Exploring Alternative Teaching and Learning Platforms in Post-COVID-19

Ozioma R. Umera[*]
University of Abuja,
NIGERIA

Stacey O. Baror
University of Pretoria,
SOUTH AFRICA

Article Info	Abstract
	Learning for undergraduate students at the National Open University of Nigeria (NOUN), Gwagwalada study center, has significantly shifted toward e-learning since the COVID-19 pandemic. This study investigates how NOUN students use e-learning platforms and the challenges they face. Using a survey design with qualitative methods, data from 364 participants were collected through questionnaires and interviews. Guided by the Technology Acceptance Theory, the study finds that students predominantly use emails, LMS, video conferencing, and social media for academic activities. Key benefits include flexibility, convenience, equitable access, and enhanced critical thinking. However, infrastructure and policy gaps persist. The study highlights the importance of ongoing improvements in e-learning systems and recommends that NOUN regularly conduct faculty training and digital literacy workshops to enhance participation and reduce barriers.

INTRODUCTION

The advancement of information and communication technologies in the 21st century has affected every aspect of human life, and their effect is evident in the educational sector (Koshti et al., 2023; Kumar & Priyanka, 2023). The introduction of alternative teaching and learning platforms such as Google Meet, Microsoft Teams, Zoom, Google Classroom, Duo, Blackboard, Kewl, Moodle, A-Tutor, Sakai, or Free conference has helped students in accessing learning materials globally without boundaries or time hindrance (Fang & Choi, 2022; Governance & Quality, 2021; Priadi et al., 2021). Knowledge materials can be uploaded as online facilities for the students/learners to download at will. Yakubu & Dasuki (2018) noted that electronic learning is an evolutionary process in the educational sector, which is facilitated by the application of modern technologies in the classroom. O'Neill (2024), as well as Egielewa et al. (2022) described as technology-facilitated instructions, which allow students to accomplish learning objectives without needing to be in the same physical area as their teachers. The use of e-learning platforms plays a major role in enhancing the process of teaching and learning, providing access to academic curriculum, minimizing the cost of learning, and also enlarging opportunities in the education system (Lwoga, 2014; Yuningsih et al., 2021).

Before the COVID-19 pandemic, the National Open University of Nigeria (NOUN) had adopted e-learning as part of its Open and Distance Learning model, allowing students to access course materials digitally. However, its accessibility remained limited due to several factors (Egielewa et al., 2022). The pandemic accelerated the global shift to online education and forced institutions to

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[*] **Corresponding author:**
Ozioma R. Umera, University of Abuja, Nigeria. ✉ rose4princesolar@gmail.com

rely heavily on e-learning technologies (Aziz et al., 2022; Crick, 2021; Turnbull et al., 2021). Despite having an existing digital infrastructure, NOUN faced significant accessibility challenges, including low student digital literacy, unreliable internet access, limited bandwidth, electricity shortages, inadequate ICT facilities, and a lack of technically trained lecturers (Afolabi & Uhomoibhi, 2017; Egielewa et al., 2022). These issues raised concerns about the effectiveness of e-learning in Nigeria and underscored the urgent need to strengthen institutional readiness and digital equity in the implementation of online learning systems.

Although previous research has explored the adoption of e-learning in Nigeria (Oladokun et al., 2024; Sanni et al., 2022; Thompson et al., 2024), comparative analyses between NOUN and traditional universities remain limited. Most studies focus on general infrastructure disparities, faculty readiness, and student engagement in conventional institutions (Olanrewaju et al., 2021), while the unique challenges faced by students in fully online, open, and distance learning (ODL) environments like NOUN are often overlooked. Unlike traditional universities, NOUN students rely entirely on digital platforms for accessing course materials, completing assessments, and engaging in academic interactions, making their experiences fundamentally different. Despite NOUN's investment in e-learning infrastructure, students continue to encounter critical barriers such as unequal access to digital tools, limited usability, low digital literacy, and lack of interactive engagement and collaboration (Afolabi & Uhomoibhi, 2017). Therefore, this study addresses these research gaps by investigating how NOUN students use e-learning platforms, their purposes, perceived benefits, and the challenges they face, offering targeted insights to improve engagement, accessibility, and policy implementation in ODL contexts.

Recent studies on e-learning platforms have looked at several topics, such as students' engagement, effectiveness, and accessibility. Studies have shown that e-learning platforms enhance learning results. E-learning may help students collaborate, develop their critical thinking skills, and become more digitally literate (Algahtani, 2011; Arkorful & Abaidoo, 2015). Despite these technological developments, disparities in access, digital literacy, and institutional support still prevent e-learning from reaching its full potential (Mengstie & Sendek, 2023; Srinivasan et al., 2021). Although there is a wealth of research on the adoption of e-learning, relatively little of it focuses on how easily accessible and widely used it is in the Nigerian Open University. Despite having a strong e-learning infrastructure, the National Open University of Nigeria still has issues with student awareness, engagement, and technical limitations. The particular platforms that NOUN students utilize, how frequently they use them, and the difficulties they have in adopting them have not been sufficiently investigated in previous research. By offering empirical insights into the usability, accessibility, and the benefit of ethical use of e-learning platforms at NOUN, this study aims to close these gaps.

