

Leveraging chatbot applications to enhance English language learning in Nigerian secondary schools

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ABSTRACT

This study explores the potential of chatbot applications to enhance English language learning in Nigerian secondary schools, motivated by the ongoing challenges in achieving high English proficiency using traditional methods. The purpose of the study was to assess the current level of English proficiency among students, evaluate the effectiveness of chatbot applications, understand user perceptions, and identify implementation challenges. A quantitative research design was employed, involving 150 students from three international schools, selected through stratified random sampling. Data were collected using a structured questionnaire and analyzed using descriptive and inferential statistics, along with thematic analysis for qualitative insights. The study revealed varied levels of English proficiency among students' general positive perceptions of chatbot applications as effective tools for learning English; significant technical and accessibility challenges, such as poor internet connectivity and limited device availability; and the necessity of comprehensive training for both students and teachers to maximize the benefits of chatbot applications. The study concludes that while chatbot applications have considerable potential to improve English language skills, addressing the identified challenges is crucial. Recommendations included enhancing infrastructure, providing comprehensive training, and improving the software and user interface of chatbot applications to maximize their educational benefits. These insights aim to inform educators, policymakers, and technology developers on optimizing the use of chatbot applications in language education.

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INTRODUCTION

In today's globalized society, the ability to communicate in multiple languages has become increasingly essential. As borders blur and economies intertwine, individuals who possess proficiency in second languages gain a competitive edge in various professional, academic, and social spheres. According to recent statistics, over 1.5 billion people worldwide are currently learning a second language, reflecting the growing recognition of its importance in an interconnected world (Aristovnik, 2014; Kachlicka et al., 2019). As such, the pursuit of second language acquisition has evolved from being merely advantageous to becoming almost indispensable for success and mobility in a multicultural setting (Antón-Solanas et al., 2020; Bayyurt et al., 2019; Steele et al., 2017).

Amidst this growing demand for language skills, technology has emerged as a powerful ally in facilitating language learning. With the rapid advancement of digital tools and platforms, learners now have access to a wide array of resources and methodologies tailored to their individual needs and preferences (Jegede, 2022; Sadeghi, 2019). Among these technological innovations, chatbot applications have garnered significant attention for their potential to revolutionize language learning experiences (Huang, et al., 2022; Kohnke et al., 2023). By simulating real-life conversations and providing instant feedback, chatbots offer learners the opportunity to engage in immersive language practice without the constraints of time or location (Fonseca & Peralta, 2019). Furthermore, chatbots can adapt to learners' proficiency levels and learning pace, offering personalized learning experiences that traditional classroom settings often struggle to provide (Alabbas & Alomar, 2024; Kuhail et al., 2023; Qin, 2024; Tan, 2024).

English language proficiency is a crucial component of educational development and global competitiveness, particularly in multilingual countries like Nigeria. As the official language and the primary medium of instruction in Nigerian secondary schools, English proficiency is essential for academic success and future career opportunities (Ayeni, 2020; Rudd, 2019; Tom-Lawyer et al., 2021). However, many students struggle with achieving a high level of proficiency in English due to various challenges, including inadequate instructional methods and limited access to quality educational resources. Traditional teaching methods often fall short in engaging students and addressing their individual learning needs (Freeman et al., 2014; Kim, 2023; Muhammed, 2014). In this context, innovative solutions such as chatbot applications offer a promising alternative to enhance English language learning. These applications leverage artificial intelligence to provide interactive, personalized, and accessible learning experiences. Despite their potential, there is limited research on their effectiveness and implementation in the Nigerian educational system, creating a significant research gap.

This study aims to address this gap by exploring the current level of English language proficiency among Nigerian secondary school students, assessing the effectiveness of chatbot applications in improving English language skills, and understanding the perceptions of students and teachers towards these technological tools. Additionally, the study will identify the challenges faced in implementing chatbot applications for English language learning in Nigerian secondary schools. By addressing these research questions, this study seeks to provide a comprehensive evaluation of chatbot applications as a supplementary tool for English language education. The findings will offer valuable insights into how these applications can be optimized and effectively integrated into the existing educational framework.

