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Enhancing English Language Literacy through AI-Driven Instructional Strategies in Insecure Learning Environments

Oseni, Muinat Adewumi
Department of Language and Communication,
School of General Studies Education,
Federal College of Education (Special), Oyo, Nigeria

Abstract

This study investigates the effectiveness of AI-driven instructional strategies in enhancing English language literacy among students in insecure learning environments in Nigeria. In regions where insecurity disrupts regular schooling, innovative approaches are required to support the development of essential language skills. The research employs a mixed-methods approach to assess the impact of AI-based tools such as automated writing evaluators, speech recognition applications, and adaptive reading platforms on students' literacy outcomes. Data are collected through achievement tests, surveys, and focus group discussions involving teachers and learners in selected schools. The results indicate that AI-supported instruction significantly improves students' reading comprehension, writing accuracy, and oral communication skills by providing immediate feedback and personalized learning experiences. Despite these benefits, issues such as technological limitations, high cost of devices, and insufficient teacher training remain critical barriers. The study concludes that AI-driven instructional strategies can serve as effective interventions for improving English literacy in unstable educational contexts. It recommends increased investment in educational technology, capacity building for teachers, and the development of policies that promote the adoption of AI tools in language education.

Keywords: AI instruction, English literacy, insecurity, personalized learning, educational technology

Introduction

In recent years, the increasing rate of insecurity in Nigeria has posed significant challenges to the educational sector, particularly in maintaining consistent teaching and learning processes. Issues such as insurgency, banditry, and communal conflicts have resulted in school closures, displacement of learners, and disruption of academic activities across many regions of the country (Onojah, 2025). These disruptions have adversely affected students' learning outcomes, especially in foundational subjects such as English language, which serves as the medium of instruction and a key determinant of academic success. English language literacy, which encompasses reading, writing, listening, and speaking skills, requires continuous exposure, guided instruction, and active engagement for effective development. However, in insecure learning environments where schooling is inconsistent, students often experience gaps in literacy

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acquisition. Research has shown that interruptions in formal education negatively affect learners' reading comprehension, writing proficiency, and overall communication skills (McLeod & McCormack, 2021). As a result, many students in affected regions struggle to attain the required level of English language competence necessary for academic progression.

The emergence of Artificial Intelligence (AI) in education offers promising solutions to these challenges by providing innovative instructional strategies that support language learning. AI-driven tools such as automated writing evaluators, speech recognition applications, and adaptive reading platforms have transformed language education by enabling personalized and interactive learning experiences. These technologies allow learners to receive immediate feedback, practice language skills independently, and engage with learning materials at their own pace (Schmidt & Strasser, 2022). Such features are particularly beneficial in contexts where traditional classroom instruction is disrupted. AI-driven instructional strategies also promote learner-centred approaches to teaching, where instruction is tailored to individual learners' needs and abilities. Adaptive learning systems analyse students' performance and adjust instructional content accordingly, thereby improving learning efficiency and outcomes (Wasik et al., 2020). In English language learning, this approach helps address individual differences in literacy levels, enabling learners to focus on areas requiring improvement.

Furthermore, AI technologies enhance engagement and motivation by incorporating interactive and multimedia elements into the learning process. Tools such as conversational chatbots and gamified learning platforms create dynamic learning environments that encourage active participation. These features are particularly important in insecure environments, where students may experience psychological stress or reduced motivation due to unstable conditions (Denham & Burton, 2020). By making learning more engaging and accessible, AI helps sustain students' interest and participation in language learning activities. Despite the growing potential of AI in enhancing English language literacy, its adoption in Nigeria remains limited due to several challenges. These include inadequate infrastructure, limited access to digital devices, insufficient teacher training, and high cost of technology (Akinwale & Adepoju, 2022). In insecurity-affected areas, these challenges are even more pronounced, thereby limiting the effectiveness of AI-based interventions.

Given these realities, there is a need to explore how AI-driven instructional strategies can be effectively utilized to enhance English language literacy among students in insecure learning

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environments. This study, therefore, investigates the impact of AI-based tools on students' literacy outcomes, while also examining the challenges and prospects associated with their implementation in Nigeria.

