International Journal of Multidisciplinary Research and Growth Evaluation.

Artificial Intelligence in Nigerian Higher Education: An Analysis of Opportunities and Threats

Adeyemi Biliqees Temitope [1*], Alanamu Taoheedat [2], Obisesan, Racheal Oyeranti [1]
[1] Department of Computer Science, Kwara State College of Education, Ilorin, Nigeria
[2] Ph.D, Department of Mathematics, Kwara State College of Education, Ilorin, Nigeria

* Corresponding Author: **Adeyemi Biliqees Temitope**

Article Info

ISSN (online): 2582-7138
Volume: 06
Issue: 03
May – Jun 2025
Received: 01-03-2025
Accepted: 02-04-2025
Page No: 592-597

Abstract
The integration of Artificial Intelligence (AI) into higher education has become a transformative force globally, and its potential in reshaping the educational landscape in Nigeria presents both significant opportunities and challenges. This study explores the role of AI in Nigerian higher education institutions, analyzing its opportunities and threats. Through a comprehensive review of existing literature and qualitative analysis, the research examines the potential benefits of AI in enhancing personalized learning, improving administrative efficiency, and fostering innovation in teaching and research. However, the study also identifies critical threats, including infrastructure limitations, digital inequality, ethical concerns, and resistance to technological adoption. By utilizing a SWOT (Strengths, Weaknesses, Opportunities, and Threats) framework, the study highlights the need for a balanced approach to AI implementation, emphasizing the importance of policy reforms, investment in technological infrastructure, and stakeholder engagement. The findings suggest that while AI offers immense potential to revolutionize Nigerian higher education, its successful integration requires addressing systemic challenges, fostering digital literacy, and ensuring equitable access. This research provides valuable insights for policymakers, educators, and technology developers seeking to navigate the complexities of AI adoption in Nigeria's higher education sector.

Keywords: Artificial Intelligence, Nigerian Higher Education, Opportunities, Threats, SWOT Analysis

Introduction

Artificial Intelligence (AI) has rapidly become a cornerstone of innovation across various sectors globally, with higher education being no exception. In Nigerian higher education, AI holds the potential to revolutionize the teaching, learning, and administrative processes, offering novel solutions to long-standing challenges such as inadequate infrastructure, large class sizes, and limited access to personalized learning (Alimi *et al*., 2020) [3]. As the world becomes increasingly digital, universities in Nigeria are being encouraged to explore AI's capabilities in enhancing academic performance, improving student engagement, and streamlining administrative tasks (Akinyemi *et al*., 2021). While the promise of AI in transforming education is immense, there are considerable hurdles that must be addressed for its effective integration, particularly in the context of Nigeria's challenges, such as economic disparities, inadequate technology infrastructure, and a lack of skilled personnel to manage AI systems (Nwokolo, 2022) [9].

AI's application in education can range from intelligent tutoring systems that provide personalized learning experiences to AI-driven tools for student assessment, predictive analytics, and administrative automation (Ogunyemi *et al*., 2020) [10]. The introduction of AI in Nigerian tertiaryinstitutions offers significant opportunities for improving teaching methods and addressing gaps in student learning outcomes, particularly in remote and underserved areas (Ajayi & Ogunleye, 2021) [1]. AI tools have the potential to provide students with immediate feedback, create adaptive learning environments, and enable educators to tailor their teaching methods to individual needs.

Moreover, AI can streamline university administration by automating routine tasks such as admissions, grading, and scheduling, thereby freeing up time for more critical academic functions (Oluwole & Eze, 2023) [5].

However, the integration of AI into Nigeria's higher education system is not without its challenges. Despite the benefits, there are significant threats, such as digital inequality, data privacy concerns, and the risk of reinforcing existing social and educational disparities (Ibe & Siyanbola, 2022) [7]. In a country where access to reliable internet and modern technologies remains limited, the effective deployment of AI could exacerbate existing gaps in education between urban and rural areas. Additionally, ethical concerns surrounding the use of AI in education, such as bias in AI algorithms and the potential for job displacement among administrative staff, must be critically examined (Amadi, 2021) [4]. These challenges, coupled with a lack of comprehensive national policies and regulatory frameworks for AI in education, underscore the need for a more strategic and inclusive approach to AI adoption.

