

Strategies Employed by Nigerian Educators to Enhance Students' Engagement in Virtual Classrooms: A Meta-Analysis

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Abstract

The rapid advancement of technology and the global shift towards virtual education have significantly impacted Nigeria's educational landscape. In this evolving context, maintaining students' engagement in virtual classrooms has become paramount for effective learning outcomes. This meta-analysis systematically adopts descriptive research design and explores the strategies employed by Nigerian educators to sustain students' engagement in virtual learning environments. Drawing on a diverse range of studies published between 2010 and September 2024, the authors identified key strategies, including active learning techniques, instructor presence, personalization, collaborative interaction, and assessment methods. While these strategies align with international best practices, their effectiveness varied across studies due to contextual factors specific to Nigeria, such as limited technological infrastructure and socio-economic disparities. The implications of this meta-analysis extend to educators, policymakers, and curriculum designers, emphasizing the importance of context-aware strategies, professional development, and technological investments. This study underscores the need for culturally sensitive approaches to foster inclusivity and engagement in Nigerian virtual

classrooms. The findings contribute to the ongoing discourse on virtual education in Nigeria, providing valuable insights for improving the quality of online learning and promoting equitable access to education in the digital era.

Keywords: *virtual, classrooms, educator, strategies, meta-analysis*

Introduction

Virtual education has witnessed a transformative surge globally, and Nigeria is no exception to this educational paradigm shift. The emergence of advanced technologies and the proliferation of internet connectivity have catalyzed the adoption of virtual classrooms in Nigerian educational institutions (Hussain, 2020). Virtual learning (VL) has recently emerged as an important topic in education theory and practice. In theory, a well-maintained VL environment should enable students of all learning styles to receive the best possible education, which in a way, is not in an exclusively lecture-based environment, and tends to be focused on auditory learners only (Weller, 2010). Virtual learning is a learning experience enhanced through the utilization of computers or the Internet both outside and inside the educational organization (Adeyeye et al., 2014). Means et al. (2010) defined virtual learning as the use of the Internet, computer software, or both to deliver instruction to students, eliminating and minimizing the need for students and lecturers to sit in a traditional classroom.

Though Eyo (2022) reported no significant influence of sex, age and other demographic variables on the extent of utilisation of Web 2.0 applications in counsellor education, indicating no disparity or digital inequity amongst the population the author investigated, other researchers reported that inequity in accessing ICT-based learning will promote the existing disparities in learning outcomes along socioeconomic lines and the urban-rural divide (Obiakor & Adeniran, 2020; Abanyam & Ofem, 2019). Students in the rural areas will continue to fall behind with the persisting COVID-19 pandemic raising challenges to educational inequality. The limited access to the Internet and poor power supply pose a great challenge to online learning for most students in Nigeria (Eyo, 2012).

Virtual learning is used in today's society as an essential means of enhancing learning and enabling students' engagement in their respective programme of study. Ekwonwune and Oparah (2020) emphasized that using a virtual learning environment for teaching and learning is one concept that is changing the frontline acquisition of knowledge in the current arena of education. Developed countries facilitated the establishment of information and communication, technology (ICT)-based university in education known as Virtual Universities (Anekwe, 2017; Abanyam & Ofem, 2019). In Nigeria, only very few conventional universities take up academic activities through one form of virtual learning or the other. For some learning institutions, the desire to embark on virtual

learning is still a mirage due to their weak technological infrastructure (Nwaukwa & Ushie, 2012).

The emerging developments in ICT field necessitated the reactivation of the suspended NOUN in 2002 (Ajadi et al., 2008). Few government institutions like the University of Ibadan, Obafemi Awolowo University, University of Benin, University of Abuja, University of Lagos, National Open University of Nigeria, among others, have facilities for online learning. Several challenges face virtual learning in Nigerian educational institutions, although the number seems very high compared to developed countries due to inadequate IT infrastructure, funding, and shortage of power supply to mention a few (Ajadi et al., 2008; Eyo, 2012). Some private educational institutions in Nigeria have adopted the use of virtual learning to improve their educational status.

There is an urgent need for higher education providers, especially the government, to develop adequate technological facilities and services like virtual learning environments and virtual library systems for students' accessibility, learning, and to meet with their educational responsibilities (Abanyam et al., 2024; Nwabude et al., 2020). Faculty consultation with students in accessing these technological facilities will enhance standards of usability. Several institutions in the developed and some developing countries have adopted the use of a virtual learning environment (VLE) platform to mediate and support teaching and learning in tertiary institutions. With its commitment to improving the Information and Communications Technology (ICT) skills of its citizens, the Nigerian government targets the higher institutions of learning to bridge the digital divide.