This study contributes to the existing body of knowledge by critically examining how NOUN students utilize e-learning platforms, their purposes for engagement, and the perceived benefits derived from these platforms. Focusing on a fully online, distance-learning institution, the study offers empirical, data-driven insights into enhancing accessibility, student engagement, and institutional policy within the context of Open and Distance Learning (ODL). In contrast to previous research that addressed e-learning in Nigerian universities broadly, this study specifically highlights the distinctive experiences and challenges of NOUN students, thereby providing valuable recommendations for educators, policymakers, and administrators aiming to strengthen e-learning environments and bridge the digital divide in higher education.

METHOD

This is qualitative research, where the researcher explores a phenomenon using a textual, descriptive narrative rather than numerical data (Pickard, 2013). With a strong qualitative component, data were collected on the alternative teaching and learning platforms among students. This approach allows the researcher to collect and analyse data through questionnaires and survey methods.

The population of the study consists of all the undergraduate students at the National Open University of Nigeria, Gwagwalada study centre, Abuja. The total number of undergraduates is 3,415 students spread across eight (8) faculties and 48 departments of NOUN. Using a convenience

selection technique, 346 undergraduate students from NOUN's Gwagwalada study center were chosen for the study. This represents 10% of the 3,415 total students enrolled, this sample size offers a reasonable yet representative subset of the student body, considering the vast number of students at NOUN and logistical limitations (such as distant study sites and students' variable online accessibility). Although generalizability is limited by convenience sampling, the inclusion of a variety of academic fields guarantees that the results represent a range of student experiences across NOUN. The chosen sample is representative of the larger NOUN student body in several ways, such as academic diversity, digital learning experience, and the online learning format, indicating that the experiences of one study center (Gwagwalada) are probably similar to those in other areas. These participants were selected from the 8 faculties irrespective of their year of study.

The researcher used a questionnaire and an interview as data collection techniques. The researcher employed thematic analysis to analyze and interpret data for a better understanding and easy communication of the results of the findings. Thematic data analysis is a method used to analyze qualitative data that involves identifying patterns or themes within the data. This method involves identifying recurring patterns of meaning within the data, which can then be grouped to form themes. Six-step process for conducting thematic analysis includes familiarizing oneself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing a report (Braun & and Clarke, 2006).

Ethical clearance was obtained from the management of the National Open University of Nigeria (NOUN) before the commencement of this research study. Comprehensive informed consent documents explaining the study's objectives, the participants' voluntary engagement, the confidentiality of their responses, and their freedom to stop participating at any time without facing consequences were given to the participants (see Appendix A). To minimize any potential biases associated with convenience sampling, the researcher ensured that students from all eight NOUN faculties were represented. Those actions provide a fair and accurate study and uphold ethical standards.

RESULTS AND DISCUSSION

Understanding the foundational concepts of e-learning is crucial to appreciating its role as an alternative teaching and learning platform, particularly in the post-COVID-19 context. The application of information and communication technologies, such as the internet, for the facilitation of the teaching and learning process has become one of the products of evolution. E-learning refers to a form of education that uses digital technology to deliver learning content to students through the internet or other electronic devices (Renes, 2015). This type of learning allows students to access educational resources and training materials from anywhere and at any time. E-learning, as an alternative teaching and learning includes a wide range of tools and platforms, such as online courses, webinars, virtual classrooms, educational apps, and multimedia content. Learning entails the process of obtaining innovative skills for knowledge development, which enhances productivity and improvement (Kok, 2013). E-learning is described by scholars and researchers as the application of information and communication technology, basically to deliver information as well as instructions to the learner or individual (Welsh et al., 2003). The intention of using technology-supported machines is basically for the promotion of teaching and learning. E-learning occurs when the learner applies the internet technology to streamline the learning process by making already existing courses accessible online (Renes, 2015; Stoltenkamp, 2012). This learning process encompasses every form of learning facilitated mostly by electronic means to offer better opportunities for learners. E-learning provided access to innovative opportunities in the education system through the development of innovative reasoning as well as promoting interaction and collaboration between students (Pamfilie et al., 2014).

Research Question 1: What are the alternative teaching and learning platforms used by undergraduate students?

