Comparative Analysis of Multimedia Tools for Enhancing English Grammar Instruction Among Adult Learners in Northeastern Nigeria

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Abstract

This study investigates the effectiveness of multimedia tools such as mobile apps, online platforms, interactive textbooks, and video tutorials in enhancing English grammar instruction for adult learners in Nigeria, an area of growing significance given the rapid adoption of educational technologies worldwide. English plays a vital role in Nigeria's academic and professional landscapes; however, adult learners often face significant challenges in mastering English grammar due to limited exposure, inadequate foundational knowledge, and competing responsibilities. The approaches of this study adapt the mixed-methods framework, combining quantitative surveys with qualitative interviews and observations from classroom settings. A total purposive sample size of 200 adult learners was selected; 30 of these provided rich qualitative data. The study examines learners' perceptions of usability, accessibility, and engagement with multimedia tools, alongside their impact on motivation, interaction, and learning outcomes in grammar acquisition. The results show that mobile apps and online platforms are seen as the most effective tools because of their interactive features, like gamified quizzes and instant feedback. These features make learning more engaging and motivating. Additionally, these tools are easy to access and flexible, allowing learners to study at their own pace and fit lessons into their busy schedules. However, challenges such as content overload and technical difficulties were noted. This study concludes by recommending a blended learning approach to integrate multimedia tools with traditional instruction, which provides practical insights for educators and policymakers aiming to improve adult grammar education in resource-constrained settings.

A. Introduction

The English language holds a pivotal role in Nigeria's educational and professional systems, serving as the official lingua franca and the primary medium of instruction in formal settings. English proficiency is not only critical for academic success but also for career progression and socio-economic mobility, particularly in a progressively interconnected world where English facilitates international communication and commerce. However, learning English, more particularly grammar, has become a major challenge for many learners across the nation. It is even more difficult for adult learners who often return to school after many years of absence. Challenges facing these categories of learners emanate from inadequate foundational knowledge, lack of sufficient exposure to formal English usage, and pressures associated with balancing work and family responsibilities and social interactions, among others (Mahmud & Danjuma, 2024). The

distinctive challenges presented necessitate specialized and innovative educational strategies to facilitate successful language acquisition within this group.

The need for novel pedagogical approaches has emerged as paramount because of the distinct needs of the adult learner population in overcoming deeply entrenched linguistic habits that were developed through informal language contacts. Recently, the use of multimedia resources in learning methodologies has been widely debated. The aforementioned tools, comprising mobile applications, online platforms, video tutorials, and interactive textbooks, present dynamic, adaptable, and stimulating educational settings that address various learning preferences (Almara'beh et al., 2015). Mobile apps, for instance, provide gamified elements that boost motivation (Lim & Churchill, 2016), while online platforms facilitate collaborative learning through discussion forums and real-time feedback (Liu & Shi, 2018). The promise of these tools lies in their ability to allow learners to progress at their own pace, making them particularly suitable for adult learners who often manage multiple life responsibilities. Despite these benefits, the effectiveness of multimedia tools for grammar instruction, particularly in resource-limited regions like northeastern Nigeria, remains underexplored.

The educational landscape in northeastern Nigeria presents specific challenges that call for focused research into the utilization of multimedia resources for grammar learning. This region has been characterized by socio-economic difficulties, including widespread poverty, low levels of educational attainment, and significant infrastructure deficits, particularly in digital access and literacy (Kamta et al., 2020; Martens et al., 2020). The region has also suffered many consequences in the form of insurgency and violence, particularly with the Boko Haram crisis that has disrupted educational services and access to quality education for millions of people. Kangdim et al. (2022) note that such challenges create additional factors for adult learners in northeastern Nigeria to experience their struggles in learning the English language even more strongly. In this context, the frequent restrictions on both participation in formal educational settings and utilization of the digital resources developed in the country make demands for accessible and innovative instructional tools more imperative. Thus, testing the efficiency of multimedia tools within this region becomes more than relevant-it's vital to fulfill the educational needs of an otherwise marginalized population.

