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Research Paper

Effect of Integrating WhatsApp into Open, Distance, and E-Learning: A Survey Approach

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Abstract: This study investigates the effect of integrating WhatsApp into open, distance, and e-learning (ODeL) at Ahmadu Bello University, Nigeria, during the 2023/2024 academic session. The research adopted a survey design involving 240 distance learning students and e-tutors. The study examined engagement levels, communication effectiveness, and learning outcomes resulting from WhatsApp integration. Findings reveal that WhatsApp significantly improved communication, collaboration, and student engagement, ultimately enhancing learning outcomes and motivation. By contextualising the study within Nigeria, this research highlights the platform's practical relevance for addressing infrastructural challenges and improving the quality of distance education in similar resource-constrained settings. These findings provide empirical evidence for the pedagogical value of WhatsApp in ODeL environments.

Keywords: WhatsApp, open, distance and e-learning, social media

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Introduction

In recent years, the education landscape has continued to undergo a profound transformation driven by technological advancements and the need for flexible learning solutions. Among these developments, open, distance, and e-learning (ODeL) has emerged as a critical approach for expanding access to education, especially in developing countries like Nigeria. Although various digital tools such as Facebook, Telegram, Google Classroom, and Zoom have been used to support ODeL, WhatsApp stands out due to its widespread adoption, low data consumption, ease of use, and ability to function effectively on mobile devices (Faizi et al., 2013; Ismail & Nasidi, 2018). These features make it a practical tool for learners in resource-constrained contexts, where internet bandwidth and access to advanced devices remain significant barriers.

Despite its immense potential, few empirical studies have rigorously examined the pedagogical implications of WhatsApp in ODeL, particularly in Nigeria, where infrastructural limitations and low digital literacy continue to hinder the full realisation of distance education (Gamji et al., 2022). Previous research has predominantly focused on general social media use in education rather than the targeted integration of WhatsApp as a learning tool. Furthermore, while some studies reported that WhatsApp facilitates communication and collaboration (Chaka, 2022), limited evidence exists on how it specifically enhances engagement and learning outcomes within ODeL settings. This gap underscores the need for research that not only explores its effectiveness, but also provides context-specific insights for educational policymakers and institutions in Nigeria.

This study therefore aims to achieve two critical objectives. First, it seeks to examine how digital tools particularly WhatsApp can be systematically integrated into ODeL practices to enhance learning experiences by investigating its effect on student engagement, communication effectiveness, and learning outcomes. Second, it aims to comprehensively analyse the pedagogical implications of using WhatsApp as a supplementary tool in ODeL through empirical data gathered from distance learning students and e-tutors at Ahmadu Bello University, Zaria, Nigeria. By doing so, this study will generate actionable insights into how WhatsApp can be leveraged, not merely as a communication tool but as a structured, pedagogically sound component of ODeL in Nigeria.

In Nigeria, the adoption of technology for ODeL has been both promising and challenging. Institutions such as the National Open University of Nigeria (NOUN) and distance learning centres in conventional universities, including Ahmadu Bello University, have increasingly turned to digital platforms to deliver education (Ndzinisa & Dlamini, 2022). However, issues such as limited internet infrastructure, high data costs, and insufficient training for both learners and instructors have restricted the effectiveness of these platforms (Bansal & Choudhary, 2024). Against this backdrop,

WhatsApp, with its familiarity and low entry barriers, provides a viable solution for improving interaction, engagement, and overall learning outcomes in ODeL. By contextualising this research within Nigeria's unique educational and technological landscape, this study provides evidence-based recommendations for integrating WhatsApp into ODeL environments to address both infrastructural and pedagogical gaps.

Literature Review

Open, Distance, and E-Learning (ODeL)

The concept of Open and Distance eLearning (ODeL) has significantly evolved over the past few decades, driven by advancements in technology and an increasing demand for flexible learning opportunities. Distance education began with correspondence courses, which laid the foundation for contemporary ODeL practices. Today, these practices encompass various digital technologies and instructional modalities, transforming education delivery and access (Betts et al., 2021). With the proliferation of internet connectivity and the development of online learning platforms, ODeL has become increasingly accessible to learners worldwide, transcending geographical and temporal barriers (Selwyn & Stirling, 2016). This evolution has been marked by a shift towards learner-centred pedagogies, emphasising active engagement, collaboration, and personalised learning experiences (Saiyad et al., 2020).

