



## Arid Zone Journal of Basic and Applied Research

Faculty of Science, Borno State University  
Maiduguri, Nigeria

Journal homepage: <https://www.azjournalbar.com>



### Research Article

## The Challenges of E-Learning during COVID-19 and the Best Platform to Enhance Online Education in Bayero University, Kano, Nigeria

Musa Adamu Jibrin

Department of Information Technology, Al-Madinah International University, Malaysia

\*Corresponding author's Email: [majibrin4@gmail.com](mailto:majibrin4@gmail.com), [doi.org/10.55639/607.02010024](https://doi.org/10.55639/607.02010024)

#### ARTICLE INFO: ABSTRACT

##### Keywords:

E-learning,  
Education,  
Distance learning,  
COVID-19,  
LMS

Health emergencies like the COVID-19 pandemic significantly disrupt traditional education systems, forcing institutions to adopt e-learning platforms quickly. This study explores the challenges encountered by Bayero University, Kano, Nigeria, during this transition and assesses the effectiveness of online education platforms. Using a mixed-methods approach that included surveys and document analysis, the research identified key obstacles, including inadequate infrastructure, digital illiteracy, and limited access to technology. Data was gathered from 385 students via surveys conducted through Google Forms. The study also analyzed various e-learning platforms to determine the most suitable for enhancing online education at the university. Findings reveal that while platforms like Google Classroom and Zoom were widely utilized, their effectiveness was often hampered by connectivity issues and insufficient training for instructors and students. These challenges highlighted the need for targeted interventions, such as technological enhancements and pedagogical strategies, to optimize the e-learning experience. To address these issues, the study recommends adopting a more robust, user-friendly platform tailored to the university's specific needs. The recommendations highlight the need for BUK to upgrade on-campus internet access, collaborate with telecom providers to deliver low-cost or zero-rated internet for educational platforms and provide subsidized devices to underserved students. Additionally, offering comprehensive training for students and instructors can effectively address connectivity challenges and promote equitable access to e-learning. This research offers valuable insights into the limitations and opportunities associated with online education in Nigerian universities. It highlights the need for proactive strategies to enhance e-learning systems, ensuring they are better prepared to handle future health emergencies and minimize disruptions to education. Bayero University can create a more resilient and inclusive learning environment by addressing these challenges.

**Corresponding author:** Musa Adamu Jibrin, **Email:** [majibrin4@gmail.com](mailto:majibrin4@gmail.com)

Department of Information Technology, Al-Madinah International University, Malaysia

## INTRODUCTION

The COVID-19 pandemic caused unprecedented disruptions to education systems worldwide, forcing institutions to adopt e-learning platforms to ensure academic continuity rapidly. In Nigeria, the first confirmed case of COVID-19 was reported on February 27, 2020, marking the onset of a steady rise in infection cases and prompting swift government interventions, such as travel restrictions and the nationwide closure of educational institutions (NCDC, 2020).

The closure of institutions of learning disrupted traditional in-person education and necessitated a rapid transition to online learning (OECD, 2020). This shift was incredibly challenging for developing nations like Nigeria, where e-learning platforms were not optimally utilized before the pandemic (Agbele & Oyelade, 2020). Many institutions, particularly those in rural and underprivileged areas, faced significant obstacles, including inadequate infrastructure, limited access to digital devices, and poor internet connectivity (Adedigba, 2020). Although e-learning has been around for decades, only a few privately owned tertiary institutions in Nigeria use e-learning to conduct academic activities (Eze & Okike, 2020). These challenges underscored systemic disparities within the education sector, leaving many students unable to access education during the critical period.

