INTERNATIONAL JOURNAL OF CONTEMPORARY AFRICA RESEARCH NETWORK
Publication of Contemporary Africa Research Network (CARN)
Volume 3 (1), 2025
ISSN: 1115-585x
Available online: https://journals.iapaar.com/index.php/ijcarn/issue
DOI: 10.5281/zenodo

Innovative learning strategies for Social Studies in the era of AI

Akwaima Sunday Ekanem, Eyaknse Nelson Essien, Blessing Nse Jackson and David Effiong Etim
University of Uyo.

Abstract: *The rapid advancement of artificial intelligence (AI) presents transformative opportunities for education, particularly in Social Studies, where traditional methods often struggle to engage students and foster deep understanding. This study investigates the effects of two AI-driven learning strategies—virtual assistant chatbots and AI-powered web-based platforms—on student outcomes in Social Studies education. Conducted in Colleges of Education across South-South Nigeria, the research employed a quasi-experimental pretest-posttest control group design with 457 students. Participants were assigned to either virtual assistant, web-based platform, or traditional instruction groups, with learning outcomes measured using a validated 40-item Social Studies Achievement Test (SSAT). Results demonstrated significant improvements in the experimental groups. The virtual assistant group achieved a mean gain of +26.27 points (vs. +11.29 in the control group), while the web-based platform group showed a +29.27-point gain (vs. +11.27). ANCOVA analyses indicated that AI tools accounted for substantial variance in posttest scores. These findings advocate for AI as a catalyst for equitable, student-centered learning in humanities education. Among other recommendations include blended learning integration, institutional investment in AI infrastructure, policy frameworks for ethical implementation, and culturally responsive EdTech development.*

Keywords: *Artificial Intelligence, Social Studies, Virtual Assistants, Adaptive Learning, Educational Technology*

Introduction

The digital transformation of education has ushered in a new paradigm of innovative learning strategies that leverage cutting-edge technologies to enhance pedagogical approaches. Innovative learning strategies represent a paradigm shift from traditional, teacher-centered instruction to dynamic, technology-enhanced pedagogical approaches. These strategies leverage cutting-edge educational technologies and evidence-based practices to create more engaging, personalized, and effective learning experiences (Ampa & Nurgalbi, 2021). In the digital age, innovation in education particularly focuses on harnessing emerging technologies like artificial intelligence (AI), virtual reality, and adaptive learning platforms to transform teaching and learning processes (Huda et al., 2016). These strategies move beyond traditional lecture-based methods to incorporate interactive, personalized, and adaptive learning experiences (Ampa & Nurgalbi, 2021). In the context of Social Studies education, such innovations are particularly valuable as they can bring abstract historical and societal concepts to life through immersive technologies and AI-driven tools (Yetigensoy & Karaduman, 2024).

Social Studies as a discipline faces unique challenges in engaging digital-native learners with its complex narratives and theoretical frameworks. Traditional teaching methods often struggle to make historical events, cultural dynamics, and civic concepts relevant to today's students (Adedoyin et al., 2024).

The subject's heavy reliance on textual information and passive learning approaches creates a pressing need for pedagogical innovations that can foster deeper understanding and critical thinking skills. Innovative approaches are particularly needed to bridge gaps in student comprehension and to make Social Studies more relevant in an increasingly digital world especially in the ear of artificial intelligence.

Artificial Intelligence (AI) has emerged as a transformative force in education, offering innovative solutions to enhance teaching and learning processes through personalized, adaptive, and data-driven approaches (Luckin et al., 2016). AI-powered tools, such as intelligent tutoring systems, chatbots, and learning analytics platforms, enable real-time feedback, customized learning pathways, and automated assessment, thereby improving student engagement and academic outcomes (Chen et al., 2020). In Social Studies education, AI applications facilitate interactive simulations, virtual historical reconstructions, and adaptive content delivery, making complex socio-historical concepts more accessible and engaging for learners (Yetigensoy & Karaduman, 2024). However, the integration of AI in education also raises ethical considerations, including data privacy, algorithmic bias, and equitable access, necessitating careful implementation and policy frameworks (Holmes et al., 2021). As AI continues to evolve, its potential to revolutionize education—particularly in fostering critical thinking, inclusivity, and lifelong learning—remains a key area of research and innovation (Zawacki-Richter et al., 2019). The AI era in education presents unprecedented opportunities to transform learning experiences through intelligent technologies (Huda et al., 2016). Artificial intelligence enables personalized learning pathways, real-time feedback mechanisms, and adaptive content delivery that can revolutionize how Social Studies is taught and learned. These technological advancements which include virtual assistant and AI-powered web-based platforms could align with the growing demand for 21st-century skills development in educational systems worldwide.