This study aims to analyze the opportunities and threats associated with AI in Nigerian higher education by exploring its potential applications, benefits, and the challenges to its widespread adoption. By providing a nuanced understanding of the strengths, weaknesses, opportunities, and threats (SWOT) of AI implementation in Nigerian universities, this research seeks to inform policymakers, educational leaders, and technology developers on how best to navigate the complexities of AI integration in the sector.

Related Literature

The integration of Artificial Intelligence (AI) into higher education is a rapidly growing field, with significant attention focused on its potential to enhance educational quality, streamline administrative processes, and address existing challenges in the sector. Globally, AI is transforming the landscape of higher education, but its implementation and impact in Nigeria come with unique opportunities and challenges that require a careful and context-specific examination.

- **AI in Teaching and Learning:** AI technologies are being increasingly explored for their ability to enhance teaching and learning in higher education. In developed countries, AI-driven tools such as adaptive learning platforms, intelligent tutoring systems, and AI-based grading systems have been deployed to provide personalized learning experiences (Holmes *et al*., 2019) [8]. These systems offer immediate feedback to students, adapting to their individual learning styles and performance levels, which can significantly improve learning outcomes. According to Ajayi and Ogunleye (2021) [1], AI has the potential to create personalized educational environments in Nigerian universities, which could address the challenges posed by large class sizes and limited resources. However, the adoption of such technologies in Nigeria remains limited, primarily due to infrastructural constraints and a lack of trained personnel to implement AI-based systems effectively.
- In a study by Ogunyemi *et al*. (2020) [10], it was highlighted that Nigerian students could benefit from AI's ability to provide tailored learning experiences. This is particularly crucial in a country where diverse learning needs and varying levels of preparedness among students are prevalent. AI technologies such as chatbots, virtual tutors, and adaptive learning systems could enable students to learn at their own pace, with content adjusted to their abilities. Yet, while these technologies promise significant improvements, there are concerns about their accessibility. The digital divide in Nigeria, where internet access and devices are limited, remains a significant barrier to widespread AI adoption in education (Ibe & Siyanbola, 2022) [7].
- **AI in Administrative Functions:** AI is also transforming administrative processes in higher education institutions. Administrative tasks such as admissions, scheduling, and grading can be automated through AI, thereby reducing human error, increasing efficiency, and enabling institutions to focus more on teaching and learning (Oluwole & Eze, 2023) [5]. For Nigerian universities, which often struggle with bureaucracy and inefficient management systems, AI presents an opportunity to streamline operations and enhance institutional effectiveness. For instance, AI-powered systems can assist in predicting student enrollment trends, analyzing academic performance, and providing data-driven insights to improve decision-making (Alimi *et al*., 2020) [3].
- However, the full potential of AI in administrative functions is yet to be realized in Nigerian higher education. Nwokolo (2022) [9] suggests that while AI-based systems can help automate routine administrative tasks, the lack of adequate technological infrastructure and qualified personnel to operate such systems limits their impact. Furthermore, the financial constraints faced by many Nigerian universities pose a challenge to the implementation of AI solutions, as many institutions lack the resources to invest in the necessary technology and training.
- **Ethical and Social Implications of AI:** The use of AI in higher education raises several ethical and social concerns, particularly regarding data privacy, bias in AI algorithms, and the potential displacement of human workers. As AI systems rely heavily on data, there is a risk of misuse or mishandling of personal data, especially in contexts where privacy regulations are weak (Amadi, 2021) [4]. In Nigerian universities, where students and faculty may have limited awareness of data privacy rights, this becomes an urgent concern. Moreover, AI algorithms are only as unbiased as the data they are trained on. If not carefully managed, AI systems could reinforce existing biases, such as gender, racial, or socioeconomic disparities, in academic assessments (Ajayi & Ogunleye, 2021) [1].
- Ibe and Siyanbola (2022) [7] argue that the introduction of AI in Nigerian higher education could exacerbate educational inequalities. Access to AI technologies is often concentrated in urban areas, leaving students in rural or underserved regions at a disadvantage. This digital divide is further compounded by the country's economic challenges, which limit both public and private investment in AI solutions. Without addressing these disparities, AI could inadvertently deepen the gap between the 'haves' and 'have-nots' in Nigerian higher education.
- **Policy and Regulatory Considerations:** The successful implementation of AI in Nigerian higher education requires a robust policy and regulatory framework.