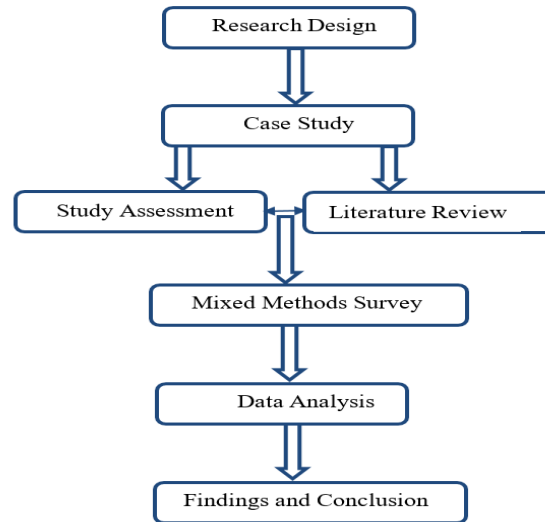
Information and communications technology (ICT) has significantly transformed the educational industry through initiatives like computer-based training, multimedia presentations, and online training. Incorporating digital tools and internet-based technologies into education is a pivotal force in broadening the horizons of teaching and learning. These advancements enable educators and students to transcend traditional limitations, unlocking new opportunities for collaboration, accessibility, and innovation in the educational experience

(Mhlongo, Mbatha, Ramatsetse, & Dlamini, 2023).

Bayero University Kano (BUK) swiftly transitioned to e-learning to ensure academic continuity. However, the degree to which students engaged with e-learning during this period remains unclear. Additionally, students and lecturers faced challenges adapting to new virtual teaching methods. While global studies have explored the transition to e-learning, there is a significant gap in understanding the specific experiences, engagement levels, and attitudes of students at BUK during this critical time. This study aims to address these gaps by investigating students' perceptions of e-learning during the pandemic, their adaptability to the platform, and the challenges encountered. The findings will provide valuable insights into enhancing e-learning experiences at BUK and contribute to the broader discourse on the future of virtual education in Nigeria. The study is guided by the following:

1. What challenges did BUK students face while using e-learning platforms and virtual classrooms during the COVID-19 pandemic?
2. How effectively were e-learning platforms supporting academic continuity and student learning outcomes at BUK during the COVID-19 lockdown?
3. Which e-learning platforms or virtual classroom tools were most effective during the pandemic?
4. Materials and Methods

The paper utilizes a research approach that integrates qualitative and quantitative methods, offering a well-rounded insight into the research topic. The primary research design focuses on a case study approach centred on e-learning dynamics among university students, specifically at Bayero University Kano (BUK).



**Figure 1:** Research Design Framework

The study is structured based on the research design framework shown in Figure 1, which systematically links the study's components to achieve the research objectives. The research design links research questions to research objectives and the corresponding methodology. The research questions focus on the challenges and effectiveness of e-learning platforms and provide recommendations for e-learning platforms. The case study focuses specifically on Bayero University, Kano, as the context for the investigation. Study assessment and literature review together provide the foundation for

understanding the challenges and context of e-learning during the COVID-19 pandemic. These elements integrate qualitative and quantitative methods, proceeding to data analysis, where statistical and thematic techniques are applied, culminating in the findings and conclusion, which summarize outcomes and offer actionable recommendations to enhance e-learning at the university.

The research questions discussed in the design are each associated with a specific research objective and methodology, a questionnaire in this case, as shown in Table 1.

**Table 1:** Research Design Scheme

| <b>STUDY</b>               |  |   |  |
|----------------------------|--|---|--|
|                            | <b>Availability and Usability</b>  | <b>Potency</b>  | <b>Suitability</b>   |
| <b>Research Questions</b>  | What are the challenges of e-learning platforms/virtual classrooms available to students in BUK during the pandemic? | How do you evaluate the effectiveness of e-learning on university education in BUK during the pandemic? | Which e-learning platforms/virtual classrooms best recommended to BUK among the ones used during the pandemic. |
| <b>Research Objectives</b> | To identify the available e-learning platforms and their challenges as faced by students of BUK during the pandemic. | To evaluate the effectiveness of e-learning process on the students of BUK during the pandemic.         | Which e-learning platforms/virtual classrooms best recommended to BUK among the ones used during the pandemic. |
| <b>Methodology</b>         | Questionnaire  | Questionnaire   | Questionnaire  |

The literature review has revealed that prior research has addressed the impact of COVID-19 on various educational e-learning platforms such as Zoom, Microsoft Teams, Moodle, Google Classroom, and virtual reality applications, among others. In the research by (Naserly, 2020), numerous online learning systems were utilized, including WhatsApp Groups, Zoom Meeting, and Google Classroom. The study discovered that Zoom is an excellent learning media for less than 20 students while the class would need to be divided into sessions for more students. He however added that for effective learning, Google classroom and WhatsApp may be used for assessment and sharing additional materials.

