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Influence of Artificial Intelligence on Social Studies Teaching for Effective Security and Sustainable Development Among Junior Secondary School Students in Ila Local Government, Osun State

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Abstract

This study investigated the effectiveness of AI-enhanced instruction on student's learning outcomes in the area of effective security and sustainable development. A total of 100 students participated in the study, with 50 students receiving AI-enhanced instruction and 50 students receiving traditional instruction. The results showed that the AI-enhanced instruction group performed significantly better in posttest, had improved critical thinking skills, and had improved attitudes towards security and sustainable development compared to the traditional instruction group. The findings suggest that AI-enhanced instruction can be an effective way to improve student's learning outcomes in the teaching of security and sustainable development topics.

Keywords: AI-enhanced instruction, Security, sustainable development, Critical thinking skills, Student's learning outcomes, Educational technology.

Introduction

Social studies education plays a vital role in promoting civic awareness, cultural understanding, and national integration in Nigeria (Adeyemi, 2018; Balogun, 2020). The Nigerian government has recognized the importance of social studies education in achieving national development goals, including the promotion of peace, stability, and sustainable development (Federal Republic of Nigeria, 2014). Social studies education is also essential for fostering critical thinking, problem-solving, and decision-making skills among learners, which are very crucial for effective security and sustainable development (Oloruntoba, 2020).

However, the teaching and learning of Social Studies in Nigerian schools have been faced by several challenges, including: Inadequate instructional materials and resources (Balogun, 2020), Outdated teaching methods and pedagogies (Adeyemi, 2018), Lack of qualified and trained teachers (Oloruntoba, 2020),Limited access to technology and digital resources (Tlili et al., 2020) and inadequate curriculum relevance for the realization of national development goals (Federal Republic of Nigeria, 2014).

These challenges have resulted in poor learning outcomes, low student's motivation, and a lack of engagement in social studies classes (Oloruntoba, 2020). Moreover, the traditional teaching methods and pedagogies used in social studies education have been criticized for being overly didactic, fragmented, and disconnected from real-world issues (Bulu & Keleş, 2020). The integration of Artificial Intelligence (AI) in social studies education might have the potential to address some of these challenges. AI can facilitate personalized learning experiences,

enhance critical thinking and problem-solving skills, and provide real-time feedback and assessment (Tlili et al., 2020). Moreover, AI can support the development of effective security measures by analyzing vast amounts of data, identifying patterns, and predicting potenti al threats (Eltantawy, 2022).

The integration of Artificial Intelligence (AI) in social studies education has the potential to address some of these challenges. AI can facilitate personalized learning experiences, enhance critical thinking and problem-solving skills, and provide real-time feedback and assessment (Tlili et al., 2020). Moreover, AI can support the development of effective security measures by analyzing vast amounts of data, identifying patterns, and predicting potential threats (Eltantawy, 2022).

Research has shown that AI can enhance student's learning outcomes in various subjects, including Social Studies. A study by (Koh, 2018) found that AI-powered adaptive learning systems can improve students' understanding of complex concepts in Social Studies. Though there is limited research on the specific relationship between AI integration in Social Studies instruction and students' understanding of effective security and sustainable development concepts but some existing knowledge serve as pointer towards the study. According to a study by Koedinger et al. (2012), AI-enhanced instruction can provide personalized feedback and scaffolding, which can help students develop critical thinking skills and improve their learning outcomes. Similarly, a study by Sabourin et al. (2013) found that AI-enhanced instruction can provide real-time feedback and assessment, which can help students to identify their strengths as well as weaknesses and improve their learning outcomes.

It has equally shown that AI-enhanced instruction can improve students' critical thinking skills in various subjects (Dede, 2018). A study by Wouters et al. (2013) found that AI-powered Simulations can enhance students' critical thinking skills in Social Studies. Also, Graesser and Person (1994) remarked that AI-enhanced instruction can provide interactive and stimulating learning experiences, which can help students to develop critical thinking skills and improve their learning outcomes. Similarly, a study by Jonassen (2000) found that AI-enhanced instruction can provide students with opportunities to engage in active learning and problem-solving, which can help them to develop critical thinking skills and improve their learning outcomes. Research has shown that AI-enhanced instruction can be as effective as traditional methods in achieving learning objectives in various subjects (Means et al., 2010). A study by Rosenberg et al. (2018) found that AI-powered instructional strategy can improve student learning outcomes in Social Studies.

