

Artificial Intelligence and Its Impact on Teaching and Learning in Higher Institutions in Ile-Oluji/Oke-Igbo and Ondo West, Nigeria

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Highlights

- Assessed students' perceptions of AI in teaching, learning, and administration across five higher institutions in Ondo State.
- Data collected via structured questionnaire from 500 students using stratified random sampling.
- Findings showed students view AI positively for understanding complex topics, assignments, and improving problem-solving.
- AI enhanced administrative efficiency, though lack of staff training was a key barrier to full integration.
- Recommended integration of AI into curricula and staff capacity building to improve digital and data literacy.

Abstract

This study focused on Artificial Intelligence (AI) and Nigerian higher education development. The aim of this study is to examine the impact of AI on teaching and learning in higher institutions in Nigeria. A self-developed questionnaire was used to collect information from the respondents. A simple random sampling technique was employed to select 500 respondents from five chosen universities in the Local Government Areas. The data collected were analysed using descriptive and inferential statistics. Findings revealed that students generally have positive perceptions of AI in their academic activities; they find it helpful for understanding complex topics, completing assignments, and enhancing problem-solving skills. While most students trust AI to provide accurate information, some variability exists in its perceived effectiveness, which suggests the need for tailored integration and support. The results also revealed the positive impact of AI on administrative tasks, including improved efficiency, simplified processes, and time savings for routine activities. However, inadequate training for administrative staff emerges as a significant barrier, limiting the full potential of AI integration. While AI is seen to enhance workflows and save time, mixed perceptions have shown ongoing challenges with implementation and technical limitations. It was therefore recommended that educational institutions should incorporate AI-related courses and tools into their curriculum to enhance students' academic competence and digital literacy. Also, Universities should provide opportunities for lecturers to develop AI-related skills and knowledge through professional development programs, which include training in data literacy, AI literacy, and understanding the ethical implications of AI in education.

Keywords: artificial intelligence, digital literacy, teaching, learning and higher institutions

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1.0 Introduction

Artificial Intelligence (AI) refers to the development of systems and machines that can simulate intelligent human behaviour, such as learning, reasoning, and problem-solving (Mircea, 2023). It involves the use of algorithms, machine learning, natural language processing, and robotics to perform tasks that typically require human intelligence (Khan et al., 2020). One of the key elements of Artificial Intelligence is the ability to learn. Intelligent systems are designed to learn from data and experiences, identify patterns and trends, and improve their performance over time. This is achieved through the use of machine learning algorithms and artificial neural networks, which enable machines to process information, identify patterns, and make predictions or decisions based on them (Richard, 2022; Agbo et al., 2021). Reasoning is another crucial aspect of Artificial Intelligence. Intelligent systems can utilise available information to make logical decisions and solve complex problems (Mircea, 2023).

A significant increase in the adoption of AI and machine learning technologies has been observed in the higher education sector, which has been primarily adopted to achieve administrative efficiency, enhance the student learning experience, and support decision-making systems (Asemi & Asemi, 2018). Colleges and universities are multifaceted institutions that provide a range of services to students and staff, including teaching and learning, enrollment management, library services, and campus security, among others (Nwogu, 2021; Oniovoghai et al., 2023; Owoeye & Onuoha, 2022). However, many schools continue to struggle with delivering traditional education due to resource constraints and growing populations (Esteva et al., 2019; Charles, 2018). This is where AI comes in; it can be used to automate repetitive tasks and processes, analyse data at a far greater scale and specificity, and deliver personalised recommendations—all things that can, in principle, make data science far more efficient and accessible (Esteva et al., 2019). A diverse range of applications and varying levels of adoption across institutions mark the current landscape of AI in higher institutions. Some universities are experimenting with AI-driven tools for personalised learning, automated grading, and campus security systems. For example, some institutions have implemented AI-based plagiarism detection software to uphold academic integrity, while others utilise AI to enhance online learning platforms with adaptive learning technologies (Popenici & Kerr, 2017; Jabar, 2018). These innovations are reshaping the educational environment, making it more interactive, efficient, and responsive to individual student needs (Huang et al., 2020). Moreover, the global COVID-19 pandemic has accelerated the adoption of AI and other digital technologies in higher education. As institutions were forced to shift to remote learning and virtual operations, AI tools played a crucial role in ensuring the continuity of services (Baker & Smith, 2021). Virtual classrooms, AI-driven tutoring systems, and automated administrative processes became essential components of the educational landscape. This rapid transition highlighted the resilience and adaptability of AI technologies, reinforcing their importance in the future of higher education (Sequeira, 2018). As institutions plan for post-pandemic recovery, the lessons learned from this period will likely influence ongoing and future AI initiatives (Grajek, 2020).

