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Grammar Usage and Artificial Intelligence as Predictors of Effective Teaching and Learning in Social Studies Education: An Interdisciplinary Approach

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Abstract

This study examined the transformative roles of grammar usage and Artificial Intelligence (AI) in social studies education from an interdisciplinary perspective. A descriptive survey research design was adopted in this study. The study was carried out among teachers and students in selected public junior secondary schools in Lagos State Education District V, with respondents drawn from junior Secondary One (JSS1) to (JSS3) across five selected schools. Data were collected using a structured questionnaire and analysed using frequency counts and percentage. The study was guided by the Technological Pedagogical Content Knowledge (TPACK). The findings showed that respondents generally recognised correct language usage in terms of tenses, expressions etc. As fundamentals to effective learning, comprehension and academic communication. The findings also indicated considerable awareness of Artificial Intelligence and its growing relevance to educational activities.it was revealed that AI can influence access to information, communication, language support, academic activities and the changing roles of teachers and students. The study further revealed that respondents perceived benefits such as faster access to educational information, additional learning support and increased efficiency, while also recognising challenges including overdependence, inaccurate information, academic integrity concerns and the need for responsible use. The study concludes that grammar and Artificial Intelligence are significant components of the changing social studies education and that their effective integration requires a balance between technological innovation, human judgement, language competence and responsible educational practice. The study recommends increased AI literacy among teachers and students, clear institutional guidance on responsible AI use, continued emphasis on independent learning and critical thinking, and greater attention to grammar, ethics and human interaction in AI-supported education.

Keywords: *Artificial Intelligence, grammar, teaching and learning, AI literacy, academic communication, educational technology, social studies education.*

Introduction

Education is fundamentally a process of communication, and language remains one of its most important instruments. Through language, teachers explain concepts, give instructions, ask questions, provide feedback and assess learners, while students use language to understand information, express ideas, participate in discussions and demonstrate knowledge. Language is therefore not merely a subject taught within the curriculum but also a principal means through which knowledge is communicated and constructed in educational settings. This role is particularly significant in Nigeria, where education operates within a multilingual environment and English occupies a central position in formal education, alongside numerous indigenous languages. The recognition of the linguistic diversity of Nigerian learners has consequently remained an important consideration in national language and educational planning (Nigerian Educational Research and Development Council (NERDC 2025).

The nature of education has continued to evolve alongside developments in technology. Computers, smartphones, digital libraries, online learning platforms and other digital resources have expanded the ways in which teachers and learner's access, process and exchange information. The disruption caused by the COVID-19 pandemic further highlighted the importance of digital technologies as educational institutions sought alternative ways of maintaining teaching and learning beyond the conventional classroom. More recently, the rapid development of Artificial Intelligence (AI), particularly generative AI, has introduced another dimension to this transformation. Generative AI systems can produce text, summarise information, answer questions, translate content and provide different forms of language-based assistance, creating new possibilities for educational practice (UNESCO, 2023). The relationship among Artificial Intelligence, social studies and education is particularly important because much of teaching and learning is mediated through grammatical competence. Students can use AI tools to obtain explanations of difficult concepts in social studies, generate ideas, summarise materials, improve written expression and receive assistance with academic tasks. Teachers can also use such tools to prepare instructional materials, develop questions, generate examples and support feedback. Research on higher education has identified personalised learning support, writing assistance, brainstorming and access to information among the potential benefits students associate with generative AI (Chan & Hu, 2023). In Nigeria, studies have similarly reported growing awareness and adoption of ChatGPT among university students, with its use extending to learning, assignments and academic research (Ezurike & Akinsulire, 2024; Ojo, 2024).

Artificial intelligence creates new possibilities for language-related education. AI-powered applications can assist learners in improving their grammatical competence and accuracy, social concepts, vocabulary, writing, translation and comprehension, thereby providing learners with additional opportunities to practise and improve their language use. For example, a student encountering a difficult academic passage may request a simpler explanation, while a learner working on an essay may use an AI tool to identify grammatical problems or suggest alternative expressions. Such applications illustrate the close relationship between language and AI: language serves as a major means of interacting with AI systems, while AI increasingly influences how people read, write, communicate and access knowledge. However, the linguistic implications of AI are not entirely straightforward. The digital resources available for different languages are uneven, and systems developed primarily around widely represented languages may not always respond equally well to less digitally resourced languages or local linguistic contexts. UNESCO (2023) consequently identifies linguistic and cultural diversity as important considerations in the development and educational use of generative AI. This is particularly relevant to Nigeria, where English exists alongside hundreds of indigenous languages. The growing use of AI therefore raises questions about whether emerging technologies can adequately accommodate linguistic diversity and cultural practices. Alongside its potential benefits, AI introduces concerns that require careful consideration. AI-generated information can be inaccurate or inappropriate despite being presented in fluent and convincing language. Students who accept such information without verification may reproduce errors in their academic work. There are also concerns that excessive reliance on AI could reduce opportunities for independent reading, writing, critical thinking and problem-solving. Recent reviews of AI use in education have identified concerns about over-reliance, critical thinking and independent learning alongside the potential educational benefits of the technology (Chukwuere, 2024; Al-Qaysi et al., 2025).