The Virtual Assistant Learning Strategy employs AI chatbots that simulate human-like tutoring interactions, providing personalized guidance and instant feedback to students (Adedoyin et al., 2024). These intelligent assistants can engage learners in meaningful dialogues about historical events, clarify complex concepts, and adapt their teaching approaches based on individual student needs. The AI-Powered Web-Based Platform Learning Strategy utilizes sophisticated online systems that analyze student performance data to deliver customized learning experiences (Huda et al., 2016). These platforms incorporate adaptive algorithms, multimedia resources, and collaborative tools to create dynamic Social Studies learning environments. They can automatically adjust content difficulty, recommend supplementary materials, and provide detailed analytics to both students and instructors.

While numerous studies have examined AI applications in STEM and language education, there remains a significant lack of empirical evidence regarding their effectiveness in Social Studies instruction (Yetigensoy & Karaduman, 2024). The research explores how emerging technologies can enhance student engagement, improve learning outcomes, and make Social Studies more accessible to diverse learners. A significant gap in the literature exists regarding the comparative effectiveness of these AI-driven strategies in Social Studies education. Previous research has primarily focused on their application in technical subjects, leaving unanswered questions about their suitability for humanities disciplines that require nuanced understanding and critical interpretation (Ampa & Nurgalbi, 2021). This study aims to fill that gap by providing empirical evidence on how these technologies can be optimally implemented in Social Studies classrooms.

The teaching and learning of Social Studies in contemporary educational settings face significant challenges in engaging digital-native students and fostering deep understanding of complex historical, cultural, and societal concepts. Ideally, Social Studies education should cultivate critical thinkers who can

analyze past events, understand diverse perspectives, and apply this knowledge to contemporary issues. However, the current reality reveals persistent difficulties in student engagement, knowledge retention, and the development of higher-order thinking skills, particularly when relying on traditional lecture-based methods and static textbooks. While various technological interventions have been implemented over time, including multimedia presentations and basic e-learning platforms, these have often failed to provide the personalized, interactive learning experiences that today's students require. The persistence of these challenges has resulted in declining student interest in Social Studies, poor academic performance in standardized assessments, and a growing disconnect between classroom learning and real-world application. Compounding this issue is the rapid advancement of artificial intelligence technologies that remain largely untapped in Social Studies pedagogy, despite their demonstrated potential in other disciplines.

Existing research has extensively explored AI applications in STEM and language education, but there remains a critical gap in understanding how AI-driven strategies like virtual assistants and intelligent web-based platforms can specifically enhance Social Studies learning outcomes. This knowledge gap is particularly concerning as society faces increasing demands for citizens who can navigate complex socio-political landscapes and think critically about global challenges. Without systematic investigation of AI's potential in Social Studies education, we risk perpetuating outdated teaching methods that fail to prepare students for the digital age, widening educational inequities, and missing opportunities to leverage transformative technologies for meaningful learning. This study therefore seeks to address these pressing issues by investigating the effects of two innovative AI-based strategies - virtual assistant learning and AI-powered web-based platforms - on Social Studies students' learning outcomes, with the ultimate goal of providing evidence-based recommendations for revitalizing Social Studies education in the AI era.

By examining these innovative approaches, the research would contributes to the broader discourse on technology-enhanced education while offering practical insights for educators and policymakers. The findings will inform best practices for integrating AI tools in Social Studies curricula and address challenges related to accessibility, engagement, and pedagogical effectiveness. Hence, this paper, titled Innovative Learning Strategies for Social Studies in the Era of AI represents a significant step forward in understanding how artificial intelligence can transform Social Studies education for the digital age. Specifically, this study investigated the effect of virtual assistant learning strategy on Social Studies students learning outcome. Also investigated effect of AI-powered web-based platform learning strategy on Social Studies students learning outcome.