According to Huang et al. (2020), the adoption of AI in higher education presents both opportunities and challenges. While AI can significantly enhance service delivery by improving efficiency, personalisation, and decision-making, it also necessitates careful consideration of ethical, financial, and technical issues (Onah & Offor, 2020; Isola, 2019). As higher institutions continue to explore and implement AI technologies, it is crucial to conduct comprehensive research to understand their impact and to develop best practices for their use. It is on this premise that this study is carried out to examine the impact of AI on teaching and learning in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State.

1.1 Statement of the Problem

The integration of artificial intelligence (AI) in higher education has the potential to revolutionise service delivery by enhancing efficiency, personalising learning experiences, and supporting data-driven decision-making (Smith, 2020; Chen & Wang, 2022). However, the adoption of AI in higher institutions also presents several challenges and uncertainties that need to be addressed to maximise its benefits and mitigate its risks. Despite the increasing implementation of AI technologies in higher education, there is a lack of comprehensive understanding of their overall impact on service delivery (Huang et al., 2020). Specifically, there is a lack of empirical evidence on how AI affects administrative efficiency, student satisfaction, academic performance, and resource management in higher education institutions locally. Furthermore, the potential for job displacement and the ethical concerns related to data privacy, algorithmic bias, and transparency remain significant barriers to the widespread adoption of AI (Khan, 2020). Thus,

higher institutions vary widely in their capacity to implement and manage AI technologies, leading to disparities in the quality and effectiveness of service delivery. Higher institutions with limited financial and technical resources like those in Ile-Oluji/Oke-Igbo and Ondo West Local Government Areas of Ondo State may struggle to keep pace with larger and better-funded higher institutions, potentially exacerbating existing inequalities in the education system (Okorie & Elom, 2020).

1.2 Purpose of the Study

The purpose of this study is to examine the impact of Artificial Intelligence from students' perception on effective teaching and learning, administrative tasks, teaching and learning process and outcome in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Areas of Ondo State which is the study area.

1.3 Research Hypothesis

The following research hypothesis will serve as a guide for this study:

Ho1: There is no significant difference in students' perception of the use of Artificial Intelligence in the study area.

Ho2: There is no significant difference in the impact of artificial intelligence on administrative tasks in the study area.

Ho3: There are no significant benefits of artificial intelligence on the teaching and learning process in the study area.

Ho4: There are no significant challenges of artificial intelligence on the teaching and learning process in the study area.

2.0 Research Method

The population of this study consists of students from higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State. A stratified random sampling was used to select 500 students from five higher institutions in the study area, ensuring representation across relevant strata. Within each stratum, simple random sampling was applied to select participants. A self-structured questionnaire was used as the research instrument for the study which was developed by the researcher and validated by an expert from educational research. The criticism and suggestions made were incorporated into the final instrument to ensure both face and content validity. The questionnaire consists of two sections: Sections A and B. Section A contains the demographic information of the respondents while section B was designed to elicit responses related to the study objectives. The respondents' responses were structured on a 4-point modified Likert rating scale from 4 to 1, indicated by Strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD). The analysis of data collected through the questionnaires was done. Data were analysed using descriptive statistics (mean and standard deviation), and inferential statistics (independent t-test) with a significance level set at $p < 0.05$.

3.0 Results

3.1.1 Hypothesis One (H_{o1})

There is no significant difference in the perception of students on the use of Artificial Intelligence in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State.

Table 1: T-test analysis on the perception of students on the use of Artificial Intelligence in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State

Variable	N	\bar{X}	SD	df	α level	t-tab	t-cal	Decision
Perception of students on the use of Artificial Intelligence	500	130.2	8.6	499	0.05	1.96	2.35	Rejected

Note: N = No of sample, \bar{X} = Mean, SD = Standard deviation, df = Degree of freedom, α level = significance level, t-tab = t-tabulated, t-cal = t-calculated.

