Educational Advancement and Development Journal (EADJ)
Volume 1 Number 2 December 2025, pp 234-242
E-ISSN: 3104-8390
https://neadafrica.com/journals/neadj

Towards Enhancing Social Studies Education Through the Use of Artificial Intelligence in Junior Secondary Schools in Nigeria

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Abstract

The integration of Artificial Intelligence (AI) into education offers transformative possibilities, particularly for enhancing teaching and learning in developing nations such as Nigeria. This position paper conceptually reviews the potential role of AI in improving Social Studies education at the Junior Secondary School (JSS) level in Nigeria. It examines both the opportunities and the systemic challenges of AI adoption in this educational context. The analysis highlights that AI technologies can revolutionize Social Studies instruction by enabling personalized learning pathways, fostering critical thinking and civic literacy, and creating interactive and engaging learning experiences connected to real-world issues. However, significant structural and pedagogical obstacles hinder effective implementation, including the acute digital divide, inadequate digital infrastructure, limited teacher preparedness, high costs of technology deployment, and pressing ethical concerns surrounding data privacy and algorithmic bias. Despite these challenges, the prospects remain promising if addressed through proactive policy measures, substantial public and private investment in teacher training, and the development of culturally relevant AI tools tailored to the Nigerian educational system. The study recommends a collaborative and phased approach involving government agencies, educators, technology developers, and local communities to ensure the equitable, ethical, and sustainable integration of AI into Social Studies education. It concludes that AI is not a replacement for teachers, but rather a powerful strategic tool to enhance pedagogical practices and equip Nigerian students with essential 21st-century civic and technological skills. Realizing the full potential of AI in Social Studies requires strategic planning and an inclusive policy framework to prevent the exacerbation of existing educational inequalities.

Keywords: Artificial Intelligence, Social Studies Education, Technologies, Technological skills

History:
Received : October 6, 2025
Revised : October 27, 2025
Accepted : November 30, 2025
Published : December 31, 2025
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Publisher: Network for Educational Advancement and Development

INTRODUCTION

The global emergence of Artificial Intelligence (AI) is fundamentally revolutionizing various sectors, and the field of education is no exception. AI technologies have introduced novel possibilities for transforming teaching and learning processes, offering adaptive, personalized, and engaging educational experiences (Holmes et al., 2019; Luckin et al., 2016). In the context of Social Studies education, particularly at the Junior Secondary School (JSS) level in Nigeria, the integration of AI holds significant promise for addressing longstanding pedagogical, curricular, and student engagement challenges.

Social Studies plays a pivotal, non-negotiable role in nurturing civic competence, critical thinking, and socio-cultural awareness among young learners (Obanya, 2014). It is the primary vehicle for transmitting the knowledge, values, and skills necessary for effective democratic and socio-economic participation in the Nigerian society (Adebayo & Abdulrahaman, 2021). However, in Nigeria, the teaching of Social Studies in JSS is often characterized by teacher-centered instruction, reliance on rote memorization, and limited use of innovative instructional resources (Ajayi et al., 2021). Such traditional methods hinder students' active participation, reduce intrinsic motivation, and severely limit the development of higher-order thinking skills essential for navigating complex contemporary societal issues (Ololube, 2016). Consequently,

there is an urgent need to explore innovative pedagogical strategies that can revitalize Social Studies education and make it more relevant, interactive, and impactful.

Artificial Intelligence offers promising avenues for addressing these systemic challenges. AI-powered educational tool such as intelligent tutoring systems (ITS), adaptive learning platforms, natural language processing (NLP) tools, and data-driven learning analytics have been shown globally to enhance students' understanding, engagement, and academic performance (Holmes et al., 2019; Woolf, 2010). For instance, ITS can provide personalized, on-demand feedback tailored to individual learning needs, while virtual simulations and interactive AI-driven resources can immerse students in real-life social and civic scenarios, fostering deeper understanding of complex issues like corruption, federalism, or human rights (Luckin et al., 2016).