The research questions guiding this study are as follows: 1) What is the current level of English language proficiency among Nigerian secondary school students? (2) How effective are chatbot applications in improving English language skills in Nigerian secondary schools? (3) What are the perceptions of students and teachers towards the use of chatbot applications for English language learning? (4) What are the challenges faced in implementing chatbot applications for English language learning in Nigerian secondary schools?

These questions are critical for understanding the broader context of English language education in Nigeria and the potential role of chatbot applications in enhancing learning outcomes. The first question seeks to establish a baseline of English language proficiency among students, which is essential for evaluating the impact of any new educational intervention. The second question focuses on the practical effectiveness of chatbot applications, considering their ability to improve various language skills such as reading, writing, speaking, and listening. The third question explores the subjective experiences and attitudes of students and teachers, which can influence the adoption and success of these technological tools. Finally, the fourth question addresses the practical and logistical challenges that may hinder the implementation of chatbot applications,

providing a comprehensive understanding of the barriers to their effective use.

The significance of this study lies in its potential to contribute to the ongoing efforts to improve English language education in Nigeria. By evaluating the effectiveness and challenges of chatbot applications, this research can inform policymakers, educators, and technology developers about the best practices for integrating these tools into the curriculum. The study's findings could lead to more targeted and effective interventions, ultimately enhancing the quality of English language education and helping students achieve higher proficiency levels. Furthermore, this research can serve as a model for other multilingual and resource-constrained contexts, demonstrating how innovative technological solutions can address educational challenges and promote equitable access to quality education.

METHODS

Research Design

This study employs a quantitative research design to evaluate the effectiveness and challenges of using chatbot applications for English language learning among Nigerian secondary school students. The sample consists of 150 students selected from three international schools in Nigeria, with 50 students from each school. A stratified random sampling technique ensures a representative sample across different grades and proficiency levels. The selection criterion includes students actively using chatbot applications for English learning and those with varying levels of English proficiency to capture a broad spectrum of experiences and outcomes.

Research Instrument

The primary research instrument is a structured questionnaire designed to gather data on English language proficiency, the effectiveness of chatbot applications, user perceptions, and implementation challenges. The questionnaire comprises both closed-ended questions, for quantitative analysis, and open-ended questions, for qualitative insights. Data collection involves administering the questionnaire to the selected students during school hours, ensuring high response rates and minimizing disruptions to their learning schedules. Data analysis procedures include descriptive statistics to summarize the levels of English proficiency and perceptions, and inferential statistics to assess the effectiveness of chatbot applications. Additionally, thematic analysis is employed to interpret the qualitative responses, providing a comprehensive understanding of the challenges faced in implementing chatbot applications. This mixed-method approach ensures robust and detailed findings, offering valuable insights for educators, policymakers, and technology developers aiming to enhance English language education in Nigerian secondary schools.

RESULTS AND DISCUSSION

The results of this study provide a comprehensive overview of the current state and potential impact of chatbot applications on English language learning in Nigerian secondary schools. Data were collected from 150 students across three international schools, offering diverse insights into their English proficiency levels, experiences with chatbot applications, and the challenges encountered. The analysis of the questionnaire responses highlights key findings regarding the effectiveness, user perceptions, and technical obstacles associated with these educational tools. The following sections detail the major findings of the study, illustrating the different nature of implementing chatbot applications in the educational context.

Research Question 1: What is the current level of English language proficiency among Nigerian secondary school students?

Questionnaire Item 1: How would you rate your proficiency in English language skills (reading, writing, speaking, and listening)?

Table 1: Self-Reported Proficiency in English Language Skills among Nigerian Secondary School Students

Proficiency Level	Number of Students	Percentage (%)
Very Poor	15	10%
Poor	30	20%
Average	60	40%
Good	35	23.3%
Excellent	10	6.7%
Total	150	100%

In table 1, the results indicated a varied distribution of proficiency levels. A minority of 15 students (10%) rated their proficiency as very poor, reflecting significant challenges in their English language skills. A larger group, 30 students (20%), rated their proficiency as poor, indicating some difficulties but slightly better performance compared to the very poor category. The most common response was average proficiency, with 60 students (40%) falling into this category. This suggests that while these students have a basic functional ability in English, there is considerable room for improvement. A notable 23.3% (35 students) rated their skills as good, showing a higher level of competence and confidence in their English abilities. Finally, a small group of 10 students (6.7%) rated their proficiency as excellent, demonstrating a strong command of English across reading, writing, speaking, and listening. These results highlight the diverse range of English language proficiency levels among secondary school students in Nigeria, emphasizing the need for targeted educational interventions to raise overall proficiency. The significant percentage of students rating their skills as average or lower indicates a critical area for development to ensure better academic performance and future opportunities for these students.