AI-Driven Instructional Strategies in English Language Literacy

Artificial Intelligence (AI)-driven instructional strategies have introduced innovative approaches to enhancing English language literacy by transforming how learners engage with reading, writing, speaking, and listening activities. These strategies leverage intelligent systems to provide personalized, interactive, and feedback-oriented learning experiences that support the development of core literacy skills. In contexts where traditional instruction is disrupted, such as insecurity-affected environments, AI-driven tools offer alternative pathways for sustaining effective language learning.

One of the most widely used AI-driven strategies in English language learning is the application of automated writing evaluation tools. These tools analyse learners' written texts and provide immediate feedback on grammar, vocabulary, sentence structure, and coherence. By identifying errors and suggesting corrections, automated writing systems help learners improve their writing accuracy and develop better composition skills. Research indicates that timely and consistent feedback plays a crucial role in enhancing writing proficiency, as it enables learners to recognize and correct their mistakes independently (Li & Wang, 2022). In insecure learning environments where teacher feedback may be limited, such tools serve as valuable substitutes for continuous assessment and support. Another important AI-driven strategy is the use of speech recognition technology to improve learners' oral communication skills. Speech recognition applications allow students to practice pronunciation, intonation, and fluency by interacting with digital systems that analyse spoken input and provide corrective feedback. This is particularly beneficial for English language learners who may have limited opportunities for face-to-face interaction with teachers or peers. Studies have shown that speech recognition tools enhance learners' confidence and speaking ability by providing a safe and supportive environment for practice (Schmidt & Strasser, 2022). In addition, these tools help learners develop listening skills by exposing them to accurate language models.

Adaptive reading platforms also play a significant role in improving English language literacy. These platforms use AI algorithms to assess learners' reading levels and provide customized texts that match their proficiency. As learners progress, the system adjusts the complexity of

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reading materials to ensure continuous development. This personalized approach enhances reading comprehension and vocabulary acquisition by allowing learners to engage with texts that are neither too easy nor too difficult. According to Wasik et al. (2020), tailored reading experiences significantly improve learners' understanding and retention of information.

Furthermore, AI-driven instructional strategies support multimodal learning, which integrates text, audio, visuals, and interactive elements to enhance comprehension. For instance, learners can engage with reading materials that include audio narration, visual illustrations, and interactive exercises, thereby catering to different learning styles. Multimodal learning environments have been shown to improve engagement and facilitate deeper understanding of language concepts (Hirsh-Pasek et al., 2015). This approach is particularly useful in insecure contexts where maintaining learners' attention and motivation can be challenging. AI also facilitates personalized learning pathways, enabling learners to progress at their own pace based on their individual abilities. Intelligent tutoring systems monitor learners' performance and provide targeted recommendations to address specific learning gaps. This ensures that learners receive the support they need to improve their literacy skills without being constrained by the pace of traditional classroom instruction. Personalized learning has been identified as a key factor in improving academic outcomes, especially in language education (Li & Wang, 2022).

In addition, AI-driven tools promote independent and self-directed learning, which is essential in environments where teacher support may be limited. Learners can access instructional materials, practice exercises, and feedback independently, thereby taking greater responsibility for their learning. This autonomy not only enhances literacy development but also fosters critical thinking and problem-solving skills. AI-driven instructional strategies provide effective means of enhancing English language literacy by improving writing accuracy, oral communication, reading comprehension, and learner engagement. These strategies are particularly valuable in insecure learning environments where conventional teaching methods are disrupted. However, their effectiveness depends on the availability of technological resources, teacher readiness, and supportive learning conditions.

English Language Literacy Development in Insecure Learning Environments

English language literacy development is a critical component of students' academic success, as it underpins learning across all subject areas. Literacy involves the ability to read, write, listen, and communicate effectively, and it requires consistent exposure to structured instruction and

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meaningful practice. However, in insecure learning environments, where educational activities are frequently disrupted, the development of these essential skills is significantly hindered. Insecurity in Nigeria has led to irregular school attendance, temporary or permanent school closures, and displacement of learners and teachers. These disruptions create gaps in learning continuity, which negatively affect students' literacy development. Research has shown that inconsistent schooling results in learning loss, particularly in foundational skills such as reading comprehension and writing proficiency (McLeod & McCormack, 2021). Students who experience prolonged interruptions in education often struggle to catch up with their peers, leading to persistent academic challenges.

