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The ethical use of generative AI in the Nigerian higher education sector

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Abstract

The use of generative Artificial Intelligence (AI) in the Nigerian higher education sector is gaining momentum, but its ethical implications remain a significant concern. This study explores the ethical considerations surrounding the adoption of AI tools, such as ChatGPT, in Nigerian universities. Despite AI's potential to enhance teaching, learning, and institutional efficiency, the lack of technological infrastructure in Nigeria presents challenges for its responsible implementation. The paper examines the impact of AI on academic integrity, highlighting issues like plagiarism and bias, while also addressing the benefits, such as improved learning experiences and administrative efficiency. Through an online survey of 242 university students, the study identifies the primary ethical challenges associated with AI use in education. The analysis reveals that awareness of AI-related challenges is the most significant predictor of ethical considerations, while familiarity with AI and perceived opportunities did not show a significant impact. The findings emphasize the need for universities to implement ethical frameworks, increase awareness of AI's risks, and establish responsible practices for its use. This study contributes to the ongoing conversation about the responsible integration of AI in Nigerian higher education and offers recommendations for future research and policy development.

Keywords: Generative Artificial Intelligence; Ethical Considerations; Nigerian Higher Education; Academic Integrity; AI in Education; ChatGPT; Plagiarism; AI Challenges

1. Introduction

Various generative AI tools are available, encompassing support for crafting human-like language, generating images or art, and even producing code (Ballantine et al., 2024). AI is defined by Kaplan and Haenlein (2019) as the capacity of a system to precisely decipher external input, acquire knowledge from that data, and employ the insights gained to accomplish objectives via adaptable modification. Therefore, in an era where AI is poised to play a pivotal role, ensuring proper education for humans becomes paramount, especially for educators who must recognize their collaborative role with machines (Ibrahim Adeshola & Adeola Praise Adepoju, 2023). Generative AI has the capacity to deliver and enhance the learning conversation (Nicol, 2021; Nicol & McCallum, 2022) however, its ethical applications in higher institutions in Nigeria remains a concern. The Nigerian higher education system is less technologically advanced compared to its Western counterparts. Tools like Turnitin, commonly used to check student papers for plagiarism, are not as widely adopted. Traditional methods, such as handwritten exams, remain the standard practice.

The increasing growth of generative artificial intelligence software has far-reaching ramifications for higher education (QAA, 2023a). According to Ballantine et al., (2024), artificial intelligence is rapidly developing as a revolutionary force in higher education, bringing both opportunities and problems in teaching, learning, institutional efficiency, and research efforts.

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The extensive usage of these AI tools has resulted in a significant increase in hybrid submissions, which use Generative Artificial Intelligence as an assistive technology (QAA, 2023a). By identifying and addressing ethical concerns, the study hopes to reduce potential dangers and challenges connected with AI use, which, in turn, promotes a more secure and responsible AI ecosystem.

2. Literature Review

In recent years, the science of artificial intelligence has made significant advances, resulting in innovative solutions such as Open AI's ChatGPT (Mhlanga, 2023). According to OpenAI (2023), ChatGPT is a powerful language model that allows for fine-tuning across a range of conversational AI tasks, exhibiting its capacity to generate text that closely mimics natural language. However, QAA (2023c) claims that Large Language Models (LLMs), such as GPT4.0, have been extensively trained on large datasets to generate coherent writing in each style depending on user input. Qadir et al. (2022) suggests that it excels at maintaining a consistent persona or identity throughout a conversation, resulting in more authentic and natural dialogues. Advanced data analytics uses statistical and computational methods to examine and interpret large datasets. Techniques like Predictive Modeling, Clustering, and Trend Analysis play a key role in uncovering patterns and predicting future trends. (Taiwo et al., 2024).

The educational sector has reacted in a variety of ways, initially embracing the innovative potential for teaching and learning. However, technological advancement complicates maintaining academic honesty, prompting educators to investigate innovative detection and prevention strategies (QAA, 2023a).