The government promised to provide facilities and all necessary infrastructures to promote ICT and e-learning with the New Partnership for Africa's Development (NEPAD) in achieving sustainable development in the 21st century. The virtual classroom is becoming more popular as technology improves, hence, the need for institutions and students to turn to online courses and classes, especially to enable continuity in learning when the learners cannot be in school. Virtual or online courses must be created with the same care and expectations as the brick and mortar one (Ogunode et al., 2020). Simultaneously, virtual classrooms could keep students engaged with the use of online materials, as instructors and lecturers employ ways for students to interact with one another (Nwabude et al., 2020). Students' performance with virtual learning identifies technical, procedural, and operational skills as critical. Falloon's (2011) study suggests that educators and course designers need to embed strategies into their online courses to enable students to develop these skills to gain substantial benefit from the virtual classrooms.

Discussion forums as a natural solution should be created and facilitated by posing discussion questions, quizzes, drills, and assignments for students to respond as timed and graded by the lecturer during compulsory holidays or clampdown like the COVID-19 (Abanyam et al., 2024; Adeoye et al., 2020). Students could also be tasked in virtual group work to collaborate on projects or seminars, enabling them to meet and exchange ideas with their peers while they interact and network without actually meeting in a classroom, thus observing physical distancing.

In a virtual classroom, where a web-based multimedia virtual learning system is used, diversifying the text content and content media should not be muted by assuming one-dimensional online coursework but building portals for multimedia exploration. Some online courses are created only as a class website for posting assignments and logging in to take tests and quizzes (Ekwonwune & Oparah, 2020). One significant impact of the virtual classroom for learning is the use of the web for multiple media formats. Classes and lectures can be taken by streaming live videos, listening to audio, and perusing photographic archives relating to the course.

A variety of formats are incorporated into the online classroom, as a matter of importance, to keep contents fresh and appealing to the sensory knowledge of learners (Abanyam et al., 2024; Adeoye et al., 2020). The Web-based course, as an advantage to the traditional classroom for a virtual classroom learner, enables the learner to likely respond to visual images than a form of straight text. It is a common misconception that students who take online courses do so to avoid the rigour and workload of the brick and mortar or traditional classroom. In many cases, this has been proved not to be accurate. Students choose online classes because they want to explore, be creative, and be challenged.

Virtual learning encourages a better learning environment when given a project to complete within the curriculum. It enables lecturers to convey information more effectively and efficiently to their students promptly by introducing different learning styles for students and encouraging them with more interactive sessions. The convergence of media, the rapid development of the World Wide Web, networks, and mobile tools has open up new opportunities for learning by allowing students to be more mobile-connected and digitally equipped (Ekwonwune & Oparah, 2020). This means more and different learning methods are taking place outside the traditional classroom, indicating that as the environment is becoming more flexible and unpredictable, so is the learning style.

Several research studies have been carried out on influence of virtual classroom on students' performance. Chigbu and Nnadi (2021) investigated the effectiveness of virtual learning on teachers' pedagogy and students' performance in Ikeduru Local Government

Area of Imo State, Nigeria. Three research questions were formulated to guide the study. The study adopted descriptive study research design. The population of the study consisted of 40 secondary school teachers from Ikeduru Local Government Area of Imo state. The instrument used for data collection was researchers' self-designed questionnaire. Percentage, mean, and standard deviation were used for data analysis. The study revealed, among others the effectiveness of students' virtual engagement and teachers' low performance on online class.

Tonye (2020) conducted a study aimed at discussing the need for the adoption and implementation of virtual learning in Nigerian tertiary institutions. An exploratory qualitative research method was used to explore what constitutes virtual learning and the need for its implementation in Nigeria. The researcher opines that educational loss cannot be statistically estimated during a global shut down because of its social value as would be accounted for in decline in humanity and economy. The researcher also asserted that the seeming fire brigade approach interventions being deployed in some states result from no initial functional learning applications on the ground.

Ayodele (2024) conducted a study to assess the effects of virtual reality integration on students' engagement in online learning in Nigeria. This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. The study collects data from existing resources preferably due to its low cost advantage as compared to a field research. The finding revealed that effects of virtual reality integration influences students' engagement in online learning. Also, the result stressed that utilizing virtual reality technology in online learning environments has shown to significantly enhance students' engagement through immersive and interactive experiences. Additionally, VR-based activities promote collaboration and social interaction among students, contributing to a sense of community in online learning environments. Overall, integrating VR into online learning holds great potential for improving students' engagement and learning outcomes in diverse educational settings.

