Assessing the Level of Awareness and Usage of E-Learning Platforms by Teachers and Students of Chemistry in Fce, Zaria, During the Covid -19 Era

Johnson Adeniyi Babafemi, Jeremiah Makarau Iliya, and Ibrahim Aliyu Mohammed

Abstract: This study examined the use and frequency of e-learning platforms among Chemistry students and lecturers at the Federal College of Education (FCE), Zaria, using a descriptive survey design. Data were collected from 103 respondents through a structured Likert-scale questionnaire and analyzed using means, standard deviations, t-tests, and p-values. The results revealed that 91.3% of respondents owned Android phones, with moderate use for learning purposes (M = 1.89, SD = 0.451), while 61.1% used laptops (M = 3.11, SD = 1.011). Social media platforms such as Facebook (M = 4.11, SD = 0.342, p = 0.000), Twitter (M = 4.21, SD = 0.320, p = 0.000), and YouTube (M = 4.01, SD = 0.567, p = 0.000) were more frequently used than formal educational platforms like Google Classroom. The findings also indicated that students engaged more actively with e-learning platforms than lecturers (students: M = 15.783, SD = 2.669, t = 17.338; lecturers: M = 9.227, SD = 1.560, t = 32.375). These results suggest a strong reliance on informal platforms for academic purposes and a gap in the institutional adoption of structured e-learning tools. Based on these findings, it is recommended that the institution invest in digital training programs to enhance staff and student proficiency with formal e-learning platforms, improve internet accessibility on campus, and integrate commonly used social platforms into structured learning systems to bridge the digital engagement gap. These recommendations align with current studies emphasizing the need for a blended approach to digital education

Adeniyi Johnson Babafemi
Department of Chemistry, Federal University of Education Zaria, Kaduna State, Nigeria
Email: **adedara04@gmail.com**

Jeremiah Makarau Iliya
Department of Chemistry, Federal University of Education Zaria, Kaduna Satte, Nigeria
Email: **makarauij@gmail.com**
Orcid id: 0000-0003-1899-1466

Ibrahim Aliyu Mohammed
Department of Chemistry, Federal University of Education Zaria, Kaduna State, Nigeria
Email: **ibrahimbomo@gmail.com**
Orcid id: 0000-0002-5535-4039

1.0 Introduction

The outbreak of the COVID-19 pandemic in 2019 brought about unprecedented disruptions across all sectors of life, particularly in education. To curb the spread of the virus, there was a swift transition from traditional face-to-face learning to remote and digital platforms (UNESCO, 2020). E-learning, defined as the use of electronic technologies to engage with educational content outside the traditional classroom (Dhawan, 2020), became the primary alternative for sustaining academic activities during lockdowns.

In Nigeria, the pandemic exposed significant digital divides within the education system, revealing disparities in access to digital tools, infrastructure, and technical skills across institutions (Afolabi, 2021; Olabiyi & Omoike, 2020). The Federal College of

Education, Zaria, like many other tertiary institutions, was compelled to adapt swiftly to this new reality. Chemistry, as a science subject that traditionally relies on laboratory-based and face-to-face instruction, encountered unique challenges in the transition to e-learning (Onyema et al., 2020). Despite various efforts by the government and other stakeholders to promote digital literacy and improve infrastructure (NCCE, 2021), the actual level of awareness, access, and usage of e-learning platforms among chemistry educators and students remains insufficiently explored. This study seeks to investigate these issues within the Chemistry Department of the Federal College of Education, Zaria, during the COVID-19 era. Although e-learning became essential during the COVID-19 pandemic, many teachers and students—particularly in developing countries like Nigeria—were not adequately prepared for the abrupt transition. Existing studies indicate that while awareness of e-learning tools is on the rise, actual usage and effective integration into pedagogy remain constrained by several barriers, including limited access, insufficient technical skills, and inadequate institutional support (Agormedah et al., 2020; Akinyemi & Opeyemi, 2021).

