

# Students' Perspective on the Effectiveness of E-Learning Adoption in Kaduna State University

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## Abstract

*The rapid advancement of Information and Communication Technology (ICT) has catalysed the integration of e-learning in higher education globally. However, the adoption of e-learning in the faculty of Computing of Kaduna State University faces considerable challenges. This study aims to explore the effectiveness and acceptability of e-learning among undergraduate students at the faculty, With the methodology employing a quantitative descriptive survey method. A structured online questionnaire was administered to 371 respondents, and the collected data were analysed using IBM SPSS analytics software, analysing both descriptive and inferential statistical techniques. The result revealed a generally positive perception of e-learning, with 75% of students expressing support and 60% indicating a preference for its continued use. Key benefits of e-learning include flexibility, accessibility via mobile devices, and self-paced learning. However, the results showed that barrier's such as poor internet connectivity (45%), loss of motivation (40%), and limited interaction (30%) remain significant impediments. Inferential analysis identified a strong correlation between perceived usefulness and continued intention to use e-learning ( $r = 0.62, p < 0.001$ ), while age significantly influenced ease of use. The study concluded that while e-learning is gaining acceptance, its sustained effectiveness depends on addressing infrastructural deficits, enhancing digital literacy, and integrating personalized and collaborative tools. Recommendations include policy reforms, improved internet access, and pedagogical innovations to enhance engagement and learning outcomes.*

**Keywords:** E-Learning, E-Learning System, Information Technology Infrastructure, Nigerian Higher Education Institutions, E-Learning Adoption

## 1. Introduction

Information and communication technology (ICT), including computers, the internet, multimedia, virtual classrooms, and smart classrooms, has been widely utilized in various fields (Asseke, 2022). Recently, this technology has been introduced into the education sector, significantly affecting the pedagogical aspects of teaching and learning (Asseke, 2022). While the use of technology in education has transformed instructional methods, traditional practices still dominate, primarily relying on lectures and memorization. As a result, students have fewer opportunities to actively engage in learning activities (Asseke, 2022). While E-learning is fundamentally transforming traditional learning approaches and is swiftly becoming an essential element of education worldwide. The exponential growth of internet-based education and online academic programs is noteworthy (Adeyeye, 2019). This remarkable expansion is fuelled by increased enrolment rates around the globe and the growing integration of technology in educational institutions. Institutions are motivated to adopt e-learning for many compelling reasons, with the most significant being enhanced access, greater flexibility, and improved cost-effectiveness (Cloete, 2017). E-learning's versatile nature and the accompanying digital revolution have ushered in extraordinary changes in the assessment of educational content, the sharing of information, and the overall consistency of the learning experience (Adeyeye, 2019). Therefore, embracing e-learning is not just an option; it is a crucial step towards a more inclusive and efficient educational future. E-learning has emerged as a new paradigm and philosophy in education, aiming to serve as a development platform for contemporary society grounded in knowledge (Ismail et al., 2021). Early adopters of e-learning are defined as “those who leverage various internet and web technologies to create, enable, deliver, and/or facilitate lifelong learning” to foster sustainable socio-economic development (Ismail et al., 2021). Acknowledging the significance of e-learning in socio-economic growth has led to numerous initiatives and interventions at both local and international levels to harness its potential. For example, the African Development Bank Group (AFDB) awarded a grant of \$15.6 million to the African Virtual University (AVU) to establish e-learning centres and train content developers across 31 partner institutions in Africa (Adkins, 2013; Ismail et al., 2021). There is inequality of access to technology itself for all students. The cost of a personal computer (PC) and a laptop is still very high in Nigeria, considering the income level of an average worker in the country. Few students who are privileged to have a PC/Laptop are not connected to the internet, as this does attract extra cost that they cannot afford (Nwabufu et al., 2011; Adeyeye et al., 2019). Most students have no background in computers, hence they are afraid of operating one; others go to the point of engaging an expert, just to fill out their admission, registration, and other documents meant for them to fill out online. While the few who have access to the computer do not know how to use it, and maximize its usage. The cost of accessing the internet