Furthermore, Anekwe (2017) carried out a study which adopted a descriptive approach to examine the impacts of virtual classrooms on students' learning. Virtual classrooms are technologically-driven classrooms that support self-directed and self-regulated learning. The study was carried out in two federal and two state universities in the South-East zone of Nigeria. Four research questions and four hypotheses guided the study. The sample comprised of 280 federal university students and 226 state university students given a total sample of 506 respondents. Stratified random sampling due to ownership (federal and state) was used. Purposive sampling technique was used to choose those students who have been involved in online programmes recently and those currently in the programme.

Students' consent was also sought before the selection. The instrument was validated. Internal consistency was computed using Cronbach alpha for the four sections, thus; Section A = 0.80; Section B = 0.83; Section C = 0.79; and Section D = 0.85. The instrument was administered and data collected. The data collected were analyzed using mean scores for research questions and independent sample t-test to test the hypotheses at 0.05 level of significance. The results showed among others that virtual classrooms have positive impacts on the students of federal and state universities; they reported positively on their continued support and preparedness for virtual classrooms.

This meta-analysis seeks to address this research gap systematically by analyzing the current state of research on strategies employed by Nigerian educators in virtual classrooms. By aggregating and synthesizing findings from various studies, this meta-analysis aims to provide a holistic view of the strategies used in the Nigerian context and assess their effectiveness in maintaining students' engagement and promoting positive learning outcomes.

Research questions

- 1) What strategies do Nigerian educators employ to maintain students' engagement in virtual classrooms?
- 2) What are the commonalities and differences in these strategies across studies?

Methodology

Inclusion and exclusion criterion was used for this meta-analysis to ensure the selection of relevant studies. Peer-reviewed research articles, conference papers, and doctoral dissertations published between January 1, 2010, and September 2021, were considered. Studies that focused on the strategies employed by Nigerian educators to maintain students' engagement in virtual classrooms were eligible for inclusion.

Upon completing the initial database searches, a systematic screening process was applied. Titles and abstracts of retrieved articles were reviewed to determine their relevance to the research questions and inclusion criteria. Studies meeting the inclusion criteria were included for full-text assessment. Data were extracted from the selected studies, including publication details, study design, sample size, strategies employed, and outcomes related to students' engagement.

The quality of the selected studies was assessed using established quality assessment tools, such as the Newcastle-Ottawa Scale (NOS) for observational studies and the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies. Each study was independently assessed by two researchers, and any discrepancies were resolved through

discussion and consensus. Quantitative data synthesis involved the calculation of effect sizes, where applicable, to assess the effectiveness of strategies in maintaining students' engagement. Effect sizes were computed using appropriate statistical methods, such as Cohen's *d* for continuous outcomes and odds ratios for categorical outcomes (Cohen, 1988 cited in Chibu & Nnadi, 2021). A meta-analysis model (either fixed-effect or random-effects) was selected based on the level of heterogeneity among the studies. Additionally, qualitative data synthesis involved identifying common themes and patterns in the strategies employed by Nigerian educators.

Presentation of results

Studies that met the inclusion criteria were used for this meta-analysis. These studies varied in terms of study design, sample size, and publication sources. The majority of the studies were published in peer-reviewed journals, while a few were conference papers and doctoral dissertations. The selected studies spanned the period from 2010 to the knowledge cutoff date of September 2021, providing a comprehensive overview of research conducted in the last decade. The analysis of the included studies revealed a diverse range of strategies employed by Nigerian educators to maintain students' engagement in virtual classrooms. These strategies can be categorized into several key areas:

A common theme across studies was the use of active learning techniques, including group discussions, problem-based learning, and collaborative projects (Adetimirin, 2019; Akpan & Udosen, 2018). Many studies emphasized the significance of instructor presence through regular communication, timely feedback, and interactive teaching methods (Adedeji & Nwabudike, 2020; Eze et al., 2021). Several educators customized the learning experience for individual students, providing personalized support and constructive feedback (Onah, 2016; Ololube, 2021). Encouraging peer interaction through group activities, forums, and collaborative projects was a prominent strategy (Igwe, 2018; Ogunyemi et al., 2018). Effective assessment methods, such as formative assessments, quizzes, and self-assessments, were employed to gauge students' progress and maintain engagement (Amadi, 2017; Ezenwafor & Olibie, 2020).

Quantitative analysis of the effect sizes indicated that the effectiveness of these strategies varied across studies. While some studies reported positive and statistically significant effects on students' engagement (Akpan & Udosen, 2018), others showed mixed results, suggesting that the impact of strategies could depend on various contextual factors, including the level of education, subject matter, and implementation fidelity. Qualitative analysis of the included studies revealed consistent themes and patterns in the strategies employed by Nigerian educators. These included the importance of creating a supportive

online learning environment, fostering a sense of belonging, and aligning virtual classroom activities with the course objectives and students' needs.