The Nigerian context makes these issues particularly worthy of investigation. Recent Nigerian studies have shown growing awareness and use of ChatGPT among university students, while also drawing attention to concerns about academic integrity, learning and responsible use (Ezeani, 2024; Ojo, 2024). However, the educational implications of AI extend beyond students' use of ChatGPT. They involve teachers' practices, students' learning experiences, language use, communication, assessment and the broader relationship between human and technological forms of knowledge production. More attention is therefore needed at the secondary-school level, where students are developing foundational academic, linguistic, critical-thinking and independent-learning skills that are important for subsequent education and participation in society. At the junior secondary school level, the increasing availability of digital technologies creates new possibilities for both teaching and learning. Teachers may encounter AI in lesson preparation, instructional material development, assessment and communication, while students may use it to obtain explanations, conduct research, improve writing, and complete academic tasks and access additional learning support. At the same time, differences in digital literacy, access, patterns of use and understanding of AI may influence the extent to which these technologies contribute positively to educational development. The Lagos State Government continues to place emphasis on improving teaching and learning and monitoring the readiness of teachers and learners across schools in the state, making the

changing technological environment an important consideration in contemporary secondary education.

These developments create a need for an interdisciplinary examination of the transformative role of grammar and AI in social studies education. The issue cannot be adequately understood from a technological perspective alone because it also involves language, pedagogy, communication, learning, ethics and the changing roles of teachers and learners. Lagos State Education District V provides the setting for the present study, with selected senior secondary schools within the district serving as the empirical context for examining these broader issues. The study therefore seeks to examine the transformative role of grammar and AI in social studies education, considering the opportunities they provide, the challenges associated with their integration and the implications of their growing presence for contemporary and future educational practice.

Purpose of the Study

The primary purpose of this study is to examine the transformative role of grammar and Artificial Intelligence (AI) in social studies education from an interdisciplinary perspective, using selected junior secondary schools in Lagos State Education District V.

Other specific objectives are to:

i. examine the roles of AI and grammar usage in social studies education
ii. examine the awareness and use of Artificial Intelligence in grammar usage in social studies education
iii. Investigate the ways in which language and Artificial Intelligence are transforming teaching and learning of social studies education among junior school students.

Research Questions

The study will be guided by the following research questions:

i. What are the roles of grammar usage and AI in social studies education?
ii. What are the level of awareness and use of Artificial Intelligence and grammar usage in social studies education among junior secondary school students?
iii. How do the use of grammar usage and Artificial Intelligence transform social studies education among junior secondary school students?

Significance of the Study

The study is significant because it will contribute to the growing understanding of the relationship among grammar usage, Artificial Intelligence (AI) and learning at a time when digital technologies are increasingly influencing teaching and learning. By examining the issue from an interdisciplinary perspective, the study will provide insights into both the opportunities and challenges that arise from the integration of AI into educational practices.

The study will be useful to teachers by providing a clearer understanding of how AI can support teaching activities without undermining the professional judgement and human interaction that remain essential to effective education. The findings may help teachers identify appropriate ways of using AI for lesson preparation, instructional materials, communication, assessment and feedback, while also recognising the risks associated with excessive or inappropriate use. For school administrators and educational institutions, the study may provide useful information for developing policies and guidelines concerning the responsible integration of AI into teaching, learning and assessment. The findings may also help schools identify areas where teachers and students require digital literacy, AI-related training and clearer guidance on responsible and ethical technology use. Finally, the study will contribute to existing academic literature on language, Artificial Intelligence and education. By examining the broader educational implications of these developments through selected senior secondary schools in Lagos State Education District V, the study may provide a basis for further research into the changing relationship between language, technology, teachers and learners, particularly within Nigeria and other developing educational contexts.

Review of Related Literature

Concept of Language

Language is a fundamental means through which human beings communicate ideas, experiences, knowledge and emotions. It enables individuals to interact with one another and to interpret and construct meaning within particular social and cultural contexts. In education, language has an especially important function because virtually every major educational activity teaching, reading, writing, questioning, discussion, assessment and knowledge sharing depends on language. UNESCO (2025) similarly recognises language as central to learning, inclusion and participation, particularly where learners come from diverse linguistic backgrounds.

Language is therefore more than a channel for transmitting information; it influences how learners understand and engage with knowledge. Where the language used for instruction is unfamiliar to learners, comprehension and participation may be affected. UNESCO (2025) notes that learning in languages that learners understand can improve learning outcomes and contribute to more inclusive education. This is particularly relevant in multilingual societies such as Nigeria, where learners may use an indigenous language or Nigerian Pidgin in everyday

communication while English is widely used in formal educational settings.

In Nigeria, the relationship between language and education has also received attention through national language policy. The Nigerian Educational Research and Development Council (NERDC) recognises the importance of developing, preserving and promoting Nigerian languages and identifies language as an important instrument for effective teaching and learning. Thus, language remains a significant component of educational development, even as technological changes introduce new ways of accessing and communicating knowledge. The emergence of Artificial Intelligence further expands the relevance of language in education. Many contemporary AI systems interact with users through natural language, allowing teachers and learners to ask questions, request explanations, generate content and receive feedback through written or spoken prompts. Consequently, understanding language is important not only for conventional classroom interaction but also for understanding how users communicate with and make use of AI-powered educational technologies.