is still very high in Nigeria (Ambe et al., 2024). The subscription packages are relatively high for the ordinary Nigerian, despite their poor services and slow rate of their server speed. The majority of students admitted lack of knowledge in information technology and computer education (Santas et al., 2025), as these subjects were not integrated into the curriculum during their elementary and secondary education. It has only been recently that computer education has been introduced at the elementary level, and it is still not a mandatory subject in secondary education. The integration of ICT fosters independent learning; however, many students are hesitant to take responsibility for their education and prefer a more hands-on approach. Additionally, acquiring certain software can be quite costly, as they are often developed in Europe and other developed countries to meet their specific needs and generate profit. The expense, along with the complexity of some software, deters even those students who initially show interest (Nwabufu et al., 2011; Adeyeye et al., 2019) Nigerian Higher Education Institutions (HEIs) are still in the early stages of embracing e-learning as a mode of study (Eli-Chukwu et al., 2023). Before the pandemic, there was no established e-learning curriculum in place (Eli-Chukwu et al., 2023). Moreover, the transition to e-learning has proven to be a challenging endeavour for both lecturers and students, largely due to limited experience with information and communications technology and insufficient infrastructure to support effective online learning (Eli-Chukwu et al., 2023). Moreover, like many institutions within the country, the university grapples with limited resources, including a lack of trained personnel, unstable electricity supplies, and poor internet connectivity, all of which prevent it from maximizing the potential of e-learning technologies (Eze et al., 2018). Addressing these challenges is essential to ensure that Nigerian universities can thrive in the evolving educational landscape. From the problems stated above, we are able to see that students in the Nigerian tertiary institutions face different challenges, ranging from inadequate IT Infrastructure, Computer literacy among students, accessibility to a good network, and the acceptance of E-learning among the students. This study addressed students' adoption of e-learning in the Faculty of Computing in Kaduna State University.

## 2. Related Works

E-learning systems represent a transformative approach to knowledge delivery in educational environments. These platforms effectively enable digital lectures, coursework, practical exercises, and assessments within higher education institutions, regardless of their physical location around the globe (Qazi et al., 2021). The exponential growth of e-learning tools and technologies marks a pivotal advancement in higher education. The substantial advantages offered by e-learning not only enhance but also enrich traditional educational methods, ensuring a comprehensive learning experience for students (Masa'deh et al., 2022; Safsouf et al., 2020). Due to the rapid advancement of educational

technology, e-learning systems have become widely implemented and adopted in academic contexts Anderson et al., (2011). Meanwhile there are many advantages to integrating these systems, ensuring their long-term success requires an understanding of the elements that impact student happiness (Anderson et al., 2014). The study by Faith (2024) examined students' adoption and participation in e-learning digital applications during the COVID-19 pandemic. Using a descriptive survey design, data were collected from a sample of 330 students across two institutions with validated scales (SAEAS and SPEAS). Results indicated a high level of adoption and participation, with frequent use of applications such as WhatsApp, Zoom, YouTube, Google Meet, Telegram, and Email, while platforms like Facebook and Twitter were used less frequently. Independent sample t-tests showed no statistically significant differences in adoption or participation levels between the two institutions, indicating a comparable and widespread readiness for digital learning during the emergency transition. The study recommends improvements in ICT infrastructure, reliable electricity, internet access, and the integration of digital literacy training into curricula and counselling services to sustain and advance the shift toward e-learning (Faith, 2024). Abass et al., (2024) examines students' perceptions of eLearning adoption at the Ladokpe Akintola University of Technology Open and Distance Learning Centre (LODLC) in Nigeria, focusing on attitudes, access to digital resources, and the influence of online learning on academic engagement. Employing a descriptive survey design, data were collected from 286 undergraduate students through a Google Forms questionnaire that assessed accessibility, effectiveness, interactivity, and preferred eLearning modalities. Results indicate that most students own personal computers and smartphones, have reliable internet access, and generally maintain positive attitudes toward eLearning, particularly valuing its flexibility, convenience, and enhanced access to diverse educational materials. Students reported a preference for blended learning that combines synchronous and asynchronous methods. However, infrastructural challenges such as inconsistent connectivity, limited digital literacy, and technological constraints persist as significant barriers to effective adoption. The study concludes that while eLearning expands learning opportunities and improves academic performance, its full potential in Nigerian higher education depends on strengthened ICT infrastructure, enhanced connectivity, and increased user support (Abass et al., 2024). In a study conducted by Ambe et al., (2024), the authors examined the availability and use of electronic media learning technologies for teaching environmental education in Nigerian tertiary institutions, focusing on 35 lecturers from the University of Calabar and the College of Education, Akamkpa. Using a descriptive survey approach, the research revealed that although various e-learning tools like computer labs, mobile phones, and internet access were present, their provision mainly depended on individual lecturers rather than institutional backing. The study also highlighted major challenges, such as limited hardware and software, unreliable internet, high costs, and insufficient lecturer training, all of which hinder effective technology integration. The

