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INTEGRATION OF ARTIFICIAL INTELLIGENCE INTO NIGERIAN POLYTECHNIC CURRICULA: AN EMPIRICAL ANALYSIS OF LEGAL AND ETHICAL AWARENESS

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Abstract: The use of Artificial Intelligence (AI) in Nigerian Polytechnic education has tremendous transformative potential and critical equity challenges. The aim of this study was to empirically explore the extent of digital equity in relation to student access to AI tools and explore the impact of legal awareness and institutional ethical responsibilities. The data were collected using the Quantitative, Cross-sectional survey design method with a sample size of 300 students from the population of 3500 students in the three categories of federal, state and private polytechnic of Osun State using stratified random sampling technique. Descriptive statistics and Multiple regression were used for the analyses. The results showed a moderate digital equity level (M=3.12 SD=0.86). Legal rights awareness (β=0.39, p< .001) and ethical responsibility (β=0.48, p< .001) significantly predicted digital equity, with ethical responsibility predicting digital equity more strongly (R^2=0.61). Overall, the results point to the challenges faced by technical education institutions in Nigeria when it comes to equitable AI implementation, which go beyond mere technological availability and are rooted in legal understandings and ethical frameworks. We argue that adopting sustainable AI practices needs to be embedded in the policy, including the use of equity indicators, legal protection, and institutional ethical commitments, to avoid the exacerbation of current socio-digital inequalities.

Keywords: Artificial Intelligence, Ethical Responsibility, Technical Education, Polytechnic, Legal Awareness, Digital Equity.

1.0 Introduction

Artificial Intelligence (AI) is transforming the landscape of education around the world, providing new opportunities to distinguish learning experiences, assess resources, and deliver personalised curriculum (Luckin *et al.,* 2022). In the Polytechnic sector, a cornerstone of technical and vocational education and training (TVET) in Nigeria, the use of Artificial Intelligence (AI) is being considered as a crucial component to equip students with skills for the 21st Century (Adeniji *et al.,* 2023). The shift towards AI-driven learning, driven by COVID-19, has starkly highlighted the existing structural disparities in access to digital learning, as well as in infrastructure and institutional readiness to use AI-driven learning (Akomolehin & Aluko, 2025; Oni *et al.*, 2025).

The pedagogical advantages of AI (Williamson, 2023) are only possible if digital equity in access and use is realised. In the Nigerian context, socio-economic status, location and institutional resourcing affect who can be connected, who owns a device and who is digitally literate, with potential to deepen the divide between those who can access AI and those who cannot (Nwosu *et al.,* 2022). This is especially true for polytechnics, where a cross-section of students, many from underserved communities, attend.

Ethical and legal considerations are as crucial as infrastructure when it comes to incorporating AI. There are important discussions on algorithmic bias, data privacy, transparency and accountability in the field of education (Brey, 2023; Mittelstadt, 2023). Having a

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digital rights awareness can help students to be more effective in navigating learning environments mediated by AI, as they learn the digital rights they have, including rights to non-discrimination, data protection, and redress (Nwankwo *et al.,* 2023). At the same time, institutions have an ethical obligation to uphold the principles of fairness, inclusiveness, and pedagogical appropriateness of the use of AI (Chaudhry & Kazim, 2022). The concept of this study is dual focus namely legal awareness and ethical responsibility. Despite growing discourse, empirical research on the interplay between legal-ethical factors and digital equity in AI integration within African technical education remains scarce. This study fills this gap by exploring two research questions in the context of Nigerian polytechnics:

How equitable are students' access to AI-based learning tools? How well do students' knowledge of legal rights and their understanding of institutional ethical responsibility predict digital equity? In addressing these questions, this study offers data to guide TVET policy and practice in the integration of AI for equitable and sustainable development in Nigeria.

1.1 Theoretical Framework,

This study is grounded in a combination of the rights-based and ethics-of-care approaches in relation to educational technology. The rights-based approach is that the right to access digital environment is part of the fundamental right to education, which means that there is need to protect it legally and create awareness about it (Okebukola, 2022). The ethics-of-care approach focuses on the responsibilities of the institution to plan and develop technology which actively supports the learning of all students, especially the disadvantaged (Mittelstadt, 2023). They argue that the outcome of equitable integration of AI (the goal) depends on individual agency (legal awareness) and institutional stewardship (ethical responsibility).