In the study by (Ohiwerei, 2021) on the usage of Zoom Meeting as an online learning tool, the author discovered that Zoom provides a number of benefits in terms of time, location, and functionalities as a tool for learning. Zoom makes it simpler for lecturers to manage students. Additionally, it is easy to monitor the activities of students during the lecture and also with the capability of viewing the recorded session. (Natsagdorj & Keunsoo, 2018) used Google Classroom to study mathematical problem-solving techniques. It was demonstrated that Google Classroom offers some benefits, like being user-friendly, effective, open-access, and adaptable. As a result, using Google Classroom for educational purposes is deemed suitable. Along with the benefits, Google Classroom also receives favorable feedback from students and better promotes students' problem-solving abilities. When implementing online learning, math instructors must pick a platform that is efficient and simple to use to support students' mathematics learning.

(Irfan, Kusumaningrum, Yulia, & Widodo, 2020) also carried out an extensive research using survey on the use of online learning platforms in teaching Mathematics in Indonesian institutions. The result showed the Google Classroom and Edmodo were the more widely used closely followed by Zoom in third. However, the lecturers had issues with the online learning platforms given the difficulty in writing mathematical symbols.

The use of e-learning in the educational system has faced several difficulties, one of which is related to technical or technological problems. According to (Ja'ashan, 2020), technical challenges associated with e-learning systems includes the presence of errors, software bugs,

and slow system performance, are closely tied to the difficulties faced in their implementation and use. According to research by (Quadri, et al., 2020) a key factor in the success of e-learning deployment is the technical features and quality of the e-learning system.

Major determinants of the utility of a system include operational aspects such as system reliability, documentation quality, ease of use, and responsiveness time in interactive systems. Inadequate system quality represents a substantial obstacle to the embrace of e-learning by university students. Furthermore, technical challenges in higher education e-learning includes inadequate internet connectivity, insufficient network and system infrastructure, and the complexities associated with the deployment and integration of technological solutions. (Bubou & Gabriel, 2021)

According to (Gillett-Swan, 2017), many higher education institutions that have adopted e-learning tend to use a uniform approach. Existing course materials are taken and converted into electronic formats with the assumption that it suit all students. However, this standard approach may not address the specific needs of individual learners.

The literature review show that a majority of research focuses on investigating students' opinions and attitudes regarding e-learning. However, there is a notable scarcity of studies that specifically examine students' perceptions of e-learning during the COVID-19 pandemic. Furthermore, the author's search did not yield any existing literature on online learning platforms in the context of Nigeria, with a particular emphasis on Bayero University Kano, Nigeria.

Ethical writing and conduct standards were upheld, including avoiding plagiarism and personal biases in reporting findings. Anonymity and privacy of participants were ensured, and personal data like names and student numbers were not collected. The author maintained validity by thoroughly examining the literature on e-learning and utilizing existing questionnaires from previous studies. Also, the author conducted a pilot test to ensure questions were clear and worded correctly while reliability was addressed by following established ethical and research standards.

Data collection was primarily conducted through the use of a questionnaire in the 2022/2023 academic session. The questionnaire consisted of 15 closed-ended questions and 3 open-ended

questions, and it was created using Google Forms. Google Forms was chosen for data collection due to its accessibility, ease of use, and ability to reach a broad audience, especially remotely, making it an ideal choice during the pandemic. Its built-in tools for organizing and analyzing responses, such as automatic summaries and compatibility with spreadsheets, made it an efficient and cost-effective option for gathering and managing the research data. Random sampling technique was used to select the students who participated in the quantitative survey. Participants were selected by randomly distributing survey links to individuals whose contact details were obtained from their course representatives. This technique ensured that the final sample would be representative and have minimal standard error. The study aimed to collect data from 402 students initially, which was later trimmed down to 385 for the final analysis based on Cochran's formula for determining sample size in equation 1.

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

**Equation 1:** Cochran's formula

While this study primarily relied on a questionnaire, secondary sources, including a report from BUK, were incorporated to provide deeper insights into their experiences with e-learning.