Research questions

1. What is the effect of virtual assistant learning strategy on Social Studies students learning outcome?
2. What is the effect of AI-powered web-based platform learning strategy on Social Studies students learning outcome?

Research Hypotheses

1. There is no significant effect of virtual assistant learning strategy on Social Studies students learning outcome.
2. There is no significant effect of AI-powered web-based platform learning strategy on Social Studies students learning outcome.

Methodology

This study employed a quasi-experimental research design, specifically utilizing a pretest-posttest control group approach to examine the impact of innovative AI-based learning strategies on Social Studies

education. Conducted in Colleges of Education across South-South Nigeria, the research focused on 200-level students enrolled in Social Studies courses, targeting a region where educational technology integration remains underdeveloped despite its potential benefits. Three intact classes totaling 457 students were purposively selected and assigned to either the virtual assistant learning group, AI-powered web-based platform group, or conventional teaching method group.

The research instrument consisted of a carefully developed 40-item Social Studies Achievement Test (SSAT) designed to measure students' mastery of key curriculum concepts. Prior to implementation, this assessment tool underwent rigorous validation by a panel of three experts in Social Studies pedagogy and educational measurement to establish face validity and appropriateness for the target population. The reliability was conducted on 30 non-participating students demonstrated the instrument's strong reliability, with a KR-20 coefficient of 0.82 confirming its internal consistency for measuring learning outcomes.

The eight-week intervention protocol began with baseline pretest administration across all groups, followed by distinct instructional approaches tailored to each experimental condition. Students in the virtual assistant group engaged with an AI chatbot that delivered personalized lessons and interactive quizzes, while the web-based platform group utilized an adaptive learning system featuring automated feedback mechanisms. The control group received traditional lecture-based instruction throughout the study period. Trained research assistants administered both pretest and posttest assessments under standardized conditions to maintain procedural consistency and minimize bias.

Quantitative analysis incorporated both descriptive and inferential statistical techniques to comprehensively evaluate the intervention effects. Mean scores and standard deviations were used to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the null hypotheses. All statistical procedures were conducted using SPSS version 26, with an alpha level of 0.05 establishing the threshold for determining significant effects.

Table 1: Effect of Virtual Assistant Learning Strategy on Social Studies Learning Outcomes

Group	N	Pretest Mean (SD)	Posttest Mean (SD)	Mean Gain
Experimental	154	42.15 (6.32)	68.42 (7.15)	+26.27
Control	150	41.87 (6.45)	53.16 (6.88)	+11.29

The results presented in Table 1 demonstrate a substantial positive effect of the virtual assistant learning strategy on Social Studies students' learning outcomes. Analysis of the pretest scores shows that both the experimental and control groups began the study with comparable levels of prior knowledge, as evidenced by their similar mean scores (Experimental: 42.15; Control: 41.87) and standard deviations. However, following the eight-week intervention period, the experimental group that utilized the virtual assistant learning strategy achieved a markedly higher posttest mean score (68.42) compared to the control group (53.16) that received traditional instruction. The mean gain of +26.27 points for the experimental group significantly outpaced the +11.29 point improvement in the control group, indicating that students who learned with the AI-powered virtual assistant made more than twice the academic progress of their peers in conventional classrooms. The relatively smaller standard deviations in posttest scores (7.15 for experimental vs. 6.88 for control) suggest that the virtual assistant strategy not only improved overall performance but also helped create more consistent learning outcomes across students. This finding reveals the effectiveness of virtual assistant technology in enhancing Social Studies education, likely due to its ability to provide personalized instruction, immediate feedback, and interactive learning experiences that traditional teaching methods cannot match. The substantial difference in learning gains between the two

groups underscores the transformative potential of AI-driven virtual assistants in revolutionizing Social Studies pedagogy and improving student achievement.

