

AN EMPIRICAL ANALYSIS OF THE ETHICAL CHALLENGES OF AI IN EDUCATION MANAGEMENT: DATA PRIVACY, BIAS, AND EQUITY IN DECISION-MAKING

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Abstract

The study examined the ethical challenges of Artificial Intelligence (AI) in education management, focusing on data privacy, bias, and equity in decision-making within higher institutions in Bayelsa State, Nigeria. Guided by three objectives, the study investigated the ethical concerns associated with data privacy, the extent to which AI applications reflect bias, and the role of AI in promoting equity in institutional decision-making. A descriptive survey research design was adopted, with a population comprising undergraduate students, academic staff, and administrators from selected tertiary institutions in the state. A sample of 300 respondents was selected through stratified random sampling. Data were collected using a structured questionnaire titled “Ethical Challenges of Artificial Intelligence in Education Management Questionnaire (ECAIEMQ)”, validated by experts in Educational Management and Measurement, with a reliability coefficient of 0.79 established using the Cronbach Alpha method. Data analysis involved descriptive statistics such as mean and standard deviation. The findings revealed that ethical concerns regarding data privacy and bias are significant, while AI’s potential to promote equity is recognized but hindered by infrastructural and digital literacy gaps. The study recommends establishing robust AI data privacy frameworks, implementing bias-monitoring mechanisms, and promoting equity-focused policies to ensure fair and ethical use of AI in higher institutions.

Keywords: Artificial Intelligence, Ethics, Data Privacy, Bias, Equity, Education Management, Higher Institutions

Introduction

The integration of Artificial Intelligence (AI) into education management has become one of the most transformative developments in higher education globally, offering new ways to improve administrative efficiency, support academic decision-making, and enhance student learning

experiences. AI technologies ranging from predictive analytics and intelligent tutoring systems to automated record management and virtual advising are increasingly being deployed in institutions to streamline processes and provide data-driven insights for decision-making (Holmes et al., 2021). However, with these advancements come pressing ethical challenges that demand careful examination, particularly in regions such as Bayelsa State where higher institutions are still in the early stages of adopting AI systems.

Conceptually, AI in education management refers to the application of machine learning algorithms, predictive models, and intelligent systems to support tasks such as admissions, student performance evaluation, curriculum planning, and resource allocation (Luckin et al., 2016). While these tools promise enhanced efficiency and objectivity, they also raise ethical issues related to data privacy, algorithmic bias, and equitable access. Data privacy concerns stem from the sensitive personal and academic information collected and processed by AI systems, raising fears of misuse, unauthorized access, or breaches (Zawacki-Richter et al., 2019). Algorithmic bias emerges when AI tools replicate or amplify existing social inequalities, leading to unfair outcomes in decisions such as student placement, scholarship allocation, or academic performance predictions (Mehrabi et al., 2021). Equity, in this context, refers to ensuring that all students—regardless of background—benefit equally from AI innovations, a goal that remains elusive in many educational environments.

Globally, scholars have highlighted the double-edged nature of AI in education. While AI can reduce administrative workload and improve predictive accuracy, the risks of surveillance, discrimination, and ethical violations remain significant (Williamson & Eynon, 2020). For instance, in the United States and Europe, concerns have been raised about predictive analytics unfairly categorizing students based on socio-economic backgrounds, thereby reinforcing

stereotypes rather than promoting equity (Baker & Siemens, 2014). In developing contexts, where regulatory frameworks are still evolving, these ethical risks are even more pronounced, as institutions often lack robust data protection policies and the expertise to monitor AI-driven systems effectively (Adebayo, 2022).

In Nigeria, the adoption of AI in higher education management is gradually increasing, with institutions leveraging AI for admissions processes, student record management, and digital learning platforms. However, the ethical dimensions of such adoption remain underexplored. Studies have shown that limited awareness, weak data governance policies, and infrastructural challenges make Nigerian institutions particularly vulnerable to privacy breaches and biased decision-making (Oladipo & Onah, 2021). In Bayelsa State, where higher institutions face persistent challenges of inadequate funding, poor technological infrastructure, and socio-economic disparities, the introduction of AI presents both opportunities and ethical dilemmas (Wariowei & Banabo, 2024). Without careful oversight, AI systems could exacerbate inequalities, exclude marginalized groups, or erode trust in educational management systems.