The data analysis carried out on the collected data involved two stages. The first stage was exploratory data analysis (EDA), which provided initial insights into the data and identified any imbalances or limitations. Descriptive statistics were used to categorize and summarize the data, as well as to characterize the individuals. This entails carefully analyzing

frequencies and percentages and creating graphs that show the participants' gender, age, and faculty, as well as their gender, age, and course information. Additionally, a percentage was obtained for each statement, and the agreement values for each statement were utilized to rank them. This method was also used in section two. A 5-point Likert scale was also employed to assess the participants' sentiments regarding specific claims. The second stage involved deriving the main findings, relationships, trends, interpretations, and narratives. Confirmatory Factor Analysis (CFA), which used software including Excel and SPSS, was employed to analyze and validate the collected data.

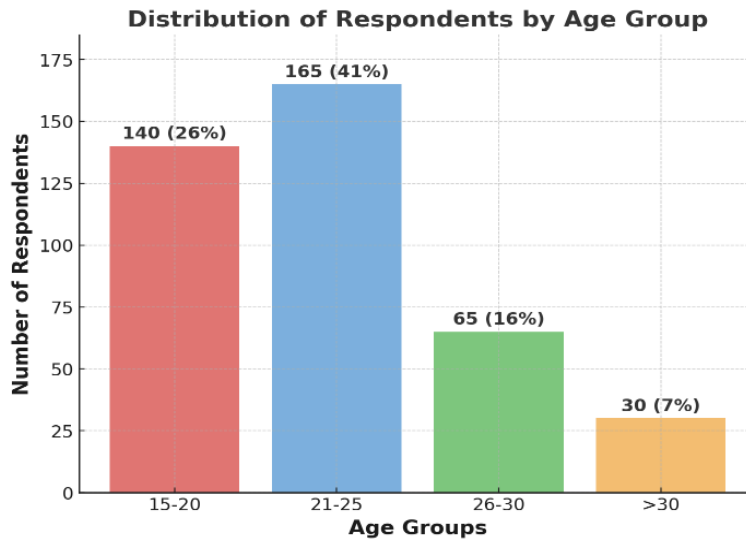
As with any research endeavour, this research work is not without limitations. Given that the study focuses on BUK, the extent to which the results can be extrapolated to other institutions or geographical contexts may be limited. Also, the qualitative nature of specific data collected, such as insights from open-ended survey responses, introduces an inherent subjectivity.

## RESULTS AND DISCUSSION

The research findings are presented across four sections. The initial section delves into the demographic characteristics of the participants, while the subsequent sections correspond to the exploration of three distinct research questions.

### Demographic Information

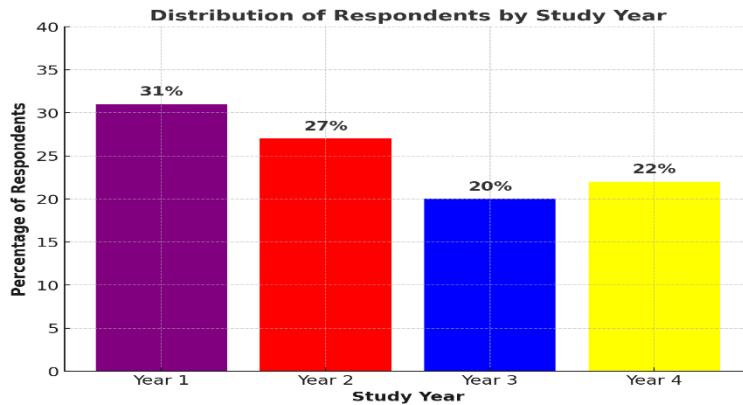
The demographic profile of the study participants reveals a relatively balanced gender distribution, with 57% male and 43% female respondents out of a total of 385 participants. In terms of age, the majority fell within the range of 15 to 25 years old, with 36% aged between 15 and 20 and 41% between 21 and 25. A smaller portion, 16%, were between 26 and 30 years old, while 7% were older than 30, as seen in Figure 3



**Figure 3:** Distribution of participants by age

In terms of class level or year, the participants consisted of 31% first-year students, 27% second-year students, 20% third-year students, and 22% fourth-year students, as shown in Fig. 4. Participants were distributed across various faculties and courses, with the top faculties