Reading comprehension, which is a fundamental aspect of English language literacy, is particularly affected in insecure environments. Effective reading requires regular practice, access to diverse texts, and guided instruction from teachers. However, students in affected areas often lack access to adequate reading materials and structured learning support. This limits their ability to develop vocabulary, understand texts, and interpret meaning effectively. Studies indicate that limited exposure to reading activities reduces learners' comprehension skills and overall academic performance (Wasik et al., 2020). Writing skills are also adversely impacted by insecurity. Writing development requires continuous practice, feedback, and opportunities for revision. In disrupted learning environments, students receive limited feedback from teachers, which affects their ability to improve grammar, sentence construction, and coherence in writing. As a result, many learners demonstrate poor writing skills, including frequent grammatical errors and limited ability to express ideas clearly. The absence of structured writing activities further exacerbates this challenge.

Similarly, the development of speaking and listening skills is constrained in insecure learning environments. Language learning is inherently interactive, requiring communication between teachers and students, as well as peer interaction. However, insecurity often reduces opportunities for such interaction, as classrooms become less conducive to collaborative learning. In addition, psychological factors such as fear, anxiety, and trauma can affect students' willingness to participate in speaking activities, thereby limiting the development of oral communication skills (Denham & Burton, 2020). Another significant challenge is the lack of qualified teachers and instructional resources in insecurity-affected areas. Displacement of teachers and inadequate staffing in schools reduce the quality of instruction, while limited access

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to textbooks and learning materials further constrains literacy development. In many cases, teachers resort to teacher-centred methods that emphasize rote learning rather than interactive and communicative approaches, which are essential for effective language acquisition (Akinwale & Adepoju, 2022).

Moreover, the digital divide poses an additional barrier to literacy development in insecure environments. While digital learning technologies have the potential to support literacy, many learners lack access to the necessary devices and internet connectivity. This limits their ability to benefit from technology-enhanced learning opportunities, thereby widening the gap between students in stable and unstable regions. Despite these challenges, there is growing recognition of the need for innovative approaches to support literacy development in insecure contexts. AI-driven instructional strategies, as discussed in previous sections, offer promising solutions by providing personalized, flexible, and accessible learning opportunities. By enabling continuous practice, immediate feedback, and interactive engagement, these technologies can help mitigate the negative effects of insecurity on English language literacy development. In view of these realities, it becomes essential to explore how AI-based instructional strategies can be effectively utilized to enhance literacy outcomes among learners in insecure environments. Addressing these challenges requires a combination of technological innovation, policy support, and targeted interventions aimed at improving access to quality education.

Effectiveness of AI-Driven Instructional Strategies on Students' Literacy Outcomes

The application of Artificial Intelligence (AI)-driven instructional strategies has demonstrated significant effectiveness in enhancing English language literacy among students, particularly in environments where traditional teaching methods are disrupted by insecurity. AI-based tools provide structured, consistent, and interactive learning experiences that support the development of key literacy skills, including reading, writing, speaking, and listening.

Adaptive reading platforms enable learners to engage with texts that are tailored to their individual proficiency levels, thereby enhancing understanding and retention. By gradually increasing the complexity of reading materials, these systems support progressive learning and help students develop critical reading skills. Studies have shown that personalized reading experiences significantly improve comprehension, vocabulary acquisition, and overall literacy performance (Wasik et al., 2020). In insecure environments where access to guided reading instruction is limited, such platforms provide valuable support for continuous literacy

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development. Similarly, AI-driven tools have also been effective in improving writing accuracy and proficiency. Automated writing evaluation systems allow learners to receive immediate feedback on grammatical errors, sentence structure, and coherence. This instant feedback enables students to identify mistakes, make corrections, and refine their writing skills independently. Continuous exposure to such feedback has been found to enhance learners' ability to construct meaningful and grammatically correct sentences (Li & Wang, 2022). In contexts where teacher feedback is limited due to disruptions, AI tools serve as reliable alternatives for improving writing competence.

In addition, AI technologies contribute significantly to the development of oral communication skills. Speech recognition applications provide learners with opportunities to practice pronunciation, intonation, and fluency in a controlled and supportive environment. These tools analyse spoken input and provide corrective feedback, helping learners improve their speaking skills over time. Research indicates that such interactive technologies increase learners' confidence and willingness to communicate, which are essential for effective language use (Schmidt & Strasser, 2022). Furthermore, AI-driven instructional strategies enhance learner engagement and motivation, which are critical factors in literacy development. Interactive features such as gamified exercises, conversational agents, and multimedia content make learning more appealing and enjoyable. Engaged learners are more likely to participate actively in learning activities, practice regularly, and retain knowledge. This is particularly important in insecure environments, where students may experience reduced motivation due to unstable conditions (Hirsh-Pasek et al., 2015).

