

Impact of Artificial Intelligence on Students' Academic Performance in Junior Public Secondary Schools in Delta State

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Abstract

The study investigated the impact of artificial intelligence on students' academic performance in Social Studies in junior secondary schools in Delta State. The study was guided by two research questions and two null hypotheses were formulated and tested 0.05 alpha level. A correlational research design was adopted for the study from the population of 49,879 JSS II Students, a sample of 1,496 was drawn using multistage sampling technique, a questionnaire was developed by the researcher was used for the data collection in the study. The instrument was validated by two experts in the Faculty of Education, Delta state University, Abraka. The reliability of the instrument was determined through test retest method and the coefficient of 0.82. Out of 1,496 copies of instrument distributed, a total of 1,481 copies of the questionnaire were returned. The research question was answered using mean scores and standard deviation and Pearson product moment correlation was used to test the null hypothesis. The findings of the study among others there is a significant relationship between the impact of AI integration and students' academic performance in the Social Studies in junior public secondary schools in Delta State. The finding also revealed that there is a relationship between the challenges associated with the use of AI in Social Studies education and students learning outcomes in Delta state. The study recommended among others that Social Studies teacher should employ the use of artificial intelligence in teaching in order to improve students' academic performance.

Keywords: Artificial intelligence, Social Studies, Academic Performance

Introduction

The outbreak of the Covid – 19 pandemics has significantly altered the educational landscape leading to a shift in the instructional process worldwide. This change was imperative as both teachers and students were unable to convene in traditional classroom settings. This development led to the integration of Artificial intelligence in education. Aina *et al*, (2023) described artificial intelligence as an innovative technical framework that encompasses the creation of computer systems with the ability to execute activities that usually need human intellect. These activities involve problem-solving, acquiring knowledge, comprehending language, and seeing visual information. Artificial intelligence has become increasingly prominent in recent years, bringing about a revolutionary transformation in the methods by which jobs are completed in numerous businesses. Within the realm of education, artificial

intelligence offers a multitude of possibilities to augment the learning process. Intelligent systems provide the ability to adjust to the specific requirements of each learner, deliver tailored learning experiences, and provide immediate feedback (Aina, *et al.*, 2023).

Artificial intelligence applications in education encompass adaptive learning platforms, intelligent tutoring systems, and virtual simulations. Through the use of artificial intelligence, teachers have the ability to construct dynamic and interactive learning environments that accommodate the various learning styles and capabilities of student. The convergence of artificial intelligence presents significant opportunities for tackling the obstacles encountered by the Nigerian educational system. The use of artificial intelligence tools and technology in junior secondary school Social Studies classrooms has the potential to fundamentally transform the methods of teaching and learning, hence enhancing accessibility, engagement, and effectiveness of education (Soma, 2018). Zhang and Li (2019) emphasized that the use of artificial intelligence in education can enhance personalized learning, improvement students' engagement and academic performance. According to *Sengupta el al*, (2018) highlights the potential of adaptive learning systems in promoting self – directed and personalized learning. A report by UNESCO (2021) emphasizes the potential of artificial intelligence in improving educational administration, management process, students' engagement and academic outcome.

In spite of the relevance of artificial intelligence in education, social Studies teachers still face some problems and challenges in the use of artificial intelligence in teaching. These may include lack of power supply, high cost of computer, limited access technology and resources, lack of training and professional development in the using Artificial intelligence tools effectively, concerns about privacy and data security, as well as the need to ensure that the use of artificial intelligence aligns with the ethical and social implications of the subject matter. Additionally, there may be a fear of artificial intelligence replacing Social Studies teachers, as well as challenges adapting curriculum and teaching methods to incorporate artificial intelligence technology in a meaningful way. As such, it is important for Social Studies teachers to receive adequate support and resources to overcome these challenges and effectively integrate artificial intelligence in their teaching. It against this back drops the study intended to investigate the impact of artificial intelligence on students' academic performance in Social Studies in junior secondary schools in Delta State.

Statement of the Problem

Social Studies as an integrated discipline in the educational system of Nigeria, is a study which emphasizes the process of identifying and solving problems for the survival of man which also includes the ability to maintain peace, an orderly, decent and progressive life. One key impotence of Social Studies to students is to helps them develop a sense of social awareness

and a broader perspective on societal issues and, also lays the foundation for the development of important civic and ethical values in students.