Academic cheating has existed in educational institutions for decades (Ghiaţău, 2021; Hinduja & Patchin, 2008; Mokdad & Aljunaidi, 2021). However, the introduction of AI-generated text, particularly the use of tools such as ChatGPT and GPT-4.0, adds a new dimension to an age-old problem (Pavlik, 2023; Susnjak, 2022). ChatGPT is distinguished by its capacity to generate high-quality text for a wide range of applications, its continuous learning capabilities, and the fact that it is free to use (Ibrahim Adeshola & Adeola Praise Adepoju, 2023).

These advanced technologies in higher education settings constitute a significant issue to academic integrity, particularly when students portray the product of LLMs as original work (QAA, 2023c). The use of AI-generated text in academic dishonesty, in essay writing, presents a new challenge for instructors because identifying AI-generated material presents a considerable problem, unlike traditional types of cheating (Aydın & Karaarslan, 2022; Frye, 2022).

2.1. Challenges of AI in Higher Education

The introduction of ChatGPT has highlighted the educational system's vulnerability to external dangers. This vulnerability jeopardises the system's integrity while also creating disparities among students, particularly those without access to such resources (Ibrahim Adeshola and Adeola Praise Adepoju, 2023). ChatGPT's capabilities include the ability to effectively complete graduate-level exams, which may render some sorts of evaluations unnecessary. Educators are concerned that students would outsource their work to ChatGPT since it generates acceptable material quickly, making it difficult to detect instances of plagiarism (Rudolph et al., 2023).

Evidence suggests that essays generated with ChatGPT can circumvent typical plagiarism detection (Lo, 2023). Alser and Waisberg (2023), notes that citing ChatGPT for its content is unethical because it fails to properly cite the primary sources of information, resulting in source-based plagiarism. QAA (2023c) agrees that the inherent nature of how Large Language Models (LLMs) generate text makes it difficult to identify such work, and conventional plagiarism detection tools may not be effective in detecting content produced by ChatGPT.

It is important to note, however, that ChatGPT is only as reliable as its training data. There is a risk of bias and possibly creating and distributing misinformation (Qadir et al., 2022). This raises critical questions about the ethical application and ramifications of such technologies in the educational landscape.

One common ethical challenge in the creation and implementation of language models is bias. If the data used to train a language model contains biassed representations of groups of humans, it might lead to social stereotypes and unfair discrimination as a result, predictions are generated that are discriminatory to those specific populations (Weidinger et al., 2021). Also, training a language model on data that only represents a subset of the population, such as a single culture, can result in the formation of exclusionary norms. As a result, the model may fail to understand or generate information for groups not represented in the training data (Weidinger et al., 2021).

Training a language model using obsolete or faulty data might also lead to the creation of wrong information (Jang et al., 2021). A search on the internet shows that when asked about its most recent update, GPT3.5 stated, that its last training cut-off was in January 2023, therefore its training data contains information up to that moment as it does not have real time updates or capabilities.

A more positive attitude regards AI as a challenge rather than a danger. When used creatively, this obstacle could provide opportunities to rethink conventional processes. Such a move could help educators and researchers overcome ingrained inertia that impedes advancement (Ballantine et al., 2024).

2.2. Opportunities of AI in Higher Education

AI, as demonstrated by ChatGPT, is making major advances in both automation and creativity. Diverse from information processing, AI shows higher reliability in task performance and knowledge presentation (Zhai, 2022). ChatGPT offers a variety of educational applications for both students and instructors, including mathematical problem solving, theoretical and conceptual inquiries, and even code generation (Welsh, 2022). However, Mhlanga, (2023) notes that while the integration of ChatGPT into academic environments holds promise for substantial enhancements in students' learning experiences, it is imperative that this technology be employed in a responsible and ethical manner. Additionally, Ballantine et al., (2024) suggests that AI can automate mundane portions of traditional education while maintaining student learning.