The Nigerian government has shown increasing support for ODeL through policy initiatives to expand access to education (Adeosun, 2010). For example, the National Policy on Education (NPE) emphasises using distance education to reach underserved populations. The National Universities Commission (NUC) has also developed guidelines and accreditation processes for open and distance learning institutions, ensuring quality standards are maintained (Ndzinisa & Dlamini, 2022).

ODeL's development reflects a broader trend towards using technology to enhance education. The internet and digital communication tools have revolutionised how information is shared and consumed, making education more accessible and flexible than ever before. These technological advancements have facilitated the growth of ODeL by providing a platform for delivering educational content to a global audience. As a result, learners can access a wealth of resources and learning opportunities from anywhere in the world, breaking down the barriers that traditionally limited access to education.

In Nigeria, the roots of distance education can be traced back to the 1960s with the establishment of the National Teachers' Institute (NTI) and the University of Ibadan's Department of Adult Education, which offered correspondence courses (Nakpodia, 2010). These early initiatives laid the groundwork for the development of ODeL in Nigeria, setting the stage for more advanced and comprehensive programs.

In 1983, the National Open University of Nigeria (NOUN) was established to provide open and distance learning opportunities at the tertiary level. However, it faced challenges, including limited resources and political instability, which led to its closure in 1984 (Ajadi et al., 2008). Despite these initial setbacks, the demand for flexible learning opportunities persisted, leading to the re-establishment of NOUN in 2002.

Since its re-establishment, NOUN has played a pivotal role in expanding access to higher education in Nigeria. It has embraced digital technologies to enhance its educational offerings and reach a broader audience. By leveraging the internet and digital platforms, NOUN has provided various courses and programs to learners across Nigeria, including those in remote and underserved areas. This has contributed to a more inclusive and equitable education system, allowing individuals from diverse backgrounds to pursue educational goals.

The Nigerian government has also shown increasing support for ODeL through policy initiatives to expand access to education. For example, the National Policy on Education (NPE) emphasises using distance education to reach underserved populations. This policy reflects the government's recognition of the potential of ODeL to address educational disparities and promote social inclusion. By prioritising ODeL, the government aims to provide educational opportunities to those who may not have access to traditional forms of education.

To ensure the quality and credibility of ODeL programs, the National Universities Commission (NUC) has developed guidelines and accreditation processes specific to open and distance learning institutions. These guidelines help maintain quality standards and ensure that ODeL programs are on par with traditional education. By establishing clear criteria for accreditation, the NUC promotes accountability and transparency in the delivery of ODeL, enhancing the credibility of these programs in the eyes of learners, employers, and the wider community.

The evolution of ODeL in Nigeria and beyond is not without its challenges. While technology has made education more accessible, it has also introduced new obstacles that must be addressed. For instance, digital literacy remains a significant barrier for many learners, particularly those in rural areas (Choudhary & Bansal, 2022). Additionally, the digital divide, characterised by disparities in access to technology and internet connectivity, poses a challenge to the widespread adoption of ODeL. To overcome these barriers, policymakers and educators must work together to develop strategies to address these issues and promote inclusive access to ODeL.

Lastly, the evolution of Open and Distance eLearning (ODeL) has been marked by significant technological advancements and a growing recognition of the need for flexible learning opportunities. ODeL has transformed the educational landscape by making learning more accessible, inclusive, and learner-centred. In Nigeria, the development of ODeL has been supported by government policies and initiatives that

aim to expand access to education and promote social inclusion. While challenges remain, the continued growth and development of ODeL hold great potential for shaping the future of education and empowering learners worldwide. As technology continues to evolve, so will the opportunities for ODeL to innovate and enhance the educational experience for learners across the globe.

Role of Technology in Enhancing ODeL

Technology is central in facilitating the delivery and administration of ODeL programs, offering many tools and platforms to support teaching and learning activities. Virtual learning environments (VLEs), such as Moodle, Blackboard, and Canvas, provide comprehensive frameworks for course management, content delivery, and online assessment. These platforms allow educators to organise course materials, create interactive assignments, and monitor student progress efficiently. VLEs offer functionalities such as discussion boards, quizzes, and feedback tools, which enhance the learning experience by enabling seamless communication between instructors and learners. By integrating learning analytics, VLEs can offer insights into student engagement and performance, allowing educators to tailor their teaching strategies to meet individual needs better (Nwabude et al., 2020).