authors recommend increased funding from government and school authorities for strong e-learning infrastructure, compensation for lecturers who use their own resources, and continuous professional development to support the long-term, effective use of digital tools in environmental education (Ambe et al., 2024). Barikzai et al., (2024) conducted a study based on the review of 84 studies, this article synthesizes the challenges and strategies of e-learning adoption in emerging economies, revealing a complex interplay of infrastructural, pedagogical, and contextual factors. The analysis identifies critical success factors such as robust technological infrastructure, institutional support, and digital literacy, while highlighting critical failure factors including unreliable electricity, inadequate internet access, resistance to change, and insufficient funding. The study underscores that effective implementation requires context-sensitive strategies, recommending blended learning models, investment in localized digital infrastructure, comprehensive educator and student training, and supportive policy frameworks. It concludes that a holistic, adaptive approach tailored to the specific socioeconomic and cultural realities of each region is essential for harnessing the transformative potential of e-learning to bridge educational gaps in these dynamic environments (Barikzai et al., 2024). A study by Mbato et al., (2024) examined the prospects and challenges of e-learning in Nigerian education, defining it as a process enabling learners and teachers to connect digitally via computers and internet connectivity, thereby facilitating instruction from any location without physical presence. The authors identify significant prospects, including cost savings on transportation, the promotion of independent and individualized research, enhanced collaborative learning, and greater accessibility for infirm or shy learners. However, these benefits are severely constrained by critical challenges such as unreliable electricity supply, poor network connectivity, widespread poverty limiting device acquisition, high costs of modern technology, and a general lack of ICT infrastructure in schools. The study concludes that for e-learning to thrive in Nigeria, substantial government intervention is imperative, including revitalizing the power sector to ensure stable electricity and making digital electronic tools readily available in schools to support academic performance and equitable educational access (Mbato et al., 2024). The research by Santas et al., (2025) explores how teachers viewed the use of digital technologies for e-learning during the COVID-19 lockdown in three selected schools in Keffi, Nigeria, focusing on the tools utilized, their effectiveness, and the challenges encountered. A quantitative survey of 70 teachers revealed that mobile phones, laptops, computers, and tablets were the main devices used, with platforms like WhatsApp, Telegram, Zoom, and Moodle supporting online teaching. Teachers mostly had a positive outlook on e-learning, highlighting its benefits for self-directed learning, rapid feedback, and maintaining academic engagement. Most agreed that e-learning improved student performance even in remote settings. Nonetheless, the adoption of digital learning faced barriers such as unreliable electricity, high data expenses, weak network connections, and household distractions. The study

