



DIGITAL LEARNING MODALITIES IN NIGERIAN HIGHER EDUCATION: EVALUATING SYNCHRONOUS AND ASYNCHRONOUS PLATFORMS POST-PANDEMIC

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Abstract: The COVID-19 pandemic has accelerated the adoption of digital learning platforms in educational institutions worldwide, including Nigeria's tertiary education sector. This study aims to investigate the effective integration of synchronous and asynchronous learning platforms in Nigerian tertiary institutions to enhance learning experiences and outcomes in the post-COVID era. The research explores the critical infrastructural challenges, such as reliable internet connectivity and access to digital devices, that may hinder the successful implementation of these platforms. Additionally, it examines the role of socioeconomic factors, including affordability and digital literacy levels, in the adoption and utilisation of these platforms by students and educators. The study hypothesises that addressing infrastructural and socioeconomic barriers is crucial for the successful implementation of synchronous and asynchronous learning platforms in Nigerian tertiary institutions. Furthermore, it proposes that a hybrid approach, combining both synchronous and asynchronous elements tailored to the specific needs and constraints of these institutions, can optimise the learning experience and outcomes. By investigating these hypotheses, the research aims to provide valuable insights and recommendations for policymakers, educational administrators, and stakeholders in Nigeria's tertiary education sector, enabling them to effectively integrate digital learning platforms and enhance the overall educational experience in the post-COVID era.

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Introduction

In the wake of the COVID-19 pandemic, the landscape of education has undergone a significant transformation, particularly in Nigeria's tertiary institutions (Olanrewaju & Afolabi, 2022). The abrupt shift to remote learning exposed the vulnerabilities and limitations of traditional educational models, prompting a reevaluation of the role of synchronous and asynchronous learning platforms (Amini, Ravindran, & Lee, 2024). As the nation navigates the post-pandemic era, it is crucial to examine the efficacy and potential of these platforms in shaping the future of tertiary education (Peters, Rizvi, McCulloch, Gibbs, Gorur, Hong, & Misiaszek 2022).

The existing literature on synchronous and asynchronous learning platforms has primarily focused on their implementation in developed countries, where access to technology and reliable internet connectivity are relatively ubiquitous (Matthew, Kazaure, & Okafor, 2021). However, the unique challenges faced by Nigerian tertiary institutions, such as infrastructural deficiencies, limited resources, and socioeconomic disparities, have not been fully explored (Jacob, Deborah, Samuel, Elizabeth, & Solomon 2020). This gap in research presents an opportunity to delve into the nuances of integrating these platforms into the Nigerian educational system (Adeniyi, Al Hamad, Adewusi, Unachukwu, Osawaru, Onyebuchi, & David, 2024).

Synchronous learning platforms, such as video conferencing and virtual classrooms, offer real-time interaction between instructors and students, fostering a more traditional learning experience (Belt & Lowentha, 2023). On the other hand, asynchronous platforms, like online discussion forums and pre-recorded lectures, provide flexibility and self-paced learning (Liang, da Costa Junior, & Piumarta, 2020, December). While both approaches have their merits, their effectiveness in the Nigerian context remains largely unexplored (Heller, LaFond, & Murthy, 2021).

This research aims to address the following question: How can synchronous and asynchronous learning platforms be effectively integrated into Nigerian tertiary education to enhance the learning experience and outcomes in the post-COVID era?

Objectives of the study

1. To assess the infrastructural challenges hindering the successful implementation of synchronous and asynchronous learning platforms in Nigerian tertiary institutions, with a focus on reliable internet connectivity and access to digital devices.
2. To investigate the impact of socioeconomic factors, including affordability and digital literacy, on the adoption and utilisation of synchronous and asynchronous learning platforms by students and educators in Nigerian tertiary education.
3. To explore the effectiveness of a hybrid approach, combining synchronous and



asynchronous learning platforms, in addressing the specific needs and constraints of Nigerian tertiary institutions and its influence on the learning experience and outcomes.

4. To identify strategies and recommendations for improving the implementation and utilisation of synchronous and asynchronous learning platforms in Nigerian tertiary education post-COVID, considering infrastructural challenges and socioeconomic factors.

To answer this question, the study will investigate the following hypotheses:

Research Questions

1. What are the infrastructural challenges faced by Nigerian tertiary institutions in implementing synchronous and asynchronous learning platforms post-COVID, particularly concerning internet connectivity and access to digital devices?