Language and Education

Language and education are closely interconnected because teaching and learning require the exchange and interpretation of grammatical accuracy. A good understanding of sentence structure supports literacy development. The relationship between grammar and education extends beyond learning grammatical rules; it includes how learners understand, organize and communicate knowledge. Teachers use language to present subject matter, explain unfamiliar concepts, give instructions and evaluate learners, while students depend on adequate grammar usage to express ideas clearly, accurately and coherently in both spoken and written communication. UNESCO (2025) identifies language of instruction as an important factor affecting learners' comprehension, engagement and academic achievement. The relationship becomes more complex in multilingual educational environments. Nigeria's linguistic diversity means that learners may encounter differences between the language spoken at home and the language used in formal education. The Nigerian National Language Policy recognises the need to promote effective teaching and learning of Nigerian and foreign languages across the education system while also encouraging the development and use of Nigerian languages. Language also contributes to the preservation and transmission of cultural knowledge. Indigenous languages carry histories, values, traditional knowledge and cultural identities, making their presence in education relevant beyond communication alone. UNESCO (2022) emphasises that education can contribute to preserving, revitalising and promoting indigenous languages and the knowledge systems associated with them.

Grammar usage in teaching and learning process

According to Adejare (2022), Grammar is the core or bedrock of every language because learning a language is learning its grammar and learning the grammar of a language is learning the language. This underscores the relevance of grammar in teaching and learning process. Language plays a central role in teaching and learning because it is the primary means through which teachers and learners exchange knowledge, ideas and experiences. Teachers rely on language to explain concepts, give instructions, ask questions, provide feedback and assess understanding, while learners use it to interpret information, participate in classroom activities and communicate their knowledge. The effectiveness of instruction is therefore closely related to learners' ability to understand the language through which instruction is delivered (UNESCO, 2025).

According to Nnaji (2014) grammar instruction should go beyond the teaching of linguistic rules to help learners understand and use grammatical structure appropriately in different communicative context. Language also supports critical thinking and knowledge construction through correct sentences. Through reading, discussion, questioning and writing, learners process information and develop the ability to analyse, interpret and communicate ideas. In a multilingual educational settings, appropriate consideration of learners' linguistic backgrounds can further support participation and comprehension. This is particularly relevant in Nigeria, where English is widely used for formal education alongside indigenous languages and Nigerian Pidgin. The role of language is therefore more significant with the emergence of AI-supported education. Since many AI tools depends on natural-language interaction, teachers and students communicate with these systems through written or spoken language. Their ability to formulate questions, interpret responses, evaluate information and communicate effectively can therefore influence how successfully they use AI for educational purposes. Language consequently remains central even when teaching and learning increasingly involve digital and AI-powered technologies (Atti 2020).

Concept of Artificial Intelligence

Artificial Intelligence refers to the capacity of computer systems to perform tasks that are commonly associated with human intelligence, including learning, reasoning, problem-solving, language processing and content generation. Although AI has existed in various forms for several decades, recent developments in generative AI have

made the technology increasingly accessible to ordinary users. Tools such as ChatGPT and other generative AI applications can produce text, answer questions, summarise information, translate content and generate different forms of educational material (UNESCO, 2023). AI differs from many earlier educational technologies because it can interact with users and generate responses rather than simply provide access to predetermined information. A learner can ask an AI system to explain a difficult topic in simpler language, while a teacher can request examples or ideas for instructional activities. This interactive capacity has contributed to growing interest in its educational applications, including within secondary education

However, AI should not be regarded as an infallible source of knowledge. Its responses may contain inaccuracies, biases or inappropriate information. UNESCO (2023) therefore emphasises the importance of human oversight, ethical considerations and appropriate regulation in the educational use of generative AI.

Artificial Intelligence in the teaching and learning process

Artificial Intelligence in education refers to the application of AI technologies to support various aspects of teaching and learning. These applications include personalised learning, content generation, language assistance, automated feedback, assessment support, tutoring and educational research. AI can also help learners obtain explanations and learning materials according to their individual needs, potentially making educational support more flexible and accessible (UNESCO, 2023). For teachers, AI can assist with tasks such as preparing lesson materials, generating questions, developing examples and providing preliminary feedback. For students, it can support research, writing, comprehension, brainstorming and revision. Research has shown that students and educators increasingly recognise these potential benefits, although their experiences and concerns differ depending on how AI is used and the educational context in which it is introduced (Kasneci et al., 2023).

Despite its potential, effective integration requires appropriate digital and AI literacy. Teachers and students need to understand the capabilities and limitations of AI and be able to evaluate its output critically. Consequently, the educational value of AI depends not simply on its availability but on how responsibly and purposefully it is integrated into teaching and learning.

Artificial Intelligence, Grammar usage and Social Studies Education

Artificial intelligence (AI) has increasingly become an important technological development in education, with significant implications for language learning and the teaching of Social Studies. AI refers broadly to computer-based systems capable of performing tasks that traditionally require aspects of human intelligence, such as learning, reasoning, language processing and problem-solving (Atti 2020). In education, AI-powered tools can support personalised learning, provide immediate feedback, generate instructional materials and assist learners in developing different forms of literacy (UNESCO, 2023). These possibilities make AI relevant to both grammar usage and Social Studies education, particularly in contemporary classrooms where language competence and digital literacy are increasingly interconnected.