concludes that, while digital technologies were vital for maintaining instruction during the pandemic, substantial investment in ICT infrastructure and support is necessary to make e-learning more sustainable in Nigeria's education sector (Santas et al., 2025). Ye et al. (2022) investigated the effectiveness of e-learning among students in China during the Covid-19 shutdown era. Lack of clarity regarding the advantages of distance learning, especially in light of time constraints and students' forced learning, was the author's main concern. The study's objective was to determine whether or not the advantages of distance learning matched students' learning expectations. Consequently, 356 students were interviewed using the snowball sampling technique. The findings demonstrated that anticipation value belief was positively connected with theoretical course satisfaction in the first place, and with learning efficacy in the second place, as well as with both theoretical and practical course pleasure. Instead of focusing solely on the significance of expectation belief, future research will need to broaden the study's focus and consider other factors that influence student satisfaction and learning effectiveness. (Ye et al., 2022). Obviously, it is established from the literature that numerous factors influence user acceptance and effectiveness, but only a small number have been investigated. Most studies tend to overlook certain elements because of their unique characteristics, making it difficult to generalise. Even though it may seem impossible to investigate every factor, focusing on a small number will make it more difficult to discover the crucial components influencing students' adoption and effectiveness. Thus, investigating more user acceptance and effectiveness components will greatly improve the identification of crucial elements aimed at improving the rate students' adoption of e-learning. This research will look to examine student's adoption of e-learning in the faculty of computing in Kaduna State University while also enhancing the usage and acceptability of technology in the field of education in the Nigerian Higher Education Sector.

### **3. Methodology**

This research employed a quantitative approach, and utilised a survey method to gather data on the effectiveness of e-learning adoption in the faculty of computing in Kaduna state university. The study developed an enhanced model that identified key factors influencing effectiveness and adoption rate, IBM SPSS Version 20 software was used to run the analysis of the collected data.

#### **3.1 Research Design**

The research design outlines the overall strategy adopted to integrate different components of the study coherently and logically. For this study, which focuses on the adoption of e-learning in Kaduna

State University, a quantitative research approach was adopted. This approach facilitates the systematic collection and analysis of numerical data to uncover patterns, test hypotheses, and derive statistically significant insights. The study employed a descriptive survey approach, this design is particularly suitable for examining attitudes, behaviours, perceptions, and experiences of participants regarding e-learning platforms and practices. By using a structured questionnaire, the research sought to gather data on the extent of e-learning adoption, the perceived benefits and limitations, user experiences, and factors influencing its effectiveness, all this information will be obtained from the online questionnaire administered. The descriptive design was complemented by cross-sectional methodology, allowing data collection at a single point in time across multiple levels of undergraduate studies. This enabled comparison among different categories of respondents, such as students from different departments, levels of study and age.

