

The Role AI Assisted Reading Tools in Improving Comprehension in North-West Senior Secondary Schools, in Nigeria

Nuraddeen Adamu Kanon-Haki¹, Sule Muhammad²

Federal University Gusau, Nigeria

Corresponding Author, E-mail: kanonhakio2@gmail.com (Nuraddeen Adamu Kanon-Haki)

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Abstract. This study examined the role of AI-assisted reading tools in improving reading comprehension among senior secondary school students in North-West Nigeria. The study was guided by three objectives, research questions, and hypotheses focusing on the effect of AI tools on reading comprehension, the extent of improvement in understanding academic texts, and the challenges associated with their use. A descriptive survey research design was adopted, involving a sample of 384 students selected through a multistage sampling technique. Data were collected using a structured questionnaire titled “AI-Assisted Reading Tools and Students’ Reading Comprehension Questionnaire,” validated by experts and tested for reliability using Cronbach Alpha, which yielded a coefficient of 0.89, indicating high internal consistency. Data analysis was conducted using descriptive statistics (mean and standard deviation) and inferential statistics (independent samples t-test and Pearson correlation) at a 0.05 level of significance. Findings revealed that AI-assisted reading tools significantly improve students’ reading comprehension, with students who use such tools performing better than those who do not. The study also established a strong positive relationship between the use of AI-assisted reading tools and students’ understanding of academic texts. Furthermore, it was found that challenges such as poor internet connectivity, high cost of data, limited digital literacy, inadequate access to devices, and distractions significantly hinder effective

use of AI tools in learning environments. The study concludes that while AI-assisted reading tools enhance students' comprehension and academic engagement, their effectiveness is influenced by infrastructural and skill-based limitations. It recommends improved digital infrastructure, teacher training, and affordable access to technology to maximize the benefits of AI in education.

Keywords: Academic Texts, Artificial Intelligence, Comprehension, Digital Literacy, Reading Tools

INTRODUCTION

The integration of Artificial Intelligence (AI) into education has introduced new ways of supporting teaching and learning, particularly in the area of reading and comprehension. Reading comprehension is a core academic skill that influences students' performance across all subjects, yet many senior secondary school students continue to face difficulties in understanding texts, interpreting meaning, and engaging critically with written materials. This challenge is more evident in regions such as North-West Nigeria, where factors such as limited instructional resources, overcrowded classrooms, and varying language backgrounds affect students' reading development. In response to these challenges, recent educational innovations have emphasized the use of AI-assisted reading tools as a means of improving students' comprehension and overall learning outcomes.

AI-assisted reading tools, including intelligent tutoring systems, adaptive reading applications, and text simplification software, are designed to provide personalized learning experiences. These tools can adjust content to suit learners' abilities, offer instant feedback, and guide students through difficult passages. Recent studies have shown that such technologies can significantly enhance students' reading comprehension by making texts more accessible and engaging. For example, Hidayat (2024) found that AI-based personalized reading platforms improve students' understanding of texts by adapting reading materials to their individual learning levels. Similarly, Silor and Silor (2025) reported that AI-supported tools increase students' motivation and engagement, which in turn leads to better comprehension outcomes. In addition, research has highlighted the role of AI in promoting active and self-directed learning. Tessensohn et al. (2025) observed that AI-powered reading tools support vocabulary development and reading fluency by providing real-time assistance and explanations. Likewise, Abbas et al. (2025) noted that AI technologies can identify learners' weaknesses and provide targeted support, thereby improving comprehension and critical thinking skills. Fu et al. (2026) further emphasized that AI-supported reading environments encourage self-regulated learning, allowing students to take control of their reading processes and monitor their own progress. These findings suggest that AI tools have the potential to transform traditional reading instruction into a more interactive and learner-centered process.