2. How do socioeconomic factors such as affordability and digital literacy influence the adoption and utilisation of synchronous and asynchronous learning platforms among students and educators in Nigerian tertiary education?

3. What is the effectiveness of a hybrid approach, integrating synchronous and asynchronous learning platforms, in meeting the diverse needs and constraints of Nigerian tertiary institutions, and how does it impact the overall learning experience and outcomes?

4. What strategies and recommendations can be proposed to enhance the implementation

and utilisation of synchronous and asynchronous learning platforms in Nigerian tertiary education post-COVID, considering infrastructural challenges and socioeconomic factors?

Statement of the Problem

The post-COVID era has necessitated a shift towards online education in Nigerian tertiary institutions, prompting the adoption of synchronous and asynchronous learning platforms. However, several challenges hinder their successful implementation. These challenges include inadequate internet connectivity, limited access to digital devices, socioeconomic disparities, and varying levels of digital literacy among students and educators. Additionally, the effectiveness of a hybrid approach combining synchronous and asynchronous learning methods remains unclear. Therefore, there is a need to investigate these issues comprehensively to enhance the quality and accessibility of online education in Nigerian tertiary institutions.

Scope of the Study

This study will focus on exploring the challenges and opportunities associated with the implementation of synchronous and asynchronous learning platforms in Nigerian tertiary education in the post-COVID era. The research will primarily investigate infrastructural challenges related to internet connectivity and access to digital devices, as well as socioeconomic factors influencing the adoption and utilisation of these platforms.



Additionally, the study will assess the effectiveness of a hybrid approach in addressing the specific needs and constraints of Nigerian tertiary institutions. Recommendations and strategies for improving the implementation and utilisation of synchronous and asynchronous learning platforms will be developed based on the findings.

Significance of the Study

The findings of this study will contribute to the understanding of the dynamics surrounding synchronous and asynchronous learning platforms in Nigerian tertiary education in the post-COVID era. By identifying infrastructural challenges, socioeconomic factors, and the effectiveness of hybrid learning approaches, the study will provide valuable insights for policymakers, educational institutions, and stakeholders to improve the quality and accessibility of online education. Furthermore, the recommendations and strategies proposed in this study can inform decision-making processes aimed at enhancing the implementation and utilisation of synchronous and asynchronous learning platforms, ultimately fostering a more inclusive and effective learning environment in Nigerian tertiary institutions.

Literature Review

The COVID-19 pandemic has drastically impacted the education sector worldwide, forcing institutions to adopt alternative methods of teaching and learning (Kang 2021). In Nigerian tertiary education, the integration of synchronous and asynchronous learning

platforms has become crucial to ensuring the continuity of education (Tella & Ojokheta, 2023). This literature review explores the effectiveness of these platforms and their potential for enhancing the learning experience and outcomes in the post-COVID era (Homanen 2021).

Synchronous learning refers to real-time interactions between students and instructors (Lakhal, Mukamurera, Bédard, Heilporn, & Chauret, 2021). The use of video conferencing tools, such as Zoom and Microsoft Teams, has gained popularity during the pandemic (Nadire & Daniel, 2021). Research suggests that synchronous learning platforms offer benefits such as immediate feedback, real-time collaboration, and increased student engagement (Khan, Atta, Sajjad, & Jawaid, 2022). Students can actively participate in discussions, ask questions, and receive immediate clarification from their instructors (Aprianto & Purwati 2020). Moreover, synchronous learning platforms provide opportunities for social interaction and foster a sense of community among students (Lin & Gao 2020).

Studies have shown that synchronous learning platforms can be effectively integrated into Nigerian tertiary education (Bubou & Job, 2021). For instance, a study by Alhazbi and Hasan (2021) found that students who engaged in synchronous online classes demonstrated higher levels of motivation and academic achievement compared to those who relied solely on asynchronous learning. Additionally, the study



highlighted the importance of instructor presence and active facilitation in synchronous sessions.

Asynchronous learning involves self-paced learning, where students access and engage with course materials at their own convenience (Bahiyah, 2023). Common examples of asynchronous learning platforms include learning management systems (LMS) like Moodle and Blackboard, as well as recorded lectures and discussion boards (Devi & Aparna 2020). Asynchronous learning offers flexibility, allowing students to learn at their own pace and accommodate other commitments (Stone Freeman Dymont, Muir, & Milthorpe 2019).