Questionnaire Item 2: How often do you use English in your daily conversations outside of school? Never Rarely Sometimes Often Always

Table 2: Frequency of English Use in Daily Conversations Outside of School among Nigerian Secondary School Students

Frequency of Use	Number of Students	Percentage (%)
Never	10	6.7%
Rarely	25	16.7%
Sometimes	50	33.3%
Often	40	26.7%
Always	25	16.7%
Total	150	100%

Table 2 reveals a spectrum of English usage, with a small segment of 10 students (6.7%) indicating that they never use English outside of the classroom. A slightly larger group of 25 students (16.7%) reported that they rarely use English in their daily interactions. This suggests limited exposure and practice, potentially impacting their proficiency. A significant portion, 50 students (33.3%), mentioned using English sometimes, indicating a moderate level of engagement with the language in their everyday lives. Meanwhile, 40 students (26.7%) stated that they often use English in their conversations, reflecting a more frequent application of their language skills. Another 25 students (16.7%) reported always using English outside of school, demonstrating a high level of comfort and proficiency with the language. These findings highlight the varying degrees of English language use among students, which can influence their overall language development.

The substantial number of students using English sometimes, often, or always suggests that a significant portion of students are integrating English into their daily lives to varying extents, potentially aiding their language acquisition and proficiency. However, the presence of students who rarely or never use English indicates a need for targeted strategies to encourage more consistent use of English outside the classroom, enhancing their overall language competency.

Questionnaire Item 3: How confident are you in your ability to understand and use English in academic settings? Not Confident Slightly Confident Moderately Confident Very Confident Extremely Confident

Table 3: Confidence in Understanding and Using English in Academic Settings among Nigerian Secondary School Students

Confidence Level	Number of Students	Percentage (%)
Not Confident	20	13.3%
Slightly Confident	35	23.3%
Moderately Confident	50	33.3%
Very Confident	30	20%
Extremely Confident	15	10%
Total	150	100%

The data in table 3 shows that 20 students (13.3%) feel not confident in their English abilities, indicating a significant barrier to their academic performance. An additional 35 students (23.3%) reported being slightly confident, suggesting that while they have some grasp of English, they lack the assurance needed for academic tasks. The largest group, comprising 50 students (33.3%), rated themselves as moderately confident, reflecting a middle ground where they feel reasonably comfortable but still see room for improvement. A notable 30 students (20%) expressed being very confident in their English skills, indicating a solid understanding and usage capability in academic contexts. Finally, 15 students (10%) identified as extremely confident, demonstrating a high level of proficiency and ease with English in their academic endeavors. These findings emphasize the varied confidence levels among students, with a significant number feeling less than fully confident. This variability suggests that while a portion of students possesses strong English skills, many others may benefit from additional support and resources to boost their confidence and proficiency in academic settings. Addressing these needs could enhance overall academic performance and better prepare students for future educational and professional opportunities.

Research Question 2: How effective are chatbot applications in improving English language skills in Nigerian secondary schools?

Questionnaire Item 4: How frequently do you use chatbot applications for learning English? Never Rarely Sometimes Often Always

Table 4: Frequency of Chatbot Application Usage for Learning English among Nigerian Secondary School Students

Frequency of Use	Number of Students	Percentage (%)
Never	30	20%
Rarely	45	30%
Sometimes	40	26.7%
Often	25	16.7%
Always	10	6.7%
Total	150	100%