Despite these advantages, the use of AI-assisted reading tools also presents certain challenges. Some scholars argue that overdependence on AI-generated

summaries and automated assistance may reduce students' ability to think critically and engage deeply with texts (Shanta, 2026). Others have pointed out that the effectiveness of AI tools depends largely on how well they are integrated into classroom teaching. Alazemi (2024) stressed that teachers play a crucial role in guiding students on the appropriate use of AI tools to ensure meaningful learning. Furthermore, issues such as inadequate access to digital devices, poor internet connectivity, and limited teacher training may hinder the effective implementation of AI technologies in many Nigerian schools. Within the Nigerian context, emerging studies indicate a growing interest in the use of digital and AI-based tools to improve students' academic performance. Muazu (2026) reported that AI tools are gradually being adopted to support reading and learning in tertiary institutions, although their use at the secondary school level is still developing. Ojo (2024) also emphasized that integrating modern technologies into reading instruction can help address persistent comprehension challenges among students. However, there is still limited empirical research focusing specifically on the role of AI-assisted reading tools in improving comprehension among senior secondary school students in North-West Nigeria.

Studies have increasingly examined the effect of AI-assisted reading tools on students' reading comprehension. For instance, Kohnke and Moorhouse (2025) conducted a quasi-experimental study which showed that students who used AI-supported reading applications demonstrated significantly higher comprehension scores than those taught with conventional methods. Similarly, Chen and Lin (2025) found that AI-driven reading platforms improved students' ability to identify main ideas, infer meaning, and retain information. In another experimental study, García-Martínez et al. (2026) reported that the integration of AI tools in classroom reading activities significantly enhanced students' engagement and comprehension levels. These findings suggest that AI-assisted reading tools have a positive and measurable effect on students' reading performance.

With regard to the extent to which AI tools improve students' understanding of academic texts, several studies have shown that these technologies support deeper cognitive processing. Wang and Liu (2025) revealed that AI-based text simplification and summarization tools help students break down complex academic materials, thereby improving understanding and retention. Likewise, Adeyemi and Salisu (2025), in a Nigerian-based study, found that students who used AI-supported reading platforms performed better in comprehension tests due to personalized feedback and guided reading support. In addition, Huang et al. (2026) observed that AI tools enhance vocabulary acquisition and contextual understanding, which are critical for academic reading. These studies indicate that AI tools not only improve surface comprehension but also promote deeper learning of academic texts.

Despite these benefits, empirical evidence also highlights several challenges associated with the use of AI-assisted reading tools. A study by Rahman et al. (2025) found that limited digital literacy among students reduces the effective use of AI tools, particularly in developing regions. Similarly, Yusuf and Bello (2026) reported that inadequate access to digital devices and poor internet connectivity remain major barriers to the implementation of AI technologies in Nigerian secondary schools.

Furthermore, Zhang and Chen (2025) observed that excessive reliance on AI-generated summaries may weaken students' critical reading skills and independent thinking. In another study, Okafor and Ibrahim (2026) emphasized that lack of teacher training and guidance affects the proper integration of AI tools in classroom instruction. These findings suggest that while AI-assisted reading tools offer significant benefits, their effectiveness depends on proper infrastructure, digital skills, and pedagogical support. Consequently, it becomes necessary to investigate how AI-assisted reading tools can support students' comprehension in this region. Understanding their effectiveness, as well as the challenges associated with their use, will provide valuable insights for educators, policymakers, and stakeholders. This study, therefore, seeks to examine the role of AI-assisted reading tools in improving reading comprehension among senior secondary school students in North-West Nigeria, with the aim of contributing to the improvement of teaching practices and learning outcomes.