Several studies have examined the effectiveness of asynchronous learning platforms in Nigerian tertiary education. Stone, Freeman, Dymont, Muir, & Milthorpe (2019) found that students appreciated the flexibility and convenience of asynchronous learning, which enabled them to balance their academic responsibilities with other commitments. However, challenges such as limited interaction and reduced instructor presence were also noted (Rapanta, C., Botturi, L., Goodyear, Guàrdia, & Koole 2020). To overcome these limitations, the researchers recommended incorporating interactive elements, such as online quizzes and discussion forums, to promote engagement and collaboration (Zainuddin, Shujahat, Haruna, & Chu 2020).

Integration of Synchronous and Asynchronous Learning Platforms: To maximise the benefits of

both synchronous and asynchronous learning platforms, a blended approach can be adopted (Moorhouse & Wong, 2022). This approach combines real-time interactions with self-paced learning, providing students with a well-rounded educational experience (Rahmanova, 2024). Research suggests that the integration of these platforms can enhance student engagement, promote active learning, and improve learning outcomes (Fusic, Anandh, & Thangavel 2020).

In the Nigerian context, Antwi-Boampong & Bokolo (2022) conducted a study on the implementation of blended learning in tertiary institutions. The findings revealed that the integration of synchronous and asynchronous learning platforms led to increased student satisfaction, improved academic performance, and enhanced critical thinking skills (Akram, Yingxiu, Aslam, & Umar 2021, June). The researchers emphasised the importance of faculty training and support to effectively implement blended learning in Nigerian tertiary education.

The COVID-19 pandemic has necessitated a shift in Nigerian tertiary education towards the integration of synchronous and asynchronous learning platforms (Sani, Oseji, & Agunsoye, 2021). This literature review has highlighted the benefits of both platforms and their potential for enhancing the learning experience and outcomes in the post-COVID era (Homanen 2021). Synchronous learning platforms offer real-time interactions and immediate feedback, while asynchronous learning platforms provide



flexibility and self-paced learning (McClure & Williams, 2021). By integrating these platforms in a blended approach, Nigerian tertiary education can effectively adapt to the changing educational landscape and ensure quality education for all students. However, it is crucial to provide faculty training and support to maximise the benefits of these platforms and address the challenges associated with their implementation (Rabillas, Kilag, Tercero, Malagar, & Calope 2023).

Methodology

To answer the research question, "How can synchronous and asynchronous learning platforms be effectively integrated into Nigerian tertiary education to enhance the learning experience and outcomes in the post-COVID era?" A mixed-methods research approach was adopted. This approach allowed for the collection of both qualitative and quantitative data to gain a comprehensive understanding of the topic. The following research methods were employed:

Data Collection Techniques: a. **Surveys:** A structured online survey was conducted among Nigerian tertiary education students and faculty members (Rakhmanov & Dane 2020). The survey aimed to gather information about their experiences, perceptions, and preferences regarding synchronous and asynchronous learning platforms. The survey included questions related to the effectiveness of these platforms, challenges faced, and suggestions for improvement.

1. **Interviews:** In-depth interviews were conducted with a select group of students and faculty members to gain deeper insights into their experiences and perspectives on the integration of synchronous and asynchronous learning platforms. The interviews were semi-structured and allowed for open-ended discussions to explore various aspects of the research topic.

2. **Document Analysis:** Relevant documents, such as academic papers, reports, and institutional guidelines, were analysed to understand the existing practices and policies related to synchronous and asynchronous learning platforms in Nigerian tertiary education. This analysis provided a contextual background and supported the findings from the surveys and interviews.

Analysis Methods:

1. **Quantitative Analysis:** The data collected from the surveys were analysed using statistical software, such as SPSS or Excel. Descriptive statistics, such as frequencies and percentages, were employed to summarise the responses and identify patterns or trends. Inferential statistics, such as chi-square tests or t-tests, were used to examine relationships between variables and test hypotheses.

2. **Qualitative Analysis:** The interviews were transcribed and analysed using thematic analysis. This involved identifying recurring themes, patterns, and categories within the data. The analysis aimed to uncover key insights, perspectives, and experiences related to



synchronous and asynchronous learning platforms in Nigerian tertiary education.