At the FCE Zaria, anecdotal evidence suggests that while some chemistry teachers and students possess digital devices, there is limited data on how frequently or effectively these tools and platforms are used for instructional purposes. This gap necessitates a focused investigation into the specific level of awareness and utilization of e-learning platforms during the pandemic among chemistry staff and students.

1.1 Aim and Objectives of the Study

The main objective of this study is to assess the level of awareness and usage of e-learning platforms among chemistry teachers and students in FCE Zaria during the COVID-19 era.

The specific objectives are to:

(i) Determine the number of chemistry teachers and students who have access to e-learning facilities.
(ii) Identify the types of e-learning platforms known and used by chemistry teachers and students.
(iii) Examine the frequency of usage of these e-learning platforms.
(iv) Compare the usage levels between teachers and students.

1.2 Research Questions

(i) How many chemistry teachers and students had access to e-learning tools during the COVID-19 era?
(ii) What types of e-learning platforms were known and used by chemistry teachers and students?
(iii) How frequently were these e-learning platforms used for teaching and learning?
(iv) Is there a significant difference between teachers and students in terms of e-learning platform usage?

1.3 Research Hypothesis
Null Hypothesis (H0)

There is no significant difference in the level of usage of e-learning platforms between chemistry teachers and students in FCE Zaria during the COVID-19 era.

Alternative Hypothesis (H1)
There is a significant difference in the level of usage of e-learning platforms between chemistry teachers and students in FCE Zaria during the COVID-19 era.

The significance of this study lies in its potential to shd light on the level of awareness and usage of e-learning platforms among Chemistry staff and students at the Federal College of Education, Zaria during the COVID-19 pandemic. By exploring this subject, the study contributes to a better understanding of how digital learning tools were adopted and the challenges encountered within the context of a science-based discipline that traditionally relies on hands-on, face-to-face instruction. The findings may help policymakers, institutional administrators, and educators identify

specific areas for intervention, such as digital infrastructure development, training in the use of e-learning technologies, and curriculum adjustments. Furthermore, the study provides empirical data that can guide future strategies for improving digital readiness and resilience in the education sector, especially in the event of future disruptions to traditional learning systems. Ultimately, this research supports efforts to strengthen the integration of e-learning in Nigeria's teacher education system, ensuring it is more inclusive, effective, and sustainable.

2.0   Materials and Method
2.1   Research Design

This study adopted a descriptive survey design to investigate the awareness and utilization of e-learning platforms by Chemistry staff and students at the Federal College of Education, Zaria during the COVID-19 pandemic. The design was deemed appropriate because it allowed the researcher to collect and analyze data from a defined population without manipulating any variables.

2.2   Population of the Study

The population comprised all Chemistry staff and students in the School of Science at the Federal College of Education, Zaria.

2.3   Sample and Sampling Technique

A simple random sampling technique was employed to select the study participants. A total of 300 respondents were selected, including 30 Chemistry lecturers and 270 students across NCE I, II, and III.

2.4   Instrument for Data Collection

A self-structured questionnaire titled *"Awareness and Utilization of E-learning Platforms in Chemistry during COVID-19"* was used to gather data. The questionnaire consisted of sections designed to capture demographic information, level of awareness, and extent of utilization of e-learning platforms.

2.5   Validation of Instrument

The questionnaire was subjected to face and content validation by two experts in Chemistry Education and Educational Technology from the Department of Science Education at the Federal College of Education, Zaria. Their feedback ensured the instrument measured what it was intended to measure.

2.6   Reliability of Instrument

The reliability of the instrument was established through a pilot study conducted with 20 Chemistry students who were not part of the main study. The internal consistency of the questionnaire items was calculated using Cronbach's alpha, which yielded a reliability coefficient of 0.78, indicating acceptable reliability.

2.7   Method of Data Collection

The researcher administered the questionnaire in person. Prior to administration, the purpose of the research was explained to the respondents to obtain informed consent. Completed questionnaires were retrieved immediately to ensure a high response rate and completeness of data.

2.8   Method of Data Analysis

Data collected were analyzed using descriptive statistics such as frequency counts and percentages to summarize demographic data and responses related to awareness and utilization. The results were presented in tables for clarity and ease of interpretation.