Despite these immense potentials, the adoption of AI in Nigerian educational settings faces substantial barriers, including inadequate digital infrastructure, a severe teacher capacity gap, insufficient funding, and legitimate concerns over ethical implications and data privacy (Adebayo & Abdulrahaman, 2021; Okoye et al., 2023). Moreover, the glaring disparities in access to technology between urban and rural schools pose a significant risk of deepening existing educational inequalities (Obi & Oyetoro, 2022). Thus, while AI offers transformative prospects for Social Studies education, its successful and equitable integration requires deliberate policies, massive investment in teacher training, and strategic resource allocation.

This paper, therefore, examined pathways towards enhancing Social Studies education through the strategic use of Artificial Intelligence in Nigerian Junior Secondary Schools. It aimed to identify the specific potential benefits of AI integration, explored the existing and projected challenges, and propose practical, context-specific recommendations for leveraging AI to transform Social Studies into a dynamic, engaging, and future-oriented discipline capable of preparing students for active citizenship in a rapidly changing world.

Artificial Intelligence in Education (AIEd)

Artificial Intelligence (AI) refers to computational systems designed to mimic human cognitive processes, such as learning, reasoning, perception, and problem-solving (Holmes et al., 2019). In educational contexts (AIEd), this encompasses a range of tools and applications, including:

1. Intelligent Tutoring Systems (ITS) that provide one-on-one, customized instruction.
2. Adaptive learning technologies that adjust content and pace based on real-time student performance.
3. Natural Language Processing (NLP) applications for automated feedback on writing and communication skills.
4. Learning analytics that process large datasets to offer insights into student progress and teacher effectiveness (Luckin et al., 2016; Zawacki-Richter et al., 2019).

AI's key strength lies in its ability to analyze complex data in real time and provide hyper-personalized learning pathways for millions of students simultaneously (Ifenthaler & Yau, 2020). Applications of AIEd include: personalized instruction (Roll & Wylie, 2016), automated assessment and feedback (Holmes et al., 2019), immersive learning through virtual reality (Cheng et al., 2020), and robust support for teachers in designing effective pedagogical strategies (Luckin et al., 2016). However, the implementation of AIEd raises significant concerns regarding ethical considerations, data privacy, the widening digital divide, and the urgent need for teacher preparedness (UNESCO, 2021; Obi & Oyetoro, 2022).

Social Studies Education in the Nigerian Context

Social Studies is a multidisciplinary field encompassing elements of history, geography, government, economics, sociology, and cultural studies. Its overarching goal is to foster civic competence, critical thinking, and informed, responsible citizenship (Ajayi et al., 2021). In Nigeria, Social Studies is a compulsory core subject at the JSS level, designed to equip students with the essential knowledge, positive values, and functional skills required for constructive participation in society and national development (Adebayo & Abdulrahaman, 2021).

Despite its crucial mandate, the teaching of Social Studies in Nigerian schools remains overwhelmingly traditional, characterized by: Teacher-centered instructional delivery; Excessive reliance on rote memorization for high-stakes examinations; Limited learner engagement and active participation, and; a chronic lack of innovative, contextualized teaching aids (Nwankwo et al., 2022; Obi & Oyetoro, 2022). These prevailing traditional methods significantly hinder the development of students' crucial critical thinking and problem-solving skills, leading to superficial learning and reduced student interest in a subject vital for the nation's democratic survival (Obi & Oyetoro, 2022).

Opportunities for AI Integration in Social Studies Education in Nigerian Junior Secondary Schools

AI integration presents a unique opportunity to modernize and enhance Social Studies education in Nigeria, addressing persistent challenges like rote learning, resource shortages, and low student engagement (Ajayi et al., 2021). The integration can align Nigeria's JSS curriculum with global standards for 21st-century civic and digital literacy.

1. Personalized and Adaptive Learning Pathways

AI technologies can design truly personalized learning experiences that cater to the diverse learning needs and abilities present in typical large Nigerian classrooms. Intelligent Tutoring Systems (ITS) and AI-driven educational software can analyze student performance data and cognitive patterns in real time to deliver content specifically tailored to each learner's pace and prior knowledge (Holmes et al., 2019; Ifenthaler & Yau, 2020). In Social Studies, such systems can provide differentiated content, identify and immediately correct misconceptions in complex topics (e.g., civic rights, democratic principles, national integration), encourage self-paced learning, and reduce test anxiety. The effectiveness of adaptive learning in increasing knowledge retention, motivation, and academic success is well-documented (Roll & Wylie, 2016).