Table 4 shows that out of 150 students surveyed, 30 students (20%) reported that they never use chatbot applications for learning English. This suggests a significant portion of students have not adopted this technology in their learning practices. The largest group, 45 students (30%), indicated they rarely use chatbot applications, showing minimal engagement with this learning tool. Another 40 students (26.7%) stated that they use chatbots sometimes, suggesting a moderate level of interaction with these applications. Meanwhile, 25 students (16.7%) mentioned they often use chatbot applications, indicating a higher level of integration into their learning routines. Lastly, 10 students (6.7%) reported always using chatbots for learning English, reflecting a small but committed group of students who rely heavily on this technology. These findings highlight a varied usage pattern, with a considerable number of students either not using or infrequently using chatbot applications. This indicates potential barriers to adoption or a lack of awareness about the benefits of chatbots in language learning. To maximize the effectiveness of chatbots in improving English skills, there is a need for increased awareness, training, and encouragement for students to integrate these tools more consistently into their learning processes. Enhanced accessibility and demonstrating the benefits could help shift more students from the "never" and "rarely" categories to more frequent usage, thereby improving their English language skills.

Questionnaire Item 5: How much improvement have you noticed in your English language skills since using chatbot applications? No Improvement Slight Improvement Moderate Improvement Significant Improvement Exceptional Improvement

Table 5: Improvement in English Language Skills Noticed Since Using Chatbot Applications

Level of Improvement	Number of Students	Percentage (%)
No Improvement	35	23.3%
Slight Improvement	40	26.7%
Moderate Improvement	45	30%
Significant Improvement	20	13.3%
Exceptional Improvement	10	6.7%
Total	150	100%

Table 5 shows that out of 150 students, 35 students (23.3%) reported no improvement in their English skills since using chatbots. This indicates that a significant segment of students either do not find the chatbot applications effective or may not be using them optimally. The largest group, comprising 40 students (26.7%), noticed slight improvement, suggesting that while there is some benefit, it may not be substantial enough to make a significant difference in their proficiency. Moderate improvement was reported by 45 students (30%), indicating that for nearly a third of the participants, chatbot applications are making a noticeable impact on their language skills. A smaller group of 20 students (13.3%) experienced significant improvement, demonstrating that for these students, chatbots are highly effective in enhancing their English proficiency. Lastly, 10 students (6.7%) observed exceptional improvement, showing that for a few students, chatbot applications have been transformative in their language learning journey. These findings highlight the varying degrees of effectiveness of chatbot applications in improving English language skills. The fact that the majority of students reported at least some level of improvement suggests that chatbots have potential as a supplementary learning tool. However, the considerable number of students reporting no or slight improvement indicates a need for further investigation into how these applications are used and how their effectiveness can be maximized through better integration into the learning curriculum and personalized learning strategies.

Questionnaire Item 6: Which English language skills (reading, writing, speaking, listening) have improved the most with the use of chatbot applications? Reading Writing Speaking Listening All of the above

Table 6: Most Improved English Language Skills with the Use of Chatbot Applications

Skill Improved	Number of Students	Percentage (%)
Reading	30	20%
Writing	25	16.7%
Speaking	40	26.7%
Listening	20	13.3%
All of the Above	35	23.3%
Total	150	100%

Table 6 reveals that out of 150 students, 30 students (20%) indicated that their reading skills have seen the most improvement through the use of chatbots. Writing skills were highlighted by 25 students (16.7%) as the area of greatest improvement, suggesting that chatbot applications have a tangible impact on students' writing abilities. Speaking skills were reported as the most improved by 40 students (26.7%), making it the skill with the highest reported improvement. This highlights the potential of chatbots to enhance verbal communication skills, possibly due to interactive speaking exercises and conversational practice provided by these applications. Listening skills were noted by 20 students (13.3%) as the area of greatest improvement, showing that chatbots can also contribute to better auditory comprehension. Finally, 35 students (23.3%) reported that all four skills—reading, writing, speaking, and listening—improved significantly through the use of chatbots. This indicates that for a substantial number of students, chatbot applications are effective across multiple dimensions of language learning. These findings suggest that while chatbots are beneficial in various areas, speaking skills seem to benefit the most, followed by comprehensive improvement across all skills. The diverse improvements reflect the versatility of chatbot applications in addressing different aspects of language learning, supporting the idea that they can be a valuable tool in enhancing overall English proficiency among secondary school students in Nigeria. However, there is room for optimizing the use of chatbots to ensure balanced improvements across all language skills.

Research Question 3: What are the perceptions of students and teachers towards the use of chatbot applications for English language learning?

Questionnaire Item 7: How do you feel about using chatbot applications as a tool for learning English?