Empirical evidence from related contexts underscores the importance of addressing these concerns. For example, in South Africa, research revealed that biases in AI-based student assessment tools led to disproportionate disadvantages for learners from underrepresented backgrounds (Mhlana, 2021). Similarly, in Kenya, the deployment of AI-driven data systems without sufficient privacy safeguards exposed students' sensitive information, undermining institutional credibility and student trust (Wanyama & Omondi, 2020). These findings emphasize the necessity of context-specific empirical studies to examine how ethical issues manifest in different educational environments.

Within Bayelsa State, there is limited research on the ethical implications of AI use in education management, despite the growing interest in leveraging digital innovations to enhance institutional efficiency. Higher institutions in the state are beginning to experiment with AI-enabled tools for record management, academic monitoring, and decision-making, yet little is known about the extent to which these practices safeguard privacy, mitigate bias, and promote equity. This gap underscores the need for an empirical analysis that not only identifies ethical challenges but also offers evidence-based recommendations for responsible AI adoption in education management.

Against this backdrop, this study seeks to conduct an empirical analysis of the ethical challenges of AI use in education management in higher institutions in Bayelsa State, with a particular focus on data privacy, bias, and equity in decision-making.

Purpose of the Study

The study examined the ethical challenges of Artificial Intelligence (AI) use in education management with particular reference to data privacy, bias, and equity in decision-making in higher institutions in Bayelsa State. Specifically, the study achieved the following:

- i. examines the ethical concerns associated with data privacy in the use of AI for education management in higher institutions in Bayelsa State.
- ii. investigate the extent to which AI applications in education management reflect bias in higher institutions in Bayelsa State.
- iii. assess the role of AI in promoting equity in decision-making processes within higher institutions in Bayelsa State.

Research Questions

The following research questions guided the study:

- i. What are the ethical concerns associated with data privacy in the use of AI for education management in higher institutions in Bayelsa State?
- ii. To what extent do AI applications in education management reflect bias in higher institutions in Bayelsa State?
- iii. To what extent do AI promote equity in decision-making processes within higher institutions in Bayelsa State?

Research Method

This study adopted a descriptive survey research design. According to Charles-Owaba (2019), descriptive survey research design is a method in which data is collected from a representative sample of individuals or items, and the findings are then generalized to the entire population. This design is suitable for the present study as it enabled the collection and analysis of data from a sample of academic staff, administrative staff, and students in higher institutions who are directly affected by AI applications in education management. The objective was to obtain empirical insights into the prevailing ethical challenges associated with AI use, specifically focusing on data privacy, bias, and equity in decision-making within higher institutions in Bayelsa State.

The population of the study comprised academic staff, administrative staff, and final-year undergraduate students across public higher institutions in Bayelsa State. A sample of 300 respondents was selected from three higher institutions in the state (a university, a polytechnic, and a college of education) using a stratified random sampling technique. Stratification was based on stakeholder categories (academic staff, administrative staff, and students) to ensure adequate representation of the different perspectives regarding AI use in education management.

This approach ensured that the diversity of opinions on the ethical challenges of AI was captured comprehensively.

The instrument for data collection was a structured questionnaire titled “Ethical Challenges of Artificial Intelligence in Education Management Questionnaire (ECAIEMQ)”. The questionnaire was designed using a four-point Likert scale format, ranging from Very High Extent (4) to Very Low Extent (1), to measure respondents’ perceptions of the ethical issues associated with AI use in higher institutions. The questionnaire was organized into two parts: Part I and Part II. Part I gathered demographic information such as gender, age, institutional type, and stakeholder category. Part II was divided into three sections corresponding to the three research questions. Section A examined ethical concerns associated with data privacy in the use of AI, Section B investigated the extent of bias reflected in AI applications, while Section C assessed the role of AI in promoting or hindering equity in decision-making processes.