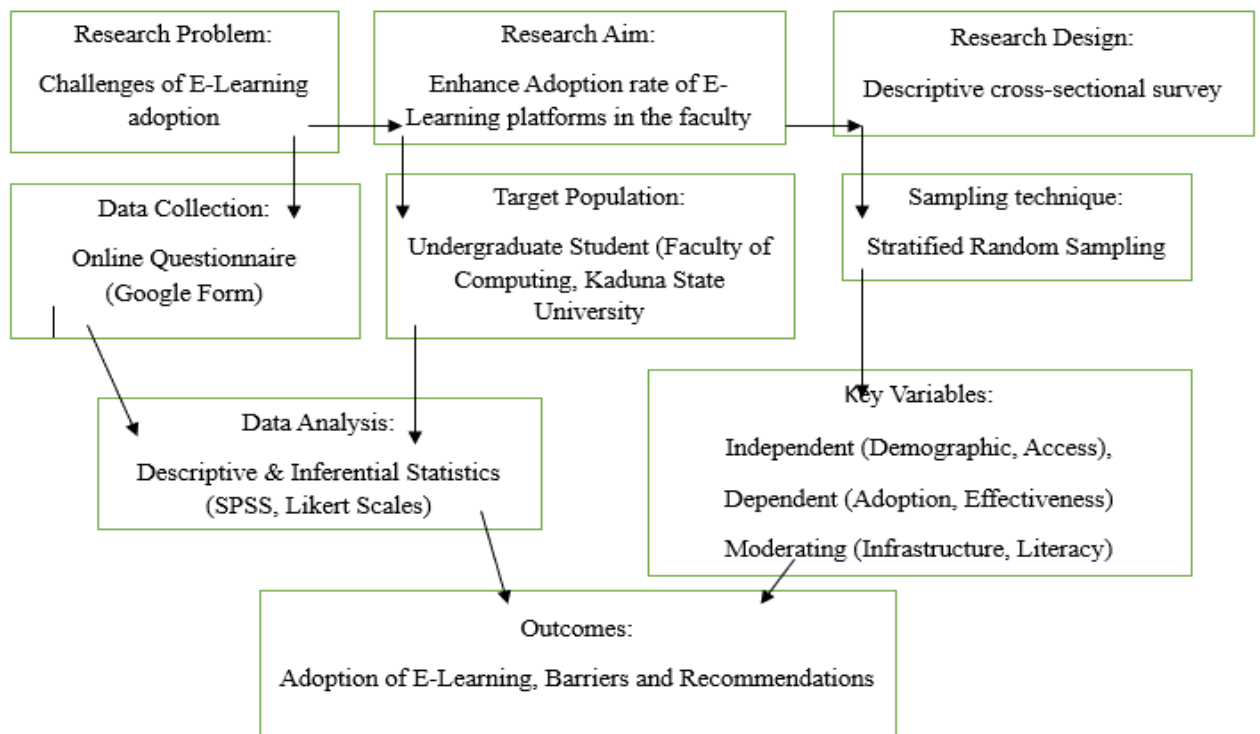


Figure 1 Research Design

### 3.1.1 Research Variables

The study focused on the following categories of variables:

**a. Independent Variables:**

Demographic factors (age, gender, level of study, faculty/department), access to internet-enabled devices, and availability of infrastructure.

**b. Dependent Variables:**

Adoption of e-learning, perceived effectiveness of online platforms, user engagement, and learning

outcomes.

**c. Moderating Variables:**

Internet reliability, digital literacy, and institutional support. These variables were operationalized through a questionnaire designed to quantify user experiences and perceptions using Likert scales, multiple-choice items, and open-ended responses. In conclusion, the chosen research design provided a robust feedback for examining the state of e-learning adoption in Nigerian tertiary institutions. The use of a descriptive, cross-sectional survey approach enabled the collection of data that is both rich in context and statistically analyzable. This design aligns well with the study’s objectives and ensures that the resulting insights are grounded in empirical evidence drawn from the actual experiences of learners and educators across the country.

**3.2 Explanation of Dataset used in the study**

Table 1 describes the attributes that make up the dataset that supports this research.

Variable Name	Question	Data Type	Coding/Format
Age	Age	Ratio	Numeric (e.g., 18, 22)
Gender	Gender	Nominal	1=Male, 2=Female, 3=Other, 4=Prefer not to say
Faculty_Department	Faculty/Department	Nominal	Text or coded by faculty (e.g., 1=Science, 2=Arts)
Level_Study	Level of Study	Ordinal	1=100 level, 2=200 level, 3=300 level, 4=400 level
Past_eLearning	Have you participated in any eLearning courses in the past year?	Nominal	1=Yes, 0=No
Devices_Used	What devices do you use for eLearning? (Select all that apply)	Nominal (multi-response)	1=Laptop, 2=Smartphone, 3=Tablet, 4=Desktop, 5=Others
Internet_Reliability	How reliable is your internet connection?	Ordinal	1=Very unreliable to 5=Very reliable
Quiet_Space	Do you have a quiet space to participate in eLearning activities?	Nominal	1=Yes, 0=No