2.0 Aim and Objectives

The aim of this study is to examine the predictors of digital equity in the context of AI integration in Nigerian polytechnics. The specific objectives are to:

1. assess the perceived level of digital equity in student access to AI-based learning tools.
2. evaluate the influence of students' awareness of their legal rights on this digital equity.
3. determine the effect of perceived institutional ethical responsibility on digital equity.

2.1 Hypotheses

Based on the theoretical framework, the following hypotheses were tested:

H_{01}**:** There is no significant level of digital equity in student access to AI-based tools in Nigerian polytechnics.

H_{11}**:** There is a significant level of digital equity in student access to AI-based tools in Nigerian polytechnics

H_{02}: Legal rights awareness has no significant positive effect on digital equity in AI integration.

H_{12}: Legal rights awareness has a significant positive effect on digital equity in AI integration.

H_{03}**:** Perceived institutional ethical responsibility has no significant positive effect on digital equity in AI integration.

H_{13}**:** Perceived institutional ethical responsibility has a significant positive effect on digital equity in AI integration.

3.0 Methodology

The research method used in this study was quantitative and descriptive; in the form of cross sectional. The population consisted of students of polytechnics in Osun State, Nigeria selected to represent federal, state and private institutions. The number of 300 participants were selected using stratified random sampling technique according to the size of the institution and composition of the faculty. This sample size is larger than the minimum required for a regression analysis with 2 predictors and in line with similar research in other related fields. The Artificial Intelligence Integration Equity Questionnaire (AIIEQ) was employed for data collection as this is a structured questionnaire developed specifically for this study. The questionnaire was the result of three validated constructs with 5-point Likert response format: 5 =

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Strongly Agree (SA), 4 = Agree (A), 3 = Undecided (U), 2 = Disagree (D), 1 = Strongly Disagree (SD).

The four items of Digital Equity in AI Access (dependent variable) and the four items of Legal Rights Awareness and Ethical Responsibility Perception (independent variables) were measured. Content validity was assessed by experts in the fields of educational technology, law and ethics, resulting in satisfactory validity scores of 0.897, 0.877 and 0.862 respectively for the three experts in the reliability test, indicating a satisfactory internal consistency. All statistical assumptions were checked and data was subsequently analysed using SPSS version 27 and multiple linear regression was used to explore the predictive relationship between legal awareness and ethical responsibility with digital equity in order to address the first objective.

4.0 Results

4.1 Descriptive Statistics and Level of Digital Equity (Objective 1 & H_1)

Table 1 presents the descriptive statistics. The mean score for Digital Equity (M=3.12, SD=0.86) falls just above the scale midpoint, indicating a *moderate* level of perceived equity. Legal Awareness (M=3.45) and Ethical Responsibility (M=3.67) scored higher. This supports H_1, confirming a significant but moderate level of digital equity.