In response to Research Question 1, a conceptual overview of e-learning platforms is necessary to understand their forms, classifications, and relevance in the context of higher education. E-learning platforms as a collaborative online service that provides opportunities for the

e-learning community to access information, coursework, tools, and other digital resources to facilitate the educational process and management (Egielewa et al., 2022; Morscheck, 2021). E-learning platforms could also be regarded as a Learning Management System (LMS), Virtual Learning Environment (VLE), or Course Management System (CMS). Examples of e-learning platforms include, but not limited to Blackboard, Moodle, WebTrain, Sakai, SecondLife, Sensei, StudyWiz, Coursera, edX, Udacity, Khan Academy, Skillshare, etc. E-learning is classified based on its engagement in education, the level at which it is engaged, as well as the timing, and interaction (Arkorful & Abaidoo, 2015). They further divided e-learning into two basic types, which consist of computer-based and internet-based. Figure 1 provides data on the alternative teaching and learning platforms used by undergraduate students of the National Open University of Nigeria (NOUN).
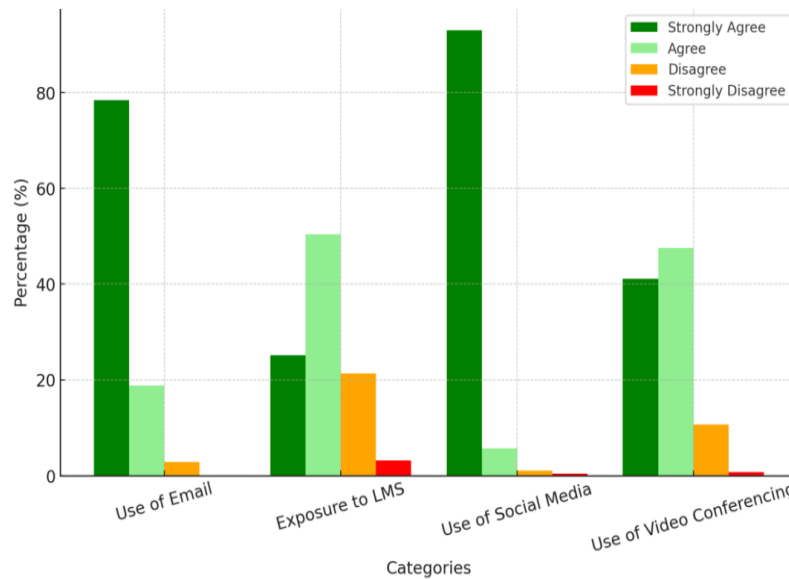
Figure 1. Alternative Teaching and Learning Platforms at the National Open University of Nigeria (NOUN)

Based on Figure 1, the most commonly used alternative teaching and learning tool and level of familiarity among respondents is email. This is an indication that email is mostly used as an alternative teaching and learning communication tool for assignment or coursework-related information dissemination among undergraduate students. In the course of an interview, a respondent was asked to list the e-learning platforms she has used and to what extent, she responded as quoted "…Venue for our academic activities is the eNOUN Learning Space, many students also use other digital learning resources. For example, groups on Telegram and WhatsApp are frequently utilized for real-time question-asking, discussion, and sharing of course materials. Some instructors even set up special groups for particular classes to respond to student questions and give prompt updates. Additionally, technologies like Zoom and Google Classroom are occasionally used, particularly for virtual meetings and interactive sessions. Given that students frequently use instructional videos to enhance their learning."

The findings also prove that significant numbers of students are familiar with e-learning management systems such as the institution's specific LMS called eNOUN Learning Space or NOUN e-Courseware, Social Media is not a typical learning platform, but it is used either formally or informally for academic purposes like information sharing or group discussions among students. Also, a high number of participants affirmed that they can use video conferencing applications such as Google Meet, Zoom, Microsoft Teams, Skype, Slack, Cisco, etc. These applications are the typical e-learning platforms mostly used for teaching and learning processes. The findings of this study agree with Algahtani (2011), who submitted that both synchronous and asynchronous e-learning systems allow virtual community members to collaborate and share for academic advancement. The findings show that a high percentage of students are familiar with e-learning as an alternative

teaching and learning platform, which they use for virtual meetings and online classes. Based on the above information, it could be established that undergraduate students are very familiar with different types of digital tools that are used to actualize their academic purposes. The digital tools used by students, such as email and video conferencing applications, are invaluable in their academic experiences. Despite the effectiveness of the LMS, these other platforms fill the gap and increase the flexibility and accessibility of learning. This finding will help the management of academic communities, as well as lecturers in planning, designing, and implementing e-learning content and communication strategies that are in line with undergraduate students' preferences and familiarity with alternative teaching and learning platforms.