Ease_Platform	How easy to use is the eLearning platform?	Ordinal	1=Very difficult to 5=Very easy
Engagement	How engaging do you find your eLearning experiences?	Ordinal	1=Not at all to 5=Very engaging
Effective_Activities	Which eLearning activities do you find most effective?	Nominal (multi-response or text)	Options: 1=Video lectures, 2=Quizzes, 3=Discussion boards, 4=Live sessions, 5=Assignments
Learn_Effectively	I learn effectively through eLearning.	Ordinal (Likert)	1=Strongly disagree to 5=Strongly agree
Motivation	I feel motivated to participate in online classes.	Ordinal (Likert)	1=Strongly disagree to 5=Strongly agree
Time_Management	I can manage my time well during online learning.	Ordinal (Likert)	1=Strongly disagree to 5=Strongly agree
Challenges	What challenges do you face in eLearning?	Nominal (multi-choice or coded open text)	e.g., 1=Connectivity, 2=Distractions, 3=Platform issues, 4=Motivation, 5=Time management
Biggest_Barrier	In your own words, describe the biggest barrier you face in eLearning.	Text (Qualitative)	Open-ended
Suggested_Changes	What changes would improve your experience with eLearning?	Text (Qualitative)	Open-ended
Future_Features	What features or tools would you like to see in future eLearning platforms?	Text (Qualitative)	Open-ended
Other_Comments	Do you have any other comments or suggestions on how to make eLearning more acceptable and effective?	Text (Qualitative)	Open-ended

The dataset that support's this study was obtained from an online survey, conducted specially for the purpose of this research. Before training the model, data pre-processing steps was applied, including handling missing values, outlier detection, and feature scaling.

### **3.3 Data Collection and Sampling**

This study adopted a systematic approach to data collection and sampling to examine the adoption of e-learning in the Faculty of Computing of Kaduna State University. A structured methodology was employed to ensure the accuracy, reliability, and representativeness of the collected data, enabling meaningful analysis and valid conclusions.

#### **3.3.1 Data Collection Method**

A quantitative survey method was utilized for the study, with a structured questionnaire serving as the primary instrument for data collection. The questionnaire was designed to capture a comprehensive set of variables related to e-learning adoption, including demographic characteristics, access to digital tools, internet reliability, user perceptions, and common challenges associated with online learning. The questionnaire consisted of both closed ended and open-ended questions, allowing for both statistical analysis and the extraction of participant perspectives. Prior to full deployment, a pilot study was conducted to test the clarity and reliability of the instrument. Based on feedback received, necessary modifications were made to improve its effectiveness.

#### **3.3.2 Mode of Administration**

The questionnaire was administered using the online method: Online distribution was carried out via the Google Forms (an online survey tool). Undergraduate students from the faculty were used, because they are the majority and their insight will be the most formative as among them are first time users. This strategy ensured inclusivity and maximized response rates across diverse level of undergraduate students.

#### **3.3.3 Target Population**

The target population included undergraduate students from the Faculty of Computing of the Kaduna State University, Kaduna. The study focused on students at the undergraduate level, engaged in e-learning course delivery. This allowed for a broad exploration of e-learning adoption across various departmental contexts.

#### **3.3.4 Sampling Technique**

A stratified random sampling technique was employed to ensure balanced representation across different age groups, faculties, and academic levels. Stratification was based on: Age groups (Teenagers, Early 20s, late 20s, and early 30s), Departments (Informatics, Intelligent Computing, and Secure Computing), Level of study (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> year). This approach helped ensure that the sample was representative of the population and allowed for the comparison of sub-groups within the study.

### **3.4 Data Analysis and Interpretation**

This section outlines the procedures and statistical tools employed in analysing the data collected during the study on e-learning adoption in the Faculty of Computing of the Kaduna State University.

The goal of the analysis is to derive meaningful insights from the responses and test the research hypotheses based on empirical evidence.