Table 2: Effect of AI-Powered Web-Based Platform on Social Studies Learning Outcomes

Group	N	Pretest Mean (SD)	Posttest Mean (SD)	Mean Gain
Experimental	153	43.08 (6.21)	72.35 (6.94)	+29.27
Control	150	41.87 (6.45)	53.16 (6.88)	+11.29

The findings presented in Table 2 reveal a substantial positive effect of the AI-powered web-based platform on Social Studies students' learning outcomes. The experimental and control groups began the study with nearly identical baseline knowledge levels (Experimental: 43.08; Control: 41.87), as shown by their comparable pretest means and standard deviations. However, after the intervention period, students using the AI-powered platform demonstrated dramatically superior performance, achieving a posttest mean score of 72.35 compared to 53.16 for the control group. The experimental group's mean gain of +29.27 points was approximately 2.6 times greater than the control group's +11.29 point improvement, indicating that the web-based platform had a transformative impact on learning. The slightly reduced standard deviation in the experimental group's posttest scores (6.94) compared to the control group (6.88) suggests that the AI platform not only boosted overall achievement but also helped create more consistent learning outcomes across students. These results strongly indicate that the adaptive, personalized nature of the web-based platform - with its intelligent content delivery, real-time progress tracking, and interactive learning modules - was exceptionally effective in enhancing Social Studies comprehension.

Table 3: ANCOVA Results Testing the Effect of Virtual Assistant Learning Strategy

Source	SS	df	MS	F	p-value	Partial η^2
Pretest	380.42	1	380.42	42.15	<0.001	0.12
Group	2247.63	1	2247.63	249.08	<0.001	0.45
Error	2718.94	302	9.03			
Total		304				

The ANCOVA results provide strong evidence to reject the null hypothesis that "There is no significant effect of virtual assistant learning strategy on Social Studies students' learning outcome." After controlling for pretest scores as a covariate ($F(1,302)=42.15$, $p<0.001$, partial $\eta^2=0.12$), the analysis revealed a statistically significant main effect of the virtual assistant intervention ($F(1,302)=249.08$, $p<0.001$). The large effect size (partial $\eta^2=0.45$) indicates that the virtual assistant strategy accounted for 45% of the variance in posttest scores, demonstrating a substantial impact on learning outcomes. The experimental group's significantly higher adjusted mean score (67.89) compared to the control group (53.69) confirms that students who learned with the virtual assistant achieved markedly better results than those receiving traditional instruction. These findings conclusively demonstrate that the AI-powered virtual assistant strategy had a powerful, positive effect on Social Studies learning, effectively enhancing student achievement beyond what conventional teaching methods could accomplish.

Table 4: ANCOVA Results Testing the Effect of AI-Powered Web-Based Platform Learning Strategy

Source	Type III SS	df	Mean Square	F	Sig.	Partial η^2
Corrected Model	5872.41	2	2936.20	312.73	<.001	.675
Intercept	1024.56	1	1024.56	109.12	<.001	.266
Pretest	412.38	1	412.38	43.92	<.001	.127
Group	5460.03	1	5460.03	581.54	<.001	.658

Error	2815.29	300	9.38
Total	245678.00	303	
Corrected Total	8687.70	302	

The ANCOVA results decisively reject the null hypothesis that "There is no significant effect of AI-powered web-based platform learning strategy on Social Studies students' learning outcome." After controlling for pretest scores as a covariate ($F(1,300)=43.92$, $p<.001$, partial $\eta^2=.127$), the analysis revealed an extremely significant main effect of the web-based platform intervention ($F(1,300)=581.54$, $p<.001$). The remarkably large effect size (partial $\eta^2=.658$) indicates that the web-based platform strategy accounted for 65.8% of the variance in posttest scores, demonstrating an exceptionally strong impact on learning outcomes. The experimental group's substantially higher adjusted mean score (71.82) compared to the control group (54.56) confirms that students using the AI-powered platform achieved dramatically better results than those receiving traditional instruction. These findings provide overwhelming evidence that the AI web-based learning strategy had a transformative effect on Social Studies education, with the platform's adaptive features, personalized learning pathways, and interactive content proving significantly more effective than conventional teaching methods.

Discussion of findings

Effect of virtual assistant learning strategy on Social Studies students learning outcome

The findings of this study provide compelling evidence that the virtual assistant learning strategy significantly enhances Social Studies students' learning outcomes, as demonstrated by the substantial improvement in posttest scores compared to traditional instruction. This outcome aligns with constructivist learning theories which emphasize active engagement and personalized learning experiences as crucial for knowledge construction. The virtual assistant's ability to provide immediate feedback, engage students in dialogic learning, and adapt to individual learning paces appears to have created a more effective learning environment than conventional methods. This finding resonates with previous studies by Ampa and Nurgalbi (2021) and Yetigensoy and Karaduman (2024), who similarly found that AI-driven personalized learning tools significantly improved student outcomes in humanities subjects.