Frequency of E-learning Platforms usage
Figure 2 provides data on how often undergraduate students use e-learning platforms.
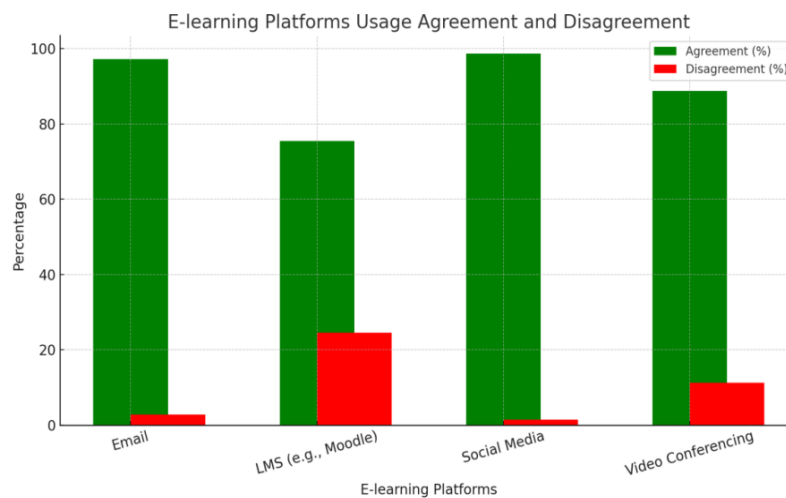
Figure 2. Frequency of E-learning Platforms Usage

Figure 2 provides data on how often undergraduate students use e-learning platforms. The findings show that a higher percentage of undergraduates use email more often, and most of them use email daily. This proves that undergraduate students use email as a communication tool in actualizing their academic and personal needs, such as interacting with their lecturers and peers, as well as receiving and sharing course-related information. When a respondent was asked how often he uses e-learning platforms, her response was this: "*I spend several hours each day using apps like WhatsApp. It's the quickest and most convenient method to communicate, receive information, and even have group chat discussions about schoolwork. Nearly everyone I know uses social media every day.*

Furthermore, the study revealed that a significant number of undergraduate students use Learning Management Systems (LMS) and Video Conferencing platforms regularly, while the majority of students use them weekly. A respondent responded as quoted, "*I use learning management systems (LMS) primarily when I have assignments or coursework to turn in; I would say that I access the LMS once a week, rather than every day like I do with email. Some of my classmates don't use the LMS very often unless they have a specific task to finish, which I believe is because not all courses require constant LMS engagement*".

This suggests that LMS and Video conferencing platforms are actively used to access assignments, course materials, and other online engagement activities. The findings also provide insight into the widespread daily usage of social media platforms among NOUN students. This suggests that social media is undergraduates' integral part of their' daily lives. This shows that social media platforms play a significant role in their communication, group collaboration, and learning process. The result of the study agrees with Morscheck (2021) study, which listed, among other things that e-learning platforms are used to provide access to educational resources and facilitate collaboration and communication between peers and instructors.

Based on the findings of this study about the frequency at which undergraduate students use alternative teaching and learning platforms, it could be concluded that e-mail, learning management systems (LMS), video conferencing applications, and social media platforms are frequently used by students with varying degrees. E-mail, LMS, and Video conferencing platforms are used regularly, while social media platforms are used by the great majority of students daily. The findings revealed the commonly used learning tool. This is invaluable for educators when planning and implementing their teaching and learning strategies.

Purpose of E-Learning Platforms

The purpose of e-learning is to provide an online learning experience that allows learners to acquire knowledge, skills, and competencies using digital technologies. E-learning is often used to supplement or replace traditional classroom learning and can be delivered through a variety of methods, such as online courses, virtual classrooms, webinars, video tutorials, and mobile apps. The purpose of the development of e-learning platforms as an alternative to the conventional education system is educational technology, digital literacy, blended learning, and online assessment. Figure 3 provides insights into the various purposes for which undergraduate students use e-learning as an alternative teaching and learning platform at the National Open University of Nigeria.
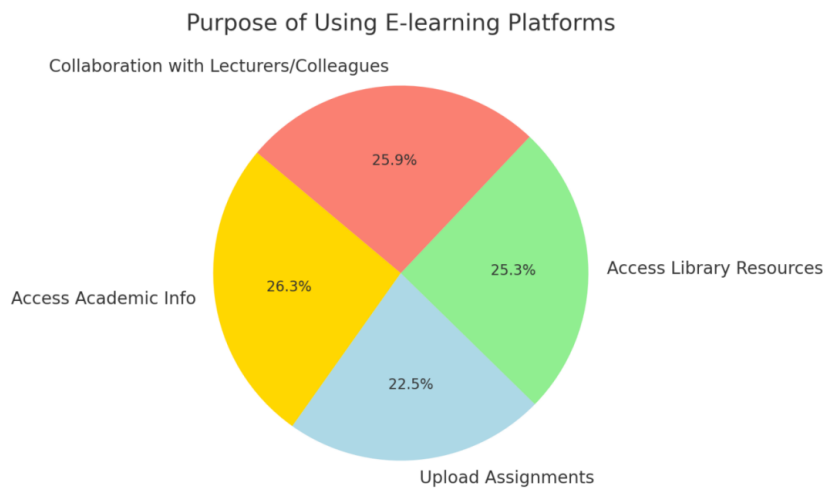