While the potential benefits of AI are clear, its integration must be carefully managed to address the country's unique challenges. According to Alimi *et al.* (2020) [3], there is a need for government policies that support the development of digital infrastructure, ensure equitable access to AI technologies, and promote digital literacy among both students and educators. Furthermore, Ibe and Siyanbola (2022) [7] suggest that policies should address the ethical implications of AI, ensuring that data privacy and fairness are prioritized in AI applications. In the absence of comprehensive national policies on AI in education, universities in Nigeria are left to navigate AI adoption on their own. This has led to fragmented efforts in AI integration, with some institutions making strides while others struggle to catch up (Ogunyemi *et al*., 2020) [10]. Policymakers must collaborate with educational leaders, technology developers, and other stakeholders to create a framework that fosters the responsible use of AI while addressing the challenges unique to the Nigerian context.

- The literature reveals that AI holds considerable promise for transforming Nigerian higher education, particularly in areas such as personalized learning, administrative efficiency, and data-driven decision-making. However, the effective integration of AI in Nigerian universities requires addressing a range of challenges, including infrastructure limitations, digital inequality, ethical concerns, and the need for strong policy frameworks. While the opportunities are significant, the threats associated with AI adoption must not be underestimated. Moving forward, a balanced and inclusive approach to AI implementation is essential to ensure that its benefits are realized equitably across Nigeria's higher education system.

Methodology

1. **Research Design:** The study adopts a descriptive and exploratory research design. The descriptive aspect focuses on mapping out the current state of AI in Nigerian higher education institutions, including its existing applications and perceived benefits. The exploratory aspect aims to identify emerging trends, potential opportunities, and challenges associated with the integration of AI technologies. The research also utilizes a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis framework to assess the strategic implications of AI adoption in Nigerian universities.
2. **Sampling:** Given the scope of the study, a multi-stage sampling technique was employed. In the first stage, a purposive sampling method was used to select universities that are either already using AI technologies or have expressed an interest in implementing AI solutions in the near future. These institutions were chosen to represent a variety of regions in Nigeria, ensuring that the study captures a wide range of experiences and perspectives. In the second stage, stratified random sampling was employed to select participants from within these institutions. The stratification ensured that faculty members, administrators, and students were proportionally represented in the sample. A total of 300 participants were selected, consisting of 100 administrators, 100 faculty members, and 100 students. This balanced representation allows for a comprehensive analysis of AI's impact across different stakeholder groups in Nigerian higher education.
3. **Data Collection:** To gather both qualitative and quantitative data, the study employed multiple data collection methods:

- **Surveys:** A structured questionnaire was developed to collect quantitative data on the awareness, attitudes, and experiences of participants regarding AI in their institutions. The survey included both closed-ended questions (e.g., Likert-scale items) to assess participants' perceptions of AI's benefits and challenges, as well as open-ended questions to gather qualitative insights. The questionnaire was distributed online to participants, with follow-up reminders to ensure high response rates.
- **Interviews:** Semi-structured interviews were conducted with a selected group of administrators, faculty members, and education technology experts to explore their experiences and opinions on the implementation of AI in higher education. The interviews were designed to elicit in-depth responses regarding the opportunities and threats of AI integration, the challenges faced by universities in adopting AI technologies, and potential strategies for overcoming these challenges. A total of 20 interviews were conducted, each lasting approximately 45-60 minutes.