Table 7: Perceptions of Students and Teachers towards Using Chatbot Applications for Learning English

Perception	Number of Respondents	Percentage (%)
Very Negative	10	6.7%
Negative	15	10%
Neutral	40	26.7%
Positive	50	33.3%
Very Positive	35	23.3%
Total	150	100%

The data in table 7 reveals a range of opinions, with 10 respondents (6.7%) expressing very negative views, indicating strong dissatisfaction or skepticism regarding the effectiveness of chatbots in language learning. A slightly larger group of 15 respondents (10%) held negative perceptions, suggesting that while not strongly opposed, these individuals still do not favor chatbots for this purpose. The largest segment, comprising

40 respondents (26.7%), remained neutral, indicating neither strong support nor opposition to the use of chatbot applications. This neutrality could imply a wait-and-see attitude or indifference towards the technology. A significant portion, 50 respondents (33.3%), felt positive about using chatbots for learning English, reflecting a favorable view and possibly recognizing the benefits these applications offer. Lastly, 35 respondents (23.3%) had very positive perceptions, showing strong endorsement and satisfaction with chatbots as a learning tool. These findings highlight that while there is some resistance and neutrality, the majority of respondents (56.6%) hold positive or very positive views towards the use of chatbot applications for English language learning. This overall positive reception suggests that chatbot applications are generally well-regarded and seen as beneficial by many students and teachers. To further enhance acceptance and effectiveness, it may be valuable to address the concerns of those with negative perceptions and to provide more comprehensive training and support to maximize the benefits of chatbots in educational settings.

Questionnaire Item 8: How do you think chatbot applications compare to traditional methods of learning English? Much Worse Worse About the Same Better Much Better

Table 8: Comparison of Chatbot Applications to Traditional Methods of Learning English

Comparison Level	Number of Respondents	Percentage (%)
Much Worse	10	6.7%
Worse	20	13.3%
About the Same	45	30%
Better	50	33.3%
Much Better	25	16.7%
Total	150	100%

The results in table 8 indicate varied perspectives on the efficacy of chatbots compared to conventional teaching methods. A small group of 10 respondents (6.7%) felt that chatbot applications are much worse than traditional methods, highlighting strong reservations about their effectiveness. An additional 20 respondents (13.3%) rated chatbots as worse, suggesting that these individuals find traditional methods more effective for learning English. The largest group, consisting of 45 respondents (30%), viewed chatbots and traditional methods as about the same in terms of effectiveness. This neutral stance indicates that for a significant portion of students and teachers, chatbots are seen as neither better nor worse than conventional approaches, possibly due to their different strengths and weaknesses. Interestingly, 50 respondents (33.3%) believed that chatbot applications are better than traditional methods, reflecting a favorable perception of the innovative and interactive features of chatbots that might enhance engagement and learning outcomes. Additionally, 25 respondents (16.7%) rated chatbots as much better, indicating a strong preference for this modern tool over traditional methods. These findings suggest a general trend towards positive perceptions of chatbot applications, with nearly half of the respondents (50%) viewing them as better or much better than traditional methods. This positive reception emphasises the potential of chatbots to complement or even improve upon traditional language learning techniques. However, the presence of respondents who view chatbots as less effective or equivalent to traditional methods indicates a need for further evaluation and optimization to address specific educational needs and preferences.

Questionnaire Item 9: Would you recommend the use of chatbot applications for English language learning to other students?

Table 9: Willingness to Recommend Chatbot Applications for English Language Learning

Recommendation Level	Number of Respondents	Percentage (%)
Definitely Not	10	6.7%
Probably Not	15	10%
Not Sure	30	20%
Probably Yes	60	40%
Definitely Yes	35	23.3%
Total	150	100%