### 3.4.1 Preparation of Data

The data collected through the questionnaire were compiled, cleaned, and coded prior to analysis. Responses from the online (Google Forms) source were consolidated into a single dataset. Incomplete and inconsistent responses were identified and excluded to ensure the integrity and validity of the results. The study's statistical analysis was performed using Statistical Package for the Social Sciences (SPSS).

### 3.4.2 Analytical Techniques

A combination of descriptive and inferential statistical methods was used:

1. Descriptive Statistics: These included frequency counts, percentages, means, and standard deviations. Descriptive statistics were used to summarize demographic characteristics, internet access levels, platform usability, and other variables related to e-learning experiences.
2. Inferential Statistics: Chi-square tests were applied to examine associations between categorical variables, such as gender and device usage.

Independent samples t-tests and ANOVA were used to determine statistically significant differences in e-learning perceptions across demographic subgroups.

Correlation analysis (e.g., Pearson's  $r$ ) was employed to assess relationships between continuous variables like internet reliability and perceived learning effectiveness.

Where applicable, regression analysis was conducted to identify predictors of e-learning adoption and user satisfaction.

## 4. Results and discussion

The presented result analysis was conducted on the e-learning survey data. The analysis is divided into three major sections: Providing insight into e-learning's adoptability, effectiveness and accessibility. Descriptive statistics, which provide an overview of the participants and their responses, while also evaluating the comparison between e-learning and traditional teaching method. Inferential statistics was employed to test the comparative analysis between two groups and identified relationships.

#### 4.1 Analysis of the Effectiveness of Electronic Learning

##### I. Positive Feedback (70-80% of respondents):

In terms of engagement, 65% found e-learning "Very engaging" or "Somewhat engaging," citing live lectures, quizzes, and projects as effective activities. Platform usability is another factor with 60% of responders rating the platform's ease of use, accessibility, and organization as good (4-5/5). With respect to learning outcomes, 55% agreed they "learn effectively through e-learning" (rated 4-5/5) and 50% felt motivated to participate in online classes.

##### II. Critical Gaps (20-30% of respondents):

Low Engagement Drivers: 30% cited poor content delivery, lack of feedback, and limited interaction with instructors.

#### 4.1.1 Acceptability of e-Learning

##### I. High Acceptance (75%):

90% stated device flexibility, the use of smartphones/laptops, as their reason for accepting e-learning and convenience, was a key factor also with 70% valuing flexibility, self-paced learning, and recorded lectures. In the future, 60% want e-learning expanded, with some responders terming it as "stress-free and efficient."

##### II. Key Barriers of Electronic Learning (25%):

Internet reliability is a real concern when it comes to electronic learning, with 40% of responders faced with "unstable connections," especially in remote areas.

Environmental, 35% of responders lacked quiet study spaces or consistent electricity, with some stating "Network issues interrupted live sessions constantly."

III. Some responders identified social isolation, with 30% missing peer/instructor interactions, leading to disengagement.

#### 4.1.3 Top Challenges Reported

The table 2 below shows the challenges experienced by students with their percentages.

Challenge	Frequency	Example Quote
Internet Access	45%	"Poor connectivity made downloading materials impossible."
Motivation Loss	40%	"No classroom structure = procrastination."
Technical Issues	35%	"Platform glitches during exams."
Limited Interaction	30%	"Can't ask questions in real-time."

## 4.2 Descriptive Statistics

### 4.2.1 Demographic Characteristics of Respondents

A total of N = 371 respondent participated in the survey, after cleaning and analysing the data, N = 250 respondents was obtained. The demographic distribution is summarised below:

I. **Gender:** Male: 120 (48%) and Female: 130 (52%)

II. **Age Group:** 18–24: 70 (28%), 25–34: 110 (44%), 35–44: 50 (20%), 45 and above: 20 (8%)

III. **Education Level:** 100 Level: 60 (24%). 200 Level: 140 (56%) and 300 Level 50 (20%)

IV. **Prior Experience with E-learning:** Yes: 180 (72%) and No: 70 (28%)

### 4.2.2 Evaluating Students' Opinion on the adoption of E-Learning.

Figure 2 summarizes the central tendencies of responses measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The result depicts a general positive perception of the adoption of e-learning among respondents, with the highest average recorded for intention to continue and perceived usefulness.