Figure 3. Purpose of the Use of E-Learning

Figure 3 illustrates the primary purposes for which undergraduate students at the National Open University of Nigeria utilize e-learning platforms. It provides evidence that these platforms play a crucial role in granting access to course-related content, thereby supporting students in meeting their academic objectives. Also, the findings prove that a high percentage of students are utilizing e-learning as an alternative teaching and learning platform to access library resources and services. This indicates that the NOUN alternative teaching and learning platforms are facilitating access to the library resources effectively, thereby supporting coursework and research activities. A majority of the respondents agreed that they use e-learning platforms to collaborate with their lecturers and peers. An interview respondent revealed that "the main reason she uses the e-learning space is to access academic materials and services, which provide her with essential resources like lecture notes, course outlines, and recorded lectures, which help her stay on track with her studies. She added that the platform also makes it easier for her to submit assignments and take quizzes without having to visit the campus physically. Going further, she stated that e-learning platforms serve as a bridge between students and lecturers. She stated as quoted, "…I can get announcements, updates, and feedback directly from my instructors, which helps me stay informed about deadlines and academic requirements. The discussion forums are also helpful for engaging with classmates and clarifying concepts". Analyzing the responses critically, it could be said that e-learning platforms simplify access to learning materials and academic services, making education more flexible and convenient.

The finding is in agreement with the submission of Morscheck (2021) those who stated, among other things, that e-learning supports the provision of access to educational resources and facilitates collaboration and communication between peers and instructors. The above findings validate the claim that e-learning, as alternative teaching and learning platform, supports academic activities such as accessing course materials and library resources, facilitating collaboration and communication, and fostering a sense of community with the National Open University of Nigeria. This is the reflection of the typical multifaceted nature of e-learning as an alternative teaching and learning platforms.

Advantages of the ethical use of E-learning

The use of e-learning platforms as an alternative teaching and learning ensures that all learners have an equal opportunity to access learning materials and resources, regardless of their background, race, gender, or physical ability (Lwoga, 2014). E-learning platforms that are designed to be accessible to all learners create a fair and equitable environment for everyone. This promotes inclusivity and helps to reduce discrimination and bias, which can negatively affect the learning experience. Use of e-learning platforms encourages collaboration and cooperation among learners. Learners can share ideas, thoughts, and perspectives in a safe and respectful environment, which can lead to a deeper understanding of the subject matter. This collaboration can take various forms, such as discussion forums, group assignments, and peer feedback, which can enhance the learning experience (Arkorful & Abaidoo, 2015). This also promotes transparency and accountability in the learning process. Learners are aware of the learning outcomes, expectations, and assessment criteria, which can help them to stay focused and motivated. Moreover, e-learning platforms that provide regular feedback and progress reports to learners enable them to track their learning progress and identify areas that need improvement (Smedley, 2010). Figure 4 shows the advantages associated with the ethical use of e-learning platforms at the National Open University of Nigeria (NOUN).
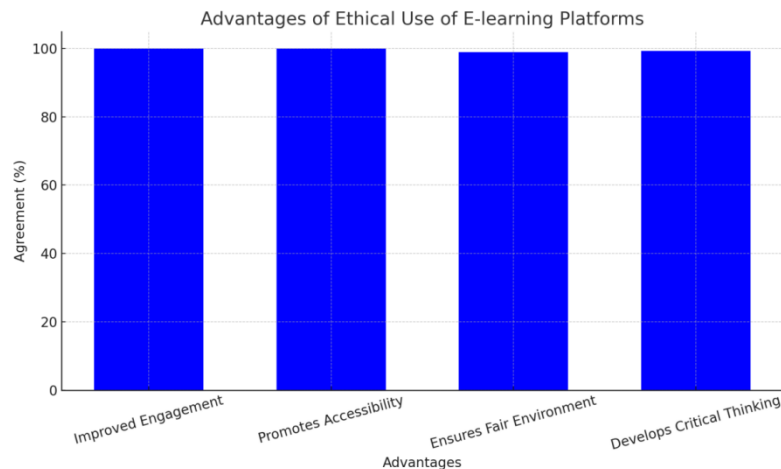
Figure 4. Advantages of the Ethical Use of E-learning

Data from Figure 4 shows the advantages associated with the ethical use of e-learning platforms at the National Open University of Nigeria (NOUN). The figure revealed that 100% of the respondents agreed that the ethical use of e-learning improved their engagement and motivation towards learning, while none of the respondents disagreed. Also, 100% of the participants agreed (82.3% strongly agreed and 17.7% agreed) that the ethical use of e-learning promotes accessibility and convenience of learning, while none of the respondents disagreed. Furthermore, 98.9% of the respondents agreed (79.4% strongly agreed and 19.5% agreed) that ethical use of e-learning ensures a fair and equitable learning environment, while 1.1% of respondents disagreed. Also, 99.3% of the respondents agreed (77% strongly agreed and 22.3% agreed) that the ethical use of e-learning platforms contributes to the development of their critical thinking and problem-solving skills, while 0.7% of respondents disagreed.