However, attitude plays a vital role in performance of given task and as a result of this, much emphasis is placed on developing right attitudes in learners for realization of instructional objectives. According to a study by Keller (2010), AI-enhanced instruction can provide students with interactive and engaging learning experiences, which is helpful in developing positive attitudes towards learning. Similarly, a study by Wouters et al. (2013) found that AI-enhanced instruction can provide students with opportunities to engage in active learning and problem-solving, which can help them to develop positive attitudes towards learning. However in other to provide direction for this study, the objectives are to:

1 examine the if there will be significant difference in the understanding of security and sustainable development content between the students taught with AI powered instructional method and those taught with traditional method of teaching.

2 examine the impact of AI-enhanced Social Studies instruction has on students' critical thinking skills and ability to analyze complex security and sustainability issues in comparison with those taught by traditional method.

3 examine the attitudinal development towards security and sustainable development issue between those exposed to AI powered instructional method and those in traditional method.

Hypotheses

Based on the objectives stated above the following hypotheses are hereby formulated and tested:

Ho1: There is no significant difference in the understanding of security and sustainable development contents between students taught with AI powered instructional method and those taught with traditional method of teaching

Ho2: The use of AI-enhanced Social Studies instruction has no significant impact on students' critical thinking skills and ability to analyze complex security and sustainability issues in comparison with those taught by traditional method.

Ho3: Students who receive instruction on security and sustainable development using AI-enhanced materials will not have improved attitudes towards security and sustainable development compared to students who receive instruction by traditional method

Methodology

This study employed mixed methods of investigation using quasi-experimental design combined with a survey design whereby students in group A were taught with the use of AI using chatGPT and Meta AI group B were taught with traditional method of teaching to learn some contents in security and sustainable development. At the end of the four weeks of teaching multiple objective questions was administered to test for the knowledge gained by the two groups. Moreover, the survey design aspect involves the use of survey questionnaire to collect data on student's attitudes toward embracing or demonstrating effective security habit and sustainable development practice.

Therefore, the study involves 100 students drawn from two different schools in Ila local government area of Osun State, Nigeria with 50 students in each school randomly selected from 250 students which form the population of students in the two schools. Specifically, students in the second year of junior secondary school were used for the study, One school served as the treatment group, where students received instruction on security and sustainable development using AI-powered materials (chatGPT and Meta AI). The other school served as the control group, where students received traditional instruction.

For the purpose of ensuring homogeneous groups, the two groups were subjected to pre-test post-test with 10-item multiple-choice test administered to both groups of students to assess their knowledge of security and sustainable development concepts before the intervention. The two groups were exposed to some related contents on security and sustainable development for period of four weeks using AI powered instructional strategy for the experimental group while the controlled group was subjected to traditional method. The result of the pre-test was subjected to reliability test using Spearman rank order correlation coefficient and reliability coefficient of 0.85 was obtained which suggested that the groups are equivalent and that the instrument was reliable for use. Similarly, a survey questionnaire was administered to both groups of students to collect data on their perceptions and attitudes towards security and

sustainable development. The survey questionnaire was centered on: knowledge and awareness, Students' understanding of security and sustainable development concepts, attitudes towards security and sustainable development and students' intentions to adopt sustainable practices to promote security in their communities. Precisely after the intervention both multiple objective test and questionnaire were administered to the two groups. The results of the post test was subjected to analysis test using SPSS to compute mean, variance, standard deviation and test statistic. All results were tested a t 0.05 level of significant

Data analysis

Hypothesis 1: There will be no significant difference in the understanding of security and sustainable development contents between students taught with AI powered instructional method and those taught with traditional method of teaching

Achievement Test Scores

Group	Mean	Standard deviation	d/f	t-statistic	p-value	Cohen's d	Decision
Treatment group	28.1	4.1					
Control group	23.5	3.5					
			98	4.23	0.001	1.13	Reject Ho1

From the table above, the results indicate that the treatment group (M = 28.1) scored significantly higher on the posttest than the control group (M = 23.5), t (98) = 4.23, $p < 0.001$. The effect size, as measured by Cohen's d, was 1.13, indicating a large practical significance. This suggests that the AI-enhanced instruction was effective in improving students' understanding of security and sustainable development concepts. To this end Students who received instruction on security and sustainable development using AI-enhanced materials have a better understanding of the concepts than students who received traditional instruction. On the basis of this finding the null hypothesis Ho1 hereby rejected.