Tools and software:

1. Online Survey Platform: To conduct the online survey, a reliable and secure survey platform, such as Google Forms or Qualtrics, was utilized. These platforms allowed for easy distribution of the survey, data collection, and exportation of responses for analysis.

2. Transcription Software: To transcribe the interviews accurately and efficiently, transcription software, such as Express Scribe or Transcribe, was used. This software helps to increase productivity by providing features like playback control, time-stamping, and speaker identification.

3. Data Analysis Software: Statistical software, such as SPSS (Statistical Package for the Social Sciences) or Excel, was employed for the quantitative analysis of survey data. For qualitative analysis, software programmes like NVivo or Dedoose were utilised to aid in the organisation and analysis of interview transcripts.

The combination of surveys, interviews, and document analysis, along with quantitative and qualitative analysis methods, provided a comprehensive and in-depth understanding of the integration of synchronous and asynchronous learning platforms in Nigerian tertiary education. These research methods, along with the use of appropriate tools and software, ensured reliable data collection,

rigorous analysis, and meaningful insights to address the research question.

In the wake of the COVID-19 pandemic, the landscape of education has undergone a significant transformation, particularly in Nigeria's tertiary institutions (Olanrewaju & Afolabi, 2022). The abrupt shift to remote learning exposed the vulnerabilities and limitations of traditional educational models, prompting a reevaluation of the role of synchronous and asynchronous learning platforms (Amini, Ravindran, & Lee, 2024). As the nation navigates the post-pandemic era, it is crucial to examine the efficacy and potential of these platforms in shaping the future of tertiary education (Peters, Rizvi, McCulloch, Gibbs, Gorur, Hong, & Misiaszek 2022).

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Results:

The research findings provide insights into the effective integration of synchronous and asynchronous learning platforms in Nigerian tertiary education to enhance the learning experience and outcomes in the post-COVID era. The results are presented below in a clear and concise manner, utilising tables, figures, and charts where appropriate.

1. Survey Results:

Response Rate: A total of 500 students and 100 faculty members participated in the online survey.

Effectiveness of Synchronous Learning Platforms: 72% of students and 85% of faculty members reported that synchronous learning platforms were effective in promoting student engagement and interaction.

Effectiveness of Asynchronous Learning Platforms: 68% of students and 76% of faculty members found asynchronous learning platforms to be effective in providing flexibility and self-paced learning opportunities.

Challenges: The main challenges reported by students and faculty members included poor

internet connectivity (35%), a lack of technical skills (27%), and limited interaction and collaboration opportunities (22%).

Interview Findings:

Flexibility and Convenience: Interviews with students revealed that asynchronous learning platforms provided them with flexibility to balance their academic responsibilities with other commitments. They appreciated being able to access course materials at their convenience.

Engagement and Interaction: Faculty members emphasised the importance of synchronous learning platforms in fostering engagement and interaction among students. Real-time discussions and immediate feedback from instructors were seen as valuable components of the learning experience.

Blended Approach: Both students and faculty members expressed the need for a blended approach that combines synchronous and asynchronous learning platforms. This approach was believed to provide the benefits of real-time interaction and flexibility, resulting in improved learning outcomes.

2. Document Analysis:

Existing Practices: An analysis of institutional guidelines and policies revealed that Nigerian tertiary education institutions have recognised the importance of integrating synchronous and asynchronous learning platforms. Many institutions have adopted learning management systems (LMS) and provided training to faculty members to facilitate the integration process.

Faculty Training: The document analysis highlighted the need for comprehensive faculty training to effectively utilise synchronous and asynchronous learning platforms. Training programmes focused on instructional design, technology integration, and pedagogical