Improved Engagement and Motivation towards Learning:

All the respondents agreed that the ethical use of e-learning as an alternative teaching and learning method improved their engagement and motivation towards learning. This validates the claim of Wagner et al. (2006), who submitted that the ethical use of e-learning systems is effective in motivating students to collaborate and influence communication without much effort. This means that when students use e-learning as an alternative teaching and learning platform ethically, they are more motivated and engaged in their learning processes, such as respectful communication, active participation in class activities, as well as responsible engagement in the online community.

Promotes Accessibility and Convenience of Learning:

All the respondents who were interviewed affirmed that ethical use of e-learning promotes accessibility and convenience of learning, which is particularly important to students who may have other commitments and constraints. One of the final year students of the Department of Education, in the course of the interview, revealed to me that he accesses most of his course materials, as well as attends to assignments at night. According to him, he usually has tight schedules coupled with children's distractions during the day. He excitedly told me that reading at night promotes his level of comprehension. This is in line with the findings of a previous study, which revealed that e-learning enables adult learners with family responsibilities and full-time jobs to attend classes without risking their jobs (Park & Choi, 2009). Ethical use ensures that e-learning resources and materials are available and accessible to all students, regardless of their location or physical constraints. Many students highlighted that attending lectures does not stop them from traveling on like the conventional system where geographical location matters. This also supports the submission of Morscheck (2021) outlining the advantages of e-learning platforms, which include but are not limited to accessibility and flexibility of learning.

Ensures a Fair and Equitable Learning Environment:

Almost all the students (98.9%) concur that the ethical use of e-learning as an alternative teaching and learning ensures a fair and equitable learning environment. This entails that all students have equal opportunities to access and benefit from e-learning resources, creating a level playing field. This agrees with the findings of Lwoga (2014) that the ethical use of e-learning platforms ensures that all learners have an equal opportunity to access learning materials and resources, regardless of their background, race, gender, or physical ability. This can help in addressing issues of equity and inclusion in education.

Contributes to the Development of Critical Thinking and Problem-Solving Skills:

Almost all the respondents (99.3%) agreed that the ethical use of e-learning as an alternative teaching and learning platform contributes to the development of their critical thinking and problem-solving skills. This entails students' ability to be involved in critical analysis, collaborative problem-solving, and thoughtful discussions in the online environment. These skills are crucial in preparing students for real-world challenges, as well as academic success.

Comparison of Pre and Post-COVID-19 Trends in Nigeria based on Historical Data

Prior the COVID-19 pandemic, conventional face-to-face classroom teaching and learning was the mainstay of higher education in Nigeria generally although the National Open University of Nigeria had adopted e-learning as a component of their Open and Distance Learning model that enable students to access their course materials, however, the rate of its accessibility was low due to some factors. While some institutions in Nigeria were experimenting with e-learning platforms like Learning Management Systems (LMS, their adoption was generally low. Most Nigerian institutions only provided rudimentary digital learning choices, such as lecture materials preserved on CD-ROMs, rather than fully integrated online learning platforms (Eze et al., 2018; Olaniyi, 2006). Poor internet infrastructure, power outages, and a lack of ICT resources plagued Nigerian institutions despite the global trend toward e-learning for flexible education (O'neill et al., 2004; Renes, 2015).

Higher education institutions in Nigeria were obliged to switch to online instruction due to the COVID-19 pandemic, which revealed serious structural issues. Due to inadequate internet infrastructure, unstable electrical supplies, and restricted access to digital devices, many students expressed dissatisfaction with virtual learning (Egielewa et al., 2022). The efficiency of e-learning was further hampered by low computer literacy among instructors and students, as well as a lack of technical support (Afolabi & Uhomoibhi, 2017). Nigerian students struggled with interest and comprehension, in contrast to pupils in more developed nations who adjusted to online learning more readily. Although e-learning offered accessibility and flexibility, it was often believed to lack the academic rigor and efficacy of a face-to-face teaching and learning system (Armstrong, 2011; Bali & Liu, 2018).

Many Nigerian students reported hesitancy to continue fully online learning after the pandemic because of their unfavorable experiences (Egielewa et al., 2022). According to studies, the majority of students like blended learning because it provides a more well-rounded approach to education by combining the traditional face-to-face education system with online learning (Kituyi & Tusubira, 2013). However, the complete implementation of e-learning in Nigerian institutions is still challenged by infrastructure issues, such as inadequate digital literacy, erratic power supplies, and restricted internet access. To explore the alternative teaching and learning platforms in Nigeria and ensure sustainable digital education, it would be essential to upgrade digital infrastructure, train teachers in e-learning methodologies, and incorporate affordable learning solutions.

LIMITATIONS

A greater quantity of surveys would have been preferable for this research, as it would have allowed for a bigger sample size and the collection of more diverse and informative data. This would have facilitated a more comprehensive and applicable study. However, due to limitations in time and finances, the scope of the research was limited.