The results in Table 1 revealed that the calculated t-value (t-cal) of 2.3 is greater than the table value (t-tab) of 1.96 at an alpha level of 0.05 with 499 degrees of freedom. This indicates a significant difference in students' perceptions regarding the use of AI. The high t-cal value demonstrates a strong divergence from the null hypothesis, which posits no significant difference in perception. Thus, the null hypothesis is rejected. To this end, this result signifies in these Local Government Areas a significantly distinct perception of AI usage, highlighting its impact and relevance in their academic environment.

3.2 Hypothesis Two (H_{02})

There is no significant impact of artificial intelligence on administrative tasks in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State.

Table 2: T-test analysis on the impact of artificial intelligence on administrative tasks in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State

Variable	N	\bar{X}	SD	df	α level	t-tab	t-cal	Decision
Impact of artificial intelligence on administrative task	500	124.2	57.89	499	0.05	1.96	4.79	Rejected

The result from Table 2 showed that the calculated value (t-cal) of 4.79 is greater than the table value (t-tab) of 1.96 at an alpha level of 0.05 with 499 degrees of freedom. This result indicates that the observed difference between the sample data and the hypothesised value is statistically significant at the 0.05 alpha level. Therefore, the null hypothesis is rejected. To this end, there is a significant impact of artificial intelligence on administrative tasks in higher institutions in these Local Government Areas.

3.3 Hypothesis Three (H_{03}):

There are no significant benefits of artificial intelligence on the teaching and learning process in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State.

Table 3: T-test analysis on the benefits of artificial intelligence on teaching and learning process in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State

Variable	N	\bar{X}	SD	df	α level	t-tab	t-cal	Decision
Benefits of artificial intelligence on teaching and learning process	500	167.4	19.70	499	0.05	1.96	25.10	Rejected

The result from Table 3 showed that the calculated value (t-cal) of 25.10 is greater than the table value (t-tab) of 1.96 at an alpha level of 0.05 with 499 degrees of freedom. Consequently, the null hypothesis, which assumes no significant benefits of AI in the teaching and learning process, is rejected. It could therefore be inferred that AI significantly benefits teaching and learning. These findings support the view that AI offers personalised learning experiences, enhances comprehension, and improves research skills. Thus, the statistical evidence underscores the transformative potential of AI in revolutionising educational practices and outcomes.

3. 4 Hypothesis Four (H_{04}):

There are no significant challenges of artificial intelligence on the teaching and learning process in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State.

Table 4: T-test analysis on the Challenges of artificial intelligence on teaching and learning process in higher institutions in Ile-Oluji/Oke-Igbo and Ondo West Local Government Area of Ondo State

Variable	N	\bar{X}	SD	df	α level	t-tab	t-cal	Decision
Challenges of artificial intelligence on	500	154.2	8.6	499	0.05	1.96	10.91	Rejected

teaching and learning process								
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From Table 4, the calculated value (t-cal) of 10.91 is greater than the table value (t-tab) of 1.96 at an alpha level of 0.05 with 499 degrees of freedom. As a result, the null hypothesis, which posits no significant challenges associated with AI in the teaching and learning process, is rejected. This result suggests that significant challenges are associated with the use of AI in teaching and learning. These challenges may include high costs of AI tools, poor internet connectivity, insufficient training for lecturers, and inadequate infrastructure, as previously identified. The statistical significance highlights the pressing need to address these issues to optimise the integration of AI into education.

4.0 Discussion of Findings

The findings from testing hypothesis one show the impact of artificial intelligence on student academic competence in the Nigerian citadel of learning. The results show that students generally have positive perceptions of Artificial Intelligence (AI) in their academic activities. They are aware that using AI helps understand complex topics, complete assignments, and enhance problem-solving skills. While most students trust AI to provide accurate information, some variability exists in its perceived effectiveness, suggesting the need for tailored integration and support. This can be corroborated with the study by Ferreira et al. (2020) which revealed that AI is a system that thinks like humans, acts like humans, and thinks rationally which has been enhancing the academic achievement of the students. Hence, AI is and will continue to be increasingly prevalent in our lives. Google or Amazon products are being integrated into our daily lives, and many more companies are providing smart services in their products.