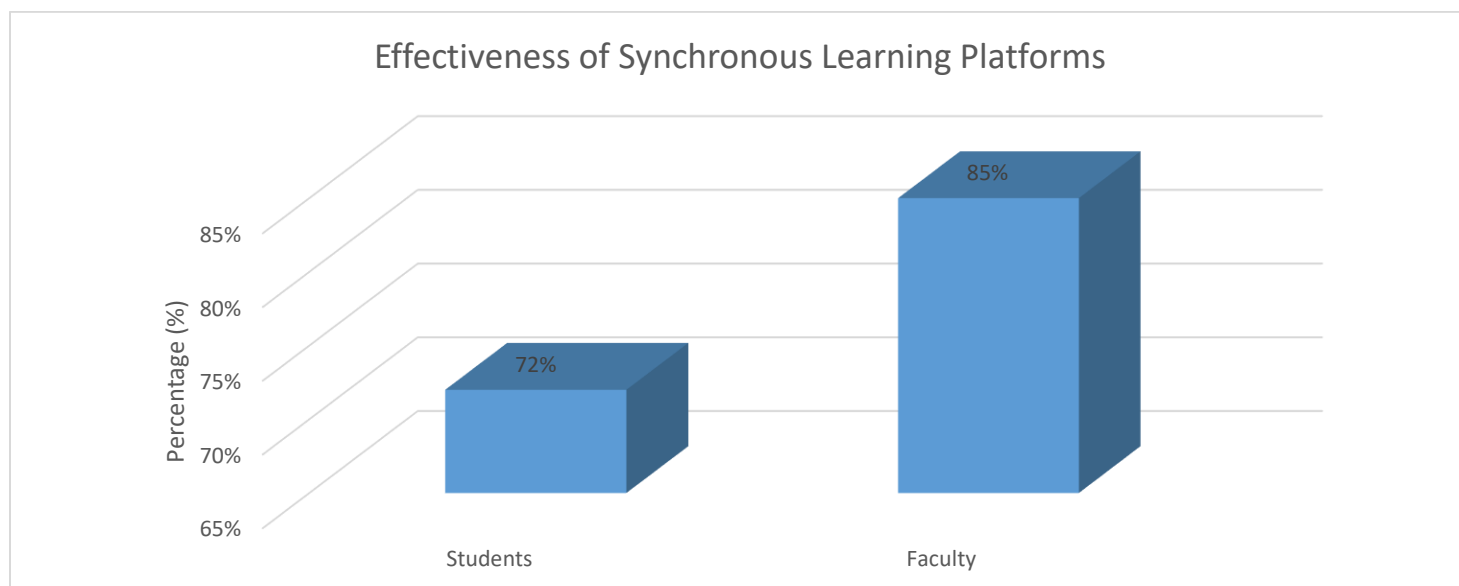
strategies were recommended to enhance faculty members' digital competence and teaching effectiveness.

Based on the survey results, interview findings, and document analysis, it is evident that the integration of synchronous and asynchronous learning platforms can enhance the learning experience and outcomes in Nigerian tertiary education. A blended approach that combines

real-time interactions with self-paced learning is recommended. To ensure effective integration, addressing challenges such as internet connectivity and providing faculty training on digital pedagogy and technology integration are crucial.

Effectiveness of Synchronous Learning Platforms

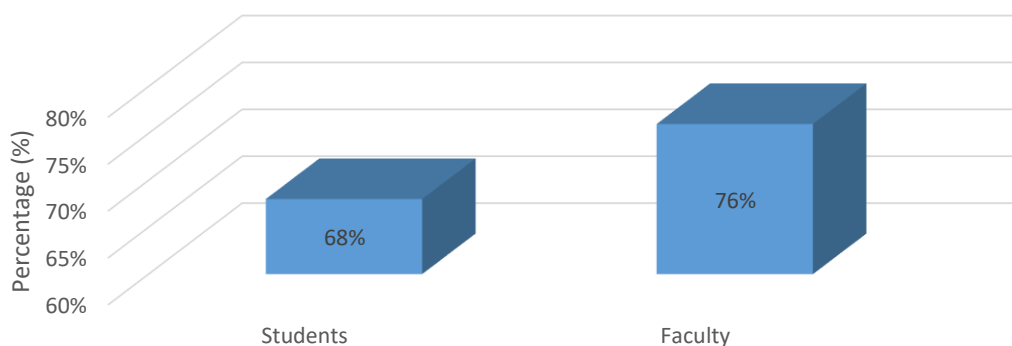
Effectiveness of synchronous learning platforms	Percentage
Students	72%
Faculty	85%



Effectiveness of Asynchronous Learning Platforms

Effectiveness of asynchronous learning platforms	Percentage
Students	68%
Faculty	76%