The subject of AI ethics is continually evolving and iterating, demanding continuing discussions regarding definitions and the development of ethical frameworks and standards (Goldstein et al., 2023). There is the need to explore both human intelligence and AI—which parts of human intelligence can be supplanted by AI, and which cannot (Frye, 2022) although Sallam (2023) contends that HI-AI collaboration can yield significant benefits if AI output is accurate and reliable. In addition , Classroom management software (AI) has become an essential tool, simplifying administrative duties, improving organization, and fostering smooth communication between students and teachers. (Ejiofor et al., 2024).

While the existing literature recognises the challenges presented by AI, in higher education, a conspicuous gap exists in comprehending the specific ethical implications and repercussions for academic integrity. Additionally, there is limited understanding of how AI can be responsibly integrated within the Nigerian higher education sector. This study therefore seeks to bridge these gaps by delving into the intricate ethical considerations, academic challenges and by examining instances of both successful and responsible applications of AI in higher education.

3. Methodology

Data for this study was collected through online surveys distributed to university students across Nigeria. A total of 242 students, ranging from first year to final-year levels, completed the questionnaires. Participants were assured of the anonymity and confidentiality of their responses. The collected data was subsequently analysed using the Statistical Package for the Social Sciences (SPSS).

Multiple regression analysis was conducted to examine the relationship between the independent variables— challenges, benefits, familiarity with artificial intelligence (AI), and demographics (DMG)—and the dependent variable, ethics. Demographics (DMG) were included to control for potential variations based on participant background characteristics.

4. Interpreting and Discussing the Results of the Multiple Regression Analysis

This essay presents an in-depth interpretation and discussion of the multiple regression analysis conducted to explore the relationship between the independent variables- challenges, benefits and familiarity with artificial intelligence and the dependent variable- ethics. The analysis aims to understand how these factors collectively and individually influence ethical considerations in the context of AI utilisation in the Nigerian higher education.

4.1. Model Summary and Interpretation

The model summary provides key insights into the overall performance and explanatory power of the regression model. The correlation coefficient (R) of 0.477 indicates a moderate positive relationship between the observed and predicted values of ethics, suggesting that as the independent variables change, there is a corresponding moderate change in ethics. The coefficient of determination (R^2 = 0.200) reveals that approximately 20% of the variance in the dependent variable is explained by the combination of challenges, benefits and familiarity with AI. Although this demonstrates some explanatory power, it also suggests that 80% of the variance remains unexplained, indicating that other factors are not included in this model likely influence ethics.

Table 1 The Model Summary and Interpretation

Model	R	R^2	Adj. R^2	Std. Error of Estimate	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	0.477	0.200	0.186	0.59253	14.790	4	237	< 0.001	0.358

The Adjusted R^2 value of 0.186 further refines this assessment by accounting for the number of predictors in the model, confirming that 18.6% of the variance is explained after adjusting for the predictors. This minor reduction from R^2 suggests that the model's explanatory power remains stable without significant overfitting.

The Standard Error of the Estimate (0.59253) reflects the average distance that the observed values deviate from the predicted values. A lower standard error would suggest a tighter fit; however, the value obtained indicates a moderate level of accuracy in prediction. The F Change statistic (14.790) with a significance level of **p < 0.001** demonstrates that the model is statistically significant overall. This means that the predictors, when considered together, significantly contribute to explaining variations in ethics.

4.2. ANOVA Table Interpretation

The analysis of variance (ANOVA) table corroborates the model's overall significance. The F-value of 14.790 with a p-value of 0.001 confirms that the regression model significantly predicts the dependent variable. The total sum of squares (103.979) represents the total variability in ethics, of which the regression model explains 20.771, aligning with the previously reported R^2 value.