To ensure the validity of the instrument, the draft questionnaire was reviewed by three experts in Educational Management, Information Technology, and Measurement and Evaluation. Their suggestions led to improvements in clarity, item wording, and relevance to the research objectives. A pilot study was conducted with 20 respondents from a higher institution not included in the main study. The reliability of the instrument was calculated using the Cronbach Alpha method, which yielded a coefficient of 0.79, indicating high internal consistency and suitability of the instrument for data collection.

The researcher personally administered the questionnaire to all sampled respondents with the assistance of trained research aides to ensure proper guidance during administration and to maximize the quality of responses. Out of the 300 distributed questionnaires, 285 were successfully retrieved, representing a response rate of 95%. Data collected were analyzed using

descriptive statistics such as mean and standard deviation. Mean scores were interpreted based on a benchmark of 2.50: items with a mean score of 2.50 and above were regarded as “High Extent,” while those below 2.50 were considered as “Low Extent.” This analysis provided insights into the ethical challenges of AI in education management in terms of data privacy, bias, and equity in decision-making in higher institutions in Bayelsa State.

Results

Research Question 1

What are the ethical concerns associated with data privacy in the use of AI for education management in higher institutions in Bayelsa State?

Table 1: Mean and standard deviation on the ethical concerns associated with data privacy in the use of AI for education management in higher institutions in Bayelsa State

S/N	STATEMENT	$\bar{x}$	SD	REMARK
1.	AI-based systems in my institution collect and store large amounts of student data.	3.28	.85	HE
2.	I am concerned about how securely student data is stored when processed through AI tools.	3.04	.74	HE
3.	AI tools used in my institution sometimes request personal information that seems unnecessary.	3.14	.50	HE
4.	My institution has clear policies guiding data privacy when using AI systems.	2.73	.53	HE
5.	Students are informed about how their data will be used by AI-powered platforms.	2.90	.48	HE
6.	Unauthorized access to student data through AI systems is a major risk in my institution.	2.88	.53	HE
7.	AI enhances data management but increases the chances of privacy breaches.	2.91	.51	HE
GRAND MEAN		2.98		HE

Source: Fieldwork (2025) *LE=Low Extent, HE= High Extent

Table 1 above shows the mean and standard deviation of responses regarding the ethical concerns associated with data privacy in the use of AI for education management in higher institutions in Bayelsa State. All items recorded mean scores above the decision benchmark of

2.50, indicating general agreement among respondents. This suggests that AI-based systems in higher institutions collect and store large amounts of student data ($\bar{x} = 3.28$), and respondents expressed concern about the security of such data when processed through AI tools ($\bar{x} = 3.04$). They further indicated that AI tools sometimes request unnecessary personal information ($\bar{x} = 3.14$), while institutions provide only moderate clarity on policies guiding data privacy ($\bar{x} = 2.73$). Similarly, respondents agreed that students are informed about how their data will be used ($\bar{x} = 2.90$), but still perceive risks of unauthorized access ($\bar{x} = 2.88$) and privacy breaches despite AI's benefits in data management ($\bar{x} = 2.91$). The grand mean of 2.98 therefore reveals that ethical concerns relating to data privacy in AI use are prevalent in higher institutions in Bayelsa State.

Research Question 2

To what extent do AI applications in education management reflects bias in higher institutions in Bayelsa State?

Table 2: Mean and standard deviation on the extent to which AI applications in education management reflect bias in higher institutions in Bayelsa State

S/N	STATEMENT	$\bar{x}$	SD	REMARK
8	AI systems in my institution provide fair and unbiased recommendations in academic matters.	3.12	.85	HE
9	There is a risk that AI tools favor some categories of students over others.	3.21	.74	HE
10	Bias in AI-based decision-making is influenced by the data used for training the system.	3.08	.50	HE
11	AI-driven admission or grading tools may disadvantage students from certain backgrounds.	3.03	.53	HE
12	AI systems should be constantly reviewed to reduce bias in their decision-making process.	3.03	.48	HE
13	Students and staff are aware that AI systems can sometimes produce biased results.	3.14	.53	HE