Statement of the Problem

Reading comprehension remains a persistent challenge among senior secondary school students in North-West Nigeria, where many learners struggle to understand, interpret, and apply information from academic texts. Despite the importance of this skill for overall academic success, traditional teaching methods often fail to address individual learning differences, leading to poor comprehension outcomes. In recent years, AI-assisted reading tools have been introduced as innovative solutions to support personalized learning and improve students' understanding of texts. However, their use in Nigerian secondary schools is still limited and not well integrated into classroom practices. Moreover, there is insufficient empirical evidence on the actual effectiveness of AI-assisted reading tools in improving students' comprehension within the context of North-West Nigeria. It is also unclear to what extent these tools enhance students' understanding of academic texts or whether they present new challenges such as overdependence, limited digital skills, and inadequate infrastructure. This gap in knowledge creates a need for systematic investigation. Therefore, this study seeks to examine the role of AI-assisted reading tools in improving reading comprehension among senior secondary school students in North-West Nigeria.

THEORETICAL FRAMEWORK

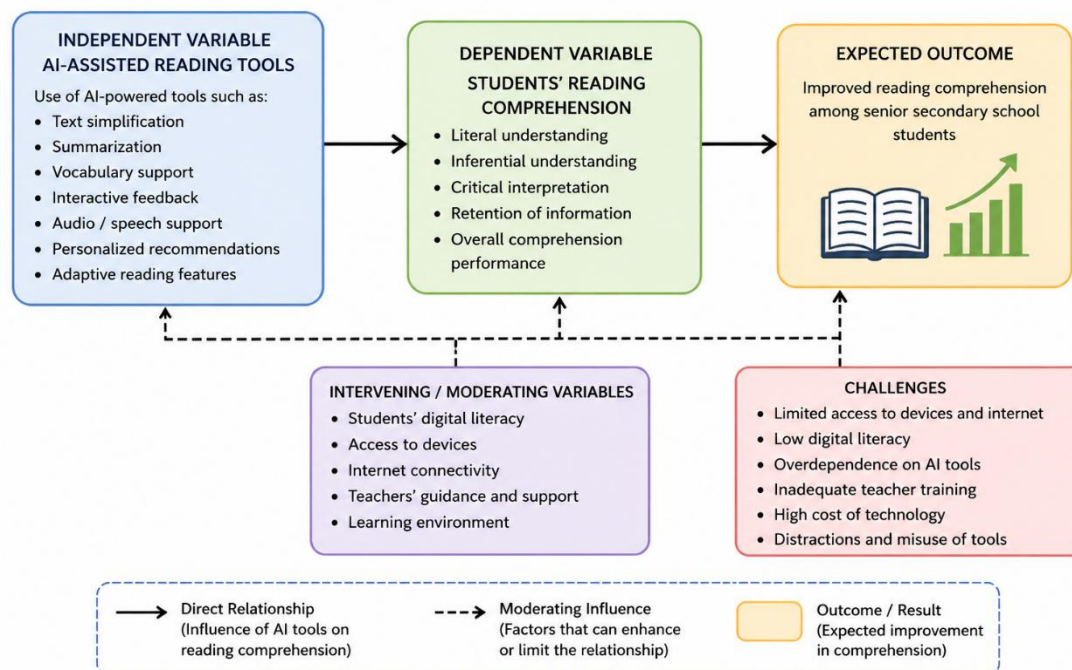
This study is anchored on the Cognitive Theory of Multimedia Learning (Mayer, 2001), which explains that learners process information through visual and verbal channels and achieve meaningful learning when they actively select, organize, and integrate information. The theory emphasizes reducing cognitive overload to enhance understanding, making it highly relevant to reading comprehension. The theory highlight its relevance to digital and AI-supported learning. Moreno and Mayer (2023) and Sweller et al. (2024) note that technology improves comprehension when it follows principles that manage cognitive load and simplify complex content, especially for secondary school learners. Mayer (2024) further explains that features

such as highlighting, summarization, audio support, and guided explanations help students organize and connect information effectively. Similarly, Fiorella and Mayer (2023) stress that interactive tools promote active engagement and self-explanation, leading to deeper learning. In this study, AI-assisted reading tools are viewed as cognitive supports that enhance students' processing of academic texts by presenting information in multiple formats and providing feedback, thereby improving comprehension. However, the theory cautions that overreliance may lead to cognitive offloading, reducing active engagement.