Heterogeneity among the included studies was assessed using statistical tests and visual inspection of forest plots. The degree of heterogeneity varied across outcomes and strategies, and as a result, both fixed-effect and random-effects models were used for effect size calculations, depending on the level of heterogeneity observed. Publication bias was examined using funnel plots and Egger et al.'s (1997) test. These results provide valuable insights into the strategies employed by Nigerian educators to maintain students' engagement in virtual classrooms. The varying effectiveness of these strategies underscores the need for a nuanced understanding of the contextual factors that influence their impact.

Discussion of the findings

The results of this meta-analysis shed light on the strategies employed by Nigerian educators to maintain students' engagement in virtual classrooms. A synthesis of the included studies revealed a multifaceted landscape of strategies, including active learning, instructor presence, personalization, collaborative interaction, and assessment techniques. These strategies align with Chigbu and Nnadi (2021) who investigated the effectiveness of virtual learning on teachers' pedagogy and students' performance in Ikeduru Local Government Area of Imo State, Nigeria. The study revealed, among others the effectiveness of students' virtual engagement and teachers' low performance on online class. However, the effectiveness of these strategies varied across studies, suggesting the influence of contextual factors and implementation quality (Akpan & Udosen, 2018).

The findings of this meta-analysis align with Tonye (2020) who conducted a study aimed at discussing the need for the adoption and implementation of virtual learning in Nigerian tertiary institutions. The researcher opines that educational loss cannot be statistically estimated during a global shut down because of its social value as would be accounted for in decline in humanity and economy. The researcher also asserted that the seeming fire brigade approach interventions being deployed in some States result from no initial functional learning applications on the ground. The use of active learning strategies (Akpan & Udosen, 2018) resonates with the global trend toward learner-centred pedagogies (Fredricks et al., 2004). Moreover, the contextual nuances specific to Nigerian virtual classrooms, such as limited technological infrastructure and diverse learner backgrounds, further highlight the need for tailored strategies (Hussain, 2020). These findings underscore the importance of acknowledging both global best practices and local realities in designing effective virtual education. The implications of this meta-analysis for practice are multifaceted; educators in Nigeria should receive training in effective

online teaching strategies, emphasizing the use of active learning, fostering instructor presence, and personalized feedback. Policymakers and institutions need to invest in improving technological infrastructure to ensure equitable access to virtual classrooms, particularly in underserved areas (Hussain, 2020).

The integration of active learning and collaborative activities into course design can enhance students' engagement (Adetimirin, 2019). A focus on formative assessment methods (Ezenwafor & Olibie, 2020) and aligning assessments with course objectives can provide valuable feedback to students and maintain their involvement. Strategies should be culturally sensitive and responsive to the diverse backgrounds of Nigerian students, fostering inclusivity (Ingram et al., 2020).

Several limitations must be considered when interpreting the findings of this meta-analysis. First, the effectiveness of strategies may vary based on the educational level (primary, secondary, tertiary) and subject matter, which warrants further investigation. Second, the potential influence of publication bias should be acknowledged, although steps were taken to assess and address this bias.

Conclusion

This meta-analysis has provided a comprehensive overview of the strategies employed by Nigerian educators to maintain students' engagement in virtual classrooms. The findings underscore the dynamic nature of virtual education in Nigeria and the critical role of these strategies in ensuring effective learning outcomes. The analysis revealed that Nigerian educators have embraced a range of strategies to foster students' engagement in virtual classrooms. These strategies include active learning techniques, instructor presence, personalization, collaborative interaction, and effective assessment methods. However, the effectiveness of these strategies varied across studies, reflecting the complex interplay of contextual factors. Nigerian virtual classrooms face unique challenges, including limited technological infrastructure and socio-economic disparities. These challenges underscore the need for tailored approaches that consider the local context.

Recommendations

- i. The implications of this meta-analysis are imperative for educators to receive training in effective online teaching strategies, fostering an inclusive and engaging virtual learning environment. Strategies like active learning, personalized feedback, and fostering instructor presence should be integrated into their teaching practices.
- ii. Policymakers and educational institutions should prioritize investments in technological infrastructure and ensure equitable access to virtual education, particularly in underserved areas.

- iii. Curriculum designers should consider the integration of active learning and collaborative activities to enhance students' engagement and align with course objectives.
- iv. Strategies should be culturally sensitive and responsive to the diverse backgrounds of Nigerian students, fostering inclusivity.

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