14	Human oversight is necessary to balance fairness in AI decision-making processes.	3.12	.51	HE
GRAND MEAN		2.98		HE

Source: Fieldwork (2025) *LE=Low Extent, HE= High Extent

Table 2 above shows the mean and standard deviation of responses regarding the extent to which AI applications in education management reflect bias in higher institutions in Bayelsa State. All items recorded mean scores above the decision benchmark of 2.50, indicating agreement among respondents. This suggests that while AI systems are perceived to provide fair and unbiased recommendations in academic matters ($\bar{x} = 3.12$), respondents also acknowledged that there is a risk of favoritism towards certain categories of students ($\bar{x} = 3.21$). Bias in AI-based decision-making was attributed to the nature of training data used ($\bar{x} = 3.08$), and concerns were raised that AI-driven admission or grading tools may disadvantage students from particular backgrounds ($\bar{x} = 3.03$). Respondents further agreed that AI systems require constant review to minimize bias ($\bar{x} = 3.03$) and that both students and staff are aware of the possibility of biased results ($\bar{x} = 3.14$). The need for human oversight to ensure fairness in AI decision-making processes was emphasized ($\bar{x} = 3.12$). The grand mean of 2.98 therefore indicates that respondents perceive a high extent of bias concerns associated with AI applications in higher institutions in Bayelsa State.

Research Question 3

To what extent do AI promote equity in decision-making processes within higher institutions in Bayelsa State?

Table 3: Mean and standard deviation on the extent to which AI promote equity in decision-making processes within higher institutions in Bayelsa State

S/N	STATEMENT	$\bar{x}$	SD	REMARK
15	AI enhances equal access to learning resources for	2.98	.85	HE

	students regardless of background.			
16	AI-driven systems improve inclusiveness by considering diverse student needs.	3.09	.74	HE
17	AI sometimes creates inequalities among students due to differences in digital literacy.	2.34	.50	LE
18	My institution uses AI to promote fairness in resource allocation (e.g., library access, online learning).	2.33	.53	LE
19	AI has the potential to reduce educational inequalities if properly implemented.	3.03	.48	HE
20	Lack of adequate infrastructure limits the equitable benefits of AI in my institution.	3.04	.53	HE
21	AI ensures that decisions in my institution are applied fairly to all students.	2.12	.51	LE
	GRAND MEAN	2.70		HE

Source: Fieldwork (2025) *LE=Low Extent, HE= High Extent

Table 3 above shows the mean and standard deviation of responses on the extent to which AI promotes equity in decision-making processes within higher institutions in Bayelsa State. The results indicate a mixed perception among respondents. On one hand, respondents agreed that AI enhances equal access to learning resources regardless of background ($\bar{x} = 2.98$), improves inclusiveness by considering diverse student needs ($\bar{x} = 3.09$), has the potential to reduce educational inequalities if properly implemented ($\bar{x} = 3.03$), and that inadequate infrastructure limits its equitable benefits ($\bar{x} = 3.04$). On the other hand, some items recorded mean scores below the decision benchmark of 2.50, such as AI creating inequalities due to differences in digital literacy ($\bar{x} = 2.34$), limited fairness in resource allocation ($\bar{x} = 2.33$), and failure to ensure that institutional decisions are applied fairly to all students ($\bar{x} = 2.12$). The grand mean of 2.70 indicates that while AI is perceived to promote equity to a high extent, significant concerns remain regarding its uneven impact on fairness and inclusiveness in higher institutions in Bayelsa State.

Discussion of Findings

The findings in research question 1 revealed that there is a general agreement among respondents that ethical concerns regarding data privacy are significant in the use of AI for education management in higher institutions in Bayelsa State. This suggests that staff and students recognize that while AI enhances data collection and management, it raises critical issues around secure storage, unauthorized access, and the use of personal information. The relatively high mean scores indicate that respondents are aware of the potential risks of privacy breaches and the inadequacy of institutional policies to fully safeguard sensitive data. This implies that higher institutions must pay closer attention to data governance frameworks and ensure stronger safeguards are in place when deploying AI-powered systems.