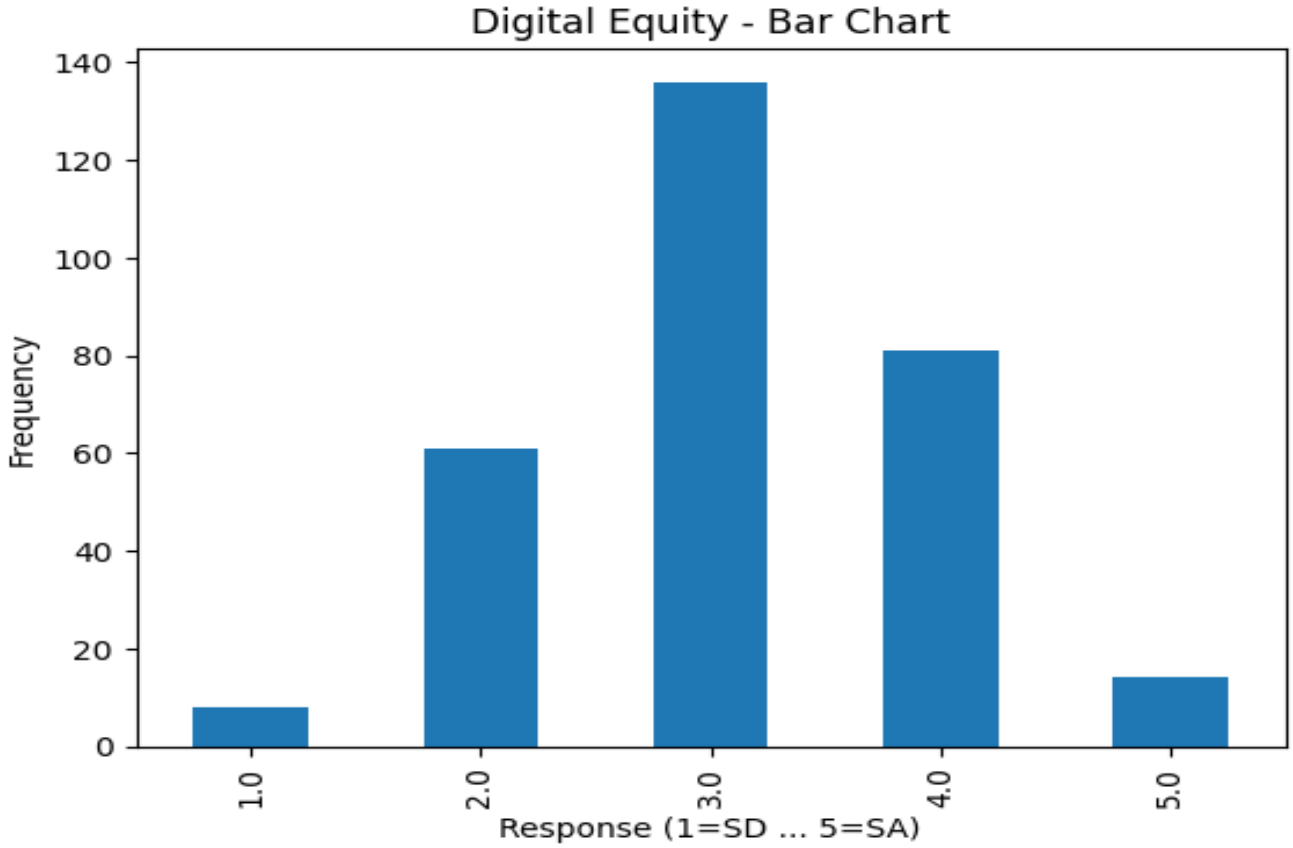

Figure 1: Digital equity responses. Author's computation, 2026.

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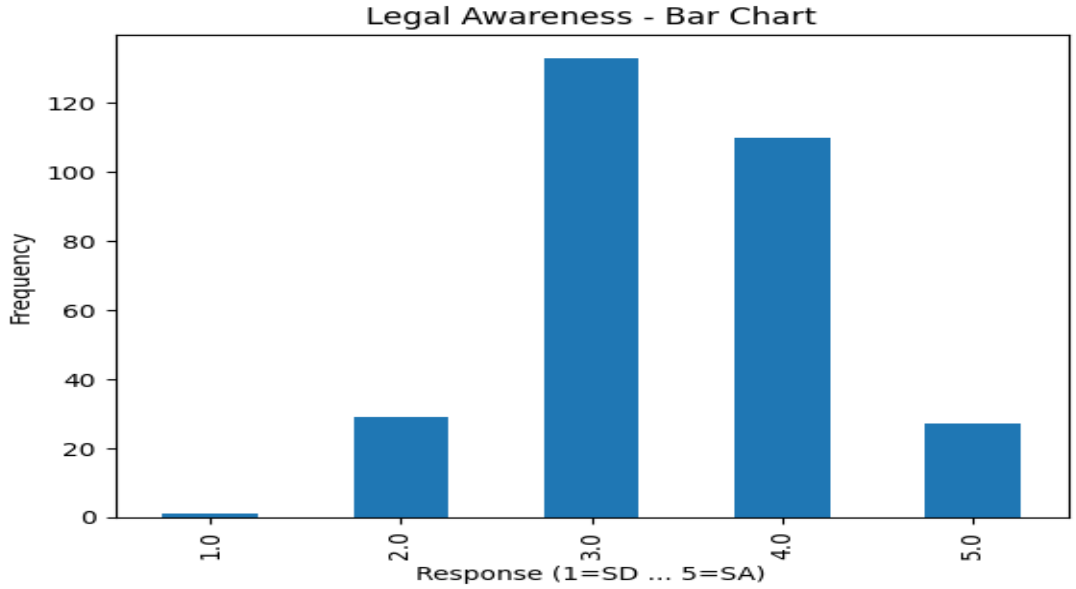

Figure2: Legal awareness responses. Author's computation, 2026.