**Table: Central tendency / dispersion (N = 250)**

Variable	Mean	Std. Dev.	Min	Max
Perceived Usefulness	4.12	0.74	2	5
Ease of Use	3.95	0.68	2	5
Satisfaction with E-learning	4.05	0.80	1	5
Accessibility of Materials	3.89	0.85	1	5
Intention to Continue	4.18	0.70	2	5

Figure 2: The Central Tendencies of Responses Measured

## 4.3 Inferential Statistics (t-test, ANOVA and Correlation Chi-square)

This step tested the comparison between groups of respondents.

### 4.3.1 Comparison and Relationship Testing

#### Test One (Gender)

The analysis shows there is a significant difference in satisfaction with e-learning between male and female participants.

**Test Used:** Independent Samples t-test (between two groups).

**Result:**  $t(248) = 1.57, p = 0.118$

The result, shows the test is statistically significant as gender does not appear to significantly affect adoption rate of e-learning.

**Test Two (perceived usefulness and intention to continue)**

The analysis shows a significant relationship between perceived usefulness and intention to continue using e-learning.

**Test Used:** Pearson Correlation

**Result:**  $r = 0.62, p < 0.001$

The result, shows a strong positive correlation between the compared attributes, as perceived usefulness increases, so does the intention to continue.

**Test Three (Multiple Test)**

The analysis was carried out to test multiple groups in one analysis, with particular emphasis on age group, and age is shown to significantly affect perceived ease of use.

Between Groups (Age groups)	SS	df = 3	MS	F = 4.76	p = 0.003
Within Groups	SS	df = 246	MS		
Total	SS	df = 249			

Figure 3: Age Group

**Test Used:** One-way ANOVA

**Result:**  $F(3, 246) = 4.76, p = 0.003$

Participants aged 25–34 reported significantly higher ease of use than those aged 45+. Age has a statistically significant impact on ease of use. This study examined the effectiveness and acceptability of e-learning adoption among undergraduate students in the Faculty of Computing at Kaduna State University. Using a quantitative descriptive survey design, data were collected from 371 students through an online questionnaire, with 250 valid responses analysed using SPSS. The findings revealed a generally positive perception of e-learning, with approximately 75% of the respondents expressing acceptance of the modality and 60% rating the platform as easy to use and well-organized. Engagement levels were also high, with 65% describing their learning experiences as very or somewhat engaging due to interactive activities such as live lectures, quizzes, and practical assignments. However, notable challenges persisted, including unreliable internet connectivity (45%), reduced motivation (40%), inadequate opportunities for interaction (30%), and environmental constraints such as lack of quiet study spaces and poor electricity supply. Inferential analyses showed a strong positive correlation between perceived usefulness and intention to continue using e-learning ( $r = 0.62, p < 0.001$ ), while age significantly influenced perceived ease of use, with students aged 25–34 reporting greater comfort with the platforms. Overall, the findings underscore both the growing acceptance of e-learning and the persistent infrastructural and pedagogical barriers affecting its effectiveness.

## 5. Conclusion

The study concludes that e-learning has gained considerable acceptance among students in the Faculty of Computing at Kaduna State University, driven by its flexibility, accessibility, and support for self-paced learning. Students largely perceive e-learning platforms as usable and effective for academic engagement. However, the sustainability of these positive outcomes is hindered by persistent barriers such as unstable internet access, limited digital literacy, inconsistent interaction with instructors, and environmental distractions. The results highlight the need for institutional investments in digital infrastructure, continuous power supply, enhanced technical support, and improved pedagogical strategies that foster interaction and feedback. Addressing these factors will be crucial for strengthening the long-term effectiveness of e-learning and ensuring equitable access to digital education in Nigerian higher institutions.

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