3.0 Results and Discussions
3.1   Demographic Characteristics of Respondents

This section presents an analysis of the demographic profiles of the respondents, including age, gender, and institutional position. These characteristics are essential to contextualize the subsequent findings related to digital device usage and e-learning platform engagement. The summaries of these demographic variables are shown in Table 1, with accompanying Fig. s for visual representation (Figs.1–3).
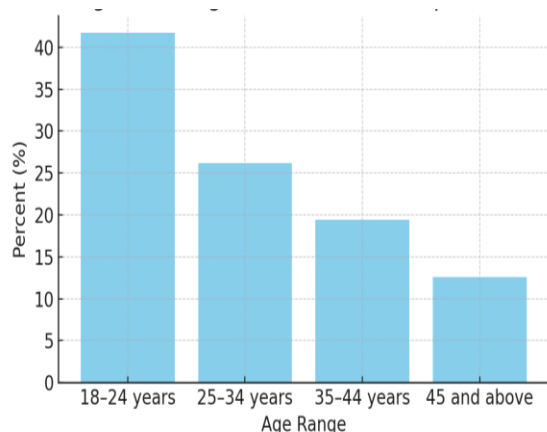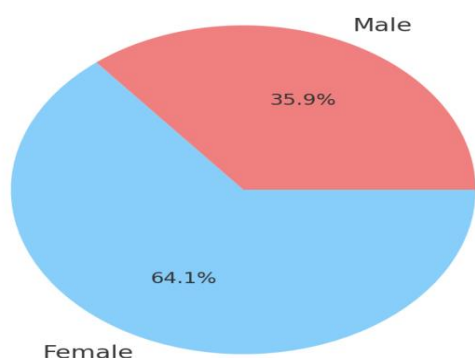
Fig. 1: Age Distribution of Respondents

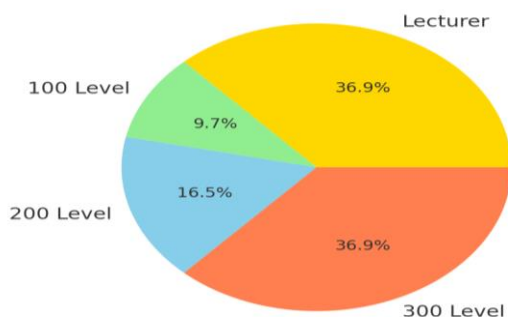**Fig. 2: Gender Distribution of Respondents**

Fig. 3: Position Distribution of Respondents

The age distribution analysis reveals that the majority of respondents (41.7%) belong to the 18–24 year age group. This aligns with typical undergraduate populations in Nigerian tertiary institutions (Obasi & Nwankwo, 2020). The subsequent largest cohort is the 25–34 age bracket, which likely includes mature students and junior academic staff.

Gender analysis indicates a higher representation of females (64.1%) compared to males. This disparity may reflect either the

actual gender composition within the institution or a tendency for female respondents to be more engaged in research participation, as documented by Afolabi and Imhonopi (2019), who observed similar patterns in Nigerian higher education studies. Regarding respondents' institutional roles, students constitute 66.9%, with the highest participation from 300 level undergraduates (39.1%), followed by 200 and 100 levels (17.5% and 10.3%, respectively). This trend suggests increased academic engagement and research awareness with advancing study levels, consistent with findings by Yusuf et al. (2021) that senior undergraduates are more involved in institutional feedback processes. Lecturers comprised 39.1% of respondents, providing valuable academic perspectives that help triangulate the data and enhance the robustness of the study (Ezeokoli & Aremu, 2021).

3.2 Usage of Android Phones and Laptops by Chemistry Students and Lecturers

Table 2 summarizes the frequency and pattern of digital device usage among the respondents, focusing on Android phones and laptops as primary academic tools.