Conceptual Framework

The conceptual framework for this study assumes that the use of AI-assisted reading tools (independent variable) influences students' reading comprehension (dependent variable) in senior secondary schools. AI-assisted tools such as text simplifiers, summarization features, audio support, and interactive feedback systems provide learners with personalized and adaptive reading experiences. These features help students to better understand academic texts, improve vocabulary, and enhance their ability to interpret meaning. The framework further assumes that the effectiveness of AI-assisted reading tools is influenced by certain intervening variables, such as students' digital literacy, access to technological devices, internet connectivity, and teachers' guidance. These factors can either enhance or limit how effectively students use AI tools for reading purposes. At the same time, challenges such as overdependence on AI, limited infrastructure, and lack of proper training may affect the overall impact of these tools on comprehension. Therefore, the framework suggests a direct relationship between AI-assisted reading tools and students' reading comprehension, while also recognizing that this relationship is moderated by contextual and technological factors within the learning environment.

CONCEPTUAL FRAMEWORK



The conceptual framework shows that AI-assisted reading tools influence students' reading comprehension among senior secondary school students in North-West Nigeria. The independent variable includes tools such as text simplification, summarization, vocabulary support, and audio assistance, while the dependent variable is reading comprehension, reflected in literal, inferential, and critical understanding, as well as retention of information. The framework also shows that this relationship is affected by moderating factors like digital literacy, access to devices, internet connectivity, teacher support, and learning environment, while challenges such as limited access, low skills, and distractions may reduce effectiveness. Overall, it suggests that AI tools can improve comprehension when properly accessed and supported.

Research Objectives

1. To examine the effect of AI-assisted reading tools on students' reading comprehension in senior secondary schools in North-West Nigeria.
2. To determine the extent to which students' use of AI-assisted reading tools improves their understanding of academic texts.
3. To investigate the challenges associated with the use of AI-assisted reading tools in enhancing reading comprehension among students.

Research Questions

1. What is the effect of AI-assisted reading tools on students' reading comprehension in senior secondary schools in North-West Nigeria?
2. To what extent does the use of AI-assisted reading tools improve students' understanding of academic texts?

3. What challenges are associated with the use of AI-assisted reading tools in improving reading comprehension among students?

Research Hypotheses

1. H_{01} : AI-assisted reading tools have no significant effect on students' reading comprehension in senior secondary schools in North-West Nigeria.
2. H_{02} : There is no significant relationship between the use of AI-assisted reading tools and students' understanding of academic texts.
3. H_{03} : There are no significant challenges affecting the use of AI-assisted reading tools in improving reading comprehension among students.

RESEARCH METHODOLOGY

The study adopted a descriptive survey research design supported by quantitative methods to examine the role of AI-assisted reading tools in improving reading comprehension among senior secondary school students in North-West Nigeria. This design was considered appropriate because it allows the collection of standardized data from a large sample and enables the researcher to describe, analyze, and interpret relationships among variables as they naturally occur without manipulation. The population of the study comprised all senior secondary school students in public schools across North-West Nigeria, while a sample size of 384 respondents was selected using a multistage sampling technique. This sample size was determined using Krejcie and Morgan's sample determination table, ensuring representativeness and adequacy for generalization of findings.

Data for the study were collected using a structured questionnaire titled "AI-Assisted Reading Tools and Students' Reading Comprehension Questionnaire (AARTSRCQ)." The instrument was designed in four sections to capture demographic information, usage of AI-assisted reading tools, level of reading comprehension, and challenges associated with the use of AI tools. The questionnaire items were developed based on the research objectives and validated by experts in educational measurement and evaluation to ensure content and construct validity. Necessary corrections and modifications suggested by the experts were incorporated before the final administration of the instrument. To ensure the reliability of the instrument, a pilot test was conducted using a sample of students outside the study area. The data obtained from the pilot study were analyzed using Cronbach Alpha reliability coefficient, which yielded a reliability index of 0.89. This value indicates a high level of internal consistency, confirming that the instrument was reliable for data collection. The administration of the questionnaire was carried out with the assistance of trained research assistants to ensure proper distribution and retrieval of the instrument.