2. Immersive and Experiential Learning

Social Studies can be profoundly enriched through AI-enabled Virtual Reality (VR) and Augmented Reality (AR) experiences. These immersive technologies move learning beyond the textbook. Students can virtually visit historical Nigerian sites (e.g., the ancient Benin Kingdom, monuments related to Nigeria's independence) or experience simulations of critical historical events (e.g., constitutional conferences, landmark judicial decisions). They can participate in civic simulations, such as mock elections or parliamentary sessions, fostering a deeper, empathetic understanding of complex societal dynamics (Cheng et al., 2020).

3. Automated and Intelligent Assessment Systems

AI technologies can transform assessment practices by introducing automated tools that provide immediate, actionable feedback, a critical element often missing due to large class sizes and teacher workload. AI systems can instantly evaluate students' short-answer responses for factual accuracy and analyse essays for argument quality, coherence, and critical thinking development which are central to Social Studies. This shifts assessment from mere factual recall to the evaluation of higher-order cognitive and metacognitive skills (Holmes et al., 2019), allowing teachers to make timely, data-informed instructional decisions.

4. Enhanced Engagement through Gamification

AI-powered gamification offers exciting ways to make Social Studies interactive and enjoyable, countering the perception of the subject as boring or purely theoretical. AI-driven educational games can simulate historical conflicts or negotiations where students' decisions influence outcomes, or include adaptive quizzes related to Nigerian history, civic responsibilities, and cultural diversity. Gamification has been linked to increased student participation, curiosity, and retention of complex subject matter (Adebayo & Abdulrahaman, 2021).

5. Supporting Inclusive Education and Differentiated Instruction

Nigeria's diverse classrooms, including learners with disabilities, can benefit immensely from AI tools designed for accessibility. AI can offer text-to-speech, speech-to-text, and real-time translation features, making content accessible to students with visual, auditory, or diverse linguistic backgrounds. It can provide cognitive support tools for students with learning disabilities such as dyslexia. This commitment aligns AI with global educational goals of making learning equitable, inclusive, and accessible for all students (UNESCO, 2021).

6. Promoting Data-Driven Teaching Practices

AI-driven learning analytics offer essential support to educators for making evidence-based decisions, particularly valuable in resource-constrained environments. These systems analyse comprehensive student performance data to identify specific topics (e.g., national unity, constitutional development) that consistently challenge a class or a group of students. AI can predict students at risk of underachievement and suggest targeted, personalized interventions and instructional strategies, thereby improving learning outcomes and classroom efficiency (Ifenthaler & Yau, 2020).

7. Overcoming Resource Limitations and Democratizing Access

AI offers a scalable solution to the chronic problem of inadequate teaching materials and infrastructure in Nigerian schools. AI tools can automatically generate culturally appropriate lesson plans, differentiated assessments, and local-context learning materials. Digital libraries, curated by AI, provide vast, high-quality content accessible via mobile devices, even in low-resource contexts. This capability can democratize education, ensuring students in rural areas have access to high-quality content previously limited to urban centers (Okoye et al., 2023).

Challenges and Concerns in Integrating Artificial Intelligence into Social Studies Education in Nigerian Junior Secondary Schools

While the opportunities are significant, the pathway to integrating AI into Nigerian JSS Social Studies is fraught with complex, interconnected challenges spanning technological, infrastructural, pedagogical, and ethical domains (Holmes et al., 2019; UNESCO, 2021; Obi & Oyetoro, 2022).

1. The Acute Digital Divide and Socioeconomic Inequity

Nigeria suffers from a stark digital divide between urban and rural regions, and across socioeconomic lines. While schools in major cities (Lagos, Abuja, Port Harcourt) may have some digital infrastructure, many rural schools in states like Zamfara, Ebonyi, or Benue lack reliable electricity, internet access, and basic digital devices. Only about 35% of secondary schools in rural communities report having any computers, with far fewer possessing functional internet access (Ajayi et al., 2021). AI initiatives risk dramatically exacerbating educational inequalities rather than bridging them (Nwankwo et al., 2022). Additionally, inability to afford home devices for supplementary AI-enhanced learning further deepens the disparity in educational outcomes (Obi & Oyetoro, 2022).