Despite the importance of Social Studies education, there been a growing concern about the declining academic performance of students in this subject in Nigeria junior secondary schools. This is attributed to many factors such as lack of power supply, high cost of computer, limited access technology and resources, lack of training and professional development in the using artificial intelligence tools for effective teaching of social studies. On this basis, it become imperative to investigate the impact of artificial intelligence on students' academic performance in Social Studies in junior secondary schools in delta state.

Objectives of the Study

The main purpose of this study is to investigate the influence of artificial intelligence on students' academic performance in Social Studies in junior public secondary schools in delta state. Specifically, the objective of this study is to:

- i. Evaluate the influence of Artificial intelligence integration on students' academic performance in Social Studies in junior secondary schools in Delta State
- ii.. Find out the challenges educators face in implementing Artificial Intelligence in Social Studies instruction in junior secondary schools in Delta State
- iii Recommend Strategies for effective integration of Artificial Intelligence in education System in Delta State, Specifically in Social Studies

Research Questions

- i. To What extent does the integration Artificial intelligence (AI) enhance students' academic performance in Social Studies in junior public secondary schools in Delta State?
- ii. What challenges do educators face in implementing Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State?
- iii. What strategies can be employed to enhance the use of Artificial intelligence (AI) in junior secondary schools in Delta State?

Null Hypotheses

- i. There is no significant positive relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior public secondary schools in Delta State.

- ii. There is no significant positive relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State.
- iii. There is no significant positive relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State.

Methodology

A correlational research design is a type of research design that looks at the relationship between two or more variables. Wubante (2020) defines correlational research design as simply a statistical measurement of relationship between two variables. The study adopted a correlation design because it sought to determine the relationship between the independent variables and independent variables as ascertained by Ajoku (2016). Independent variable is teacher preparedness) and the dependent variables (Students' academic performance) The population for the study comprises of all students of junior public secondary schools in Uvwie local government Area of Delta State.

The sample size of the study is 1,496 students of public junior secondary schools, 3% of the total population. A stratified random sampling technique was adopted to select the students. According to Nworgu (2016), the proportionate stratified random sampling technique is a type of sampling where the elements are drawn randomly from each stratum in such a way that relative proportions of the strata in the resultant sample are the same as the main population. Firstly, the school in Delta State were sorted into three zone which are Delta central, Delta North and Delta South. Therefore, six secondary schools were used for the study, the technique was used to select 1,496 students using 3% as prescribed by Atoyebi (2015) who stated that the sample size of 3% from a population is enough to ensure representation of the population that ranges from 10,000 (ten thousand above). The instrument for data collection for the study was questionnaire. Items of the instrument was developed by the researcher from the three research questions. The questionnaire was divided into two parts. The first part is in line with the demographic characteristics of the respondents. The second parts focus on six items on issues relating impact of artificial intelligence on students' academic in Social Studies was used to measure their academic performance

The instrument was validated based on face and content by two experts in Curriculum and Instruction Department and one from Measurement and Evaluation Department. These items were assessed in terms of clarity, appropriateness and whether the elicited the information correctly. In order to obtain the reliability of the instrument, a test re –test was carried on a sample of sample of 20 students who were not members of sample population of the study. To established the reliability coefficient for the test. This was done using Cronbach

alpha test. This help to measure the consistency accuracy of the instrument. A reliability coefficient of 0.76 was obtained, confirming the consistency and accuracy of the questionnaire.

The researcher with the aid of two research assistants administered the questionnaire to the 1,496 respondents. To ensure a high response rate, three research assistants were briefed and engaged to help in administering the questionnaire to the respondents. A period of one week was used for the administration of the questionnaires, filled and returned. Out of the 1,496 of the instruments distributed to the respondents, 1,481 copies of the instruments were found valid for analysis due inability of some respondents to respond to the questions. The data collected from the respondents was analyzed in line with the research questions using mean scores and standard deviation. The mean was used to answer the research questions, while the standard deviation was used to determine the closeness or otherwise of the opinions of the respondents from the group mean. The mean for the scale is 2.5. The decision was that any item that scored below 2.50 was regarded as disagreed. The hypotheses were analyzed using Pearson Product Moment Correlation coefficient

Research Question 1: To What extent does the integration Artificial intelligence (AI) enhance students' academic performance in Social Studies in junior public secondary schools in Delta State?