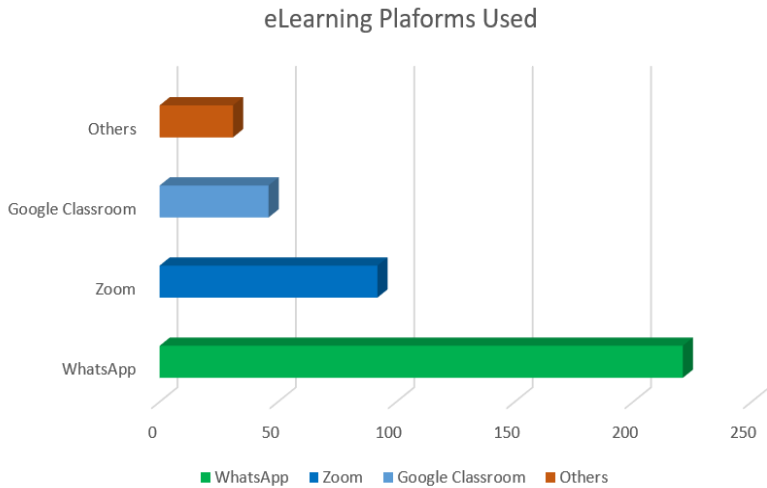
being Sciences (25%) and Computer Science and Information Technology (29%). Due to the diversity of courses (approximately 23), only the top 10 were detailed, while the others were grouped as "others".



**Figure 4:** Distribution of participants by class year

Fig. 5 shows that the most utilized e-learning platform was WhatsApp, used by 57% of participants, followed by Zoom Meeting (25%), Google Classroom (12%), and other platforms (8%). WhatsApp's popularity stemmed from its

simplicity, low data usage, and widespread adoption, especially in areas with limited internet infrastructure. Zoom was preferred for interactive sessions but was hampered by connectivity issues.



**Figure 5:** Platform usage distribution of participants

Inferential statistics from the demographic information showed that gender differences had limited impact, except for question 4, where female students were more likely to suggest better alternatives to the e-learning platform. Additionally, Study-year significantly affected responses. First-year students rated the platforms higher for ease of use and effectiveness than fourth-year students, possibly due to greater adaptability among first-year students.

**Preferences in Usage of E-Learning Platforms by Students**

Questionnaire responses provided insights into students' perceptions and preferences for e-learning platforms, as shown in Table 2.

Confidence intervals ( $\pm 5\%$ ) were calculated for responses to validate the percentage summaries. For instance, 18.9% ( $\pm 2.1$ ) rated the ease of use as 1 (least effective). The mean score was 2.9, suggesting that, on average, students found the platforms moderately easy to use. In comparing the effectiveness of the e-learning platform being used by BUK to others, the participants gave it a moderate rating with a mean score of 2.7. Regarding the specific features of the e-learning platform that are considered valid, responses varied, with features such as file sharing, collaboration, recorded lectures, and interactive tools mentioned.

**Table 2:** Responses on platform usage

| S/No. | Statement  | Percentages |      |      |      |      |
|-------|--|-------------|------|------|------|------|
|       |  | 1           | 2    | 3    | 4    | 5    |
| 1.    | How would you rate the ease of use of the e-learning platform/virtual classroom currently being used by BUK?   | 18.9        | 19.2 | 30.8 | 17.7 | 13.3 |
| 2.    | How does the e-learning platform/virtual classroom currently being used by BUK compare to others you have used in terms of effectiveness for learning? | 20.4        | 23.6 | 22.8 | 15.5 | 17.7 |

For the question about better alternatives to the e-learning platform used by BUK, 45.8% of students were unaware of alternatives. Of those who suggested alternatives, 39.3% recommended Zoom, 7.4% recommended Google Meet, and 7.4% recommended Moodle.

### **Challenges Faced By Students in Using E-Learning Platforms**

Participants reported facing several challenges with e-learning platforms. For instance, 80% experienced technical difficulties, including slow internet and connectivity issues. 62% faced a lack of interaction or engagement during virtual classes. Also, 52% noted a negative impact on motivation and engagement with course material due to the transition to e-learning. Additionally, 63% noticed differences in the quality of education received via e-learning compared to face-to-face classes, including a lack of personal interaction and technical issues. About 57% found it challenging to ask questions or receive help during virtual classes, and 42% encountered issues with the format of virtual classes, such as poor internet connectivity. Lastly, 78% noticed differences in student-teacher interaction during virtual classes compared to face-to-face classes. For instance, laboratory-based courses struggled to transition online due to the absence of virtual lab tools. Similarly, group-based projects faced challenges due to limited real-time collaboration options on platforms like WhatsApp.

