technologies, digital pedagogy, and content-

creation tools. The competence of lecturers has a direct impact on the digital behavior of students.

6. Digital Literacy Certification Program is one of the graduation requirements that should be implemented by every university. This will guarantee the ability by the students to use ICT in research, communication, and problem-solving before the culmination of their studies.
7. The Federal Government ought to carry out some form of interventions in state-owned universities that are at a disadvantage in terms of infrastructure and access to ICT. This gives the assurance that the digital transformation takes place equally to all students irrespective of institutional type.
8. Provide student-led generation labs and digital studios to facilitate practical experimentation in the area of coding, AI, data analytics, and designs. This will create creativity, employability and sustainable digital competence.

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