Table 1: Summary of Mean and Standard Deviation on the extent integration of Artificial intelligence enhance students' academic performance in Social Studies in junior secondary schools in Delta State

S/N	ITEMs	SA	A	D	SD	$\bar{x}$	$\pm$	Decision
1	Artificial intelligence integration has a positive impact on students' academic performance in Social Studies.	104	654	366	357	2.3	2.8	Disagree
2	Artificial intelligence integration has a negative impact on students' academic performance in Social Studies.	87	617	401	376	2.3	2.8	Disagree
3	Artificial intelligence integration enhances students' critical thinking and problem – solving abilities in Social Studies.	23	327	729	402	2.0	2.3	Disagree
4	The use of artificial intelligence has not had a significant impact on students' academic performance in social studies in junior secondary schools in Delta State.	474	820	98	89	3.1	3.3	Agree
5	Artificial intelligence improves students understanding of complex Social Studies concepts.	485	829	85	82	3.2	3.4	Agree
6	Artificial intelligence hinders students' creativity and originality in their Social Studies assignment	339	901	119	122	3.0	3.2	Agree

Weighted $\bar{x}$ /Mean 2.6>2.5 2.9 Agree

The result from Table 1, shows the items 1, 2, and 3 have mean scores below the criterion mean of 2.5. This indicates disagreement that artificial intelligence integration has a positive impact on students' academic performance in Social Studies, artificial intelligence integration has a negative impact on students' academic performance in Social Studies, and artificial intelligence integration enhances students' critical thinking and problem – solving abilities in Social Studies.

On the other hand, majority of the respondents agreed that the use of artificial intelligence has not had a significant impact on students' academic performance in social studies in junior secondary schools in Delta State, artificial intelligence improves students understanding of complex Social Studies concepts, and artificial intelligence hinders students' creativity and originality in their Social Studies assignment. The weighted mean of 2.6 indicates that there is current level of technology integration in teaching social studies in junior secondary schools in Delta State

Research Question 2: What challenges do educators face in implementing Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State?

Table 2: Summary of Mean and Standard Deviation on the challenges educators face in implementing Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State

S/N	ITEMS	SA	A	D	SD	$\bar{x}$	$\pm$	Decision
1	Student readiness	139	663	327	352	2.4	2.9	Disagree
2	Resistance to change	101	489	546	345	2.2	2.8	Disagree
3	Curriculum alignment	99	487	555	340	2.2	2.7	Disagree
4	Access to resource	197	789	272	223	2.6	3.0	Agree
5	Lack of expertise	320	941	149	71	3.0	3.2	Agree
6	Professional development	230	935	223	93	2.9	3.1	Agree
	Weighted Mean	2.5=2.5					2.9	Agree

Table 2 shows that most of the respondents disagreed that the student readiness, Resistance to change and curriculum alignment are not challenging educators face in implementing Artificial intelligence in Social Studies instruction in junior secondary schools in Delta State. On the other hand, the respondents agreed that Access to resource, Lack of expertise and professional development are the challenges educators face in implementing artificial intelligence in Social Studies instruction in junior secondary schools in Delta State.

The weighted mean of 2.5 indicates that educators face various challenges in implementing Artificial intelligence in social studies instruction in junior secondary schools in Delta State.

Research Question 3: What strategies can be employed to enhance the use of Artificial intelligence (AI) in junior secondary schools in Delta State?

Table 3: Summary of Mean and Standard Deviation on the strategies employed to enhance the use of Artificial intelligence (AI) in junior secondary schools in Delta State?

	ITEMS	SA	A	D	SD	$\bar{x}$	$\pm$	Decision
1	Process automation	148	672	327	334	2.4	2.9	Disagree
2	Campaign Optimization	146	679	332	324	2.4	2.9	Disagree
3	Personalized customer experience	139	652	342	348	2.4	2.9	Disagree
4	Content Creation with AI	136	1000	45	40	3.2	3.3	Agree
5	Implement Chatbots	439	1002	21	19	3.3	3.3	Agree
6	AI – enhanced data security	243	988	198	55	3.0	3.1	Agree
	Weighted Mean	2.7>2.5					3.0	Agree

The result from Table 3 shows that most of the respondent disagreed that process automation, campaign Optimization and personalized customer experience are not strategies employed in enhancement of the use of artificial intelligence in junior secondary school in Delta State. On the other hand, the respondents agreed that Content creation with AI, implement Chatbots and AI-enhanced data security are strategies employed to enhance the use artificial intelligence in junior secondary schools in Delta State. The weighted mean of 2.7 indicates that there are content creation with AI, implement Chatbots, and AI- enhanced data security are strategies employed to enhance the use of Artificial intelligence in junior secondary schools in Delta State.

