The Impact of Artificial Intelligence on Education in the 5IR: The Case of Some Selected Public Secondary Schools in Obanliku Local Government Area of Cross River State, Nigeria

By

Eleken Denis Kekpose
Department of Library & Information Science,
Faculty of Art & Social Sciences Education,
University of Calabar
dencodezua@gmail.com
&
Eleken David Akwulibue
Department of Library & Information Science,
Faculty of Art & Social Sciences Education,
University of Calabar
princesszion2023@gmail.com

Abstract
The increasing adoption of Artificial Intelligence (AI) in education has raised significant concerns regarding its long-term implications for teaching, learning, and institutional management. This study critically examines the role of Artificial Intelligence in Education. Be it as it may, the benefits of AI in education cannot be overemphasized. However, this study highlights negative roles of AI, including but not limited to the risks of overreliance on technology, reduced critical thinking skills among students, job displacement for educators, and ethical concerns surrounding data privacy and security. The research adopted a descriptive research design. The research was conducted in selected secondary schools in Obanliku Local Government Area, Cross River State, Nigeria, with a population comprising students, teachers, and school administrators. A sample of 600 respondents (300 students, 150 teachers, and 150 administrators) was selected using a stratified random sampling technique to cover the various aspects and perspectives across different educational strata. Data were collected through structured questionnaires and semi-structured interviews, analyzed using descriptive and inferential statistical tools. Findings reveal that 72% of students admitted to becoming overly dependent on AI-powered learning tools, leading to a decline in problem-solving and independent thinking skills. Teachers expressed concerns about AI-driven automation that reduces their instructional roles, with 65% fearing job displacement due to AI-assisted teaching systems. Furthermore, 80% of school administrators reported challenges in regulating AI use, citing cybersecurity threats, unethical data collection, and the potential for biased AI algorithms that reinforce educational inequalities and the negative conversion of ethical hacking programs to crime. The study concludes that AI poses more threats than benefits in education, compromising teacher-student relationships, diminishing the role of human educators, and creating ethical dilemmas. It recommends that institutions exercise caution in AI adoption, prioritize teacher-led instruction, and implement stringent regulations to ameliorate AI-related risks. These findings serve as a cautionary guide for policymakers, urging them to critically assess AI's implications before integrating it into educational systems.

Keywords: Artificial Intelligence, Education, Teacher Displacement, Student Dependency, Ethical Concerns, Cybersecurity, AI Bias.

Introduction

The 21st century has witnessed rapid technological advancements that have significantly influenced various sectors, with education being no exception. Among these technologies, Artificial Intelligence (AI) stands out as one of the most transformative forces reshaping educational landscapes globally (Luckin et al., 2016). AI in education encompasses a broad range of applications, including adaptive learning systems, automated grading, intelligent tutoring systems, and administrative tools designed to streamline institutional operations. The integration of AI technologies into educational systems has promised efficiency, personalization of learning, and enhanced decision-making processes (Holmes et al., 2019). However, alongside these perceived benefits, there is growing concern about the potential negative consequences of AI on education, particularly in developing countries such as Nigeria.

In Nigeria, the educational sector grapples with challenges such as inadequate infrastructure, limited access to quality teaching resources, and disparities in educational opportunities (Olayemi & Adesina, 2020). The introduction of AI-powered systems in public schools and tertiary institutions is viewed as a potential solution to bridge educational gaps and modernize instructional methodologies. Nevertheless, there are apprehensions about overreliance on technology, the erosion of critical thinking skills, job displacement among educators, and ethical issues related to data privacy and cybersecurity (Ifeoma & Agbo, 2021). These concerns necessitate a critical examination of AI's role in education to balance innovation with ethical and pedagogical considerations.

Obanliku Local Government Area in Cross River State, Nigeria, presents a unique context for this investigation. The area features a mix of urban and rural schools facing diverse educational challenges. The adoption of AI technologies in selected public schools within this locality offers valuable insights into the practical implications, opportunities, and risks associated with AI integration in education. This study, therefore, seeks to critically examine the role of AI in education, focusing on both its benefits and drawbacks, to inform policy and practice in Nigeria's educational system.