4.3. Coefficients Analysis

The regression coefficients offer detailed insights into the individual contributions of each predictor variable to ethics

- Challenges emerged as the only statistically significant predictor with an unstandardized coefficient (B = 0.435) and a standardized coefficient (Beta = 0.421) at p < 0.001. This implies that for every one-unit increase in perceived challenges associated with AI, the ethics score increases by 0.435 units, holding all other variables constant. The strong positive relationship suggests that greater awareness of AI-related challenges heightens ethical considerations among participants. This finding underscores the importance of addressing ethical concerns when integrating AI into higher education settings.
- Demographics (DMG), Familiarity with AI, and Opportunities did not reach statistical significance (p > 0.05). Their negligible Beta values and insignificant t-values indicate that these variables do not independently predict ethics in this model. The lack of significance for familiarity with AI is particularly noteworthy as it suggests that mere exposure or understanding of AI does not necessarily translate into heightened ethical awareness unless coupled with an understanding of its challenges.

4.4. Multicollinearity Check

4.4.1. Understanding the Coefficients

The variance inflation factor and tolerance values for all predictors were close to 1, indicating no multicollinearity issues. This is crucial, as it confirms that the predictors are not highly correlated with one another, ensuring the stability and reliability of the regression coefficients.

Table 2 Coefficient checks

Predictor	B (Unstandardized Coeff.)	Std. Error	Beta (Standardized Coeff.)	t-value	Sig. (p-value)	Collinearity Tolerance	VIF
Constant	0.160	0.226	—	0.709	0.479	—	—
DMG	-0.045	0.070	-0.037	-0.639	0.523 (NS)	0.983	1.018
Familiarity	-0.114	0.087	-0.077	-1.316	0.189 (NS)	0.998	1.002
Opportunities	0.028	0.033	0.050	0.858	0.392 (NS)	0.977	1.023
Challenges	0.435	0.061	0.421	7.109	< 0.001 (Significant)	0.962	1.039

5. Discussion and Implications

The findings of this multiple regression analysis highlight several critical points. Foremost, perceived challenges associated with AI are a significant driver of ethical considerations within the Nigerian higher education system. This underscores the necessity for institutions to engage in transparent discussions about the potential risks of AI, including academic integrity, bias and misuse. Raising awareness of these challenges can foster a more ethically informed student and faculty body.

In contrast, familiarity with AI and perceived opportunities did not significantly predict ethical considerations. This raises important questions about the nature of AI education. Simply providing information or exposure to AI technologies may be insufficient to promote ethical reflection. Educational strategies should therefore emphasize the potential dilemmas and real-world consequence of AI use, rather than focusing solely on technical familiarity or perceived benefits.

The moderate R^2 value (20%) indicates that while the included predictors have a notable effect on ethics, a substantial portion of the variance remains unexplained. This suggests that other factors – such as institutional policies, personal values or cultural influences- may play significant roles. Future research should explore these additional dimensions to provide a more comprehensive understanding.

Recommendations for Future Research

To strengthen the model and deepen the understanding of factors influencing ethics, the following recommendations are proposed:

- **Expand the range of predictors** to include variables like institutional support, personal values, or ethical training programs.
- **Examine potential interaction effects** between predictors to identify nuanced relationships.
- **Investigate the role of cultural and socio-demographic factors**, which may significantly influence ethical perceptions.
- **Address autocorrelation** by exploring longitudinal data or implementing time-series analyses.

6. Conclusion

The multiple regression analysis provides valuable insights into the ethical considerations surrounding AI use in Nigerian higher education. Perceived challenges stand out as the primary factor influencing ethical awareness, highlighting the importance of addressing the complexities and risks associated with AI technologies. While the model demonstrates moderate explanatory power, further research is necessary to capture the full spectrum of factors affecting ethical decision-making. By broadening the scope of inquiry and refining methodological approaches, future studies can offer more robust guidance for fostering a responsible and ethical AI ecosystem in academic settings.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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