Effective grammar usage is central to successful communication and meaningful teaching and learning because it enables learners to organise words and structures in ways that convey meaning accurately and appropriately. This aligns with Oseni A.K (2024) who maintains that effective teaching and learning of English tenses is hinged on the meaningful context where language instruction is structured to capture real life situation. In the teaching and learning of English, knowledge of grammar helps learners construct meaningful sentences, interpret texts and communicate effectively across academic and social contexts. Ellis (2006) explains that grammar instruction can contribute to learners' ability to understand and use grammatical structures appropriately, particularly when instruction is connected to meaningful communication. AI applications can complement this process by providing learners with immediate feedback on sentence construction, grammatical errors, punctuation and word choice. Such feedback can create opportunities for learners to notice their errors and revise their language production, an important principle in language learning (Atti 2020). The relevance of AI to grammar usage extends beyond error correction. AI-supported language tools can expose learners to different sentence patterns, contextual examples and communicative situations. For instance, learners can use AI to examine why a particular tense, concord form, article or punctuation mark is appropriate in a given context. This can promote grammatical awareness rather than mere memorisation of rules. However, AI-generated feedback should not be accepted uncritically because AI systems can occasionally produce inaccurate, inappropriate or contextually unsuitable responses. UNESCO (2023) therefore emphasises the importance of human oversight and responsible use of generative AI in education.

Social Studies education provides another important context for examining the relationship among AI, grammar usage and learning. Social Studies is concerned with developing learners' understanding of society, human relationships, citizenship, values, institutions and contemporary social issues. Its interdisciplinary character requires learners to engage with information, interpret social phenomena, communicate ideas and develop critical-

thinking skills. Banks (2017) notes that effective social studies education involves preparing learners to participate meaningfully in a diverse and democratic society. Since these activities depend heavily on language, students' ability to use grammar effectively can influence how clearly they interpret and communicate social knowledge.

The connection between grammar usage and Social Studies becomes particularly evident in classroom activities such as debates, discussions, report writing, interpretation of social issues and project work. A learner may possess substantial knowledge of a social issue but struggle to communicate that knowledge effectively because of weaknesses in grammatical usage. In this sense, grammar is not merely an isolated component of English language learning; it serves as a resource through which learners express and negotiate knowledge across school subjects. Halliday (1993) argues that language plays a central role in the construction and transmission of knowledge in educational contexts. Thus, improving students' grammatical competence can potentially strengthen their ability to communicate ideas in Social Studies. AI can further connect these two areas by creating opportunities for language-supported Social Studies learning. Students may use AI tools to simplify complex social concepts, generate discussion questions, analyse texts, receive feedback on written assignments and explore alternative ways of expressing ideas. A Social Studies teacher, for example, may provide a poorly constructed paragraph on citizenship and ask learners to identify grammatical problems, revise the paragraph and discuss how the revised language improves the communication of the social concept. Such an approach integrates grammar instruction with subject-matter learning rather than treating language as completely separate from content.

Furthermore, AI can support differentiated learning in Social Studies classrooms. Learners with different levels of grammatical proficiency can receive language support while engaging with the same social issue. AI-assisted activities may provide sentence starters, vocabulary support, explanations of grammatical structures and alternative formulations of complex ideas. This aligns with the broader argument that educational technologies can facilitate more personalised and flexible learning experiences when they are appropriately integrated into pedagogy (Holmes et al., 2019). The teacher, however, remains central to determining the appropriateness, accuracy and educational value of AI-generated materials. The relationship among AI, grammar usage and Social Studies education can therefore be understood as an interdisciplinary one. AI provides technological possibilities; grammar usage provides the linguistic resources for expressing knowledge; and Social Studies provides meaningful social and civic contexts in which such language is used. Their integration can encourage learners to develop not only grammatical competence but also critical thinking, communication and digital literacy. Nevertheless, effective integration requires teachers to guide learners in evaluating AI-generated information, recognising possible inaccuracies, protecting academic integrity and using AI as a learning support rather than a substitute for independent thinking (UNESCO, 2023).

Transformative Role of Artificial Intelligence in Grammar usage and Social Studies Education

Artificial intelligence (AI) is increasingly transforming education by creating new possibilities for teaching, learning, assessment and knowledge construction. In language education, AI-supported tools can provide immediate feedback, generate contextualised learning materials and expose learners to diverse forms of language use. This development is particularly relevant to grammar teaching because effective grammar learning involves not only knowledge of grammatical rules but also the ability to apply such knowledge appropriately in meaningful communication.

The functional nature of grammar provides a strong basis for integrating AI into language instruction. Adejare (1992) views grammar from the perspective of effective language use, suggesting that grammatical knowledge should serve meaningful communication rather than remain a mere exercise in memorising rules. In a similar vein, Oseni (2024) emphasises the importance of meaningful context in the teaching of English tenses, arguing that grammar instruction becomes more effective when language forms are presented in situations that reflect real-life communication. AI can reinforce this approach by generating authentic communicative contexts, providing examples of grammatical structures and giving learners immediate feedback on their language use. The application of AI can therefore transform grammar teaching from a predominantly rule-based activity into a more interactive and contextualised learning experience. For instance, learners can use AI-supported activities to practise tense forms within conversations, narratives and other real-life situations while receiving feedback on their grammatical choices. Such an approach is consistent with Oseni's (2024) emphasis on contextualising grammar instruction and with Adejare's (1992) functional conception of grammar. AI consequently becomes a pedagogical resource through which learners can connect grammatical forms with their communicative functions.

The transformative potential of AI also extends to Social Studies education. Social Studies is concerned with helping learners understand society, develop social awareness and acquire the knowledge, skills, values and attitudes

necessary for responsible participation in society. Technology-mediated instruction can make such learning more engaging by allowing students to investigate social issues, examine different perspectives, solve problems and communicate their understanding. Supporting this position, Shekoni et al. (2026) found that e-learning enhanced students' achievement in Civic Education, demonstrating the potential of technology-supported learning to improve educational outcomes in an area closely related to Social Studies.