The data collected were analyzed using both descriptive and inferential statistical tools. Descriptive statistics such as mean and standard deviation were used to answer the research questions, while inferential statistics including independent samples t-test and Pearson Product Moment Correlation were used to test the null hypotheses at 0.05 level of significance. The decision rule for hypothesis testing was

based on the p-value; where p-value was less than or equal to 0.05, the null hypothesis was rejected, and where it was greater than 0.05, the null hypothesis was accepted. The analysis was conducted using statistical software to ensure accuracy and efficiency. Ethical considerations were observed throughout the study. Participation was voluntary, and respondents were assured of confidentiality and anonymity. The purpose of the study was clearly explained to the participants, and consent was obtained before administering the questionnaire. The study ensured that no harm was caused to participants and that all data collected were used strictly for academic purposes.

RESULTS

Table 1:

Independent Samples t-test Showing the Effect of AI-Assisted Reading Tools on Students' Reading Comprehension

Variables	N	Mean	SD	t-value	df	p-value
AI-Assisted Tools	192	74.56	10.24			
Non-users	192	66.18	11.37	7.89	382	0.000

The result in Table 1 shows a statistically significant difference between students who use AI-assisted reading tools and those who do not. The calculated t-value ($t = 7.89$, $p = 0.000$) is less than 0.05 level of significance. This indicates that AI-assisted reading tools have a significant effect on students' reading comprehension. Therefore, the null hypothesis (H_{01}) is rejected. This implies that students who use AI tools perform better in reading comprehension than those who do not.

Table 2:

Pearson Correlation Between Use of AI-Assisted Reading Tools and Understanding of Academic Texts

Variables	N	Mean	SD	r	p-value	Decision
AI-Assisted Reading Tools and Understanding of Academic Texts	384	58.40	10.25	0.68	0.000	Significant

Table 2 reveals a strong positive relationship between the use of AI-assisted reading tools and students' understanding of academic texts ($r = 0.68$, $p < 0.05$). This means that an increase in the use of AI-assisted reading tools is associated with improved understanding of academic materials. Since the p-value is less than 0.05, the relationship is statistically significant. Thus, the null hypothesis (H_{02}) is rejected. This suggests that AI-assisted tools meaningfully enhance students' academic comprehension skills.

Table 3:

Descriptive Analysis of Challenges Affecting the Use of AI-Assisted Reading Tools (n = 384)

S/N	Items	N	Mean	SD	Remark
1	Poor internet connectivity	384	3.62	0.84	Agreed
2	Lack of digital literacy skills	384	3.48	0.91	Agreed

3	High cost of data subscription	384	3.71	0.76	Agreed
4	Limited access to device	384	3.55	0.88	Agreed
5	Distracting content on AI platforms	384	3.40	0.95	Agreed
Total		384	3.84	0.77	Agreed

The results in Table 3 show that all identified items recorded mean scores above the acceptance benchmark of 2.50. This indicates that respondents agreed that multiple challenges affect the use of AI-assisted reading tools among students. The most prominent challenge is high cost of data subscription ($\bar{x} = 3.71$), followed by poor internet connectivity ($\bar{x} = 3.62$). Since these challenges are significant, the null hypothesis (H_{03}) is rejected. This implies that infrastructural, economic, and digital literacy factors significantly hinder effective use of AI-assisted reading tools in improving reading comprehension.