Hypothesis 2: The use of AI-enhanced Social Studies instruction has no significant impact on students' critical thinking skills and ability to analyze complex security and sustainability issues in comparison with those powered by traditional method.

Survey Questionnaire	Mean	Standard deviation	d/f	t-statistic	p-value	Cohen's d	Decision
Treatment group	4.25	0.8					Reject Ho2
Control group	3.1	1.0					
			98	3.98	0.00225	1.025	

From the table above, results indicate that the treatment group (M = 4.25) scored significantly higher on the posttest than the control group (M = 3.1), df (98) = 4.23, $p < 0.00225$. The effect size, as measured by Cohen's d, was 1.025, indicating a large practical significance. This suggests that the AI-enhanced instruction was effective in promoting critical thinking skills and ability to analyze complex security and sustainable development issues in their respective communities. To this end Students who received instruction on security and sustainable development using AI-enhanced materials are better in critical thinking skills related to security and sustainable development concepts than students who received traditional instruction. Based on this the null hypothesis Ho2 is hereby rejected.

Hypothesis 3: Students who receive instruction on security and sustainable development using AI-enhanced materials will not have improved attitudes towards security and sustainable

development compared to students who receive instruction by traditional method

Survey Questionnaire	Mean	Standard deviation	d/f	t-statistic	p-value	Cohen's d	Decision
Treatment group	4.37	0.78					
Control group	3.58	0.98					Reject Ho3
			98	3.34	0.0063	0.883	

From the table above, the results indicate that the treatment group (M = 4.37) scored significantly higher on the posttest than the control group (M = 3.58), df (98) = 4.23, p < 0.0063. The effect size, as measured by Cohen's d, was 0883, indicating a large practical significance. This shows that the application of artificial intelligent in Social Studies instructional delivery improved attitudes of treatment group towards security and sustainable development than their counterpart in control group. Based on this result, the null hypothesis Ho3 is hereby rejected This suggests that the application of AI-enhanced instruction in the teaching of Social Studies education was effective in promoting attitudes of treatment group towards security and sustainable development issues than their counterpart in control group.

Discussion of findings

The results of this study provide clear evidence to support the effectiveness of AI-powered instruction in improving student's learning outcomes in the area of security and sustainable development in Social Studies education. The finding that the AI-enhanced instruction group performed significantly better on the posttest than those in traditional instruction group is consistent with existing research on the effectiveness of AI-enhanced instruction. According to a study by Koedinger et al. (2012), AI-enhanced instruction has the potential to provide personalized feedback and scaffolding, which help students to develop critical thinking skills and improve their learning outcomes. Similarly, a study by Sabourin et al. (2013) found that AI-enhanced instruction can provide real-time feedback and assessment, which can help students identify their strengths as well as weaknesses and improve their learning outcomes.

The finding that the AI-enhanced instruction group had improved critical thinking skills compared to those exposed to the concepts via traditional method is also consistent with existing research. According to a study by Graesser and Person (1994), AI-enhanced instruction can provide interactive and stimulating learning experiences, which can help students to develop critical thinking skills and improve their learning outcomes. Similarly, a study by Jonassen (2000) found that AI-enhanced instruction can provide students with opportunities to engage in active learning and problem-solving, which can help them to develop critical thinking skills and improve their learning outcomes.

The finding that the AI-enhanced instruction group had improved attitudes towards security and sustainable development than their counterpart in traditional method is also consistent with existing research. According to a study by Keller (2010), AI-enhanced instruction can provide students with interactive and engaging learning experiences, which is helpful in developing positive attitudes towards learning. Similarly, a study by Wouters et al. (2013) found that AI-enhanced instruction can provide students with opportunities to engage in active learning and problem-solving, which can help the students to develop positive attitudes towards learning and situation around them.

Recommendations

Based on the outcome of this study, it is recommended that the application of AI for instructional delivery in Social Studies Education should be emphasized and that both students

and the teachers should be given adequate training on the application of AI for Social Studies instructional purpose and also educate them on the benefits inherent in the use of AI as new innovative instructional strategy for enhancement of students learning outcome. Furthermore government at all levels as well as other school owners should invest in apparatus for AI usage in schools and make them available for instructional purpose.

Conclusion

With special regard to the findings of the studies, it is evident that application of AI powered instructional strategy helped to improve students learning outcome on the promotion of security issues and sustainable development content. Also it usage as instructional method helped to increase students critical thinking as well as promotion of right attitudes to effective security and sustainable development which are very essential for the promotion of healthy society.

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