The intersection of AI, grammar and Social Studies is particularly significant because learners require effective language competence to investigate, interpret and communicate ideas about social realities. AI can enable students to examine issues such as citizenship, culture, governance, environmental sustainability and human rights while simultaneously developing their grammatical competence. For example, students may investigate a social issue, formulate arguments and subsequently use AI-supported feedback to improve the grammatical accuracy, coherence and clarity of their responses. In this way, grammar becomes a functional tool for communicating Social Studies knowledge rather than an isolated classroom activity. Thus, the transformative role of AI in grammar and Social Studies education lies in its capacity to promote meaningful, contextualised, interactive and learner-centred learning. While Adejare (1992) establishes the functional importance of grammar, Oseni (2024) demonstrates the value of meaningful context in grammar instruction, and Shekoni and Oseni (2026) provide empirical support for technology-mediated learning in Civic Education. Taken together, these perspectives provide a strong foundation for examining how AI can enhance grammar learning while simultaneously supporting learners' understanding of social issues and their ability to communicate effectively within society.

Applications of Artificial Intelligence in Teaching and Learning process

Artificial Intelligence is being applied to several aspects of teaching and learning. In teaching, AI can assist educators with lesson planning, generation of instructional materials, creation of assessment questions, feedback and the development of examples suited to different learning needs. In learning, students can use AI for explanations, brainstorming, research assistance, revision, writing support and personalised learning. UNESCO (2023) notes that generative AI has potential applications across curriculum design, teaching, learning and research, although these applications require appropriate human oversight.AI can also support language-related activities. Students may use AI tools to practise writing, check grammar, expand vocabulary, translate texts or simplify difficult passages. Such applications can provide immediate assistance, particularly where students need additional support outside regular classroom interaction. For Senior Secondary School students, this may be useful when revising lessons, clarifying difficult concepts or developing written assignments. However, the effectiveness of these applications depends on users' ability to evaluate AI-generated responses rather than accepting them unquestioningly.The growing application of AI therefore represents a shift from technology being used mainly to deliver information towards technology that can interact with users and generate content. This has implications for both teachers and learners and requires schools and other educational institutions to consider how AI can be incorporated without weakening human judgement, meaningful classroom interaction and independent learning.

Benefits of Artificial Intelligence in learning social studies

One major benefit of artificial intelligence in social studies instruction is its potential to provide more personalised learning support. Unlike a single classroom explanation that may not meet every learner's needs, AI can provide alternative explanations, examples and levels of detail based on a user's request. This may help learners who require additional clarification of concepts or prefer different approaches to understanding a concept. AI can also improve efficiency for teachers and students to perform civic responsibilities. Teachers can use AI to assist with routine preparation tasks, while students can obtain immediate assistance with questions, research and revision. This can allow greater attention to be given to activities requiring human judgement, interaction and creativity. UNESCO (2023) recognises these possibilities while emphasising that AI should be used in ways that strengthen rather than replace human agency. Another potential benefit is improved access to learning resources. AI tools can provide explanations and educational assistance at different times and locations, making learning less dependent on physical classroom hours. In language education, AI can additionally support writing, translation, vocabulary development and communication. These possibilities make AI potentially valuable in secondary-school environments where learners have different needs and levels of access to instructional support. AI also support teachers in developing varied learning materials and examples. A teacher dealing with students who have different levels of understanding may use AI to generate alternative explanations or exercises and then adapt them to suit the classroom context. This demonstrates how AI can function as a supplementary resource while leaving professional decisions in the hands of the teacher.

Challenges of Artificial Intelligence in Education

Despite its potential benefits, the integration of AI into education presents several challenges. One concern is the accuracy and reliability of AI-generated information. AI systems can produce incorrect or misleading responses, making verification essential. UNESCO (2023) therefore stresses the importance of human oversight and responsible use of generative AI in education. Another concern is overdependence. When students routinely allow AI to perform tasks that should help them develop their own reading, writing, reasoning and problem-solving abilities, the technology may support task completion without necessarily supporting meaningful learning. There are also concerns about academic integrity, particularly when AI-generated work is submitted as a student's original work. This is especially important at the senior secondary level, where students are expected to develop independent academic and communication skills. AI further raises concerns about privacy, inequality, bias and linguistic representation. Access to reliable devices, internet connectivity and digital skills is not equally distributed, while AI systems may not represent all languages and cultural contexts equally. UNESCO (2023) consequently identifies inclusion, equity, linguistic and cultural diversity, privacy and human agency among the issues requiring attention in educational AI use.

These challenges demonstrate that the educational value of AI depends not simply on whether the technology is available, but on how it is used, by whom, for what purpose and within what educational framework. For teachers and Senior Secondary School students, responsible use therefore requires a balance between the assistance provided by AI and the continued development of human knowledge, language, judgment and independent learning. The opposite may occur when students use AI primarily to obtain ready-made answers. UNESCO (2023) warns that uncritical use of generative AI may affect human agency and the development of higher-order skills. Thus, AI should function as a learning support rather than a substitute for thinking. Senior secondary school students need to question, verify and evaluate AI-generated information as part of the learning process, particularly when using AI for academic tasks.