The predominance of technical issues highlights the urgent need for infrastructure development, particularly in improving internet connectivity and device access. Strategies such as government or institutional subsidies for internet data and devices could bridge this gap. Moreover, fostering engagement through interactive and gamified learning tools could mitigate the lack of motivation and enhance student interaction.

### **Evaluating the Effectiveness of E-Learning**

Responses to questions assessing the effectiveness of e-learning showed mixed opinions, reflecting the diversity of student experiences and perceptions. For question 1, which asked whether e-learning was as effective as in-person classes for understanding and retaining course material, the mean score was 2.28. This indicates a somewhat negative

perception, with respondents expressing scepticism about e-learning's capacity to deliver comparable outcomes.

A large majority (82%) of respondents reported no significant differences in academic performance since transitioning to e-learning. However, 18% noted declines in their performance, citing reduced interaction and technical barriers as contributing factors. The majority (65.91%) believed that multiple-choice assessments would have improved their academic performance, followed by group projects (14.04%), emphasizing the importance of collaboration in maintaining motivation and engagement. Essays were suggested by 13.33%, reflecting the value of reflective and analytical assessments even in virtual settings.

The findings highlight critical gaps in Nigeria's digital education infrastructure, necessitating targeted policy interventions. The government and educational institutions, including BUK, must prioritize investments in digital infrastructure, such as subsidized internet access for students and standardized e-learning training programs. Additionally, policies should mandate the integration of hybrid learning models to ensure continuity in education during future disruptions. The identified challenges point to the need for a hybrid approach that integrates the best in-person and virtual learning modalities. For instance, enhancing e-learning platforms with gamified features, interactive simulations, and real-time feedback mechanisms could address engagement gaps and foster a richer educational experience. T

### **CONCLUSION**

This research paper has explored the challenges posed by health emergencies such as the COVID-19 pandemic on e-learning, explicitly focusing on Bayero University, Kano, Nigeria. The study aimed to identify the obstacles faced during the unprecedented shift to online education to serve as a guide for improving e-learning systems and preparedness in future emergencies.

Several key findings have emerged through a comprehensive review of existing literature and a rigorous examination of the unique circumstances at Bayero University, Kano. The pandemic exposed the existing inequalities in technology access and resources, making the



challenges experienced by numerous students and faculty members even more pronounced. Furthermore, the research highlighted the importance of selecting an appropriate e-learning platform to facilitate effective online education. The evaluation of various e-learning platforms revealed that no one-size-fits-all solution exists. The choice of platform should be based on a careful assessment of the university's specific needs, technological infrastructure, and the preferences of both educators and students. Factors such as user-friendliness, scalability, accessibility, security, and compatibility with existing systems were found to be crucial considerations.

Addressing the challenges of e-learning during the COVID-19 pandemic and beyond requires a comprehensive approach. Bayero University should adopt a hybrid model combining in-person and virtual elements, leverage AI for personalized learning, and partner with ed-tech providers for tailored solutions. Prioritizing investments in internet connectivity and device access for students is essential, along with implementing training programs to boost digital literacy among faculty and students. Institutions must also strategically choose e-learning platforms that align with their long-term educational goals and technological capabilities. Furthermore, national policies are needed to strengthen online learning frameworks in Nigerian universities, with regulatory bodies setting quality standards, promoting digital equity through device accessibility, and fostering public-private partnerships to enhance online education infrastructure.

The challenges encountered during the pandemic have provided valuable insights into the strengths and weaknesses of online education, paving the way for a more robust and inclusive educational landscape. There remains ample room for improvement in enhancing the e-learning experience for BUK students. Future research could focus on using machine learning to analyze student data to recommend optimal platforms, gamification in e-learning to improve student engagement through interactive features like quizzes and badges, and exploring the accessibility of e-learning platforms for students with disabilities, a subject of interest.