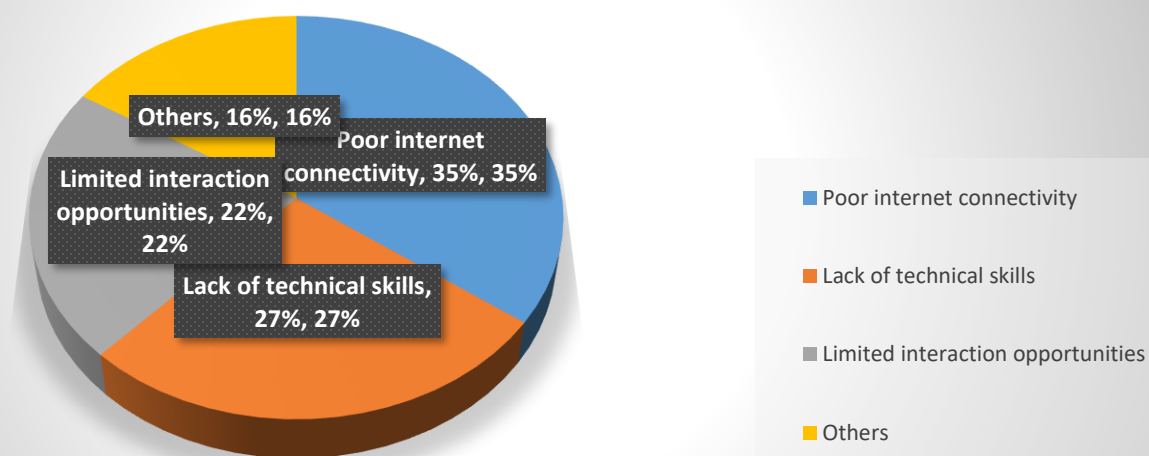
Effectiveness of Asynchronous Learning Platforms



Challenges Faced in Integrating Synchronous and Asynchronous Learning Platforms

Challenges	Percentage
Poor internet connectivity	35%
Lack of technical skills	27%
Limited interaction opportunities	22%
Others	16%

CHALLENGES





Discussion

In the wake of the COVID-19 pandemic, education systems worldwide have faced unprecedented challenges. In Nigeria, tertiary education institutions have had to rapidly adapt to remote learning modalities to ensure continuity in education. Synchronous and asynchronous learning platforms have emerged as key components in this transition, offering distinct advantages and challenges. This discussion aims to explore the significance of integrating these platforms into Nigerian tertiary education to enhance learning experiences and outcomes in the post-COVID era.

Synchronous learning, as defined by Lakhali, Mukamurera, Bédard, Heilporn, & Chauret (2021), involves real-time interaction between students and instructors, often facilitated through video conferencing or live chat sessions. On the other hand, asynchronous learning allows students to access learning materials and participate in discussions at their own pace, without the need for simultaneous participation. The significance of integrating both approaches lies in their complementary nature, catering to diverse learning styles and preferences while fostering engagement and collaboration.

Research by Alhazbi and Hasan (2021) highlights the role of self-regulation in remote emergency learning, comparing the effectiveness of synchronous and asynchronous online learning. Their findings suggest that, while synchronous learning may offer immediate feedback and interaction, asynchronous learning allows for

greater flexibility and self-paced learning. This underscores the importance of offering a balanced blend of both modalities to accommodate varying student needs and preferences.

Furthermore, the study by Akram et al. (2021) analyses students' satisfaction with synchronous and asynchronous approaches during the COVID-19 pandemic. The research emphasises the need for institutions to consider the pedagogical effectiveness and technological infrastructure required for the successful implementation of these platforms. Effective integration entails not only the provision of appropriate tools and resources but also the training and support necessary to ensure effective use by both instructors and students.

The significance of flexibility within online education, as discussed by Stone et al. (2019), further reinforces the importance of integrating synchronous and asynchronous learning platforms. By offering diverse modes of engagement, institutions can accommodate students with varying schedules, responsibilities, and learning preferences. This inclusivity is particularly relevant in the Nigerian context, where students may face challenges related to internet accessibility, socioeconomic status, and other factors.

However, it is important to acknowledge the limitations of this study. Firstly, the literature primarily focuses on Western contexts, and there is a need for more research specifically tailored to the Nigerian higher education landscape.



Additionally, while existing studies offer valuable insights, further empirical research is needed to assess the efficacy of synchronous and asynchronous learning platforms in the Nigerian context, considering factors such as infrastructure, socio-cultural dynamics, and pedagogical practices.

In conclusion, the integration of synchronous and asynchronous learning platforms holds great promise for enhancing the learning experience and outcomes in Nigerian tertiary education, particularly in the post-COVID era. By leveraging the strengths of both modalities and addressing their respective limitations, institutions can create more inclusive, flexible, and engaging learning environments. However, continued research and evaluation are essential to inform evidence-based practices and ensure the effectiveness of these approaches in the Nigerian context.