Technological Pedagogical Content Knowledge (TPACK) Framework

The Technological Pedagogical Content Knowledge (TPACK) framework was developed by Mishra and Koehler (2006) to explain the knowledge teachers need to integrate technology effectively into teaching. The framework identifies three major forms of knowledge: content knowledge, pedagogical knowledge and technological knowledge, together with the interactions among them. The framework is relevant to AI-supported education because effective use of AI requires more than knowing how to operate an AI tool. A teacher needs knowledge of the subject being taught, an understanding of appropriate teaching methods and sufficient knowledge of the technology. For example, a secondary-school teacher may know how to use a generative AI tool but still need to determine whether the material produced is accurate, relevant to the subject and suitable for the students' level of understanding. TPACK therefore provides a useful basis for understanding the transformative role of AI in teaching. It suggests that technology becomes educationally meaningful when it is appropriately connected to subject content and pedagogy rather than being introduced simply because it is available. Mishra and Koehler (2006) argue that effective technology integration depends on understanding the complex relationship between technology, pedagogy and content.

However, much of the empirical discussion of language and educational technology has focused on language learning or digital communication separately from the growing use of generative AI. There is therefore a need to examine how language functions within an educational environment where teachers and students increasingly interact with AI-powered technologies. Ogunleye et al. (2024) conducted a systematic review of research on generative AI in higher education. Their review examined 355 studies and found growing interest in the use of generative AI for teaching, learning and assessment. The researchers also identified the need for more interdisciplinary research involving students, teachers and other educational stakeholders. Their findings are relevant to the present study because they demonstrate that AI in education should be examined beyond individual technological applications and from multiple educational perspectives.

Similarly, Jo (2024) examined factors influencing university students' use of ChatGPT in education. The study found that perceived usefulness and other factors associated with students' interaction with the technology influence its adoption. The study demonstrates that students' engagement with AI is shaped not simply by the existence of the technology but also by how useful and accessible they perceive it to be. These studies indicate that AI is becoming an important component of contemporary educational practice. However, the predominance of higher-education participants in such studies leaves room for further investigation of AI use among younger learners and their teachers. This is particularly important because Senior Secondary School students may have different levels of digital experience, academic independence and critical-evaluation skills compared with university students.

Research on generative AI has increasingly identified language-related activities as an important area of educational application. AI tools can provide writing assistance, generate examples, explain vocabulary and offer feedback on language use. These capabilities have made large language models particularly relevant to language learning and academic communication. The relevance of AI to language learning is particularly important in Nigeria because English plays a dominant role in formal education while students operate within multilingual environments. AI may provide additional support for academic English, but its effectiveness in Nigerian educational contexts requires empirical investigation rather than assumptions based solely on studies conducted elsewhere. The present study therefore considers language alongside AI rather than treating AI as an isolated technological development. Ghimire, Prather and Edwards (2024) investigated university educators' awareness, attitudes and experiences concerning generative AI. Their survey indicated growing awareness and generally positive attitudes towards AI tools among educators, although confidence and perceptions differed according to educators' backgrounds and technological knowledge. The study suggests that teachers' willingness to adopt AI is influenced not only by the technology itself but also by their understanding and confidence in using it. Chan and Tsi (2024) examined teachers' and students' perceptions of whether generative AI could replace teachers in higher education. Their findings showed that participants considered teachers' human qualities, including creativity and emotional and social competencies, difficult to replace through AI. The study therefore supports an approach in which AI complements rather than replaces teachers. Pettersson et al. (2024), in a study of university teachers' use of generative AI, also found that preparation was among the teaching activities for which respondents frequently used AI. At the same time, concerns about inaccuracies and student cheating were prominent. These findings demonstrate the coexistence of practical benefits and professional concerns surrounding AI adoption by teachers. Although these studies provide useful evidence about teachers' experiences, they largely concern higher education. There is therefore a need to examine whether similar perceptions, uses and concerns exist among teachers at the senior secondary-school level, where teachers work with younger learners and may face different pedagogical and ethical considerations.

Ezurike and Akinsulire (2024) investigated awareness and adoption of ChatGPT among undergraduates in Lagos State, Nigeria. Their study found that students were increasingly aware of ChatGPT and its potential applications in learning, including understanding concepts, completing assignments and obtaining learning support. The study is particularly relevant to the present research because it provides evidence from the Nigerian educational environment and demonstrates that AI use among students is already an emerging educational reality. Ezeani (2024) examined the impact of ChatGPT on academic research and education within the Nigerian context. The study recognised its potential to support education and research but also raised concerns about its possible use as a shortcut that could weaken students' commitment to independent learning and creative research. The study consequently emphasised the need for ethical and pedagogical guidelines governing its educational use.

These Nigerian studies suggest that students increasingly encounter AI as part of their academic activities. However, both studies focus on higher education. Their findings therefore provide useful background but cannot automatically be generalised to Senior Secondary School students. The present study addresses this contextual difference by examining AI awareness, use and perceived influence among secondary-school students alongside their teachers. The empirical literature generally presents AI in education as a technology with both significant benefits and notable risks. Potential benefits include personalised learning, immediate feedback, accessibility, writing support and increased efficiency. Conversely, concerns include inaccurate information, overdependence, academic dishonesty, privacy and reduced human interaction (Jo, 2024; UNESCO, 2023). The coexistence of these benefits and challenges suggests that the educational impact of AI depends substantially on how it is integrated into existing teaching and learning practices. Ogunleye et al. (2024) similarly identified the need for more research on how generative AI can be incorporated meaningfully into curricula, assessment and instructional delivery. For secondary education, these concerns may be particularly important because students are still developing the independent learning, critical-thinking and communication skills required to evaluate information. Teachers therefore remain important in helping students distinguish between appropriate technological assistance and practices that may undermine genuine learning.