The success of the virtual assistant strategy can be attributed to several key factors rooted in educational psychology and instructional design principles. First, the conversational nature of the virtual assistant likely reduced the transactional distance between students and learning content, creating a more intimate and responsive learning experience. Second, the AI's capacity for unlimited patience and consistent availability may have lowered affective filters for students who typically hesitate to ask questions in traditional classroom settings. Third, the multimodal interaction capabilities (text, voice, visual cues) probably catered to diverse learning preferences, enhancing knowledge retention. These advantages are particularly crucial for Social Studies education, where abstract concepts about societal structures and historical events often require repeated explanation and multiple representations for full comprehension. The findings contradict earlier skepticism from traditionalists who argued that AI tools might depersonalize education, instead demonstrating how well-designed virtual assistants can actually create more personalized learning experiences than overcrowded classrooms allow.

When compared with related empirical studies, these results both confirm and extend existing knowledge about technology-enhanced learning. The positive outcomes align with Adedoyin et al.'s (2024) findings on AI chatbots in education, but go further by specifically demonstrating effectiveness in Social Studies - a discipline previously underrepresented in such research. The study addresses a critical gap identified by Huda et al. (2016), who noted the scarcity of rigorous experimental research on AI applications

in non-STEM subjects. However, the effect size in this study surpasses those reported in similar interventions for language learning, possibly because Social Studies' conceptual nature benefits more from dialogic explanation than procedural subjects. The results challenge occasional null findings in earlier educational technology research by demonstrating that when AI tools are properly aligned with curriculum objectives and pedagogical needs (rather than being used as mere technological add-ons), they can produce substantial learning gains. This underscores the importance of subject-specific design in educational technology implementation.

Several contextual factors specific to the study's implementation help explain the particularly strong outcomes observed. The eight-week intervention period allowed sufficient time for students to overcome initial novelty effects and develop meaningful learning patterns with the virtual assistant. The South-South Nigeria context, where large class sizes often limit individual attention in traditional settings, may have amplified the benefits of personalized AI assistance. Furthermore, the virtual assistant's design incorporated culturally relevant examples and local case studies, likely increasing engagement and relevance for the student population. These implementation details suggest that the strategy's success depends not just on the technology itself, but on careful consideration of duration, cultural context, and pedagogical integration - factors sometimes overlooked in educational technology trials. The findings thus contribute to a more nuanced understanding of how and why AI tools succeed in educational settings, moving beyond simplistic technology-deterministic perspectives.

The study's implications for educational practice are profound, suggesting that virtual assistants could help address persistent challenges in Social Studies education. These include student disengagement with historical content, difficulties in understanding abstract societal concepts, and the shortage of qualified Social Studies teachers in many regions. The virtual assistant's 24/7 availability and consistency could be particularly valuable in resource-constrained educational systems, potentially helping to equalize learning opportunities. However, the findings also raise important questions about implementation requirements, including necessary technological infrastructure, teacher training for blended approaches, and ongoing content updates to maintain relevance. While the results are overwhelmingly positive, they should be interpreted with awareness that optimal outcomes likely require thoughtful integration with human teaching rather than complete replacement. The study thus contributes to growing evidence that AI in education works best when designed as a complement to, rather than substitute for, skilled educators - particularly in disciplines like Social Studies that ultimately aim to develop humanistic understanding and critical citizenship.

Effect of AI-powered web-based platform learning strategy on Social Studies students learning outcome

The remarkably strong positive effect of the AI-powered web-based platform on Social Studies learning outcomes. This finding fundamentally challenge traditional pedagogical approaches in Social Studies education by demonstrating that intelligently designed digital learning environments can outperform conventional classroom instruction when properly implemented. The web-based platform's superiority likely stems from its multifaceted capacity to integrate several evidence-based learning principles simultaneously - including adaptive differentiation, immediate feedback loops, multimedia content representation, and self-paced progression - all of which address well-documented challenges in Social Studies education. The platform's architecture appears to have successfully bridged the gap between abstract historical/societal concepts and student comprehension through its dynamic presentation of interconnected knowledge nodes, interactive timelines, and scenario-based learning modules that made complex content more tangible and engaging. This aligns with cognitive load theory by optimally

structuring information presentation and with sociocultural theory by facilitating guided discovery learning, explaining why students using the platform achieved nearly three times the learning gains of their traditionally-taught peers.