While there is, indeed, a growing body of research regarding multimedia-enhanced learning, a large part of the current study focus has been directed toward general language acquisition, with the specific issues that surround grammar instruction for adult learners receiving inadequate attention (Isik, 2023). Studies have shown that multimedia tools can significantly enhance learners' motivation and engagement, particularly through features like interactive quizzes, progress tracking, and personalized feedback (Budiarto & Jazuli, 2021; Shaik et al., 2023). Mobile apps, for instance, are accessible and often incorporate gamified elements that boost learner motivation through features like quizzes, progress tracking, and real-time feedback (Liqiong, 2016; Safatian, 2023). Deepa et al. (2022) found that mobile apps not only enhance accessibility but also accommodate learners' busy schedules with flexible, convenient learning options. Meanwhile, online platforms provide more comprehensive learning environments with interactive components, such as discussion forums and personalized feedback, which foster collaboration and individualized learning (Shurygin et al., 2021).

However, the efficacy of these tools in the context of grammar acquisition, which requires more structured and repetitive learning processes, is still under-researched. This gap is even more significant for developing countries like Nigeria, where infrastructural concerns and socio-economic constraints further complicate the challenges involved in the implementation of learning technologies (Abdulmajeed et al., 2020). Consequently, there is a dire need to explore how such tools could be enhanced in English grammar teaching among adult learners in resource-constrained contexts like northeastern Nigeria.

In addition, the current research addresses the critical gap in the literature that pertains to the use of multimedia materials in grammar instruction. While previous studies have explored the general benefits of multimedia-enhanced learning in language acquisition (Vargo et al., 2023), little consideration has been paid to how these materials clearly contribute to the acquisition of English grammar. Grammar, as a rule-governed and structured component of language, requires repetitive practice and clear feedback mechanisms. It can best be supported by multimedia tools (Zhang & Zou, 2022). However, adult learners in northeastern Nigeria have additional challenges that may negatively impact their ability to benefit fully from these resources, including insufficient digital literacy and restricted access to technological means to support learning (Creswell, 2021; Wami, 2023). The present study extends current knowledge on integrated technology education in resource-limited settings by investigating the way that multimedia resources could be adapted to suit such learners' needs.

In short, the necessity of this research lies in its potential to bridge the gap between the theoretical promise of multimedia tools and the practical challenges of implementing them in northeastern Nigeria. Empirical evidence on the effectiveness of various multimedia tools for grammar instruction in this study will, therefore, inform educators and policymakers on how best to integrate such tools into adult education programs. This study also brings into focus the need to adapt educational technologies to meet the specific needs of the learners in resource-constrained regions to ensure that they can overcome not only infrastructural but also socio-economic barriers in pursuit of functional literacy. In the process, this might just help in advancing methodologies in teaching English grammar in northeastern Nigeria and, by extension, improving educational and vocational opportunities for adult learners in one of the country's most underdeveloped regions.

The primary objective of this study is to evaluate the effectiveness of various multimedia tools in enhancing English grammar instruction for adult learners in northeastern Nigeria. By focusing on this specific region, the study seeks to understand how multimedia tools can be adapted to overcome the unique challenges learners face in this context, such as low digital literacy and limited access to internet infrastructure. The study aims to determine the perceptions of adult learners about multimedia tools, identify the key features that support grammar learning, and investigate the impact of such tools on motivation, engagement, and learning outcomes. Understanding such dynamics is critical to the development of instructional approaches that are both accessible and efficient in an area that has long experienced deficits in educational resources. Specifically, this study seeks to address the following questions: 1) How do adult learners in Nigeria perceive the effectiveness of different multimedia tools for teaching English grammar?, 2) What are the key features and functionalities of multimedia tools that are most effective in enhancing English grammar learning among adult learners in Nigeria?, 3) How does the use of multimedia tools for teaching English grammar impact adult learners' motivation, engagement, and overall learning outcomes in Nigeria?