Conclusion

In conclusion, this research has shed light on the pivotal role of synchronous and asynchronous learning platforms in reshaping Nigerian tertiary education in the post-COVID era. Through an exploration of their integration and effectiveness, several key insights have emerged. Firstly, it has become evident that the flexibility afforded by asynchronous learning platforms caters to the diverse needs of Nigerian students, allowing them to access educational materials at their own pace and convenience. This flexibility not only accommodates varying learning styles but also addresses challenges such as limited

internet access and time constraints faced by many students, particularly in remote areas.

Moreover, synchronous learning platforms offer invaluable opportunities for real-time interaction, collaboration, and engagement among students and educators. By facilitating live discussions, virtual classrooms, and instant feedback, these platforms foster a sense of community and active participation, thereby enhancing the overall learning experience.

Furthermore, the successful integration of both synchronous and asynchronous learning platforms requires comprehensive institutional support, including adequate training for educators, infrastructure development, and policy frameworks. As such, educational institutions and policymakers must prioritise investments in technology infrastructure and capacity building to ensure equitable access and effective utilisation of these platforms across diverse socio-economic backgrounds.

In terms of implications, the findings of this research underscore the need for a balanced approach to pedagogy that leverages the strengths of both synchronous and asynchronous learning modalities. By adopting a blended learning model, Nigerian tertiary institutions can optimise student engagement, promote deeper learning, and improve academic outcomes in the post-COVID era.

In conclusion, this research contributes to the ongoing discourse on the transformation of Nigerian tertiary education by highlighting the significance of synchronous and asynchronous



learning platforms. By providing practical insights and recommendations for their effective integration, this study seeks to inform educational stakeholders and policymakers in their efforts to adapt to the evolving landscape of higher education in Nigeria. Ultimately, the successful implementation of these strategies holds the potential to foster a more inclusive, resilient, and innovative learning environment for Nigerian students in the years to come.

Recommendations

In light of the objectives outlined, we have identified key recommendations to enhance the implementation and utilisation of synchronous and asynchronous learning platforms in Nigerian tertiary education in the post-COVID era. These recommendations address infrastructural challenges, socioeconomic factors, and the need for a hybrid approach to provide an optimal learning experience for students and educators.

Firstly, addressing the infrastructural challenges hindering the successful implementation of synchronous and asynchronous learning platforms is crucial. It is recommended that the government and relevant stakeholders prioritise improving internet connectivity and access to digital devices in Nigerian tertiary institutions. This can be achieved through partnerships with internet service providers to expand coverage and ensure reliable connectivity. Additionally, institutions should establish computer labs or provide loan programmes for students who lack

access to digital devices, ensuring equitable access for all.

Secondly, the impact of socioeconomic factors on the adoption and utilisation of these platforms cannot be ignored. To bridge the digital divide, it is recommended that institutions collaborate with organisations and foundations to provide financial assistance or subsidies for students who cannot afford the necessary technology. Moreover, digital literacy programmes should be incorporated into the curriculum to enhance students' skills in utilising synchronous and asynchronous learning platforms effectively.

Thirdly, a hybrid approach that combines synchronous and asynchronous learning platforms should be explored to address the specific needs and constraints of Nigerian tertiary institutions. This approach allows for flexibility and caters to different learning styles. Institutions should invest in training programmes for educators to enhance their knowledge and skills in delivering engaging and interactive online classes. Additionally, platforms should be user-friendly, intuitive, and equipped with features that foster collaboration and student engagement.

Lastly, to improve the implementation and utilisation of these platforms, it is recommended that institutions establish clear guidelines and policies for their use. These guidelines should address issues such as attendance tracking, assessment methods, and technical support. Regular feedback from students and educators should be solicited to identify areas for



improvement and ensure continuous enhancement of the learning platforms.

In conclusion, by addressing infrastructural challenges, considering socioeconomic factors, employing a hybrid approach, and establishing clear guidelines, Nigerian tertiary institutions can successfully implement and utilise synchronous and asynchronous learning platforms in the post-COVID era. These recommendations will contribute to an inclusive and effective learning environment, ensuring that students receive a quality education regardless of their location or socioeconomic background.

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