Similarly, video conferencing tools, such as Zoom, Microsoft Teams, and Google Meet, have revolutionised how educators and students interact, providing opportunities for live lectures, virtual office hours, and collaborative projects. These tools facilitate real-time communication and enable learners to engage in synchronous learning experiences that mimic the interactivity of a physical classroom (Manji et al., 2021; Mols & Pridmore, 2021; Nasidi et al., 2022). Discussion forums, chat platforms, and social media integration further enrich the learning experience by fostering collaboration and community-building among learners and instructors. Such technologies break down geographical barriers, enabling students from diverse backgrounds to participate in a global educational community (Sneha & Nagaraja, 2014). Integrating technology into ODeL practices has expanded access to education and opened up new possibilities for innovative instructional approaches and pedagogical strategies (Hantoobi et al., 2021).

Technology has democratised education by providing learners with unparalleled access to educational resources (Ionescu et al., 2020). Through online platforms, learners can engage in learning activities anytime, anywhere, breaking free from the constraints of traditional classroom settings. This flexibility accommodates diverse learning styles and caters to the needs of non-traditional students, such as working professionals and individuals with familial responsibilities. However, technological tools enable seamless communication and collaboration among learners, educators, and peers. Discussion forums, video conferencing, and messaging applications foster an interactive learning environment where participants can exchange ideas, share

resources, and engage in meaningful discourse (Ionescu et al., 2020). This promotes active learning and cultivates a sense of community despite physical distances.

Technology also enables the creation and delivery of multimedia-rich educational content, encompassing text, images, videos, simulations, and interactive exercises (Kekkonen–Moneta & Moneta, 2002). This diverse array of multimedia resources caters to different learning modalities, enhancing comprehension and retention. Visualisations and simulations, in particular, facilitate experiential learning, enabling learners to explore complex concepts in immersive virtual environments. Digital assessment tools streamline the evaluation process, offering diverse assessment formats such as quizzes, essays, and interactive assignments. Automated grading features expedite feedback delivery, providing learners with timely insights into their progress and areas for improvement. Additionally, technology facilitates peer assessment and collaborative feedback mechanisms, fostering a culture of continuous learning and refinement. Effective implementation of ODeL relies on robust technological infrastructure and comprehensive technical support services (Legris et al., 2003).

Integrating WhatsApp into Open, Distance, and E-Learning

WhatsApp has become a popular tool for communication and collaboration among students and instructors (Al-Rahmi et al., 2019). Its mobile-friendly interface, real-time messaging capabilities, and multimedia-sharing functionalities make it an attractive option for facilitating asynchronous communication and informal learning activities (Alyoussef et al., 2019). Studies have documented various uses of WhatsApp in educational settings, including group discussions, peer support, feedback exchange, and assignment coordination (Alenazy et al., 2019; Chan et al., 2020). However, the integration of WhatsApp into formal educational contexts poses challenges related to privacy, security, and management of communication channels (Ajani & Khoalenyane, 2023).

Integrating WhatsApp into open, distance, and e-learning environments can significantly enhance students' and educators' communication, collaboration, and learning experiences. WhatsApp enables real-time communication through instant messaging, voice calls, and video calls. Students can reach out to instructors or peers for immediate clarification on course content or assignments (Zarouali et al., 2021). Educators can utilise WhatsApp to deliver course materials, such as PDFs, videos, audio clips, and links to online resources. Further, sending bite-sized learning materials or daily reminders can help keep students engaged and on track with their studies.

WhatsApp chats facilitate peer-to-peer learning and collaboration (Vogiatzis et al., 2022). Instructors can create groups for each course or topic, where students can ask questions, discuss concepts, and share resources. Group discussions foster a sense of community among learners, promoting active participation and knowledge sharing. WhatsApp can also be used for students to submit assignments, projects, or

assessments. Instructors can provide timely feedback, grades, and comments through private messages or group chats. Multimedia features allow for richer feedback, including voice notes or annotated images. Further, WhatsApp is an effective channel for sending announcements, reminders, and important updates (Henry et al., 2016). Instructors can notify students about upcoming deadlines, class schedule changes, or relevant events.