Statement of the Problem

Despite the growing adoption of AI technologies in educational settings, there is a paucity of empirical research examining their effects on teaching, learning, and institutional management in

Nigeria, particularly at the grassroots level. While AI offers numerous advantages, concerns about its negative implications remain underexplored in local contexts. Issues such as students' overdependence on AI tools, the diminishing role of educators, job insecurity, and ethical dilemmas surrounding data use warrant thorough investigation (Obadare, 2022).

Preliminary observations in selected public schools within Obanliku Local Government Area indicate an increasing reliance on AI-powered learning applications and administrative systems. Educators have expressed apprehensions about the potential displacement of their instructional roles, while administrators struggle with challenges related to AI regulation and cybersecurity threats. There is also evidence of students exhibiting reduced problem-solving and independent thinking abilities, raising questions about the long-term educational outcomes of AI adoption.

Given these observations, this study aims to fill the existing research gap by systematically assessing the impact of AI in education within Obanliku Local Government Area. It seeks to evaluate both the benefits and potential risks associated with AI integration, providing data-driven recommendations for policymakers, educators, and institutional managers.

Objectives of the Study

The primary objective of this study is to critically examine the role of Artificial Intelligence in education within selected public schools in Obanliku Local Government Area of Cross River State, Nigeria. The specific objectives are to:

1. Assess the impact of AI on students' cognitive development.
2. Examine teachers' perceptions of AI-driven educational tools and their implications for instructional roles.
3. Investigate the ethical challenges faced by school administrators in regulating AI usage.

Research Questions

To achieve the study's objectives, the following research questions were formulated:

1. How does AI affect students' cognitive development?
2. What are teachers' perceptions regarding the integration of AI in instructional processes and the risk of job displacement?
3. What ethical challenges do school administrators face in regulating AI use within their institutions?

Research Hypotheses

The study tested the following hypotheses:

H_{01}: There is no significant impact of AI technologies on students' cognitive development in selected public schools.

H_{02}: There is no significant bias in teachers' perception of AI integration and the risk of job security (displacement).

H_{03}: There is no significant ethical challenge faced by school administrators in regulating AI use.

Significance of the Study

This study holds significance for various stakeholders within the educational sector. For policymakers, it provides empirical data to guide the formulation of AI integration policies that balance technological advancement with ethical and pedagogical considerations. Educators and institutional managers will gain insights into the practical implications of AI adoption, enabling them to make informed decisions about instructional methodologies and administrative practices. Additionally, the study contributes to academic literature by addressing a research gap in the Nigerian context, particularly within rural and semi-urban educational settings.

Scope and Delimitation of the Study

The study focused on selected public secondary schools within Obanliku Local Government Area of Cross River State, Nigeria. It examined the types of AI technologies utilized, their impact on students, teachers, and administrators, and the ethical concerns arising from AI adoption. The study was limited to public educational institutions due to accessibility, funding constraints, and the need for contextual consistency.

Operational Definition of Terms

Artificial Intelligence (AI): The simulation of human intelligence processes by computer systems, including learning, reasoning, and self-correction.

AI Technologies: Software and hardware applications designed to perform tasks that typically require human intelligence, such as adaptive learning systems and AI-powered administrative tools.

Cognitive Development: The progression of mental processes such as thinking, problem-solving, memory, and decision-making.

Teacher Displacement: The reduction or elimination of teachers' instructional roles due to AI-driven automation.

Ethical Concerns: Moral issues related to data privacy, security, and fairness arising from the use of AI in educational settings.

Review of Related Literature

Conceptual Framework

The rapid advancement of Artificial Intelligence (AI) technologies has transformed various sectors, with education experiencing notable changes in instructional delivery, student engagement, and administrative processes (Luckin et al., 2016). AI in education refers to the use of intelligent systems capable of performing tasks such as adaptive learning, automated assessment, and data-driven decision-making (Holmes et al., 2019). This section reviews literature on the concept of AI, its applications in education, and the associated benefits and challenges.

The Concept of Artificial Intelligence in Education

Artificial Intelligence involves creating machines and software capable of performing tasks that typically require human intelligence, including reasoning, learning, perception, and decision-making (Russell & Norvig, 2020). In educational contexts, AI applications include virtual tutors, learning analytics, content recommendation systems, and intelligent administrative tools. These systems analyze data to personalize learning experiences, optimize resource allocation, and improve institutional efficiency (Ifenthaler & Yau, 2020).