2. High Cost of Implementation and Maintenance

The financial investment required for large-scale AI integration is a major hurdle for the Nigerian public education system. Costs include: Initial procurement of hardware (tablets, VR headsets, and interactive whiteboards); Procuring expensive AI software licenses (e.g., adaptive platforms can cost $10–$30 per student annually) (Holmes et al., 2019); Ongoing maintenance, system updates, and specialized technical support. Also, large-scale AI adoption risks diverting already strained educational budgets from other essential needs (e.g., teacher salaries, classroom maintenance), which requires careful financial planning (Okoye et al., 2023).

3. Insufficient Teacher Digital Literacy and Pedagogical Training

The current capacity of Social Studies teachers to effectively utilize and integrate AI tools is severely limited. Many Nigerian JSS teachers lack the fundamental training required to use sophisticated AI tools, design AI-enhanced learning activities, or interpret data insights from learning analytics. Studies suggest that over 60% of teachers lack confidence in integrating any form of digital technology into their lessons (Nwankwo et al., 2022). Furthermore, Even where digital literacy exists, many teachers lack the specialized pedagogical knowledge on how AI can facilitate critical thinking, civic discourse, and ethical discussions, viewing AI as an add-on rather than an integrated instructional resource (Adebayo & Abdulrahaman, 2021).

4. Critical Infrastructural Challenges

The success of AI is also linked to infrastructural readiness, which remains a key barrier. Frequent, prolonged power outages in many regions render AI tools unusable, highlighting the need for decentralized power solutions (Obi & Oyetoro, 2022). Similarly, slow or unreliable internet access hampers access to essential cloud-based AI platforms and real-time collaboration tools. In addition, overcrowded classrooms and lack of physical security for expensive devices raise the risk of theft and vandalism (Okoye et al., 2023).

5. Data Privacy, Security, and Ethical Concerns

AI applications collect and analyze massive amounts of sensitive student data, creating significant ethical and security risks. Such concerns include the exposure or misuse of students' personal information, learning habits, and behavioral data (UNESCO, 2021). Cybersecurity risks are high, and institutional data protection policies are often weak. While the Nigeria Data Protection Regulation (NDPR) of 2019 exists, many schools lack the resources or expertise to ensure full compliance (Okoye et al., 2023). Given that Social Studies is intrinsically linked to civic values and human rights, ethical lapses in data management carry exceptional weight.

6. Cultural and Contextual Misalignment (Bias)

Many existing AI EdTech tools are developed for Western educational contexts, leading to significant misalignment. The use of historical examples or civic education content that is irrelevant or misaligned with Nigeria's specific sociopolitical realities (e.g., referencing the American Revolution when teaching democracy) risks alienating students (Ajayi et al., 2021). Also, AI systems trained on non-diverse, Western-centric datasets may inadvertently perpetuate biases (e.g., ethnic stereotypes, gender biases, socioeconomic assumptions). In Social Studies, such algorithmic bias could distort historical facts, reinforce harmful stereotypes, and severely undermine the subject's core mission of promoting national unity and unbiased civic education (Holmes et al., 2019).

Recommendations for Enhancing Social Studies Education through Artificial Intelligence in Nigerian Junior Secondary Schools

Integrating AI successfully into Nigerian JSS Social Studies requires a coordinated, multi-stakeholder approach. The following recommendations provide a practical roadmap for equitable, effective, and sustainable adoption.

1. Bridge the Digital Divide through Strategic Infrastructure Investment

Government, in partnership with the private sector (e.g., telecommunication companies), must prioritize the expansion of reliable broadband access, especially in underserved rural and remote areas. The deployment of solar and other renewable energy solutions is critical to ensure stable power supply for all digital learning tools. Subsidized or loan programs should be introduced to make basic digital devices (tablets, laptops) accessible to students from low-income households, funded through state-level EdTech budgets.