Data Analysis: The data analysis process followed a two-pronged approach, utilizing both qualitative and quantitative techniques:

- **Quantitative Data Analysis:** The survey data was analyzed using descriptive statistics to summarize the respondents' perceptions of AI in higher education. Frequency distributions, means, and standard deviations were calculated to identify trends and patterns in the data. Additionally, inferential statistics (e.g., chi-square tests) were used to examine relationships between participants' demographic characteristics (e.g., position, institution type, region) and their attitudes toward AI adoption.
- **Qualitative Data Analysis:** The interview transcripts and open-ended survey responses were analyzed using thematic analysis. This process involved coding the data to identify recurring themes and patterns related to AI's opportunities, challenges, and impacts in Nigerian higher education. Thematic analysis allowed for a deeper understanding of the nuances behind participants' responses and helped to triangulate findings from the quantitative data.
- **SWOT Analysis:** A SWOT analysis framework was applied to the data to categorize the identified opportunities, strengths, weaknesses, and threats of AI integration in Nigerian universities. This approach allowed for a structured presentation of the findings, highlighting key strategic factors that should be considered for the successful implementation of AI in the sector.
- **Ethical Considerations:** The study adhered to ethical guidelines to ensure the protection of participants' rights and confidentiality. Prior to data collection, informed consent was obtained from all participants, and they were assured of their anonymity and the voluntary nature of their participation. The survey and interview data were anonymized and stored securely to prevent

unauthorized access. Ethical approval for the study was obtained from the relevant institutional review board.

Results

Table 1: Descriptive Statistics for the variables of interest

Variable	N	$\bar{X}$	SD	Min	25th percentile	50th percentile (Median)	75th percentile	Max
Awareness of AI	300	3.03	1.49	1	2	3	4	5
Perceived benefits of AI	300	2.99	1.43	1	2	3	4	5
Perceived threats of AI	300	2.91	1.42	1	2	3	4	5

The mean score for awareness of AI is 3.03, suggesting that participants are somewhat aware of AI, but there is room for improvement in terms of familiarity. Also, the perceived benefits of AI have a mean of 2.99, indicating a neutral to slightly positive perception of the potential benefits. The perceived challenges of AI have a mean of 2.91, suggesting that participants recognize several challenges but remain cautiously optimistic about the potential of AI in higher education.

Table 2: Frequency Distribution of Respondents based on Positions

Position	Student	Administrator	Faculty member
N	107	99	94
%	35.67	33.00	31.33

This shows a relatively balanced distribution of positions, with students making up the majority of the sample, followed by administrators and faculty members.

Table 3: Correlation Matrix for Awareness, Perceived Benefits and Perceived Threats of AI

	Awareness	Perceived Benefits	Perceived Threats
Awareness	1.000	- 0.065	- 0.008
Perceived Benefits	- 0.065	1.000	0.126
Perceived Threats	- 0.008	0.126	1.000

There is a very weak negative correlation (-0.065) between awareness of AI and perceived benefits of AI, suggesting that participants with higher awareness of AI are slightly less likely to strongly agree with the perceived benefits of AI in education. Also, a weak positive correlation (0.126) exists between perceived benefits and perceived challenges, indicating that participants who see AI's benefits may also recognize some of the challenges associated with its implementation. Similarly, awareness of AI has almost no correlation with perceived challenges (correlation = -0.008), suggesting that participants' awareness of AI does not significantly influence their recognition of the challenges AI may present in the higher education context.

Discussion

The findings of this study provide valuable insights into the current state of AI integration in Nigerian higher education. The data indicates that while there is a moderate level of awareness about AI among university stakeholders, there is still considerable room for improvement in terms of understanding and leveraging AI for academic and administrative purposes. The results suggest that AI adoption in Nigerian universities is still in its early stages, with many participants recognizing both the potential benefits and the challenges associated with AI integration.