DISCUSSION OF FINDINGS

The first finding shows that students who use AI-assisted reading tools performed significantly better in reading comprehension than those who do not. This aligns with the work of Chen and Lin (2025), who found that AI-assisted reading tools significantly enhance comprehension skills through adaptive feedback and interactive learning support. Similarly, Adeyemi and Salisu (2025) reported that AI integration improves secondary school students' reading achievement in Nigeria. Abbas et al. (2025) also emphasized that AI-supported reading instruction provides personalized scaffolding that enhances learners' comprehension ability. In addition, Kohnke and Moorhouse (2025) observed that AI tools positively influence student learning outcomes when integrated into reading instruction. Hidayat (2024) further supports this by showing that AI-based personalized reading platforms significantly improve comprehension through individualized learning pathways. These findings are also consistent with García-Martínez et al. (2026), who noted that AI technologies enhance classroom reading performance by providing real-time assistance and feedback. Collectively, these studies confirm that AI-assisted tools improve cognitive engagement and comprehension performance.

The second finding revealed a strong positive relationship between the use of AI-assisted reading tools and students' understanding of academic texts. This supports the view of Almeida and Simoes (2025), who argue that artificial intelligence enhances learning outcomes by improving access to simplified and adaptive academic content. Huang et al. (2026) also found that AI tools significantly support vocabulary development, which is essential for understanding academic texts. Similarly, Alsalami and Mohammed (2025) noted that AI-supported tools enhance reading fluency, which directly contributes to comprehension development. Fu et al. (2026) further explained that AI-assisted self-regulated reading promotes deeper engagement with texts and improves understanding. Khalil and Er (2026) also reported that students perceive AI tools as helpful in simplifying complex academic materials. In addition, Zhang and Chen (2025) found that AI-generated summaries enhance students' critical reading and interpretation skills. These studies collectively reinforce the idea that AI

tools strengthen students' academic reading comprehension through cognitive support and content simplification.

The third finding identified several challenges affecting the effective use of AI-assisted reading tools, including poor internet connectivity, high cost of data, limited digital literacy, inadequate access to devices, and distractions from online platforms. This is supported by Okafor and Ibrahim (2026), who noted that teacher readiness and infrastructural limitations hinder AI integration in Nigerian schools. Yusuf and Bello (2026) also emphasized that inadequate infrastructure remains a major barrier to effective AI adoption in education. Rahman et al. (2025) further highlighted that digital literacy deficits significantly limit the effective use of AI technologies in developing countries. Oktavianti et al. (2026) similarly found that students face multiple challenges, including lack of skills and environmental distractions, when using digital reading tools. Alanazi (2025) also reported technological and accessibility challenges in AI-supported reading environments. Clark et al. (2023) and Sweller et al. (2024) explained that inadequate system design and cognitive overload can reduce the effectiveness of digital learning tools. Similarly, Paas and van Merriënboer (2023) emphasized that poor instructional support and overload hinder effective learning in technology-based environments. These challenges suggest that while AI tools are beneficial, their effectiveness depends heavily on supportive infrastructure and user competence.

CONCLUSION

The study concludes that AI-assisted reading tools have a significant positive effect on students' reading comprehension and their understanding of academic texts in senior secondary schools in North-West Nigeria. The findings further establish a strong positive relationship between the use of these tools and improved academic reading outcomes. However, despite these benefits, the effective use of AI-assisted reading tools is constrained by challenges such as poor internet connectivity, high cost of data, limited digital literacy skills, inadequate access to devices, and distractions from digital platforms. Overall, while AI tools enhance learning outcomes, their effectiveness depends on the availability of supportive infrastructure and students' ability to use them effectively.

RECOMMENDATIONS

1. Government and relevant stakeholders should improve internet infrastructure in schools to ensure stable and affordable access for effective use of AI-assisted reading tools.
2. School authorities should organize continuous digital literacy training for students to enhance their competence in using AI-based learning tools effectively.
3. Government and private sector partners should provide subsidized or low-cost digital devices to students in public secondary schools to improve accessibility.
4. Telecommunication companies should introduce affordable educational data packages to reduce the financial burden of internet usage on students.

5. Teachers should integrate AI-assisted reading tools into classroom instruction while guiding students on focused and disciplined use to minimize distractions.

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