B. Research Methods

This study utilizes a mixed-methods research design to examine the effectiveness of multimedia tools on adult learning based in Nigeria, using English grammar as an example. Data collection spanned six months, from January to June 2024. This period provides sufficient engagement with participants and the use of diverse multimedia tools over a meaningful duration. To capture the depth of qualitative insights and breadth inherent in quantitative data, a combined mixed-methods approach was selected. This design allows for the triangulation of findings from multiple data sources, improving the validity of the research. The quantitative aspect includes surveys to gauge the learners' perceptions and measure their learning outcomes, while qualitative interviews and observations are employed to explore deeper insights into their experiences and challenges when using these multimedia tools. This method aligns with Creswell (2021) suggestion that mixed methods are ideal for understanding both the measurable impacts and subjective experiences in educational settings.

The target population for this study consists of adult learners enrolled in English language programs across different institutions in Nigeria. These participants were selected because adult learners often face unique challenges in language acquisition, particularly in grammar, due to cognitive, social, and contextual factors (Tagarelli et al., 2019). Purposive sampling was used to select participants from educational institutions offering adult English language learning programs, ensuring that the sample is representative of learners who use multimedia tools. A sample size of 200 adult learners was chosen, as this allows for both statistical generalization of survey results and a detailed qualitative understanding through interviews with a smaller subset (30 participants). This sampling strategy ensures that a sufficient variety of experiences with multimedia tools are captured, accounting for different backgrounds, learning needs, and digital literacy levels

To answer the research questions, a combination of surveys, interviews, and classroom observations were used as data collection methods. The survey was designed to measure learners' perceptions of the effectiveness of different multimedia tools (online platforms, mobile apps, interactive textbooks) for learning English grammar. The survey included Likert-scale questions focusing on perceived usefulness, ease of use, engagement, and impact on grammar comprehension. The survey was distributed to the entire sample of 200 participants.

In addition, semi-structured interviews were conducted with 30 selected participants to gain qualitative insights into their personal experiences with these tools. These interviews allowed the participants to express their views on the specific features they found useful and the challenges they encountered while

learning grammar through multimedia platforms. Classroom observations were also conducted in English grammar classes that integrate multimedia tools to capture real-time interactions between the learners and the tools, focusing on how learners engage with the content and the specific features of the multimedia tools that appear to enhance or hinder learning.

Data Collection Procedure:

1. The survey was distributed via online forms and printed questionnaires in collaboration with the institutions to allow both those with technology and those less familiar with digital tools to participate.
2. Follow-up emails and phone calls were made to ensure high response rates from the participants.
3. After finishing the surveys, interviews were set up with 30 participants randomly chosen. These interviews were either, in person or virtual, with the choice based on their preferences and convenience.
4. Classroom observations were scheduled to coincide with lessons where multimedia tools were actively used, allowing the researcher to observe tool engagement in real-time.

The data collected through both quantitative and qualitative methods were analyzed using appropriate techniques that align with the purpose of this study. The quantitative survey data were analyzed using descriptive and inferential statistics. First, descriptive statistics such as frequency distributions and percentages were calculated to summarize the participants' general perceptions of the multimedia tools. Following this, an inferential analysis using ANOVA (Analysis of Variance) was conducted to determine whether there are significant differences in learner perceptions and learning outcomes across the different multimedia tools. The ANOVA technique was chosen because it is effective in comparing multiple groups, allowing us to analyze the effectiveness of various tools such as mobile apps, online platforms, and interactive textbooks (Kim, 2014).

The qualitative data from the interviews and classroom observations were analyzed using thematic analysis, which is appropriate for identifying, analyzing, and reporting patterns (themes) within qualitative data (Lochmiller, 2021). This process involved several steps:

1. Familiarization with the Data: The interview transcripts and observation notes were read multiple times to gain an in-depth understanding of the data.
2. Coding: Open coding was used to label key concepts and experiences expressed by participants, particularly around the effectiveness, features, and challenges of using multimedia tools.
3. Theme Development: Similar codes were grouped into broader themes. Key themes identified include learner engagement, tool accessibility, and feature interactivity.
4. Reviewing and Defining Themes: The identified themes were reviewed and refined to ensure they accurately represent the data and align with the research questions.
5. Integration with Quantitative Results: The final step involved triangulating the qualitative findings with the statistical results from the survey to provide a richer understanding of how multimedia tools impact learners' experiences and outcomes.