2. Develop Localized and Culturally Relevant AI Content

AI must be contextually appropriate to be effective in Social Studies. Federal and State Ministries of Education must mandate that AI applications for Social Studies be developed in strict alignment with the Nigerian Social Studies curriculum, incorporating Nigerian history, civic topics, indigenous languages, and local case studies. Also, Government and donor agencies should create dedicated grants, innovation hubs, and tax incentives to support local Nigerian developers in designing culturally relevant, cost-effective AI educational tools that address unique Nigerian learning needs (Obi & Oyetoro, 2022).

3. Institutionalize Comprehensive Teacher Professional Development

Teachers are the single most important factor for AI success and must be empowered. Mandatory, nationwide capacity-building programs should train Social Studies teachers in

basic AI concepts, the use of AI-powered educational tools, and, crucially, the pedagogical integration of AI to promote critical thinking and discussion. Training must be tailored to Social Studies, helping teachers design discussion-based lessons using AI-generated data, address the ethical and civic implications of AI with students, and facilitate active, participatory learning experiences (Nwankwo et al., 2022).

4. Establish Robust Data Protection and Ethical Guidelines

The ethical risks of AI must be proactively managed, particularly in a subject focused on civic rights. Educational institutions must be adequately funded and equipped to comply with the Nigeria Data Protection Regulation (NDPR, 2019), implementing secure data management systems and transparently obtaining clear consent from students and parents. Policy guidelines must ensure that AI tools used in Social Studies are trained on diverse datasets reflecting Nigeria's cultural and social realities to actively prevent bias in content and assessment (Holmes et al., 2019). An ethical review board for EdTech tools should be established by the National Educational Research and Development Council (NERDC).

5. Adopt a Phased and Sustainable Implementation Approach

Implementation must be systemic and sustainable, and not a series of short-lived pilot projects. AI tools must first be tested through comprehensive pilot initiatives in diverse school contexts (urban, rural, low-income, high-income) to gather feedback, identify unforeseen challenges, and refine solutions before large-scale rollout. AI integration must be included into national and state education policy frameworks (e.g., the National Policy on Education) and funded through dedicated, non-donor-dependent budget lines for EdTech and AI innovations.

6. Foster Critical Engagement and Research

Social Studies curriculum updates should explicitly mandate the inclusion of digital literacy, encouraging students to critically engage with digital tools, including topics on AI ethics and its civic implications (UNESCO, 2021). Encourage universities and research institutes to study AI's impact on Social Studies learning outcomes, identify best practices for blending traditional methods with AI, and use these findings to inform national policies and teacher training programs.

CONCLUSION

The integration of Artificial Intelligence (AI) into Social Studies education in Nigerian Junior Secondary Schools presents an unprecedented and essential opportunity to revolutionize teaching and learning processes. AI possesses the potential to profoundly enhance personalized learning, cultivate critical thinking, and engage students in interactive, contextually relevant civic education experiences. AI tools can transform traditional, rote-based Social Studies pedagogy into a dynamic, learner-centred discipline, making abstract civic concepts more relatable and accessible for young learners. However, this journey towards AI integration is heavily conditional and demands strategic foresight. Structural deficits, including the pervasive digital divide and infrastructural challenges, limited teacher capacity, and legitimate data privacy concerns, pose significant threats that could easily deepen existing educational inequalities if not meticulously addressed. Ultimately, AI must be viewed not as a replacement for the committed Nigerian Social Studies teacher but as a powerful, enabling ally capable of supporting educators in delivering engaging and transformative learning experiences. When implemented with strategic foresight, inclusivity, and an unwavering focus on civic and ethical integrity, AI can significantly contribute to building an informed, critically minded, and civic-

conscious generation prepared to participate actively in Nigeria's democratic and socio-economic development. The future of Social Studies education in Nigeria lies in a carefully balanced approach that combines technological innovation with pedagogical sensitivity and ethical responsibility.

RECOMMENDATIONS

To effectively harness AI's potential, stakeholders including federal and state governments, educators, technology developers, and communities must prioritize:

1. Massive investment in resilient digital infrastructure and power supply.
2. The development of culturally relevant and localized AI educational content.
3. Robust, sustained professional development for teachers focused on AI literacy and pedagogical integration.
4. The establishment of strong ethical and regulatory frameworks to safeguard data privacy and ensure algorithmic fairness.

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