In addition, WhatsApp can be used by students to submit assignments, projects, or assessments. Instructors can provide timely feedback, grades, and comments through private messages or group chats (Soria et al., 2020). This immediacy in communication ensures that students receive constructive feedback promptly, which is crucial for their learning and improvement. The platform's multimedia features allow for richer feedback, including voice notes or annotated images (Oriji & Anikpo, 2019). This can be particularly beneficial for subjects that require detailed explanations or visual demonstrations. For example, in language courses, instructors can provide pronunciation corrections through voice messages, while in art courses, they can use annotated images to highlight areas for improvement.

WhatsApp is an effective channel for sending announcements, reminders, and important updates (Henry et al., 2016). Instructors can notify students about upcoming deadlines, class schedule changes, or relevant events. This ensures that all students receive the same information simultaneously, reducing the likelihood of miscommunication and ensuring everyone is aware of important updates. The platform's broadcast features allow instructors to send messages to multiple students without creating a group, preserving privacy while ensuring efficient communication. This is particularly useful for sending out reminders about upcoming exams, project deadlines, or any changes in the course schedule.

Empirical Review

Integrating WhatsApp in open, distance and e-learning environments has significantly enhanced student learning experiences. WhatsApp and other instant messaging applications provide asynchronous and synchronous communication opportunities, facilitating interactions between instructors and students (Chaka et al., 2020). It allows for the exchange of text, audio, and video, overcoming challenges related to high internet costs and limited infrastructure in developing countries (Zhakata, 2022). Additionally, using ICT platforms like WhatsApp has been instrumental in expanding access to higher education for students from rural or disadvantaged backgrounds, bridging socioeconomic gaps in countries like South Africa (Venturino & Hsu, 2022). Furthermore, integrating open and distance learning concepts, including WhatsApp, has improved educational outcomes and empowered marginalised groups, such as women in the Maasai community in Kenya (Njoki et al., 2023).

Al Ghaithi et al. (2024) examined the study of English with the WhatsApp bot. Using a random sampling, 150 Omani students were chosen to study English as a foreign language (EFL) at three distinct competency levels. The efficacy of the therapy was assessed using post-tests, delayed post-tests, and pretests. Learners' attitudes on the employment of the WhatsApp bot in the learning process were also ascertained through the administration of a TAM 2 extended questionnaire. According to the study's findings, the WhatsApp bot functions effectively and practically on each of the three levels. Pre-intermediate pupils did not exhibit a significant difference between the two terms, despite experimental groups using WhatsApp bots at the elementary and intermediate levels demonstrating substantial differences from the usual face-to-face sessions.

Theoretical Framework

The Technology Acceptance Model (TAM) underpinned this study. TAM, developed by Fred Davis in 1986, is a widely used theoretical framework that explains how individuals come to accept and use new technologies. The model is based on two primary constructs: perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their performance, while perceived ease of use refers to the extent to which a person believes that using the technology will be free from effort. These two perceptions influence a user's attitude towards a technology, which subsequently affects their intention to use it and eventually their actual usage behaviour.

In the context of this study, which investigated the integration of WhatsApp in Open, Distance, and e-Learning (ODeL) environments at Ahmadu Bello University, Zaria, Nigeria, TAM provided a useful lens for interpreting how students and instructors adopted the platform for academic purposes. WhatsApp was found to be both useful and easy to use, particularly in overcoming challenges related to limited internet access, high data costs, and the lack of formal learning management systems in resource-constrained settings. Respondents reported that the application enhanced communication with instructors and peers, facilitated timely feedback, and improved engagement and learning outcomes. These findings align closely with the constructs of TAM, suggesting that users' positive perceptions of WhatsApp's affordances, including functionality and usability, directly influenced their willingness to adopt it for learning purposes.

Furthermore, the study revealed that both students and instructors exhibited favourable attitudes toward the continued use of WhatsApp in their academic interactions. This reinforces TAM's proposition that behavioural intention to use a technology is shaped by the belief that it is effective and convenient. By confirming that WhatsApp is not only accessible but also improves the quality of the

learning experience, this study demonstrates the relevance of TAM in understanding technology adoption in educational settings. Overall, TAM served as a valuable theoretical foundation for analysing how digital communication tools like WhatsApp can be successfully integrated into ODeL practices, particularly in developing country contexts where traditional e-learning platforms may be less feasible.