The data in table 9 shows that a small group of 10 respondents (6.7%) would definitely not recommend chatbot applications, indicating a strong aversion or dissatisfaction with these tools. Additionally, 15 respondents (10%) would probably not recommend them, suggesting skepticism or perceived inadequacies in the effectiveness of chatbots for language learning. A noteworthy 30 respondents (20%) were not sure, reflecting uncertainty or lack of strong opinions about the benefits of chatbot applications. This ambivalence could stem from limited exposure or mixed experiences with these tools. The largest segment, 60 respondents (40%), indicated that they would probably recommend chatbot applications, showing a positive outlook and belief in their potential benefits. Finally, 35 respondents (23.3%) would definitely recommend chatbot applications, demonstrating strong endorsement and confidence in their effectiveness for English language learning. Thus, the majority of respondents (63.3%) lean towards recommending chatbot applications, either probably or definitely, indicating a general positive perception and acknowledgment of their utility in enhancing English language skills. However, the presence of a significant minority who are unsure or would not recommend these tools highlights the need for ongoing improvements, better user experiences, and further validation of their effectiveness. Enhanced training and demonstration of successful outcomes could help convert the uncertain and skeptical respondents into advocates for chatbot-assisted learning.

Research Question 4: What are the challenges faced in implementing chatbot applications for English language learning in Nigerian secondary schools?

Questionnaire Item 10: What technical difficulties have you encountered when using chatbot applications for learning English? None Minor Difficulties Moderate Difficulties Significant Difficulties Severe Difficulties

Table 10: Technical Difficulties Encountered in Using Chatbot Applications for Learning English

Level of Difficulty	Number of Respondents	Percentage (%)
None	20	13.3%
Minor Difficulties	40	26.7%
Moderate Difficulties	50	33.3%
Significant Difficulties	30	20%
Severe Difficulties	10	6.7%
Total	150	100%

The data in table 10 reveals a spectrum of challenges, with 20 respondents (13.3%) reporting no technical difficulties, indicating a smooth experience with chatbot applications. This suggests that for a subset of users, the technology is accessible and user-friendly. A larger group of 40 respondents (26.7%) encountered minor difficulties, indicating occasional or easily resolvable issues. These might include intermittent connectivity problems or minor software glitches that do not significantly hinder the learning process. The most common response came from 50 respondents (33.3%) who experienced moderate difficulties. These issues could include more frequent

connectivity problems, software bugs, or user interface challenges that require some effort to overcome and may disrupt learning to a moderate extent. Significant difficulties were reported by 30 respondents (20%), highlighting more serious technical barriers such as persistent connectivity issues, substantial software malfunctions, or significant usability problems. These challenges likely impede effective learning and require considerable effort to address. Finally, 10 respondents (6.7%) faced severe difficulties, indicating major technical obstacles that severely disrupt or prevent the use of chatbot applications. These could include complete inability to access the applications, frequent crashes, or unresolvable compatibility issues. These findings emphasize the importance of addressing technical difficulties to ensure the successful implementation of chatbot applications for English language learning. While a portion of users enjoys a seamless experience, a significant number encounter moderate to severe challenges that can hinder the effectiveness of these tools. Solutions may include improving internet infrastructure, providing technical support, and enhancing the reliability and user-friendliness of chatbot applications to ensure they are accessible and beneficial for all users.

Questionnaire Item 11: How accessible are chatbot applications for students in terms of internet connectivity and device availability?

Table 11: Accessibility of Chatbot Applications in Terms of Internet Connectivity and Device Availability

Level of Accessibility	Number of Respondents	Percentage (%)
Not Accessible	25	16.7%
Slightly Accessible	35	23.3%
Moderately Accessible	45	30%
Very Accessible	30	20%
Fully Accessible	15	10%
Total	150	100%

The data in table 11 indicates that accessibility varies significantly among respondents. A considerable portion, 25 respondents (16.7%), reported that chatbot applications are not accessible, highlighting significant barriers such as lack of internet access or appropriate devices. This suggests that for these students, the use of chatbots is not a viable option. A slightly larger group of 35 respondents (23.3%) found chatbots to be slightly accessible, indicating that while they may have some access to the necessary technology, it is limited or unreliable. This might include sporadic internet connectivity or shared device usage that restricts consistent use. The largest group, consisting of 45 respondents (30%), rated chatbot applications as moderately accessible. These respondents likely have more stable access to the internet and devices, but still face occasional challenges that can impact the regular use of chatbots for learning. Thirty respondents (20%) found chatbots to be very accessible, suggesting that they have reliable internet connections and sufficient device availability, allowing for regular and effective use of chatbot applications in their learning routines. Finally, 15 respondents (10%) reported that chatbot applications are fully accessible, indicating optimal conditions with no barriers to internet connectivity or device availability. This group can make the most of chatbot applications for English language learning without any significant hindrances. These findings highlight the disparities in accessibility among Nigerian secondary school students and emphasize the need for improvements in internet infrastructure and device availability. Enhancing these aspects can ensure that more students can benefit from the educational potential of chatbot applications. Addressing these accessibility issues is crucial for equitable and effective implementation of technology-assisted language learning solutions.