Another key advantage of AI-based instruction is the provision of personalized learning experiences. AI systems monitor learners' progress and adjust instructional content to meet their specific needs. This ensures that learners receive targeted support in areas where improvement is required, thereby enhancing learning outcomes. Personalized learning is especially beneficial in heterogeneous classrooms, where students have varying levels of language proficiency (Li & Wang, 2022). Despite these positive outcomes, the effectiveness of AI-driven instructional strategies is influenced by several factors. Limited access to digital devices, poor internet connectivity, and inadequate teacher training can reduce the impact of AI tools on learning outcomes. In addition, learners' familiarity with technology and their ability to navigate digital platforms also affect the effectiveness of AI-based instruction. The evidence suggests that AI-

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driven instructional strategies play a significant role in enhancing English language literacy by improving reading comprehension, writing accuracy, oral communication skills, and learner engagement. These strategies provide practical and effective solutions for addressing the challenges of literacy development in insecure learning environments, thereby contributing to improved educational outcomes.

Conclusion

This paper examined the effectiveness of artificial intelligence (AI)-driven instructional strategies in enhancing English language literacy among students in insecure learning environments in Nigeria. The study established that insecurity has significantly disrupted the continuity of education, thereby affecting the development of essential literacy skills such as reading, writing, speaking, and listening. These disruptions have created learning gaps that hinder students' academic progress and communication competence. The paper further demonstrated that AI-driven instructional strategies offer practical and innovative solutions for addressing these challenges. Tools such as automated writing evaluators, speech recognition applications, and adaptive reading platforms were found to enhance literacy outcomes by providing immediate feedback, personalized learning experiences, and opportunities for continuous practice. These features enable learners to improve their reading comprehension, writing accuracy, and oral communication skills, even in situations where traditional classroom instruction is limited or unavailable.

In addition, the study highlighted that AI-based learning environments promote learner engagement, motivation, and independence, which are critical for effective literacy development. By allowing learners to interact with instructional content in flexible and interactive ways, AI helps sustain learning in unstable educational contexts. However, the effectiveness of these strategies is constrained by challenges such as inadequate technological infrastructure, high cost of digital devices, and limited teacher competence in the use of AI tools.

Finally, the paper concludes that AI-driven instructional strategies have significant potential to improve English language literacy in insecure learning environments. When properly implemented, these technologies can serve as effective interventions for bridging learning gaps and ensuring continuity in education. However, maximizing their impact requires coordinated efforts in infrastructure development, teacher training, and policy support. A balanced integration

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of AI with conventional teaching approaches will be essential for achieving sustainable and inclusive literacy development in Nigeria.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance the effectiveness of AI-driven instructional strategies in improving English language literacy in insecure learning environments:

1. Educational authorities should promote the adoption of AI-driven tools such as automated writing evaluators, speech recognition applications, and adaptive reading platforms in schools, particularly in insecurity-affected regions. These tools will support continuous literacy development even when traditional classroom instruction is disrupted.
2. Government and stakeholders should prioritize the provision of affordable digital devices, stable internet connectivity, and alternative power sources (such as solar energy) to facilitate the use of AI-based learning systems. This will ensure that students in remote and insecure areas can access digital literacy resources.
3. Teachers should be equipped with the necessary digital and pedagogical skills to effectively integrate AI tools into English language teaching. Regular training programmes and workshops should focus on how to use AI applications for teaching reading, writing, speaking, and listening skills.
4. Developers and educational institutions should design AI-based learning tools that can function offline or with minimal internet access. This will make AI-driven literacy instruction more accessible in areas with poor connectivity.
5. Curriculum planners should integrate AI-supported instructional strategies into English language curricula to promote personalized and interactive learning. This will ensure that AI becomes a structured part of literacy development rather than an optional add-on.
6. Special intervention programmes should be introduced to support students affected by insecurity through mobile learning platforms, community-based digital learning centres, and remote tutoring systems. These initiatives will help bridge literacy gaps caused by disrupted schooling.

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