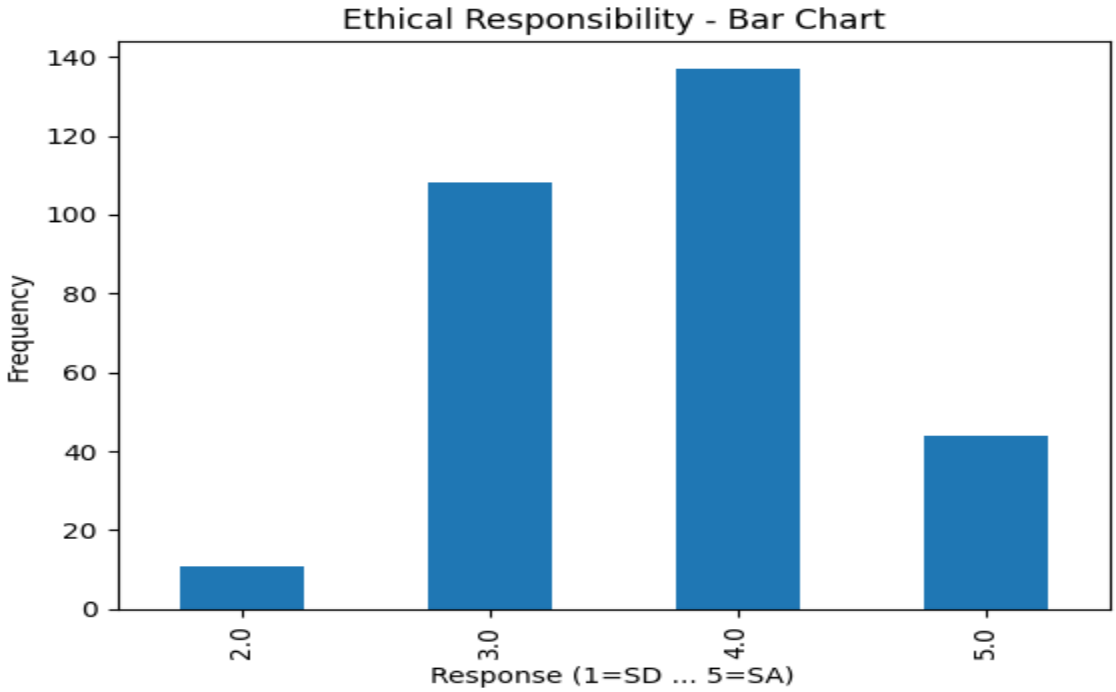

Figure 3: Ethical responsibility responses. Author's computation, 2026.

Table 1: Descriptive Statistics for Study Variables (N=300)

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Variable	Mean	SD	Min	Max
Digital Equity	3.12	0.86	1.00	5.00
Legal Rights Awareness	3.45	0.79	1.25	5.00
Ethical Responsibility	3.67	0.73	1.75	5.00

4.2 Regression Analysis: Predictors of Digital Equity (Objectives 2, 3 & H_2, H_3)

A multiple regression model was fitted with Digital Equity as the outcome. The model was statistically significant, *F(2, 297) = 231.40, p < .001*, explaining 61% of the variance in Digital Equity ($R^2 = .610$, *Adjusted* $R^2 = .607$). See Table 2 for the model summary and ANOVA.

Table 2: Regression Model Summary and ANOVA

Model	R	R^2	Adj. R^2	Std. Error	F	df1	df2	p
1	.781	.610	.607	0.54	231.40	2	297	<.001

As indicated in Table 3, both predictors contributed significantly to the prediction unique to it. Ethical Responsibility proved to be a stronger predictor (β = 0.48, p < .001) followed by Legal Rights Awareness (β = 0.39, p < .001). The results reject the null hypothesis of H_2 as well as H_3, which concluded that higher level of legal awareness and institutional ethics perceptions were associated with higher digital equity.

Table 3: Regression Coefficients

Predictor	B	SE	β	t	p	95% CI for B
(Constant)	0.87	0.21		4.14	<.001	[0.46, 1.28]
Legal Rights Awareness	0.41	0.06	0.39	6.32	<.001	[0.29, 0.53]
Ethical Responsibility	0.53	0.06	0.48	8.47	<.001	[0.41, 0.65]

5.0 Discussion

This study serves as empirical evidence that digital equity in the use of artificial intelligence in polytechnics in Nigeria is moderate, which corroborates the concerns of the researchers that technological infusion does not automatically bring about digital equity in access to and outcomes of AI use in polytechnics (Adeniji *et al.,* 2023; Williamson, 2023). Despite the introduction of AI tools, the mean score indicates that structural barriers to learning with AI are still present, such as connectivity,

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device access and customisation, which disproportionately affect students from rural or low-income backgrounds (Nwosu *et al*., 2022).