## CONFLICT OF INTEREST

The author's name stated above certifies that they have NO affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

## REFERENCES

- Adedigba, A. (2020, March 19). *Coronavirus: Nigerian govt orders closure of schools nationwide*. Retrieved March 19, 2021, from <https://www.premiumtimesng.com/news/top-news/382806-coronavirus-nigerian-govt-orders-closure-of-schools-nationwide.html>
- Agbele, A. T., & Oyelade, E. A. (2020). Impact of COVID-19 on the Nigerian Educational System: Strengths and Challenges of Online/Virtual Education. *Asian Journal of Education and Social Studies*, 26-35.
- Al-Samarraie, H., Selim, H., Teo, T., & Zaqout, F. (2017). Isolation and distinctiveness in the design of e-learning systems influence user preferences. *Interactive Learning Environments*, 25(4), 452-466.
- Aparicio, M., Bacao, F., & Oliveira, T. (2016). An e-learning theoretical framework. *Journal of Educational Technology & Society*, 19(1), 292-307.
- Bubou, G., & Gabriel, J. (2021). Benefits, Challenges and Prospects of Integrating E-Learning into Nigerian Tertiary Institutions: A mini Review. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 6-18.
- Cucinotta, D., & Vanelli, M. (2020). WHO Declares COVID-19 a Pandemic. *Acta Biomed*, 19(1), 157-160.
- Eze, S. C.-E., & Okike, A. O. (2020). Factors influencing the private Higher Education Institution (HEI) use of e-learning facilities by students in a private Higher Education Institution (HEI). *The humanities and social xommuu, Humatoessocial sciences communications*.
- Gillett-Swan, J. (2017). The challenges of online learning: Supporting and engaging the

- isolated learner. *Journal of Learning Design*, 10(1), 20-30.
- Irfan, M., Kusumaningrum, B., Yulia, Y., & Widodo, S. A. (2020). CHALLENGES DURING THE PANDEMIC: USE OF E-LEARNING IN MATHEMATICS LEARNING IN HIGHER EDUCATION. *Journal Mathematics Education*, 147-158.
- Islam, N., Beer, M., & Slack, F. (2015). E-learning challenges faced by academics in higher education. *Journal of Education and Training Studies*, 3(5), 102-112.
- Ja'ashan, M. M. (2020). The Challenges and Prospects of Using E-learning among EFL Students in Bisha. *Arab World English Journal*, 124-137.
- Kenan, T., Pislaru, C., & Elzawi, A. (2012). Analysing the effectiveness of e-learning based on national and international cultures and approaches to pedagogy. *17th UKAIS Conference on Information Systems, 2012*,. Oxford.
- Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*, 56.
- Naserly, M. (2020). Implementation of Zoom, Google Classroom, and Whatsapp Group in Supporting Online Learning in Advanced English Courses. *Journal of Chemical Information and Modeling* 4 (2), 4(2), 155-165.
- Natsagdorj, B., & Keunsoo, L. (2018). A Study on the Application of Google Classroom for Problem-Based Learning. *Journal of the Korea Academia-Industrial cooperation Society*, 19(7), 81-87.
- NCDC. (2020, February 28). *First Case of Corona Virus Disease Confirmed in Nigeria*. Retrieved November 13, 2020, from NCDC News: <https://ncdc.gov.ng/news/227/first-case-of-corona-virus-disease-confirmed-in-nigeria>
- Northey, G., Bucic, T., Chylinski, M., & Govind, R. (2015). Increasing student engagement using asynchronous learning. *Journal of Marketing Education*, 37(3), 171-180.
- OECD. (2020, June 29). *Education and COVID-19: Focusing on the long-term impact of school closures*. Retrieved May 17, 2021, from <https://www.oecd.org/coronavirus/policy-responses/education-and-covid-19-focusing-on-the-long-term-impact-of-school-closures-2cea926e/>
- Ohiwerei, F. O. (2021). Use Of Zoom Technology For Teaching And Learning Among Undergraduate Students Of Ambrose Alli University Ekpoma Edo State, Nigeria. *International Journal of Innovative Info & Technology Research*, 25-40.
- Quadri, N. N., Qureshi, M. R., Nasser, T., AbdulHafeez, M., Asadullah, S., Alhuseen, A. O., . . . Fahad, M. A. (2020). Evaluating critical success factors in implementing E-learning system using multi-criteria decision-making. *PLOS ONE*, 15(5).