CONCLUSION

The findings of this study about the advantages of the ethical use of alternative teaching and learning platforms at the National Open University of Nigeria suggest that there are several significant advantages among undergraduate students. These advantages include enhanced motivation and engagement, improved accessibility and convenience, a fair and equitable learning environment, and the development of critical thinking and problem-solving skills. The above advantages highlight the benefit of maintaining and promoting ethical conduct among undergraduate students in online education. For future research, the findings of this study suggest the need for comparative studies across various countries to explore cultural differences in perceptions and usage of alternative teaching and learning methods, particularly through social media and other e-learning platforms. Based on the conclusions drawn, several recommendations are proposed to enhance the effectiveness of e-learning at the National Open University of Nigeria (NOUN). First, the NOUN management is encouraged to collaborate with internet service providers (ISPs) to offer affordable data plans for students, thereby increasing internet accessibility. Additionally, the integration of AI-powered learning analytics is recommended to help faculty monitor student engagement and performance trends, ultimately fostering greater involvement in virtual classrooms and improving lecturer-student interactions. Furthermore, NOUN should routinely organize faculty training and digital literacy workshops focusing on the ethical use of emerging technologies and interactive online teaching strategies. These efforts will contribute to improving student participation and reducing barriers to accessing e-learning platforms.

AUTHOR CONTRIBUTIONS

UOR and BSO contributed equally to the development of this research paper, including the Conceptualization, research design, manuscript writing, data collection, analysis, interpretation, and literature review, review, editing, analysis, interpretation, validation of the final manuscript, and technical support

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APPENDIX

Appendix A

Appendix A1: Cover Letter

Dear Participant,

You are invited to participate in a survey conducted by **Ozioma Roseline Umera and Stacey O. Baror**, who are conducting research for "**Exploring Alternative Teaching and Learning Platforms in Post-COVID-19**".

The survey you have received has been designed to **Explore Alternative Teaching and Learning Platforms in Post-COVID-19**. You have been invited to participate in this study as your experience and views related to this topic are of value and importance, and will assist the researcher to gain an in-depth understanding of the area under study.

By completing this survey, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings. You are, however, under no obligation to complete the survey, and you may withdraw from the study before submitting the survey. The survey is developed to be anonymous, meaning that we will have no way of connecting the information that you provide to you personally. If you choose to participate in this survey, it will take up about 7 minutes of your time.

The benefit of participating is that you will be part of contributing to the body of knowledge in **Exploring Alternative Teaching and Learning Platforms in Post-COVID-19.**

We do not foresee that you will experience any negative consequences by completing the survey. The researchers undertake to keep any information provided herein confidential, not to let it out of our possession, and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

The records will be kept for five years for audit purposes whereafter they will be permanently destroyed. You will not be reimbursed or receive any incentives for your participation in the survey.

If you have any concerns, please contact the researcher at the details below.

Kind regards

Ozioma Roseline Umera
Contact details: The researchers can be contacted at rose4princesolar@gmail.com

Appendix A2: For online surveys:

Questionnaire:
By selecting the "Yes" option I hereby voluntarily grant permission for participation in this anonymous survey. The nature and the objective of this research have been explained to me and I understand it.

I understand my right to choose whether to participate in the research project and that the information provided will be handled confidentially. I am aware that the results of the survey may be used for academic publication.
□ Yes
□ No

Appendix A3: Informed Consent Form for Study Participants

STUDY TITLE: **Exploring Alternative Teaching and Learning Platforms in Post-COVID-19**

INTRODUCTION AND OBJECTIVES OF THE STUDY
I am Ozioma Roseline Umera, from the University of Abuja, Nigeria, and Stacey O. Baror from the University of Pretoria, South Africa, are undertaking this study to investigate the **Exploring Alternative Teaching and Learning Platforms in Post-COVID-19.**

If you agree to participate in this study, you will be interviewed for about 30 minutes. You will be required to answer a series of questions about your past and present experiences with e-learning platforms. Your responses will be descriptively analyzed using thematic approaches to generate findings, which shall be shared with you.

CONFIDENTIALITY
The opinions expressed in your interview with me will be treated as confidential information. All information gathered will be anonymized before analysis. No part of this study will be linked to you personally, either directly or indirectly. If you will permit it, the interview will be digitally recorded to ensure the completeness and accuracy of the data captured. The recording will be destroyed after transcription.

POSSIBLE RISKS AND BENEFITS
This study poses no physical or emotional harm to you as far as can be envisaged. There are also no rewards, cash or kind, to you for your role in this study. The outcome of this study will assist the university management in achieving the institutional objectives concerning the use of e-learning platforms.

VOLUNTARY CONSENT

Participation in this study is fully voluntary, and you are free to withdraw from the interview at any point during the process or to decline to respond to particular questions with which you may feel uncomfortable. You may review the transcript of my interview with you to verify the responses before the data is analyzed. You are also encouraged to ask any questions you may have about the study before the interview. To indicate your agreement to take part in this study after all the above information and other clarifications have been sought, please sign the attached informed consent form. A copy of this form will be given to you as evidence of your agreement and participation.