By employing both statistical and thematic analysis, this study ensures that both numerical trends and personal experiences are given equal consideration, offering a comprehensive picture of the effectiveness of multimedia tools in English grammar instruction for adult learners.

C. Results and Discussion

The following section presents the results and findings of the study, which utilized both quantitative and qualitative data collection methods to provide a comprehensive understanding of the effectiveness of multimedia tools in teaching English grammar to adult learners in northeastern Nigeria. The quantitative data, gathered through surveys, offers statistical insights into learners' perceptions of the various tools, including mobile apps, online platforms, interactive textbooks, and video tutorials. Meanwhile, the qualitative data, obtained through semi-structured interviews and classroom observations, provides deeper insights into learners' personal experiences, attitudes, and engagement with these tools. Together, these data sets reveal key trends, patterns, and themes that inform the overall effectiveness of multimedia tools in the educational context.

Quantitative Data Analysis

Descriptive Statistics

The following table summarizes the participants' general perceptions of the multimedia tools used for learning English grammar.

Table 1. Adult Learners' Perceptions of the Effectiveness of Multimedia Tools for Teaching English Grammar

Multimedia Tools	Very Effective (%)	Effective (%)	Neutral (%)	Ineffective (%)	Very Ineffective (%)
Online Platforms	35	30	15	7	3
Mobile Apps	40	40	20	5	5
Interactive Textbooks	20	50	20	8	2
Video Tutorials	25	45	20	7	3
4	**120**	**165**	**75**	**27**	**13**

This survey gathered information on perceptions of various multimedia resources used for teaching English grammar. The descriptive statistics indicate that all the multimedia tools were rated very positively by the respondents. The descriptive statistics indicate that all multimedia tools received generally positive feedback from participants. Of the facilitation tools, mobile apps have emerged as the most respected option: 40% of the respondents assessed them as "Very Effective" and 30% as "Effective." That is, mobile apps are considered very helpful for grammar acquisition, presumably due to interactivity and access.

Online platforms were also reviewed positively, with 35% of the learners characterizing them as "Very Effective" and 40% as "Effective." That would mean that the perception of digital platforms is equally positive; it underlines their importance as useful resources in grammar education. By contrast, 50% of them assessed the interactive textbook as "Effective," while only 20% rated them as "Very Effective." It can be said from this that even though students find interactive textbooks useful to work with, they are less interactive than apps or web-based tools. Lastly, video tutorials garnered mixed feedback, with 25% rating them as "Very Effective" and 45% as "Effective." Although video tutorials were generally well-received, they exhibited a slightly higher proportion of neutral or less favourable ratings compared to mobile apps.

Inferential Statistics

An ANOVA test was conducted to examine whether there are significant differences in learner perceptions across the different multimedia tools.

ANOVA Statistic: F = 3.12

p-value: 0.031

To further investigate the differences in perceptions of effectiveness among the various multimedia tools, an Analysis of Variance (ANOVA) was conducted. The ANOVA test yielded a statistic (F) value of 3.12, accompanied by a p-value of 0.031. This p-value indicates that there are statistically significant differences in learners' perceptions of the effectiveness of different multimedia tools at the 0.05 significance level. Therefore, we can conclude that learners do not view all tools as equally effective; rather, at least one multimedia tool stands out as being perceived as significantly more effective than the others.

The results of the ANOVA analysis highlight the necessity for educators and developers to examine the features that contribute to the varying perceptions of multimedia tools. Given that mobile apps and online platforms received the highest ratings, further investigation into the specific characteristics that make these tools effective could provide valuable insights for enhancing learning outcomes. The significance of these findings emphasizes the importance of addressing learners' preferences and needs when integrating multimedia tools into English grammar instruction.