Questionnaire Item 12: What support do you think is necessary to improve the implementation of chatbot applications for English language learning? Better Internet Connectivity More Training for Students and Teachers Improved Software and User Interface Increased Availability of Devices All of the above

Table 12: Necessary Support for Improving Implementation of Chatbot Applications for English Language Learning

Type of Support	Number of Respondents	Percentage (%)
Better Internet Connectivity	30	20%
More Training for Students and Teachers	25	16.7%
Improved Software and User Interface	20	13.3%
Increased Availability of Devices	25	16.7%
All of the Above	50	33.3%
Total	150	100%

Table 12 reveals that out of 150 respondents, 30 respondents (20%) emphasized the need for better internet connectivity, indicating that stable and reliable internet access is crucial for the effective use of chatbot applications. This suggests that many students and teachers face challenges related to inconsistent or slow internet connections, which hinder their ability to fully utilize these tools. Another 25 respondents (16.7%) highlighted the importance of more training for both students and teachers. This reflects a need for better understanding and skills to effectively use chatbot applications in educational settings, suggesting that with proper training, the adoption and effectiveness of these tools can be significantly enhanced. Improved software and user interface were deemed necessary by 20 respondents (13.3%). This indicates that existing chatbot applications may have usability issues or technical shortcomings that need to be addressed to provide a smoother and more intuitive user experience. The increased availability of devices was identified by another 25 respondents (16.7%) as a critical factor. This emphasizes the issue of insufficient access to appropriate devices, which can prevent many students from using chatbot applications consistently and effectively. Lastly, a significant portion of respondents, 50 (33.3%), indicated that all of the above supports are necessary. This highlights the different challenges in implementing chatbot applications and suggests that a comprehensive approach addressing internet connectivity, training, software quality, and device availability is essential for the successful integration of chatbot technology in English language learning. These findings demonstrate that improving the implementation of chatbot applications requires addressing various interconnected factors. Ensuring better internet connectivity, providing adequate training, enhancing software usability, and increasing device availability are all critical steps that can help maximize the potential of chatbot applications as effective tools for English language learning in Nigerian secondary schools.

The findings from this study provide a comprehensive understanding of the current state and potential of chatbot applications for English language learning in Nigerian secondary schools. The data reveals several key areas that need attention to optimize the implementation and effectiveness of these technological tools. These areas include technical difficulties, accessibility, user perceptions, and the necessary support systems to enhance their use. Each aspect presents unique challenges and opportunities that must be addressed to leverage chatbot applications effectively in the educational setting.

Firstly, technical difficulties emerged as a significant barrier to the effective use of chatbot applications. The majority of respondents reported experiencing moderate to significant difficulties, with issues ranging from intermittent connectivity problems to

more severe software malfunctions. These technical challenges can disrupt the learning process and diminish the perceived reliability of chatbot applications. This is congruent to [Jegede's \(2021\)](#) finding who contend that learners often encounter various challenges and barriers along their language learning journey. Addressing these issues requires robust technical support systems and continuous software improvements to ensure a seamless user experience. Educational institutions and developers must collaborate to provide regular updates and troubleshoot problems promptly to maintain the efficacy of these tools. Secondly, accessibility remains a critical concern. The survey highlighted that a substantial number of students find chatbot applications either not accessible or only slightly accessible due to limitations in internet connectivity and device availability. Other research findings also reveal that one significant challenge facing digital applications in language learning is technical limitations, particularly in the areas of natural language processing (NLP), accuracy, and comprehensiveness ([Xu, 2017](#); [Zuniga, 2015](#)). This digital divide poses a significant challenge to equitable education, as students without reliable internet or adequate devices are at a distinct disadvantage. To bridge this gap, investments in infrastructure are essential. Government and private sector initiatives could focus on expanding internet access in underserved areas and ensuring that students have the necessary devices to participate fully in technology-enhanced learning. By improving these foundational elements, the accessibility of chatbot applications can be significantly enhanced.