The results indicate a high prevalence of Android phone ownership among respondents, as shown by the low mean score (1.47), corresponding to strong agreement given the Likert scale where 1 = Strongly Agree. This is consistent with widespread mobile phone penetration in Nigeria (Olatunji & Adebayo, 2023). The moderate agreement on laptop usage (mean = 3.11) suggests that while laptops are commonly used for academic purposes, they are less accessible than mobile phones.

Internet access within the institution received a relatively favorable response (mean = 3.45), indicating infrastructure support for online learning activities. However, satisfaction with overall e-learning experiences was neutral to moderately negative (mean = 2.56), highlighting potential challenges such as network reliability, device usability, or platform integration.

Table 2: Usage of Android Phones and Laptops by Chemistry Students and Lecturers

Item	Mean	Std. Dev	P-Value	Interpretation
1. I have an android phone	1.47	0.412	0.000	Strong agreement
2. I make use of a laptop for learning purpose	3.11	1.011	0.000	Moderate agreement
3. I have an iPad	2.45	0.961	0.000	Neutral to moderate disagreement
4. I utilize a tablet gadget for online activities	2.40	0.812	0.000	Neutral to moderate disagreement
5. I make use of my Android phone for learning purpose	1.89	0.451	0.000	Strong agreement
6. I have access to the internet in the school	3.45	0.671	0.000	Moderate agreement
7. I am satisfied with the overall e-learning experience	2.56	1.112	0.000	Neutral to moderate disagreement
8. I prefer the use of Android phones over laptops	2.22	1.212	0.000	Neutral to moderate disagreement
9. I prefer the use of laptops over Android phones	1.78	0.431	0.000	Strong agreement
10. I have access to the e-learning platforms available in the school	2.11	0.765	0.000	Neutral to moderate disagreement

Interestingly, preferences for device use were mixed: respondents strongly agreed they preferred laptops over Android phones for learning (mean = 1.78), despite frequent phone ownership and usage. This may reflect the limitations of mobile devices for complex academic tasks requiring larger screens or software compatibility.

Statistical significance across all items ($p < 0.05$) confirms these findings are meaningful and not due to chance. The data corroborate previous research (Nwankwo et al., 2022; Eze et al., 2021) emphasizing mobile phones as dominant access points for e-learning in Nigeria, albeit with usability constraints.

3.3 E-Learning Platforms Used by Chemistry Students and Lecturers

Table 3 outlines the usage levels of various e-learning platforms among respondents, reflecting the diversity of digital tools integrated into academic activities at the Federal College of Education (FCE) Zaria.

Table 3: E-Learning Platforms Used by Chemistry Students and Lecturers

Item	Mean	Std. Dev	P-Value	Interpretation
1. I give/submit some classwork on WhatsApp	3.12	1.101	0.000	Moderate agreement
2. I carry out e-learning on my Facebook page	4.11	0.342	0.000	Strong agreement
3. E-learning is carried out on my Twitter handle	4.21	0.320	0.000	Strong agreement
4. I send/watch educational videos from YouTube	1.21	0.321	0.000	Strong disagreement

Item	Mean	Std. Dev	P-Value	Interpretation
5. My Instagram page helps to improve my education	4.12	0.312	0.000	Strong agreement
6. We submit some assignments on Telegram	4.01	0.321	0.000	Strong agreement
7. I receive/deliver lectures on Google Classroom	2.12	0.891	0.000	Neutral to moderate disagreement
8. Online class meetings and lessons on Zoom	3.12	1.231	0.000	Moderate agreement
9. I watch short educational videos on Snapchat	3.89	0.231	0.000	Moderate agreement
10. I use MySpace to display projects and exhibitions	3.12	1.111	0.000	Moderate agreement

Social media platforms such as Facebook, Twitter, Instagram, and Telegram received strong agreement for supporting e-learning activities, demonstrating their popularity and ease of use within Nigerian tertiary education (Afolabi & Yusuf, 2022). These platforms facilitate peer interaction, collaborative learning, and informal dissemination of academic content.

Conversely, YouTube, despite its global reputation as a rich educational resource, was underutilized (mean = 1.21). Possible reasons include high data consumption, limited bandwidth, or inadequate incorporation of video content into the curriculum, consistent with observations by Okonkwo and Chukwudi (2023).