Qualitative Data Analysis

The qualitative data gathered through semi-structured interviews provided deeper insights into adult learners' experiences and perceptions of multimedia tools for teaching English grammar. Thematic analysis revealed several key themes, including perceived effectiveness, accessibility, engagement and motivation, challenges, and preferences for blended learning approaches.

An overarching theme that perhaps emerged most strongly from comments was indeed the perceived effectiveness of multimedia resources in enhancing grammar acquisition. Most of the participants reported that tools such as mobile applications and video tutorials made complex grammatical ideas more understandable and accessible. Interactive features related to such tools, including quizzes and gamified elements, enabled a more engaging process of learning. One participant said, "I love the grammar app because learning is fun. I can play while I learn, and that helps me to remember things better." This focus illustrates how the development of multimedia creates a fun and interactive classroom compared with teaching methods in years past.

Other strong themes included accessibility and flexibility. There is a preference for the ability to learn at their own pace and access the materials at any time that is convenient. The flexibility aspect is important for working adults, enabling them to fit learning easily into their busy lifestyles. One of the learners commented, "I can access the learning materials anytime. "This method fits perfectly with my hectic professional schedule." This underlines the role of multimedia materials in responding to specific constraints linked to time, which adult learners have to face.

Ultimately, the data strongly feature the theme of increased engagement and motivation arising from the use of the multimedia tools. Many learners indicated that features like reward systems and interactive quizzes kept them actively involved in the learning process. A participant stated, "The interactive quizzes make me want to learn more. I get excited to see how many I can score." Such feedback suggests that multimedia tools foster a sense of accomplishment, encouraging learners to commit to their studies.

Despite the positive feedback, some challenges were noted. Participants reported technical issues such as app crashes and slow responses, which were sources of frustration, especially during engaged study sessions. Additionally, the abundance of content available on certain platforms sometimes overwhelms learners, making it challenging to navigate effectively. As one participant noted, "There's so much content that it can be challenging to know where to start." This indicates that while multimedia tools are effective, there is room for improvement in user experience and content organization.

Finally, the theme of preference for blended learning approaches emerged. Many participants expressed that while multimedia tools were effective, they valued the integration of traditional classroom learning with digital resources. Learners highlighted the importance of face-to-face interactions with teachers and peers as essential complements to digital tools that enhance their understanding of grammar concepts. One participant emphasized, "While I love the apps, I think having a teacher to explain things in person is still very important." This feedback suggests that a blended learning model, one that integrates multimedia tools with conventional teaching methods, may offer the most effective approach for adult learners.

This study attempts to look into the effectiveness of various multimedia learning tools in enhancing teaching and learning of English grammar among adult learners in northeastern Nigeria. The findings had some critical observations with regard to perceived effectiveness in relation to: use of mobile applications; online platforms; interactive textbooks; video tutorials, among others. The findings suggest that these multimedia resources, in particular, mobile applications and online platforms significantly enhance learner engagement, motivation, and acquisition of grammar skills. However, serious concerns also come up in the form of challenges relating to content saturation and technical problems. The discussion below seeks to interpret these findings, implications, and their relations to the prevailing body of literature.

The primary finding of this research is that mobile apps and online platforms were perceived by adult learners as the most effective tools for learning English grammar. Specifically, 40% of participants rated mobile apps as "Very Effective," while 35% gave the same rating to online platforms. These tools were favored because of their interactive features, flexibility, and ability to provide real-time feedback—qualities that are particularly valuable in grammar instruction, which often requires repetition and practice. On the other hand, while interactive textbooks and video tutorials are still useful, they received lower ratings, since learners reported a shift toward more passive learning with reduced interactivity. These results point to the importance of the factors of engagement and interactivity within the learning process for adults. Tools incorporating features like gamification, quizzes, and progress tracking, such as some mobile apps, are rated highly for the learners, perhaps because such tools promote active participation and reward effort with immediate feedback. This is especially important in grammar instruction, where learners profit from repeated practice and immediate correction of errors.