Student agency is emphasized by the fact that the awareness of legal rights predicts significantly. When students are aware of the rights they have to privacy, nondiscrimination, and grievance, they're more likely to be able to speak up in digital learning environments. The discovery confirms that a rights-based approach to EdTech is necessary, and hence an explicit approach towards digital rights literacy in the orientation and curricula of students should be encouraged (Nwankwo *et al*., 2023).

Most importantly, perceived institutional ethical responsibility was most predictive. This demonstrates that the students' perception of equity is determined in a great way by their confidence in the fair play efforts of the institution. This includes clear communication on AI use, pedagogical changes to support and assist tech-literate students, and algorithmic bias mitigation (Chaudhry & Kazim, 2022; Mittelstadt, 2023). It argues that equity goes beyond resources, it's also about institutional culture and ethical governance.

These two factors ($R^2 = 0.61$) suggest that a dual approach is needed for the integration of AI in an equitable manner: to empower students with legal literacy and to ensure that institutions are held to a high ethical standard. A policy that is solely techno-centric will not be able to deal with these socio-legal and ethical basics.

6.0 Conclusion and Recommendations

This study has established that digital equity in the integration of AI in Nigerian polytechnics is a socio-technical challenge. The approach to equity is at a moderate level with a strong presence of legal and ethical concerns, indicating key areas of concern that need to be addressed. The following is a list of evidence-based recommendations for sustainable and inclusive AI adoption:

1. Compile and Share an AI Charter of Rights & Responsibilities: Polytechnic authorities (e.g., National Board for Technical Education) should create a statement that specifies the rights of students and the responsibilities of the institutions with regard to the use of AI. This charter should be included in institutional policies and student handbooks.
2. Include General Studies on digital citizenship, data ethics, and AI law in the curriculum and faculty development. At the same time, offer professional development for lecturers around ethical use of AI tools and the awareness of digital disadvantage.
3. Adopt equity-first AI Piloting and Procurement: Institutions should carry out equity impact assessments prior to the implementation of new AI tools. Profiles should be written to include a preference for vendors that can provide algorithmic fairness audit and strong support for low bandwidth or assistive use.
4. Form Multi-Stakeholder Oversight Committees: Create a committee in each polytechnic that includes students, faculty, IT staff, legal professionals, and ethicists to monitor AI integration initiatives, address complaints, and uphold ethical standards.

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Appendix

Artificial Intelligence Integration Equity (AIIEQ) Questionnaire

This questionnaire aims to gather data on the perception of students on the integration of artificial intelligence in the curriculum of Polytechnic in Nigeria: An empirical study of legal and ethical awareness.

Response Scale: 5 =Strongly Agree (SA), 4 = Agree (A), 3 =Undecided (U), 2=Disagree (D), 1=Strongly Disagree (SD)

Section A: Digital Equity in AI Access (Dependent Variable)

Code	Item	SA	A	U	D	SD
2	I have sufficient access to the required hardware (e.g., computer, smartphone) to enable the learning with AI in my programme					
2	My Internet connection is always reliable and affordable enough for me to use online AI tools and platforms in my studies.					
3	The learning platform with AI my institution is using is supposed to be accessible and easy to use for every student, irrespective of their experience with technology.					
4	There is sufficient technical support and guidance provided at my institution for the use of AI tools assigned for education purposes.					

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Section B: **Legal Rights Awareness (Independent Variable)**

Code	Item	SA	A	U	D	SD
5	I am aware that I have a right to equal access to AI-based educational resources, regardless of my background, as part of my right to education.					
6	I am aware of my rights regarding how my personal data is used, stored, and protected by the AI learning platforms at my institution					
7	I know the procedures at my polytechnic for reporting issues or seeking redress if I am unfairly disadvantaged by an AI-based assessment or learning tool.					
8	I understand that if an AI tool consistently produces biased outcomes against a student group, it could be a form of discrimination					

Section C: Perceived Institutional Ethical Responsibility (Independent Variable)

Code	Item	SA	A	U	D	SD
9	My polytechnic has clear policies to ensure AI tools do not disadvantage students from poor backgrounds or rural areas.					
10	My lecturers are considerate and provide alternative arrangements when students face legitimate difficulties accessing or using required AI tools.					
11	Before implementing a new AI tool, my institution considers its potential impact on different student groups and works to mitigate negative effects.					
12	I trust that my institution is committed to using AI in education fairly, transparently, and for the benefit of all students.					