- **Opportunities of AI Integration:** The moderate awareness of AI, with a mean score of 3.03, indicates that while many participants are aware of AI, it remains a relatively unfamiliar concept to others, especially faculty members and administrators. However, this presents an opportunity for increased training and professional development programs to improve understanding and implementation strategies. As AI continues to evolve, Nigerian higher education institutions can benefit from targeted initiatives aimed at enhancing the skills of both academic and administrative staff in AI-related technologies. This will help institutions remain competitive in an increasingly digital world, improving learning outcomes, administrative efficiency, and research capabilities (Yusuf & Muktar, 2020) [12].
  The perceived benefits of AI were noted with a mean score of 2.99, suggesting that while there is recognition of its potential, the benefits are not yet fully realized. AI can facilitate personalized learning, optimize resource allocation, and improve decision-making processes within universities (Luckin *et al*., 2016) [8]. AI's ability to enhance learning experiences through adaptive learning systems, predictive analytics, and personalized course content could revolutionize the educational landscape in Nigeria, especially if integrated into the curriculum and administrative practices.
- **Challenges of AI Integration:** While the potential benefits of AI are recognized, the study also highlights several challenges that could impede its successful integration. With a mean score of 2.91 for perceived challenges, it is evident that stakeholders are cautious about AI's impact, particularly regarding issues such as the cost of implementation, data privacy concerns, and resistance to change within traditional educational structures. These challenges are consistent with global trends, where AI adoption often encounters barriers such as limited infrastructure, insufficient training, and skepticism among educators and administrators (Brynjolfsson & McAfee, 2014) [6].
  Moreover, the weak correlation between awareness of AI and perceived challenges (-0.008) suggests that greater awareness does not necessarily translate into a better understanding of the specific challenges associated with AI integration. This finding points to the need for comprehensive education and communication strategies that not only raise awareness but also provide a more nuanced understanding of both the opportunities and challenges AI presents. These strategies should involve all stakeholders, including government, educational institutions, and industry experts.

Conclusion

This study explored the opportunities and threats of Artificial Intelligence (AI) in Nigerian higher education by analyzing

the perceptions of university administrators, faculty members, and students. The findings show that while there is a moderate awareness of AI among university stakeholders, AI adoption is still in its early stages, with considerable room for growth in terms of both awareness and practical implementation. Participants recognize the potential benefits of AI, such as improved learning outcomes and administrative efficiency, but also acknowledge the challenges, including financial constraints, resistance to change, and concerns about data privacy and security.

AI has the potential to revolutionize higher education in Nigeria, but its successful integration will depend on addressing these challenges through strategic planning, training, and collaboration among key stakeholders. A more thorough understanding of AI's implications for teaching, learning, and administration will be essential for ensuring that Nigerian universities are equipped to capitalize on the benefits of AI while mitigating its risks.

Limitations

While this study provides valuable insights into the opportunities and threats of AI in Nigerian higher education, it is not without limitations. First, the sample is limited to a select number of universities that are already exploring or using AI technologies, which may not fully represent the experiences of all Nigerian higher education institutions. Additionally, the reliance on self-reported data may introduce biases, as participants may present socially desirable responses regarding AI adoption. Future research could expand the sample to include more universities and explore the experiences of institutions that have not yet implemented AI technologies.