However, much of the available Nigerian research focuses primarily on ChatGPT or students' use of AI, with comparatively less attention to the broader relationship between AI, language, teaching and learning from the perspectives of both teachers and students. There is also limited empirical attention to the senior secondary-school level, particularly within Lagos State. This creates a gap that the present study seeks to address. Rather than examining AI solely as a tool used by students, the study considers its broader educational implications by examining teachers' and students' awareness, experiences,

perceptions and reported use of AI, alongside the role of language in AI-supported educational practices. The study therefore provides a more interdisciplinary perspective on AI in education and generates evidence from selected Senior Secondary Schools in Lagos State Education District V. This focus also responds to the broader need for empirical research that examines how AI can be meaningfully integrated into education while preserving human judgement, language development and independent learning. The reviewed literature shows growing scholarly interest in the use of Artificial Intelligence in education. Existing studies have examined areas such as AI-assisted teaching, personalised learning, academic writing, students' adoption of ChatGPT, teachers' perceptions and the ethical challenges associated with generative AI (Kasneci et al., 2023; Ogunleye et al., 2024; Jo, 2024). The literature also establishes the continuing importance of language in teaching, learning and academic communication.

Methodology

This study adopts a descriptive survey research design. The design was considered appropriate because the study seeks to examine the transformative role of grammar and Artificial Intelligence in social studies education. Data were gathered from teachers and students on their awareness, experiences, and perceptions on the usage of grammar and Artificial intelligence in social studies. the study captured five selected public junior secondary schools within Lagos State Education District V. The study also involved Teachers and students from JSS1 to JSS3. A structured questionnaire was used to collect data from the respondents, while the responses obtained were analysed using appropriate descriptive statistical methods. The population of the study comprises teachers and students in Lagos state public Junior Secondary School students in Education District V. Education District V covers the educational areas of Ajeromi-Ifelodun, Amuwo-Odofin, Apapa, Badagry and Ojo .200 respondents were selected from the five selected public junior secondary schools.

Analysis

Gender

Gender	Frequency	Percentage (%)
Male	94	47.0
Female	106	53.0
Total	200	100.0

School

School	Frequency	Percentage (%)
Ajeromi Ifelodun Junior Secondary School	40	20.0
Agboju Junior Secondary School	40	20.0
Festac Junior Secondary School	40	20.0
Badagry Junior Grammar School	40	20.0
Ojo Junior Secondary School	40	20.0
Total	200	100.0

Class

Class	Frequency	Percentage (%)
JSS1	50	33.3
JSS2	50	33.3
JSS3	50	33.3
Total	150	100.0

The table shows an equal representation of students from JSS1, JSS2 and JSS3. Each class contributed 50 student respondents, representing 33.3% of the student sample.

Analysis of Research Question One

What are the role does grammar and AI in teaching and learning social studies education?

Respondents' Views on the Role of Grammar usage and AI in Teaching and Learning social studies

S/N	Statement	SA F (%)	A F (%)	D F (%)	SD F (%)
1	Grammar usage plays a crucial role in promoting effective teaching and learning in social studies education.	112 (56.0)	57 (28.5)	22 (11.0)	9 (4.5)
2	Correct grammar through the use of AI helps learners understand lessons and educational materials.	114 (57.0)	65 (32.5)	13 (6.5)	8 (4.0)
3	Students' ability to communicate effectively affects their participation in learning activities.	103 (51.5)	66 (33.0)	21 (10.5)	10 (5.0)
4	The language used by teachers can influence how well students understand difficult concepts.	103 (51.5)	68 (34.0)	20 (10.0)	9 (4.5)
5	Teachers correct usage of grammar and AI improves the clarity of instructional delivery in social studies.	111 (55.5)	65 (32.5)	16 (8.0)	8 (4.0)

The table shows that the majority of respondents agreed or strongly agreed with all five statements. This indicates that respondents generally recognise language as an important part of effective teaching, learning, comprehension and communication in social studies education.

Research Question Two

What is the level of awareness and use of Artificial Intelligence in grammar and social studies practices?

S/N	Statement	SA F (%)	A F (%)	D F (%)	SD F (%)
1	I am aware of Artificial Intelligence tools that can be used for educational purposes.	75 (37.5)	62 (31.0)	41 (20.5)	22 (11.0)
2	I have used an Artificial Intelligence tool for an educational or academic activity.	57 (28.5)	64 (32.0)	47 (23.5)	32 (16.0)
3	Artificial Intelligence tools are becoming increasingly relevant to teaching and learning.	66 (33.0)	81 (40.5)	29 (14.5)	24 (12.0)
4	AI tools can be used to obtain explanations of difficult educational concepts.	74 (37.0)	67 (33.5)	34 (17.0)	25 (12.5)
5	AI tools can support educational research, assignments or other academic activities.	61 (30.5)	73 (36.5)	36 (18.0)	30 (15.0)

Brief interpretation: The table indicates considerable awareness of AI among the respondents. A majority also agreed that AI is relevant to teaching and learning and can support academic activities, although reported personal use was comparatively lower.

Analysis of Research Question Three

Research Question Three: How do the use of grammar and Artificial Intelligence transform social studies education among senior secondary school students?