According to Holmes et al. (2019), AI technologies in education can be classified into instructional and administrative applications. Instructional AI encompasses tools that support teaching and learning, such as intelligent tutoring systems and adaptive learning platforms. Administrative AI includes systems that automate scheduling, admissions, grading, and performance evaluation. This dual application underscores AI's potential to reshape educational environments significantly.

Benefits of AI in Education

The integration of AI technologies offers several advantages for educational institutions. One primary benefit is the personalization of learning experiences. AI-powered systems adapt content delivery to individual student needs, allowing learners to progress at their own pace and receive

targeted feedback (Luckin et al., 2016). This approach enhances student engagement and improves learning outcomes.

Another advantage is the automation of administrative tasks, which reduces the workload for educators and institutional managers. AI applications streamline grading, scheduling, and data analysis, enabling staff to focus on pedagogical activities and strategic planning (Ifenthaler & Yau, 2020). Additionally, AI supports data-driven decision-making by providing insights into student performance, resource utilization, and institutional effectiveness.

AI also facilitates inclusive education by providing customized support for students with disabilities. Technologies such as speech recognition, text-to-speech converters, and predictive analytics help create equitable learning environments (Holmes et al., 2019).

Challenges of AI Integration in Education

Despite its benefits, AI adoption in education presents several challenges. One significant concern is the risk of overreliance on technology, which may diminish students' critical thinking and problem-solving abilities (Obadare, 2022). As learners increasingly depend on AI-powered tools for assignments and research, there is a danger of reduced intellectual engagement and cognitive development.

Another challenge is the potential displacement of educators. AI-driven automation of instructional and administrative tasks raises concerns about job security among teachers and non-academic staff (Ifeoma & Agbo, 2021). This issue is particularly pertinent in developing countries with high unemployment rates.

Ethical concerns also arise from AI integration, particularly regarding data privacy, security, and algorithmic bias. AI systems collect and analyze vast amounts of student data, raising questions about consent, data protection, and the potential misuse of personal information (Luckin et al., 2016). Moreover, biased algorithms may reinforce existing educational inequalities, disadvantaging marginalized groups.

Empirical Studies on AI in Education

Several empirical studies have explored the impact of AI on education. Luckin et al. (2016) conducted a comprehensive review of AI applications in UK schools, highlighting improvements in personalized learning and administrative efficiency. However, the study also identified concerns

about data security and the ethical use of AI technologies. In Nigeria, Ifeoma and Agbo (2021) examined the perceptions of educators regarding AI integration in tertiary institutions. The study found that while AI improved instructional delivery and resource management, it also raised fears of job displacement and reduced teacher-student interaction.

Obadare (2022) investigated the effects of AI on students' learning behaviors in selected Nigerian universities. The findings indicated that students relied heavily on AI tools for research and assignments, leading to a decline in critical thinking skills and independent learning.

Theoretical Framework

This study is anchored on two theories: The Technological Determinism Theory, which posits that technological developments shape societal structures and cultural values (Chandler, 1995). The theory suggests that technology influences human behavior and institutional practices, often determining the direction of societal change. In the context of education, the adoption of AI technologies reshapes teaching methodologies, learning behaviors, and administrative processes. The theory is relevant to this study as it explains how AI technologies influence educational practices in Obanliku Local Government Area. It highlights the potential of AI to drive pedagogical innovation while cautioning against the unintended consequences of technological determinism, such as job displacement and ethical dilemmas.

Propounded by Thorstein Veblen in 1921 and later advanced by Marshall McLuhan, this theory posits that technological advancement shapes societal structure, cultural values, and human behavior (Chandler, 1995). Applied to education, it suggests that AI will inevitably restructure teaching methods, administrative processes, and learner behavior — for better or worse.

The Displacement Theory

Originally formulated in the context of labor economics, this theory explains how technological innovation can render certain job roles obsolete (Brynjolfsson & McAfee, 2014). In education, AI-driven systems threaten to marginalize teachers' instructional roles, particularly in tasks like grading, content delivery, and classroom management.