Methodology

This study employed a survey research design because it allows the collection of quantitative data from a large population in a cost-effective and efficient manner. A survey was deemed suitable for examining students' and instructors' perceptions of WhatsApp's impact on engagement, communication, and learning outcomes within an Open, Distance, and e-Learning (ODeL) environment. Survey has been widely applied for technology-in-education studies as it enables the identification of measurable relationships between variables (Creswell & Creswell, 2018). The study population comprised distance learning students and e-tutors from Ahmadu Bello University (ABU), Zaria, Nigeria. The name of the university was used with institutional consent, while all the respondents' data were anonymised to ensure confidentiality. The sample size was determined using the Krejcie and Morgan (1970) table, which provides a statistical method for calculating sample size based on the desired confidence level (95%) and margin of error (5%). According to the table, a minimum of 270 respondents was required. To address potential non-responses, the sample size was increased by 10%, resulting in 297 distributed questionnaires.

A structured questionnaire was used for data collection. In total, the questionnaire comprised 13 items, measured using a 5-point Likert scale ranging from "Strongly Disagree (1)" to "Strongly Agree (5)." The items were adapted from validated instruments used in previous studies (e.g., Al-Rahmi et al., 2019; Chaka et al., 2020) and refined with input from two e-learning experts and one research methodology expert to ensure content validity. Ethical approval was obtained from the appropriate research ethics committee. Participation was voluntary, and informed consent was obtained from all respondents. The anonymity of respondents was guaranteed, and their responses were treated with strict confidentiality. The mention of Ahmadu Bello University in this study was approved institutionally and used only for contextual relevance. Out of 297 questionnaires distributed, 240 valid responses were retrieved, representing a 80.81% response rate. Data were analysed using Statistical Package for Social Sciences (SPSS) to generate descriptive statistics and perform inferential analysis. This methodological approach ensured the validity, reliability, and ethical soundness of the study while providing a clear framework to assess the pedagogical impact of WhatsApp on ODeL in Nigeria.

Validity and Reliability

Table 1 illustrates that the Cronbach's alpha values meet the threshold of 0.7. This means the three constructs in this study demonstrated high-reliability coefficient values.

Table 1. Reliability statistics for the constructs

Variable	Cronbach's Alpha (n=100)	Number of Items
Engagement Level	.888	4
Communication Effectiveness	.870	5
Learning Outcome	.937	4

Findings

This study examined three key constructs: engagement level, communication effectiveness, and learning outcomes. Each construct was measured using multiple questionnaire items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The engagement level construct consisted of four items assessing the extent to which WhatsApp enhanced student participation, collaboration, and interaction in ODeL.

Table 2. Responses for engagement level (n = 240)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
WhatsApp increased my participation in class discussions.	6 (2.5%)	12 (5.0%)	35 (14.6%)	35 (14.6%)	35 (14.6%)
WhatsApp helped me interact more with my peers.	4 (1.7%)	11 (4.6%)	32 (13.3%)	32 (13.3%)	32 (13.3%)
WhatsApp encouraged group collaboration on assignments.	2 (0.8%)	10 (4.2%)	37 (15.4%)	37 (15.4%)	37 (15.4%)
WhatsApp improved my overall learning engagement.	2 (0.8%)	7 (2.9%)	36 (15.0%)	36 (15.0%)	36 (15.0%)

The findings in Table 2 reveal that the majority of respondents perceived WhatsApp as a valuable tool for enhancing student engagement in Open, Distance, and e-Learning (ODeL). Across all four items, class participation, peer interaction, group collaboration, and overall learning engagement, over 77% of respondents agreed or strongly agreed with the positive statements. The highest level of agreement (81.3%) was recorded for improved overall engagement, while the lowest (77.9%) still reflected a strong support for increased participation in discussions. Minimal

levels of disagreement and neutrality further reinforce the conclusion that WhatsApp significantly contributed to fostering active and collaborative learning among distance learners.

Communication Effectiveness

The communication effectiveness construct comprised five items evaluating how WhatsApp facilitated timely, clear, and efficient interaction between students and instructors.