CONTACTS

For any concerns about your rights as a participant in this study, you may contact the study leader, Ozioma Roseline Umera, via email: rose4princesolar@gmail.com

Appendix A4: Informed Consent

I have been informed about and understand the purpose, procedures, potential risks, and benefits of this study and have had opportunities to ask questions about it. Anything I am unsure about has been explained to me to my satisfaction. I understand my right to choose whether to participate in the study and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for publication. I freely agree to participate in the study, and I agree to have the interview recorded. I also understand that upon signature of this form, I will be provided with a copy.

Name of Participant: ………………………………………………………………………

Signature: …………………………………… Date: ………………………………

Name of Witness: ……………………………………………………………………………..

Signature: ……………………………………………… Date: ………………………

I have sufficiently informed the participant about the purpose, procedures, potential risks and benefits of this study. I have answered all questions to the best of my ability and to the satisfaction of the participant.

Name of Researcher: Ozioma Roseline Umera

Signature: O.R.U   Date: 26th May 2023

Name of Researcher: Stacey O. Baror

APPENDIX B

Appendix B1: Questionnaire

SECTION A: DEMOGRAPHIC INFORMATION
Instruction - Tick (√) as appropriate

1. **Your Faculty**: Agricultural science (   ), Arts (   ), Education (   ), Health Science (   ), Law (   ), Management Science (   ), Science (   ), and social sciences (   ).

2. **Level of Study:** 100L (   ), 200L (   ), 300L (   ), 400L (   ), 500L (   )

SECTION B:
The purpose of constructing the following sets of questions is to investigate the e-learning platforms and ethical behavior of undergraduate students at the National Open University of Nigeria by examining the types of e-learning platforms used by students, extent of use, purpose of use, advantages of its ethical use, as well as the ethical challenges associated with the use of e-learning platforms at the National Open University of Nigeria (NOUN).

Instruction:
Please tick (✓) appropriately as it applies to you. The following Likert scale will be used:
  SA= Strongly Agree (4points), A= Agree (3points), D= Disagree (2points), SD= Strongly Disagree(1point).

Research Question 1:

What are the e-learning platforms used by undergraduate students?

S/N	QUESTION	STRONGLY AGREE (SA)	AGREE (A)	DISAGREE (D)	STRONGLY DISAGREE (SD)
1	I make use of email				
2	I have been exposed to learning via Learning Management Systems like Edmodo, Schoology, Moodle, ATutor, Blackboard Learn, etc				
3	I can use social media platforms such as Facebook, WhatsApp, Telegram etc.				
4	I can conveniently make use of Video conferencing applications such as Zoom, Skype, Google Meet, Cisco WebEx, Microsoft Teams, Slack, etc				

How often do you use the e-learning platforms?

S/N	QUESTION	DAILY	WEEKLY	MONTHLY	NEVER
1	Electronic mail (e-mail)				
2	Learning Management Systems like Edmodo, Schoology, Moodle, ATutor, Blackboard Learn etc.				
3	Social media platforms like Facebook, WhatsApp, Telegram etc				
4	Video conferencing applications such as Zoom, Skype, Google Meet, Cisco WebEx, Microsoft Teams, Slack etc.				

Research Question 2:

For what purpose do undergraduate students use e-learning platforms?

S/N	QUESTION	STRONGLY AGREE (SA)	AGREE (A)	DISAGREE (D)	STRONGLY DISAGREE (SD)
1	To access academic information and services e.g course materials				
2	To upload my assignments for grading and participate in quiz				
3	To access library resources				
4	To collaborate with my lecturers and colleagues				

Research Question 3:

What are the advantages associated with the ethical use of e-learning platforms?

S/N	QUESTION	STRONGLY AGREE (SA)	AGREE (A)	DISAGREE (D)	STRONGLY DISAGREE (SD)
1	It improved my engagement and motivation towards learning				
2	It promotes accessibility and convenience of learning				
3	It ensures a fair and equitable learning environment				
4	It contributes to the development of my critical thinking and problem-solving skills				

Appendix B2: Interview Questions

Demographic Information
1. Please indicate your faculty:………………………………………
2. What is your level of study: ………………………………………

Research questions
   Interview checklist

S/N	Question	Response
1	**What is the e-learning platforms used by undergraduate students and to what extent?** • Which e-learning platforms have you used as an undergraduate student? Please list them • How frequently do you use e-learning platforms for your undergraduate studies?	
2	**For what purpose do undergraduate students use e-learning platforms?** • What motivated you in using e-learning platforms for your studies? • How do you perceive the role of e-learning platforms in enhancing your learning experience compared to traditional classroom settings?	
3	**What are the advantages associated with the ethical use of e-learning platforms?** • Do you believe that using e-learning platforms has positively impacted your general learning outcomes? • Have you personally experienced any positive outcomes or benefits from engaging in the ethical use of e-learning platforms?	

Thank you for participating in this interview