Empirical Review

Empirically, several studies have provided insights into AI's dualistic role in education:

Luckin et al. (2016) conducted a comprehensive review of AI's applications in schools and identified benefits in personalized learning and administrative automation, but also cautioned against over-dependence and ethical lapses. Selwyn (2019) found that in secondary schools in the UK, AI-powered learning tools contributed to a decline in students' critical thinking ability, confirming that while technology aids access to information, it may impede independent reasoning.

Okoye & Madueke (2021) surveyed tertiary institutions in southeastern Nigeria and reported that 65% of lecturers feared AI might reduce their teaching relevance, with 78% noting concerns over student misuse of AI apps for academic malpractice. West (2018) examined AI's influence on education policy and ethics, concluding that algorithmic bias and privacy breaches are inevitable without strict regulatory oversight. Kaplan & Haenlein (2019) emphasized the economic implications of AI in education, including possible job displacement among non-teaching staff due to process automation.

Summary of Literature Review

The reviewed literature reveals a growing consensus on the dual nature of AI in education. While AI can improve efficiency, personalize learning, and assist management processes, it also poses significant threats such as overreliance by students, ethical and security concerns, job displacement among teachers, and biased algorithms. However, gaps exist in localized empirical studies, especially within rural and semi-urban Nigerian contexts like Obanliku LGA. Most existing studies focus on urban tertiary institutions or advanced economies. This study seeks to fill that gap by critically examining the roles — both positive and negative — of AI in public schools in Obanliku.

Research Methodology

Research Design:

This study adopted a descriptive survey research design. The choice of this design was informed by the nature of the study. It sought to collect, describe, and interpret the opinions, attitudes, and experiences of students, teachers, and administrators regarding the role of Artificial Intelligence (AI) in education within selected public schools in Obanliku Local Government Area of Cross

River State. The descriptive survey design allows for the collection of data from a large population within a limited time frame (Nworgu, 2015).

Area of the Study:

The research was conducted in Obanliku Local Government Area (LGA) of Cross River State, Nigeria. The LGA, located in the northern senatorial district of the state, is largely a semi-urban and rural area comprising several public secondary schools. The area was selected due to the increasing integration of digital learning platforms and AI-assisted systems in its schools, coupled with the unique demographic mix of students, teachers, and administrators.

Population of the Study:

The target population consisted of students, teachers, and school administrators in the selected secondary schools within Obanliku LGA. According to records obtained from the Cross River State Ministry of Education (2023), the estimated population included 3,550 students, 740 teachers, and 150 administrators. This population provided a diverse base for understanding the perspectives of various stakeholders within the educational system regarding AI.

Sample and Sampling Technique:

A total of 600 respondents were selected from the population using the stratified random sampling technique. The sample was stratified into three categories: 300 students, 150 teachers, and 150 administrators. This method ensured that all strata of the educational system were proportionately represented, thereby enhancing the reliability of the results (Creswell & Creswell, 2018).

Sample Size Determination:

The sample size was determined using Taro Yamane's formula for a finite population:

$$n = \frac{N}{1+N(e^2)}$$

Where:

n = sample size

N = population size

e = margin of error (0.05)

Applying this to the total population:

$$n = \frac{4440}{1+4440(0.05^2)} = \frac{4440}{1+4440(0.0025\ )} = \frac{4440}{1+11.1)} = \frac{4440}{12.1} = 367$$

However, to increase precision and account for non-response, the sample size was increased to 600.

Instrument for Data Collection:

The main instrument for data collection was a structured questionnaire titled "Artificial Intelligence in Education Questionnaire (AIEQ)" and a semi-structured interview guide.

The AIEQ was divided into five sections: Section A: Demographic Information, Section B: Availability and Use of AI Tools, Section C: Student Dependency on AI, Section D: Teacher Displacement Concerns, and Section E: Ethical and Security Issues of AI in Education for administrators of schools.

The items were constructed using a 5-point Likert scale ranging from: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)

Validation of the Instrument

The instruments were subjected to content and face validation by three experts: One professor of Educational Management, one specialist in Educational Measurement and Evaluation, and one ICT education expert. The experts assessed the relevance, clarity, and comprehensiveness of the items, ensuring they aligned with the study's objectives. Necessary modifications were effected based on their recommendations.

Reliability of the Instrument

A pilot test of the questionnaire was conducted using 30 respondents (10 students, 10 teachers, and 10 administrators) randomly selected from nearby Boki LGA, which shares similar educational characteristics with Obanliku LGA.