Hypothesis One: There is no significant positive relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior secondary schools in Delta State.

Table 4: Summary of Pearson Product Moment Correlation between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior public secondary schools in Delta State.

SN	Variables	The use of Artificial intelligence (AI) tools	Students' academic performance in the subject in junior public secondary schools in Delta State	Decision
1	The use of Artificial intelligence (AI) tools	Pearson Correlation 1 Sig. (2-tailed) N 1481	.212* .004 1481	Significant
2	Students' academic performance in the Social Studies in junior public secondary schools in Delta State	Pearson Correlation .212* Sig. (2-tailed) .004 N 1481	1 1481	

*. Correlation is significant at the 0.05 level (2-tailed).

The result from Table 4 shows the pair of between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior public secondary schools in Delta State and obtained a correlation coefficient of $r = 0.212$. This indicates a positive and weak relationship and is statistically significant at 0.05 alpha level (Sig. $0.04 < 0.05$). The hypothesis which stated that there is no significant positive relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior secondary schools in Delta State was rejected. It can therefore, be stated that there is a significant positive relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior secondary schools in Delta State

Hypothesis Two: There is no significant positive relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State

Table 5: Summary of Pearson Product Moment Correlation between challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State

N	Variables	The Challenges face by educators	The implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State	Decision
1	The challenges face by educators	Pearson Correlation 1 Sig. (2-tailed) N 1481	.532* .001 1481	Significant
2	The implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State	Pearson Correlation .532* Sig. (2-tailed) .001 N 1481	1 1481	

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows the pair of the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State and obtained a correlation coefficient of $r = 0.347$. This indicates a positive and weak relationship and is statistically significant at 0.05 alpha level (Sig. $0.003 < 0.05$). The hypothesis which There is no significant positive relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State was rejected. It can therefore be stated that there is a significant positive relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State

Null Hypothesis Three: There is no significant positive relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State

Table 6: Summary of Pearson Product Moment Correlation between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State

SN	Variables		The strategies employed	The successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State	Decision
1	The strategies employed	Pearson Correlation	1	.213*	Significant
		Sig. (2-tailed)		.004	
		N	1481	1481	
2	The successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State	Pearson Correlation	.213*	1	
		Sig. (2-tailed)	.004		
		N	1481	1481	

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6 shows the pair of the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State and obtained a correlation coefficient of $r = 0.866$. This indicates a positive and moderate relationship and is statistically significant at 0.05 alpha level (Sig. $0.001 < 0.05$). The hypothesis which stated that there is no significant positive relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State was rejected. It can therefore, be stated that there is a significant positive relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State

Discussion of the Findings

Relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior secondary schools in Delta State

The finding of hypothesis one revealed that there is a positive and moderate relationship between the use of Artificial intelligence (AI) tools and students' academic performance in Social Studies in junior secondary schools in Delta State. This finding is in line with Adedeji et al (2018) opined that the use of technology in teaching of Social Studies had a moderate but positive effect on students' academic performance. Also, Akasi et al (2020) posited that the integration of instructional technology positively impacted students' academic performance in social studies.

Relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State

The finding of hypothesis two shows that there is a significant relationship between the challenges face by educators and the implementation of Artificial intelligence (AI) in Social Studies instruction in junior secondary schools in Delta State. This finding is in line with Okoko (2019) who found that the use of technology in teaching of Social Studies has positive and moderate relationship on students' academic performance.

Relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta State

The finding of hypothesis three revealed that there is a positive and high positive relationship between the strategies employed and the successful integration of Artificial intelligence (AI) in teaching Social Studies in junior secondary schools in Delta Stat. Akinwunmi (2015) affirmed that the study found that while there was an increasing trend in the use of technology, there were still challenges in terms of availability of resources, infrastructure, and teachers' technological skills.

Recommendations.

1. Social Studies teacher should employ the use of artificial intelligence in teaching in order to improve students' academic performance.
2. The state Government should provide power supply to every secondary school in delta state
3. School principal should organize workshop for Social Studies teachers on the use artificial intelligence in teaching in secondary schools in Delta State.

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