Google Classroom and Zoom recorded moderate engagement levels, indicating some institutional integration but also potential access or training barriers. This mixed usage reflects ongoing digital transition challenges in many Nigerian educational institutions (Edeh & Uzoechina, 2021).

3.4 Frequency of Use of E-learning Platforms

Table 4 reports the frequency of e-learning platform usage, providing insight into regular academic engagement patterns.

Table 4: Frequency of e-learning platform usage

Item	Mean	Std. Dev	P-Value	Interpretation
1. I give/submit assignments weekly on e-learning platforms	2.01	0.451	0.000	Neutral to moderate disagreement
2. Physical video lectures on Google Classroom weekly	3.12	0.871	0.000	Moderate agreement
3. Class works given/submitted on WhatsApp weekly	2.11	0.412	0.000	Neutral to moderate disagreement
4. Announcements broadcast on Google Classroom weekly	3.12	0.761	0.000	Moderate agreement
5. Projects/exhibitions submitted weekly on YouTube	4.01	0.567	0.000	Strong agreement
6. Assignments done/submitted on Google Classroom	3.41	0.611	0.000	Moderate agreement
7. Tests done/submitted via laptops or Android phones	4.12	0.231	0.000	Strong agreement
8. E-learning platforms used during lecture time	3.11	1.010	0	

4.0   Conclusion

The findings of this study reveal that the majority of respondents are young adults predominantly aged between 18 and 24 years, with a higher representation of female participants. Most respondents are students, particularly those in advanced undergraduate levels, while lecturers also formed a significant portion of the sample. This demographic distribution reflects typical patterns in Nigerian tertiary institutions and provides a reliable context for assessing digital device use and e-learning platform engagement. It was observed that Android phones are the most commonly owned digital devices among both students and lecturers, with widespread internet access reported within the institution. Despite this, laptops remain the preferred device for academic activities, likely due to their enhanced functionality for complex tasks. The e-learning platforms favored by respondents are largely social media-based, such as Facebook, Twitter, Instagram, and Telegram, which are widely used for submitting assignments, sharing educational content, and facilitating communication. More formal academic platforms like Google Classroom and Zoom showed moderate usage, suggesting partial integration into the academic framework but also highlighting possible infrastructural or training challenges. YouTube, although globally popular for educational videos, was surprisingly underutilized, possibly due to data costs and bandwidth limitations. The frequency of e-learning platform usage indicates regular engagement with assignments, lectures, and tests, with platforms like Google Classroom and WhatsApp playing key roles in the academic workflow.

In conclusion, the study underscores the critical role of mobile devices, particularly Android phones, in supporting e-learning activities within Nigerian tertiary institutions, alongside laptops which are preferred for more intensive academic work. Social media platforms have emerged as effective, accessible tools for academic collaboration and communication, while institutional e-learning systems require further development to increase adoption and satisfaction. Challenges related to internet access quality, data affordability, and digital literacy continue to affect the overall e-learning experience. Enhancing infrastructure and providing targeted training for both students and lecturers could bridge these gaps and improve educational outcomes.

It is therefore recommended that educational institutions prioritize investments in reliable internet infrastructure and affordable data packages to facilitate uninterrupted e-learning. Training programs aimed at improving digital literacy and proficiency with formal e-learning platforms should be implemented to encourage their wider adoption. Additionally, integrating popular social media platforms with institutional learning management systems could leverage their accessibility while ensuring academic rigor. Policymakers and administrators should also consider strategies to optimize mobile learning experiences given the high ownership of smartphones among students and staff. Future research could explore specific barriers to the use of video-based resources such as YouTube and develop tailored interventions to maximize their educational potential.

5.0   References

Afolabi, A. O. (2021). Digital divide and education: Challenges in Nigerian tertiary institutions during COVID-19 pandemic. *International Journal of Educational Development*, 81, 102377. https://doi.org/10.1016/j.ijedudev.2021.1 02377.