The data collected were subjected to Cronbach's Alpha reliability test to determine internal consistency.

The reliability coefficients were: Section B: 0.78, Section C: 0.82, Section D: 0.75, Section E: 0.80. The overall Cronbach's Alpha value was 0.79, indicating that the instrument was reliable for use in the main study (Nunnally & Bernstein, 1994).

Method of Data Collection

The researcher, with the assistance of trained research assistants, administered the questionnaires directly to respondents within their schools during school hours to ensure a high response rate. Interviews were conducted with school administrators and selected teachers using an interview guide. A total of 600 questionnaires were distributed, with 575 valid copies retrieved, representing a 95.83% return rate.

Method of Data Analysis

The data collected were coded and analyzed using descriptive and inferential statistics:
Descriptive statistics such as frequency counts, percentages, means, and standard deviations were used to summarize respondents' demographic data and responses to the questionnaire items.
Chi-square test (χ^2) and Independent Samples t-test were employed to test the hypotheses and determine significant differences in opinions among students, teachers, and administrators.
Statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) version 26.0 at a 0.05 level of significance.

Data Presentation, Analysis, and Interpretation

This section presents the data collected from the field, the analysis of the data, and the interpretation of the findings based on the research questions and hypotheses formulated for the study. Data were gathered from 575 validly returned questionnaires administered to students, teachers, and administrators in selected secondary schools in Obanliku Local Government Area of Cross River State, Nigeria.

Demographic Characteristics of Respondents

Table 1: Distribution of Respondents by Category

Category	Frequency	Percentage (%)
Students	290	50.43%
Teachers	140	24.35%
Administrators	145	25.22%.
Total	**575**	**100%**

Interpretation:

The distribution shows a balanced representation across educational stakeholders, ensuring reliability in opinion sampling on the subject of AI in education.

Data Presentation Based on Research Questions

Research Question 1: In what ways does the use of AI-powered tools affect cognitive development?

Table 2: Students' Responses on AI Dependency

Statement	SA	A	N	D	SD	Mean	Decision
I depend on AI-powered apps for assignments and study tasks.	125	85	35	30	15	3.84	Agree
AI tools reduce my ability to think critically.	110	90	40	30	20	3.73	Agree
I prefer AI-assisted study over traditional classroom teaching.	100	85	45	40	20	3.64	Agree

The mean values (all > 3.5) indicate a high dependency on AI-powered tools, validating that a significant number of students are relying on AI, with a potential decline in critical thinking.

Descriptive Summary: 72% of students admitted to over-reliance on AI-powered tools.
68.9% agreed that AI tools diminish independent thinking.

Research Question 2: What are teachers' perceptions regarding AI-assisted teaching and the risk of job displacement?

Table 3: Teachers' Responses Perception of AI and Job Security (displacement)

Statement	SA	A	n	D	SD	Mean	Decision
AI-assisted systems reduce my classroom responsibilities.	50	35	25	20	10	3.69	Agree
I feel my job could be threatened by AI teaching systems.	60	32	28	15	5	3.85	Agree
AI cannot replace human instructional and moral guidance roles.	75	35	10	15	5	3.96	Agree

Majority of teachers expressed concern over AI's intrusion into teaching roles, particularly as 65% feared eventual displacement.

Inferential Statistics (Chi-Square Test):

$\chi^2 (4, n=140) = 24.78, \ p < 0.05$

The above statistics revealed that there is a significant difference in the teachers' opinions on AI and job security.

Research Question 3: What ethical challenges do administrators have about AI in education?

Table 4: Administrators' Responses on Ethical and Cybersecurity Issues

Statement	SA	A	n	D	SD	Mean	Decision
AI applications expose school data to cyber threats.	85	45	5	5	5	4.38	Agree
AI systems can promote data bias and reinforce educational inequality.	80	40	10	10	5	4.24	Agree
Ethical hacking programs designed for AI tools may be misused.	90	40	5	5	5	4.41	Agree

More than 80% of administrators expressed serious concerns about cybersecurity, AI algorithm bias, and ethical misuse of AI systems.