Moreover, individualized learning speed was cited as a critical factor enhancing the perception of mobile apps and websites regarding effectiveness. This is especially true given that adult learners are often subject to competing demands, including work-related or family responsibilities. Flexibility afforded through these

tools allows the learners to study at times and places that are most appropriate for them, which is considered for sustaining interest in the long run. In fact, these findings are important in northeastern Nigeria, where there is a deficiency in educational infrastructure and numerous hurdles faced by adult learners in their pursuit of formal education. Where access to teachers and traditional learning materials may be less than adequate, the ability to put technology-enhanced tools to use as supplementary resources becomes crucial. Amidst these, mobile applications and digital platforms have emerged as an easy, affordable path to scale and allow more learners to participate in educational opportunities that previously were beyond their reach. Such a trend corresponds to an increasing interest in e-learning and mobile learning as affordable means to expand access to education, especially within under-resourced environments.

The preference for mobile apps and online platforms in this study is supported by findings from earlier research. For example, Yu et al. (2022) demonstrated that mobile learning tools significantly enhance learner engagement in language acquisition, especially when they incorporate elements of gamification and real-time feedback. This finding is in line with the results of the present study, where mobile applications scored higher, and it implies that students feel more motivated and will keep striving harder in their studies if they keep getting feedback and are allowed to track their progress. In line with this, Liu and Shi (2018) also identified advantages related to collaborative learning environments created through online platforms, which offer both content and possibilities for interaction with peers and discussion. Learners in the present study appreciated these collaborative features, particularly the chance to discuss grammar challenges with others and receive feedback from instructors. However, the relatively lower ratings for interactive textbooks and video tutorials are also in line with previous studies. Ahmad (2024) pointed out that while multimedia learning materials such as videos may improve learning, they generally lack the interactive elements that would maintain interest over a lengthy period. The current research participants reported that, while these tools proved to be effective sources of information, they did not possess the level of interactivity and response that a mobile app or even an online tool would have. This implies that, while they may be good additional resources, they fail to be as effective in their role as primary learning tools for grammar instruction, which requires more systematic and repetitive learning methods.

The findings of this study are, therefore, in agreement with the general literature on the use of multimedia tools in educational settings. For example, Sabri et al. (2022) established that mobile applications were effective for adult learners because they integrated interactive and gamified elements that help sustain learner engagement. Similarly, Liqiong (2016) found that interactive platforms provided learners with the feedback and reinforcement needed to grasp complex language rules, such as those involved in grammar learning. The findings of this study reinforce these conclusions by showing that learners in northeastern Nigeria, despite the region's socio-economic challenges, also benefit from these interactive and flexible learning environments. Bhadri and Patil (2022) have also supported the propensity toward blended learning, which is a learning model that integrates multimedia resources with traditional classroom instruction. Specifically, Bhadri and Patil argue that although ease of access and interaction are provided through digital tools, they are most effective when integrated into an overarching educational framework, including face-to-face learning. In this study, too, the respondents expressed a desire for direct contact with the instructors to complement the use of multimedia resources, at least for explaining some difficult grammatical items.

While most of the findings favored mobile apps and online platforms, alternative explanations for these trends had to be considered. For example, the prevalence of the use of mobile phones over computers in different parts of northeastern Nigeria may influence learner responses. Because of the general experience with mobile devices, the application might have been more easily usable with mobiles on account of broader experience with the technology rather than the learning values of the application itself. However, the relatively low level of digital literacy in this region could have influenced students in ways that they could not use online platforms and interactive textbooks as effectively; hence, a penchant for the relatively simple and user-friendly interface of mobile applications. Another explanation could be saturation of content, as mentioned by the students. A number of the respondents reported feelings of being overwhelmed by the volume of information they could access on online platforms and interactive textbooks. This may indicate the ineffectiveness of these tools due either to a lack of proper structuring of the content or due to the absence of guided learning routes. When learners find it challenging to navigate through these tools effectively, they may be discouraged, which may explain the low scores for the tools when compared to mobile apps.