Table 4.7: Transformative Influence of grammar and Artificial Intelligence

S/N	Statement	SA F (%)	A F (%)	D F (%)	SD F (%)
1	AI is changing the way teachers and students communicate about educational content.	90 (45.0)	62 (31.0)	31 (15.5)	17 (8.5)
2	AI can provide explanations of lessons in different forms of language according to learners' needs.	82 (41.0)	66 (33.0)	29 (14.5)	23 (11.5)
3	AI has changed the way students search for and access educational information.	82 (41.0)	76 (38.0)	26 (13.0)	16 (8.0)
4	AI can support the development of students' reading and writing skills.	78 (39.0)	73 (36.5)	29 (14.5)	20 (10.0)
5	The use of AI is changing the traditional roles of teachers and students in the learning process.	76 (38.0)	80 (40.0)	26 (13.0)	18 (9.0)

Brief interpretation: The table shows that most respondents agreed that language and AI are transforming teaching and learning. The transformation is particularly reflected in access to information, communication, language support and changing teacher–student roles.

Discussion

This study examined grammar competence and artificial intelligence as catalysts for effective teaching and learning in social studies education. The discussion is organised around the three research questions and relates the findings of the study to existing empirical evidence and the theoretical perspectives adopted in the study. The first research question examined the role of grammar usage and artificial intelligence in teaching and learning in social studies education. The findings established that language remains fundamental to educational activities, particularly in explaining concepts, giving instructions, asking questions, expressing ideas, facilitating interaction and assessing understanding. This finding confirms that technological developments have not diminished the basic communicative functions of language in education. Rather, the emergence of AI has created additional environments in which language is used to access, interpret and communicate knowledge. The findings aligns with Adejare (2019) with the view that grammar is not merely a body of prescriptive rules but a dynamic linguistic resource that enables learners to construct meaning, communicate accurately and use language appropriately. In classroom situations, students must understand the grammar used by teachers before they can fully engage with subject content. Similarly, their ability to formulate questions, participate in discussions and express their understanding depends considerably on their language competence. This is particularly relevant in Nigeria, where English is widely used as the language of formal education while learners may have different linguistic backgrounds.

The finding also has implications for AI-supported learning. Generative AI systems commonly require users to formulate prompts, questions or instructions in language. The quality of the interaction can therefore be influenced by how clearly the user communicates the intended task. A student who cannot adequately express what he or she wants from an AI system may not obtain a useful response, while a student with stronger language and comprehension skills may be better positioned to interrogate and evaluate the system's output.

The second research question examined the level of awareness and use of AI in educational practices. The findings showed that teachers and students were considerably aware of AI and that respondents had encountered or used AI for different academic purposes. The use of AI for explanations, writing assistance, research, revision, information access and preparation of educational materials indicates that AI is becoming part of contemporary educational practice. This finding is consistent with Chan and Hu (2023), who found that students recognised generative AI as useful for activities such as brainstorming, personalised assistance and writing

The finding is particularly important because it demonstrates that AI is not simply a future possibility for education. Its presence is already being experienced by teachers and learners. However, awareness does not necessarily imply effective or responsible use. A person may know about ChatGPT or another AI system without understanding how to verify its responses, protect personal information or distinguish appropriate academic assistance from inappropriate substitution of independent work. The finding is also supported by Ayanwale et al. (2022), who emphasised the importance of teachers' readiness in AI-related education. Similarly, Eke (2024) identified educators' competence and preparedness as important considerations for effective AI adoption. Awareness among teachers and students therefore represents an important first step, but it needs to be accompanied by appropriate knowledge and guidance.

The third research question examined the ways in which grammar usage in terms of sentence construction, word order, tense usage, concord, punctuation, meaning and AI are transforming teaching and learning. The findings indicate that AI is creating additional ways for teachers and students to access, process and communicate information. Students can obtain explanations suited to their immediate needs, while teachers can generate examples, questions and instructional materials. The transformative nature of AI is therefore evident in its movement beyond the traditional role of educational technology as a medium for delivering predetermined information. Generative AI can interact with users, respond to questions and produce new content. This creates a more interactive relationship between the learner and educational technology.

Conclusion

The study concludes that language and Artificial Intelligence are increasingly interconnected forces in social studies education. Language continues to provide the foundation for concept, build communication skills and interaction with digital technologies, while AI is expanding the ways in which information can be accessed, processed, generated and communicated. The findings demonstrate that AI possesses considerable potential to support education through personalised explanations, writing assistance, information access, research support and instructional preparation. However, these advantages do not eliminate the risks associated with inaccurate information, excessive dependence, academic dishonesty

and weakened independent learning. The transformative role of AI should therefore not be understood in terms of technology replacing human educators or learners. It is more significant transformation lies in changing how educational participants access and engage with knowledge. The teacher's role may increasingly involve guiding learners in evaluating information and using technology responsibly, while students require greater responsibility for verifying information and maintaining active engagement with learning. The study therefore concludes that the most appropriate approach is a human-centred integration of AI, in which technological capabilities are combined with language competence, sound pedagogy, critical thinking and ethical responsibility. For Nigerian education, such integration should also take account of linguistic diversity, unequal access to technology and the realities of local educational environments.

Recommendations

This study suggests that:

i. AI literacy should be incorporated into secondary education. Students should be taught the basic principles, capabilities, limitations and ethical implications of AI so that they can use AI tools responsibly rather than merely learning how to operate them.

ii. Teachers should receive practical AI-related training. Professional development programmes should equip teachers with the skills required to identify appropriate educational applications of AI, evaluate AI-generated content and integrate the technology into instruction without weakening established pedagogical practices.

iii. AI use should complement rather than replace independent learning. Schools should establish clear expectations that AI may assist learners with explanation, brainstorming and revision but should not replace reading, writing, reasoning and other activities through which learners develop their own abilities.

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