Inferential Statistics (Chi-Square Test):

$\chi^2 (4, N=145) = 31.22, \ p < 0.05$

The implication of the above is that there's a significant consensus among administrators on the ethical and cybersecurity threats posed by AI.

Summary of Major Findings

1. High dependency on AI-powered educational tools was observed among students, with 72% admitting excessive reliance, reducing independent cognitive skills.
2. 65% of teachers expressed fears of job displacement as AI-driven platforms increasingly handle instructional duties.

3. 80% of school administrators reported cybersecurity and ethical concerns, especially risks of data breaches, AI bias, and ethical hacking misuse.

Discussion of Findings, Conclusion, Recommendations

This section discusses the results of the study in relation to existing literature, highlights key findings, draws conclusions, and offers recommendations based on the data analyzed. It also outlines the implications of the study and suggests areas for further research.

Discussion of Findings

AI Dependency and Student Cognitive Development

The study revealed that 72% of students heavily rely on AI-powered learning tools for assignments, study, and revision. This finding aligns with the work of Luckin et al. (2016), who argued that while AI tools offer educational benefits, over-reliance impedes learners' independent cognitive and problem-solving abilities. The result corroborates studies by Holmes et al. (2021), suggesting that continuous AI assistance reduces student agency and the drive to develop critical reasoning. Notably, the mean scores from Table 4.2 (M = 3.64–3.84) confirm a worrying trend of diminished independent thinking due to AI dependency. This agrees with Salihu et al. (2023), who warned that uncontrolled integration of AI risks making students passive learners.

Teachers' Concerns over AI-Assisted Instruction and Job Security

Findings showed that 65% of teachers expressed fear of job displacement due to AI-driven teaching systems. This agrees with assertions by Esteva et al. (2019), who argued that AI will reshape instructional delivery, automate repetitive teaching tasks, and potentially marginalize human educators. The significant chi-square result ($\chi^2(4, N=140) = 24.78, p < 0.05$) further supports the claim of widespread teacher apprehension. This echoes findings from Aoun (2017), who emphasized that while AI can complement education, its unchecked spread threatens job security and teacher morale.

Moreover, teachers emphasized the irreplaceable role of human educators in moral guidance and affective education — a point reaffirmed by Yuan-Hsuan et al. (2022), who cautioned against AI's inability to replicate socio-emotional and ethical leadership in classrooms.

Administrators' Ethical and Cybersecurity Concerns

The study highlighted that 80% of school administrators identified AI's cybersecurity risks, including threats from unethical hacking and biased data systems. The high mean values (M = 4.24–4.41) confirm strong concerns over the ethical use of AI. This finding corroborates warnings from Cios and Zapala (2020) and UNESCO (2021) that AI's deployment in education raises critical data protection and ethical accountability issues. The chi-square analysis ($\chi^2(4, N=145) = 31.22, p < 0.05$) validates the significance of these concerns.

In particular, AI algorithms risk perpetuating educational inequality by embedding existing data biases into AI-generated decisions — a risk discussed by Binns (2018), who emphasized the dangers of algorithmic discrimination.

Conclusion

Based on the findings, this study concludes that while AI presents undeniable benefits to educational institutions, its unchecked proliferation poses substantial threats to cognitive development, professional job security, and ethical integrity within the education sector. The risks of student dependency, teacher displacement, cybersecurity vulnerabilities, and AI bias demand urgent attention. Conclusively, the study posits that AI currently threatens more than it benefits the Nigerian educational system, particularly within the secondary education levels in Obanliku Local Government and similar educational contexts.

Recommendations

Drawing from the findings, the following recommendations are proposed:

1. Educational authorities should implement comprehensive AI-use policies, ensuring AI acts as a complementary, not substitutive, educational tool.
2. AI integration should prioritize teacher-led models where AI serves to support, not replace, instructional roles.
3. Schools must establish stringent cybersecurity and data protection protocols when deploying AI technologies, in line with global data governance standards.
4. Educational curricula should emphasize critical thinking, digital literacy, and AI ethics to prepare students for responsible AI use.

5. Institutions must audit AI systems regularly to detect and correct bias or discriminatory tendencies.
6. Continuous professional training programs should be organized to upskill educators, equipping them to navigate AI-assisted classrooms confidently.
7. A national framework should be developed for the ethical use of AI in education, with clear sanctions for violations.

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