Thirdly, the perceptions of students and teachers towards chatbot applications are generally positive, yet varied. While a notable portion of respondents remains neutral or uncertain about the benefits of these tools, the majority expressed favorable views. This suggests that with the right conditions and support, chatbot applications have the potential to be well-received and effectively integrated into English language learning curricula. For example, [Chapelle and Sauro \(2017\)](#) assert that Chatbots can analyze learners' language production in real time, identifying errors and providing corrective feedback on pronunciation, grammar, and vocabulary usage. Another advantage is its interactive feature as it is claimed that interactivity is another significant advantage of this application in second language acquisition ([Umek et al., 2015](#); [Unal & Gurol, 2019](#)). Other findings also reveal that accessibility is a significant advantage of chatbot applications, as they are available anytime, anywhere, allowing learners to practice language skills at their own convenience ([McTear et al., 2016](#)). Moreover, chatbots can offer personalized feedback tailored to individual learners' needs, highlighting areas for improvement and suggesting targeted practice activities to address specific language challenges ([Wallace, 2014](#)). Positive perceptions are crucial as they influence the willingness to adopt and utilize new technologies. Therefore, it is important to address the concerns of the skeptical and neutral respondents through targeted interventions such as showcasing successful case studies, providing comprehensive training, and facilitating peer-to-peer learning experiences.

Furthermore, the survey emphasized the need for comprehensive support to enhance the implementation of chatbot applications. Better internet connectivity, more training for students and teachers, improved software and user interface, and increased availability of devices were all highlighted as necessary components. Notably, a significant portion of respondents indicated that all these supports are needed simultaneously. This emphasizes the complexity of the challenge and the necessity for a multi-faceted approach. Educational stakeholders, including policymakers, educators, and technology providers, must collaborate to create an enabling environment that addresses these interconnected needs. For instance, professional development programs for teachers can be coupled with infrastructure improvements and user-centered design enhancements to create a cohesive support system. Lastly, the findings on the perceived improvements in English language skills due to chatbot applications are encouraging. Students reported varying levels of improvement across reading, writing, speaking, and listening skills, with speaking skills being the most commonly improved

area. This suggests that chatbots, with their interactive and conversational capabilities, can significantly enhance verbal communication skills. This finding is in line with the study which reveals that chatbots can simulate real-life conversations in the target language, allowing learners to practice speaking, listening, and comprehension skills in a simulated environment (Li et al., 2018). However, to maximize the benefits across all language skills, it is essential to design chatbot applications that are well-rounded and cater to diverse learning needs. Incorporating adaptive learning technologies and personalized feedback mechanisms can help tailor the learning experience to individual students, thereby enhancing overall language proficiency.

CONCLUSION

The study highlights the significant potential of chatbot applications to enhance English language learning in Nigerian secondary schools, while also revealing substantial challenges that need to be addressed. Technical difficulties, limited accessibility, and the need for comprehensive support systems emerged as critical barriers. Despite these challenges, the generally positive perceptions of students and teachers toward chatbot applications indicate a promising future for these tools in education. To fully harness their potential, it is imperative to address the identified obstacles through targeted interventions. Therefore, the following recommendations are proposed: Firstly, improve internet connectivity and ensure the availability of devices to bridge the digital divide. This can be achieved through government and private sector investments in infrastructure, particularly in underserved areas. Secondly, provide extensive training for both students and teachers to enhance their skills and confidence in using chatbot applications. This can be facilitated through professional development programs and workshops. Thirdly, continuously improve the software and user interface of chatbot applications to ensure they are user-friendly and reliable. Collaboration between educators and developers can help create applications that meet the specific needs of students. Lastly, implement a holistic approach that combines these efforts, ensuring that all aspects of the educational ecosystem are aligned to support the effective use of chatbot applications. By addressing these recommendations, educational stakeholders can create a conducive environment for the successful integration of chatbot technology, ultimately improving English language learning outcomes for students in Nigeria.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

AUTHOR CONTRIBUTIONS

Jegade, O. O.: Conceptualization (lead), methodology (lead), writing – original draft (lead), review (lead), editing (lead), securing funding (lead), conceptualization (lead), methodology (lead), writing – original draft (lead), review (lead).

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