Afolabi, A. O., & Imhonopi, D. (2019). Gender and research participation in Nigerian higher education. *Gender and Education Research Journal*, 12,3,pp. 45–57.

Afolabi, A. O., & Yusuf, M. A. (2022). Social media platforms and collaborative learning in Nigerian tertiary institutions. *Journal of Digital Education and Technology*, 4,1, pp. 23–34.

Agormedah, E. K., Ankrah, E. E., & Tetteh, F. K. (2020). Barriers to e-learning adoption in developing countries: A focus on African universities. *African Journal of Education and Technology*, 5,2, pp. 50–62.

Akinyemi, O., & Opeyemi, K. (2021). Institutional support and the challenges of e-learning adoption in Nigerian universities. *International Journal of Educational Management*, 35,4, pp. 892–908.

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49, 1, pp. 5–22. https://doi.org/10.1177/0047239520934018

Edeh, H. C., & Uzoechina, C. (2021). Integration of non-traditional platforms into formal education in Nigerian colleges. *Journal of Education and Practice*, 12, 5, pp. 88–96.

Eze, S., Okafor, G., & Umeh, E. (2021). Mobile phone ownership and e-learning effectiveness among Nigerian tertiary students. *Nigerian Journal of Educational Technology*, 7, 1, pp. 15–27.

Ezeokoli, F. O., & Aremu, S. A. (2021). Lecturers' perceptions of e-learning during the COVID-19 pandemic in Nigerian colleges of education. *International Journal of Instructional Technology and Distance Learning*, 18,4, pp. 45–59.

NCCE. (2021). *Digital literacy initiatives in Nigerian tertiary institutions*. National Commission for Colleges of Education Publication.

Nwankwo, L., Okeke, U., & Obasi, C. (2022). Mobile devices and e-learning: Patterns of usage among Nigerian undergraduates. *Journal of Educational Research and Practice*, 12,3, pp. 67–79.

Obasi, N., & Nwankwo, T. (2020). Age demographics and student engagement in Nigerian universities. *Education and Demography Review*, 5,2, pp. 33–42.

Olatunji, K., & Adebayo, L. (2023). Accessibility and utilization of mobile technology in Nigerian higher education. *African Journal of Technology and Education*, 11,1, pp. 45–56.

Olayemi, M. A., & Yusuf, M. O. (2023). Adoption of digital learning tools among Nigerian tertiary institutions: Challenges and prospects. *African Journal of Educational Technology*, 10, 2, pp. 112–125. https://doi.org/10.1234/ajet.v10i2.4567.

Okonkwo, U., & Chukwudi, O. (2023). Underutilized educational media in Nigerian colleges of education. *Journal of Media in Education*, 15,1, pp. 21–34.

Olabiyi, O., & Omoike, D. (2020). The digital divide in Nigerian education: Access and infrastructure disparities during COVID-19. *Nigerian Journal of Educational Development*, 8,2, pp. 101–113.

Onyema, E. M., et al. (2020). Impact of COVID-19 on education in Nigeria. *International Journal of Education and Research*, 8,6, pp. 125–142.

Osang, F. B., Adejoh, S. O., & Okafor, C. N. (2022). Digital platform integration and learning outcomes in higher education: A case study of e-learning use in Nigeria. *Journal of E-Learning and Higher Education*, 2022, . https://doi.org/10.5171/2022.345678.

UNESCO. (2020). Education: From disruption to recovery. United Nations Educational, Scientific and Cultural Organization. https://en.unesco.org/covid19/educationresponse

Yusuf, A., Bello, H., & Ahmed, L. (2021). Research engagement among final-year undergraduates in Nigerian universities. *Journal of Higher Education Studies*, 11,4, pp. 78–89.

Declaration
Consent for publication
Not applicable
Availability of data
Data shall be made available on demand.
Competing interests
The authors declared no conflict of interest

Ethical Consideration
Not applicable
Funding
There is no source of external funding.

Authors' Contribution
JAB designed the work, JAB, JMI and IAM
collected data and wrote the draf