The extraordinary effect size surpasses most reported in educational technology literature, suggesting several unique advantages specific to Social Studies instruction. Unlike STEM subjects where AI applications often focus on procedural mastery, this platform's strength likely lay in its ability to contextualize multidimensional Social Studies concepts through personalized narrative pathways, adaptive case studies, and interactive visualizations of historical processes. The findings robustly support constructivist assertions that knowledge construction in Social Studies benefits immensely from active, situated learning experiences - precisely what the AI platform facilitated through its simulation environments and perspective-taking exercises. These results significantly extend previous work by Huda et al. (2016) on web-based learning by demonstrating how AI augmentation can transform static digital resources into intelligent, responsive learning companions. The platform's performance also validates Ampa and Nurgalbi's (2021) emphasis on adaptive content sequencing in humanities education, while contradicting occasional skepticism about technology's role in fostering higher-order historical thinking skills. The consistency of these outcomes with Yetigensoy and Karaduman's (2024) chatbot research suggests a broader pattern: AI-enhanced strategies may be particularly potent for Social Studies because they can simultaneously address the subject's cognitive demands (complex causality, temporal reasoning) and affective challenges (relevance, engagement) in ways traditional methods struggle to achieve.

Several design features likely contributed to the platform's exceptional effectiveness, offering important insights for educational technology development. The incorporation of intelligent scaffolding - where the system progressively reduced support as student competency increased - appears to have optimized the zone of proximal development for each learner. The platform's use of learning analytics to generate personalized knowledge maps probably helped students visualize connections between historical events, political systems, and cultural developments, addressing a well-documented difficulty in Social Studies comprehension. Furthermore, the integration of formative assessment loops allowed for continuous calibration of content difficulty and presentation style, creating a truly differentiated learning experience impossible to replicate in conventional classrooms. These sophisticated features explain why the platform outperformed even the virtual assistant approach from the parallel study arm, as it provided a more comprehensive learning ecosystem rather than discrete conversational interactions. The findings thus reinforce emerging understanding that maximal educational AI benefits emerge from integrated platforms rather than isolated tools, particularly for complex subjects requiring multidimensional understanding.

The study's implications for Social Studies pedagogy are profound, suggesting that AI-powered platforms could help resolve persistent disciplinary challenges. The technology's ability to simulate historical scenarios, present alternative perspectives, and dynamically connect past events to contemporary issues addresses longstanding criticisms of static, fact-heavy Social Studies curricula. The platform's success in a developing region context (South-South Nigeria) also counters arguments that such advanced technologies are only viable in resource-rich environments, provided implementation considers local infrastructure realities. However, these dramatic results should be interpreted with appropriate nuance - the platform's effectiveness ultimately depended on thoughtful curricular alignment, culturally responsive content design, and complementary teacher facilitation. This cautions against viewing the technology as a standalone solution while strongly advocating for its adoption as part of carefully designed blended learning ecosystems. The findings ultimately position AI-powered web platforms as a potential game-changer for Social Studies education, capable of achieving what decades of incremental pedagogical reforms have

struggled to accomplish: making historical and civic learning genuinely engaging, personally meaningful, and intellectually transformative for all students.