The implications of this study are far-reaching, particularly for educators, policymakers, and curriculum developers in Nigeria and other regions facing similar educational challenges. For educators, the results suggest that incorporating mobile apps and online platforms into adult education programs could

significantly improve engagement and learning outcomes for grammar instruction. With this trend toward interactive and flexible learning environments in mind, a logical consequence is that resources allowing students to practice something and then get immediate feedback should be given priority. For the curriculum developer, this means creating digital resources that focus on experiential learning while making the functional and accessible for learners of varying skill levels with regard to digital media. It also suggests that policymakers need to invest more in digital infrastructure in northeastern Nigeria. Indeed, expanding access to the internet and building more digital literacy will be crucial in guaranteeing that more learners can benefit from multimedia tools. Furthermore, training for teachers is needed on how to effectively integrate these tools into their teaching methods, as many teachers in the area may remain without the competencies required in their own educational settings for technology-enhanced learning.

Despite the significant insights offered by this research, there exist various limitations that require acknowledgment. First, a sample size of 200 participants may not be representative of the heterogeneity of the adult learners in northeastern Nigeria. The study relied on self-reporting, which, in addition, may pose a certain bias in the sense that perceptions of learners about the tools may not actually be their educational outcomes. Another limitation of the research is that objective improvement in grammar ability was not measured through pre- and post-tests, which could therefore be a more concrete measure of the effectiveness of the multimedia tools. Besides, technical problems, such as application crashes and poor internet connectivity, could affect the learners' usage of the tools, limiting the generalization of this study's findings.

Subsequent studies ought to seek to mitigate these constraints by incorporating a larger and more heterogeneous sample, possibly extending the research to various regions of Nigeria in order to compare learner experiences across different contexts. Furthermore, the integration of objective assessments of grammatical enhancement, exemplified by pre- and post-tests, would yield more robust evidence regarding the efficacy of the instruments employed. Longitudinal studies that determine the long-term effects of multimedia resources on language retention and fluency would, therefore, be highly beneficial in order to get an idea of how long the benefits of using such tools will last. Finally, further research is needed on the effectiveness of blended learning approaches-that is, those that combine face-to-face teaching with multimedia resources in order to determine what balance is most effective between digital and traditional teaching methods.

D. Conclusion

This study examined the perceptions of adult learners in northeastern Nigeria regarding the effectiveness of multimedia tools for teaching English grammar. The purpose was to assess how learners perceive the usability, accessibility, engagement, and impact of these tools on their motivation and grammar acquisition, ultimately determining which tools are most effective in enhancing grammar learning. The research employed a mixed-methods approach combining quantitative surveys and qualitative interviews to comprehensively evaluate learner preferences, experiences, and outcomes. The findings reveal that mobile applications and online platforms were perceived as the most effective tools due to their interactive features, such as quizzes and gamified elements, their flexibility in accommodating learners' schedules, and their ability to provide immediate feedback. These tools significantly enhanced learners' motivation and engagement, making grammar learning more accessible and enjoyable. In contrast, interactive textbooks and video tutorials were found less effective due to their limited interactivity and overwhelming content structure.

The implications of these findings are clear: educators should integrate mobile apps and online platforms into grammar instruction while ensuring the tools are user-friendly, interactive, and adaptive to the needs of adult learners. Policymakers must prioritize investments in digital infrastructure and teacher training to support the effective implementation of multimedia tools. However, challenges such as technical issues and digital literacy gaps highlight areas for improvement.

Despite the important insights offers, this study has certain limitations that should be acknowledged. First, the study's sample size was limited to 200 participants, which may not fully represent the broader population of adult learners in northeastern Nigeria. Second, this study is limited by its reliance on self-reported data and the absence of pre- and post-tests of grammar proficiency. Future research should incorporate larger samples to include a more diverse range of learners across different regions of Nigeria. Moreover, incorporating objective measures of grammar proficiency would provide a more accurate assessment of the

effectiveness of multimedia tools in improving learning outcomes, as well as and longitudinal designs to evaluate the long-term impact of multimedia tools on grammar acquisition and retention..

E.   Acknowledgment

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