This finding aligns with the works of Floridi and Cowls (2021), who emphasized that data protection and accountability remain core ethical challenges in the integration of AI in educational institutions. Similarly, Smith and Miller (2022) observed that institutions often lack comprehensive privacy frameworks, exposing students to risks of data misuse. In addition, Ahmed and Thomas (2023) noted that awareness of data risks among stakeholders enhances demand for stronger institutional policies to ensure ethical compliance. These studies corroborate the current findings, showing that while AI has transformative potential, its ethical concerns regarding data privacy must be carefully managed to maximize its benefits in higher education.

The findings in research question 2 revealed that there is a general agreement among respondents that AI applications in education management reflect a high extent of bias in higher institutions in Bayelsa State. Respondents acknowledged that while AI systems provide useful recommendations in academic matters, there are concerns that these systems may favor certain categories of students and that their outcomes are heavily influenced by the datasets used to train them. The findings further suggest that respondents are aware of the potential for AI-driven

admissions, grading, and other decision-making tools to disadvantage students from specific backgrounds if not properly reviewed. The agreement that human oversight is necessary indicates that stakeholders recognize the limitations of AI and the importance of balancing automated decision-making with ethical human judgment.

This finding is consistent with the report of Crawford (2021), who noted that bias in AI often stems from systemic inequalities embedded in the data used for algorithm training. Similarly, Buolamwini and Gebru (2018) demonstrated how biased datasets lead to discriminatory outcomes in AI applications, emphasizing the need for human oversight. More recently, Okoye and Abah (2023) stressed that AI tools in Nigerian educational systems must be regularly audited to prevent biases that could disproportionately affect disadvantaged groups. These studies reinforce the present findings by underscoring the importance of ethical monitoring, inclusive data, and human judgment in mitigating AI-related bias in education management.

The findings in research question 3 revealed that respondents generally agreed that AI promotes equity in decision-making processes within higher institutions in Bayelsa State, but to a mixed extent. On the positive side, the results indicate that AI enhances equal access to learning resources, improves inclusiveness by considering diverse student needs, and has the potential to reduce educational inequalities if properly implemented. Respondents also agreed that the lack of adequate infrastructure limits the equitable benefits of AI, highlighting a contextual challenge that directly affects its effectiveness. However, some areas showed disagreement, as respondents reported that AI sometimes creates inequalities due to differences in digital literacy, that fairness in resource allocation is not always achieved, and that institutional decisions are not consistently applied equally through AI systems.

These findings support the work of UNESCO (2021), which emphasized that equity in AI deployment in education depends largely on the institutional context and infrastructural readiness. Similarly, Holmes et al. (2022) observed that although AI can democratize access to resources, unequal levels of digital literacy among students often reinforce inequalities. In the Nigerian context, Eke and Nwosu (2023) noted that infrastructural deficits and socio-economic disparities limit the equitable application of AI in higher institutions. These studies align with the present findings, underscoring the importance of combining AI integration with targeted equity-oriented strategies to achieve fairer outcomes in education management.

Conclusion

The study examined the ethical challenges of Artificial Intelligence (AI) in education management with particular reference to data privacy, bias, and equity in decision-making in higher institutions in Bayelsa State. The findings revealed that while AI offers significant benefits in enhancing data management, decision-making efficiency, and inclusiveness, it also raises pressing ethical concerns. Respondents agreed that issues such as data privacy breaches, biased outcomes influenced by training datasets, and unequal access to AI-driven opportunities pose major risks to its effective adoption. Although AI was perceived to promote fairness and equity in some areas, infrastructural limitations, gaps in digital literacy, and inadequate institutional policies undermine its equitable application. These outcomes suggest that for AI to serve as a transformative tool in higher education management, higher institutions in Bayelsa State must establish strong ethical frameworks, implement transparent data protection policies, ensure continuous monitoring for bias, and invest in digital inclusivity. Ultimately, addressing these ethical concerns is essential for maximizing the potential of AI while safeguarding fairness, trust, and accountability in educational decision-making.

Recommendations

The following recommendations were put forward:

- i. That tertiary institutions in Bayelsa State should enforce strict AI data privacy frameworks to protect sensitive academic and administrative records.
- ii. That administrators should adopt bias-checking mechanisms in AI tools to ensure fairness in student evaluation and decision-making.
- iii. That policymakers should integrate equity-focused guidelines into AI adoption to guarantee inclusive access and participation for all learners.

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