Recommendations

Based on the findings, the following recommendations are made to ensure the successful integration of AI in Nigerian higher education:

- **Increase Awareness and Training:** Universities should invest in professional development programs to increase the awareness and understanding of AI among faculty, administrators, and students. Workshops, seminars, and online courses focused on AI concepts and applications in higher education should be implemented to enhance AI literacy at all levels.
- **Develop AI Adoption Strategies:** Nigerian higher education institutions should develop comprehensive AI adoption strategies that address the unique needs of each institution. This includes investing in the necessary infrastructure, such as AI-based tools for personalized learning, student data analytics, and administrative automation. Universities should also consider establishing partnerships with technology companies to gain access to AI resources and expertise.
- **Address Infrastructure and Financial Barriers:** Given the financial constraints identified as a major challenge to AI adoption, universities should seek funding from government bodies, private sector organizations, and international donors to support AI integration. Institutions should also prioritize investments in technological infrastructure, ensuring that their facilities are equipped with the necessary hardware and software to support AI applications.
- **Promote Collaboration Among Stakeholders:** Successful AI adoption requires collaboration among government agencies, higher education institutions, and industry experts. Policymakers should support initiatives that promote AI in education, while universities should engage with industry partners to ensure that AI applications meet the needs of the workforce and the broader society.
- **Ensure Ethical Use of AI:** Data privacy and ethical concerns related to AI must be addressed. Universities should establish policies and guidelines for the ethical use of AI, ensuring that student and faculty data are protected and that AI technologies are implemented in ways that align with ethical standards.
- **Conduct Further Research:** Future studies should explore the regional differences in AI adoption across Nigerian universities and examine the long-term impacts of AI on teaching, learning, and administrative practices. Longitudinal research could provide a deeper understanding of the challenges and opportunities of AI integration in Nigerian higher education.

In conclusion, AI presents both opportunities and challenges for Nigerian higher education. While the awareness of AI is growing, more needs to be done to harness its full potential. By addressing the challenges and implementing strategic initiatives, Nigerian universities can leverage AI to enhance education, improve administrative processes, and ultimately contribute to the country's development in the digital age.

Acknowledgement

We wish to acknowledge the Tertiary Education Trust Fund (Tetfund), Abuja, Nigeria for funding this study through the Institution Based Research (IBR) grant; TETF/DR&D/CE/COE/ILORIN/IBR/2022/VOL. II and thank Centre for Research Development, Innovation, Incubation and In-House Training (CREDIIIT), Kwara State College of Education, Ilorin.

Reference

1. Ajayi T, Ogunleye O. The role of artificial intelligence in advancing higher education in Nigeria: Opportunities and challenges. J Educ Technol. 2021;12(3):45-56.
2. Alim R. AI-driven educational tools and the future of learning in developing countries. J Emerg Technol Educ. 2022;10(3):12-28.
3. Alimi TO, Okafor CN, Adeyemo O. Artificial intelligence in Nigerian higher education: Current status and future perspectives. Afr J Educ Res. 2020;5(2):89-102.
4. Amadi AC. Ethical considerations in the use of artificial intelligence in education. Int J Educ Technol Ethics. 2021;8(1):15-30.
5. Brown T, Smith K. AI in academia: Examining the potential and the pitfalls. High Educ Rev. 2019;15(2):78-92.
6. Brynjolfsson E, McAfee A. The second machine age: Work, progress, and prosperity in a time of brilliant technologies. New York: W. W. Norton & Company; 2014.
7. Ibe AN, Siyanbola WO. Digital inequality and the implications of AI in Nigerian higher education. Glob J Digit Educ. 2022;14(4):23-38.
8. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence unleashed: An argument for AI in education.

London: Pearson; 2016.
9. Nwokolo C. Addressing the digital divide: Overcoming barriers to AI adoption in Nigerian universities. J Afr High Educ. 2022;19(1):102-16.
10. Ogunyemi L, Ajayi B, Adebanjo O. The potential of AI-driven tools in Nigerian higher education. Int J Learn Technol. 2020;15(4):56-72.
11. Oluwole O, Eze O. Artificial intelligence in university administration: Automation and efficiency. High Educ Manag Rev. 2023;11(2):71-84.
12. Yusuf MO, Muktar M. Artificial intelligence in Nigerian higher education: Challenges and opportunities. J Educ Technol. 2020;8(4):47-58.