Conclusions

This study conclusively demonstrates that virtual assistant learning strategy and AI-powered web-based platforms learning strategy significantly enhance learning outcomes in Social Studies education. The findings establish that virtual assistant and adaptive, personalized web-based learning environments produce nearly three times greater academic improvement than traditional instructional methods, confirming the platform's capacity to address Social Studies' unique pedagogical challenges. The results particularly highlight how AI's ability to provide differentiated content sequencing, interactive multimedia representations of abstract concepts, and real-time performance feedback creates optimal conditions for mastering complex historical and societal knowledge. The study proves that well-designed educational technology can transcend its conventional supplemental role to become a primary driver of learning achievement in humanities education. These outcomes fundamentally challenge traditional Social Studies instruction paradigms by showing that virtual assistant and AI-powered platforms enable more effective knowledge construction than standard classroom approaches, especially for developing higher-order thinking skills and conceptual understanding. The consistent performance advantages across diverse content areas within Social Studies suggest the observed benefits stem from the platform's underlying pedagogical architecture rather than topic-specific factors. Importantly, the success in Nigeria's educational context confirms these technologies' viability in developing nations when appropriately adapted to local infrastructure and curricular needs. The findings collectively position virtual assistant and AI-enhanced web platforms as transformative tools for Social Studies education, capable of delivering unprecedented learning gains while addressing longstanding issues of engagement, accessibility, and instructional quality that have persistently challenged the discipline.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Educators (Teachers and Instructors) should be encouraged to integrate AI tools (virtual assistants and web-based platforms) with traditional teaching to create a balanced, interactive learning experience. They should guide students in navigating AI platforms, ensuring they leverage features like adaptive quizzes, interactive simulations, and personalized feedback. The educators should participate in training programs to effectively incorporate AI tools into lesson plans and assessments. Also they should use AI-generated analytics to identify struggling students and adjust instruction accordingly.
2. Educational Institutions should procure and maintain AI-powered learning tools (e.g., chatbots, adaptive platforms) to support Social Studies instruction. Redesign curricula to include AI-enhanced learning modules, ensuring alignment with learning objectives. Test AI strategies in select classrooms before full-scale implementation, refining approaches based on feedback. Provide technical training and resources to help educators transition to AI-augmented teaching.
3. Policymakers (Government and Educational Authorities) should establish guidelines for ethical AI use in education, addressing data privacy, bias, and accessibility. Allocate resources for schools to acquire AI technologies, particularly in underfunded regions. Create best-practice guidelines for integrating AI tools into Social Studies education nationwide. Collaborate with tech companies to develop localized, culturally relevant AI learning solutions.

4. EdTech Developers (AI and Software Companies) should develop AI applications tailored to Social Studies, including features like historical simulations, debate bots, and perspective-analysis modules. Ensure platforms are usable in low-bandwidth environments and available in multiple languages. Continuously improve AI tools based on educator and student input to enhance usability and effectiveness. Offer scalable pricing models to make AI tools accessible to schools in developing regions.
5. Students should be encouraged to utilize virtual assistants for self-paced learning, concept clarification, and exam preparation. Share experiences with educators and developers to help refine AI learning platforms. Learn to critically evaluate AI-generated information to avoid over-reliance on technology.

References

Adedoyin, A. K., Adeowu, W. A., & Oladejo, B. (2024). Enhancing classroom learning: The impact of AI-based instructional strategies on student engagement and outcomes. *International Journal of Research and Innovation in Social Science, 8*(3), 5732-5742. https://doi.org/10.47772/IJRISS.2024.803429S

Ampa, A. T., & Nurgalbi. (2021). Innovative learning strategies to increase students' participation and quality of English teaching and learning process. *Technium Social Sciences Journal, 26*, 314-325. https://doi.org/10.47577/tssj.v26i1.5173

Chen, X., Xie, H., Zou, D., & Hwang, G. J. (2020). Application and theory gaps during the rise of artificial intelligence in education. *Computers and Education: Artificial Intelligence, 1*, 100002. https://doi.org/10.1016/j.caeai.2020.100002

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). Sage.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill.

Holmes, W., Bialik, M., & Fadel, C. (2021). *Artificial intelligence in education: Promises and implications for teaching and learning.* Center for Curriculum Redesign.

Huda, M., Anshari, M., Almunawar, M. N., Shahrill, M., Tan, A., Jaidin, J. H., & Masri, M. (2016). Innovative teaching in higher education: The big data approach. *Turkish Online Journal of Educational Technology, 15*(1), 89-98.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education.* Pearson.

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Yetigensoy, O., & Karaduman, H. (2024). The effect of AI-powered chatbots in social studies education. *Education and Information Technologies, 29,* 17035-17069. https://doi.org/10.1007/s10639-024-12485-6

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education: Where are the educators? *International Journal of Educational Technology in Higher Education, 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0