Table 3. Responses for communication effectiveness (n = 240)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
WhatsApp enabled faster communication with instructors.	4 (1.7%)	6 (2.5%)	18 (7.5%)	80 (33.3%)	132 (55.0%)
WhatsApp improved clarity in instructions and feedback.	3 (1.3%)	8 (3.3%)	20 (8.3%)	85 (35.4%)	124 (51.7%)
WhatsApp allowed timely feedback on assignments.	4 (1.7%)	7 (2.9%)	19 (7.9%)	90 (37.5%)	120 (50.0%)
WhatsApp made it easier to share course materials.	2 (0.8%)	5 (2.1%)	15 (6.3%)	92 (38.3%)	126 (52.5%)
WhatsApp improved overall communication with peers.	3 (1.3%)	6 (2.5%)	17 (7.1%)	88 (36.7%)	126 (52.5%)

The results in Table 3 indicate that respondents overwhelmingly agreed that WhatsApp is effective for enhancing communication within the ODeL environment. Across all five items, faster communication with instructors, clarity in feedback, timely responses, ease of sharing materials, and improved peer interaction, more than 85% of respondents either agreed or strongly agreed. Notably, 88.3% of respondents affirmed that WhatsApp enabled faster communication with instructors, while 87.1% acknowledged improved clarity in instructional communication. Similarly, 87.5% and 90.8% agreed that the platform facilitated timely feedback and easier sharing of materials, respectively. Minimal disagreement (ranging from 2% to 5%) and low neutrality levels suggest that respondents consistently perceived WhatsApp as a reliable, responsive, and user-friendly tool for academic communication.

Learning Outcomes

The learning outcomes construct contained four items assessing whether WhatsApp integration improved students' understanding, performance, and motivation.

Table 4. Responses for learning outcomes (n = 240)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
WhatsApp improved my understanding of course content.	0 (0%)	6 (2.5%)	25 (10.4%)	105 (43.8%)	104 (43.3%)
WhatsApp increased my motivation to learn.	0 (0%)	7 (2.9%)	28 (11.7%)	101 (42.1%)	104 (43.3%)
WhatsApp enhanced my ability to complete assignments.	0 (0%)	8 (3.3%)	30 (12.5%)	97 (40.4%)	105 (43.8%)
WhatsApp contributed to better academic performance.	0 (0%)	9 (3.8%)	27 (11.3%)	98 (40.8%)	106 (44.2%)

The findings in Table 4 demonstrate that respondents perceived WhatsApp as having a strong positive impact on their learning outcomes within the ODeL context. For all four items, understanding of course content, motivation to learn, ability to complete assignments, and academic performance, over 84% of respondents either agreed or strongly agreed. Specifically, 87.1% of respondents reported improved understanding of course content, while 85.4% acknowledged increased motivation to learn. Additionally, 84.2% indicated enhanced ability to complete assignments, and 85% attributed better academic performance to WhatsApp use. Notably, there were no instances of strong disagreement across any item, and disagreement levels remained below 4%. These results suggest that WhatsApp played a significant role in supporting students' academic progress and fostering meaningful learning experiences in a distance learning environment.

Discussion

The findings of this study reveal that WhatsApp played a significant role in enhancing student engagement, communication effectiveness, and learning outcomes in the Open, Distance, and e-Learning (ODeL) environment at Ahmadu Bello University, Zaria Nigeria. These results are consistent with a growing body of literature that emphasizes the educational benefits of mobile instant messaging platforms in resource-constrained settings (Chaka et al., 2020; Zhakata, 2022).

The high level of agreement across all items in the engagement construct suggests that WhatsApp fosters active participation, peer collaboration, and overall learning involvement. This aligns with the findings of (Shakil et al., 2024), who reported that WhatsApp facilitates ongoing interaction and creates a sense of connectedness among distance learners. Similarly, Ramasamy and Lee (2022) found that WhatsApp groups increase student motivation and participation in collaborative tasks. In this study, WhatsApp served not only as a social tool but as a practical learning aid

that allowed learners to interact beyond scheduled online sessions, reinforcing the collaborative learning aspect of the constructivist theory.

In terms of communication effectiveness, respondents overwhelmingly agreed that WhatsApp enabled faster communication with instructors, improved clarity in feedback, and facilitated the timely sharing of materials. These findings mirror those of Bere (2013) who observed that WhatsApp improves academic interactions, particularly in contexts with limited access to formal learning management systems. The real-time nature of WhatsApp enables prompt feedback and informal support, which are vital in ODeL systems where learners often feel isolated. This communication efficiency is closely linked to the perceived usefulness construct of the Technology Acceptance Model (TAM), which posits that users are more likely to adopt technologies they find beneficial in completing tasks.

Moreover, the results indicate strong perceived learning outcomes, with over 85% of respondents reporting improvements in understanding, motivation, assignment completion, and academic performance. These outcomes support the conclusions drawn by Al-Rahmi et al. (2020), who emphasized the potential of social media tools to enhance academic performance in blended learning environments. The findings also reinforce Chaka and Govender's (2017) findings, which highlighted WhatsApp's effectiveness in promoting learner autonomy and content mastery in open learning settings.

Conclusion and Contributions

This study critically examined the effect of integrating WhatsApp into Open, Distance, and e-Learning (ODeL) environments at Ahmadu Bello University, Nigeria. Drawing on data from 240 distance learning students and instructors, the research provided empirical evidence that demonstrate WhatsApp significantly enhances three key aspects of the learning experience: student engagement, communication effectiveness, and learning outcomes.

The findings affirm that WhatsApp's affordability, accessibility, and familiarity make it an effective tool for improving educational delivery in developing contexts where advanced learning management systems may be limited by infrastructure or digital literacy challenges. Most respondents reported increased interaction with peers and tutors, faster feedback cycles, improved understanding of course content, and a stronger sense of academic motivation, all of which align with the principles of the Technology Acceptance Model (TAM) that underpin this study.

This study extends the application of TAM by demonstrating how WhatsApp can be systematically and pedagogically integrated into formal learning processes, and not just used informally as a means to enhance learning in ODeL environments. Unlike previous studies that largely focused on qualitative insights or anecdotal evidence, this research employed a quantitative survey design to assess the real-world

impact of WhatsApp across measurable constructs. It also addresses the scarcity of empirical research in the Nigerian ODeL context. The study provides a structured framework for integrating WhatsApp into distance education settings. It highlights the need for clear group protocols, moderator roles, and tailored instructional strategies to overcome challenges such as information overload and lack of structure in WhatsApp-based learning. Conducted in Nigeria, a country with significant digital infrastructure challenges, the findings offer valuable insights for educators and policymakers in similar developing regions seeking low-cost, high-impact solutions for improving the quality of distance learning.

Recommendations and Future Research

Based on the findings of this study, several recommendations are offered to enhance the effective integration of WhatsApp and similar digital tools in Open, Distance, and e-Learning (ODeL) environments. Since WhatsApp was found to improve communication, engagement, and learning outcomes, institutions should move beyond informal use and develop formal instructional guidelines for WhatsApp usage in course delivery. This includes setting rules for group discussions, assigning moderators, and aligning WhatsApp interactions with course objectives. The study reveals that increased interaction and timely feedback were linked to the effective use of WhatsApp. Therefore, institutions should provide training workshops for instructors and students on best practices for using instant messaging tools in educational settings, with an emphasis on professional boundaries, privacy, and digital etiquette.

Although WhatsApp offers accessibility advantages, its limitations (e.g., lack of content organisation and archiving features) remains a concern. As such, institutions should consider blending WhatsApp with more structured platforms like Moodle or Google Classroom to balance flexibility with instructional rigor. Policymakers in higher education should develop policies that support the use of mobile-based messaging apps for academic purposes, especially in rural or underserved areas. These policies should include considerations for data protection, communication ethics, and content moderation. Since WhatsApp was found to perform well despite infrastructural limitations, governments and institutions should prioritise low-data educational technologies in national digital education strategies, ensuring inclusivity and access for students in bandwidth-constrained regions.

To build on the contributions of this study, the following directions are recommended for future research. Future research could explore comparisons between WhatsApp and other social learning platforms such as Telegram, Signal, or Microsoft Teams, especially in terms of pedagogy, usability, and learning outcomes. This study captured perceptions at one point in time. Future work could adopt a longitudinal

design to assess how sustained WhatsApp use affects academic performance and learner retention over time. Lastly, although this study used a quantitative design, qualitative methods such as interviews or focus groups may provide deeper insights into how learners experience WhatsApp-mediated instruction, including emotional, cognitive, and social dimensions.

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