Furthermore, the findings from testing Hypothesis Two revealed a positive impact of AI on administrative tasks, including improved efficiency, simplified processes, enhanced workflows, and time savings for routine activities. This is corroborated by Huang et al. (2021), who explored the applications of AI in educational administration. The study found that AI-powered platforms improved task efficiency and reduced administrative burdens, such as managing student records, automating routine correspondence, and organising institutional data.

Additionally, the findings from testing hypothesis three demonstrated the benefits of AI in the teaching and learning process. AI is seen to enhance students' understanding of complex assignments, provide personalised learning experiences, improve research and information-gathering skills, and offer superior learning resources compared to traditional textbooks. Also, these findings support the view that AI-based platforms are acknowledged for boosting confidence among both lecturers and students in handling academic tasks. While these advantages are widely recognised, a minority expressed reservations, reflecting challenges such as data overload, preference for conventional methods, or limited familiarity with AI tools. Overall, the findings confirm the transformative role of AI in education. This finding is congruent with the study by Lu et al. (2021), who suggested that AI-powered platforms provide personalised learning experiences by adapting to the unique learning needs and styles of individual students. According to the researchers, AI systems can adjust the content, difficulty level, and pace of lessons based on the student's progress and performance. This level of customisation ensures that students receive the appropriate challenges and support, which fosters deeper engagement with the material. Consequently, students develop stronger academic competence as they build a more profound understanding of concepts through personalised feedback and practice opportunities tailored to their specific strengths and weaknesses.

More so, the findings from testing hypothesis four confirmed several challenges in the use of AI in teaching and learning at higher education institutions. These include the high cost of AI tools, poor internet connectivity, insufficient training for lecturers, students' lack of familiarity with AI tools, and inadequate electricity supply. These barriers collectively may hinder the effective adoption of AI in education, necessitating improved infrastructure, training, and resources to enhance AI integration. This finding is buttressed by Grajek (2020), who opined that despite the potential benefits of AI in education, several barriers hinder its widespread adoption in Nigeria. One of the most significant challenges is the digital divide, as many Nigerian educational institutions lack the necessary infrastructure to support AI technologies.

Additionally, insufficient funding, limited internet access, and inadequate power supply further hinder the use of AI in academic settings. Moreover, there is a lack of expertise among educators and administrators in integrating and utilising AI tools within the curriculum effectively. As a result, the full potential of AI to enhance academic competence remains untapped in many Nigerian institutions.

5.0 Conclusion

The findings of this study suggest that Artificial Intelligence has the potential to significantly transform teaching, learning, and administrative tasks in higher education institutions. There is a reasonable chance that artificial intelligence will become an integral part of all institutions in various ways, and the future of education is closely tied to it. By making learning more accessible and personalised, AI has the potential to revolutionise education for better. While the educational institution is not ready to accept humanoid robots in the classroom, it is clear that Artificial Intelligence has a future in transforming educational activities. Thus, Artificial Intelligence plays a crucial role in personalising learning, enabling content, pace and teaching style to be tailored to individual students' needs and preferences. Through AI systems, personalised learning programmes can be created which will foster the development of unique human skills by focusing on each student's specific strengths and interests. AI-based technologies can also facilitate communication and collaboration among students and between students and teachers. These tools can promote the development of unique human skills such as communication, negotiation or teamwork skills. However, the use of AI has to be done with caution. Total dependence on AI may eventually jeopardise the rational thinking of students and teachers; thereby slow down the academic progression. This may also truncate the authenticity, validity and reliability of research outcome. Also, inadequate training for administrative staff and mixed perceptions, which suggest ongoing challenges with implementation and technical limitations, are of great concern and must be addressed.

6.0 Recommendations

Based on the findings of this study, the following recommendations were made:

- Educational institutions should incorporate AI-related courses and tools into their curriculum to enhance students' academic competence and digital literacy
- Universities should provide opportunities for lecturers to develop AI-related skills and knowledge through professional development programs. This includes training in data literacy, AI literacy, and understanding the ethical implications of AI in the education sector.
- Universities should encourage collaboration among lecturers and researchers from different disciplines to leverage the potential of AI in interdisciplinary research projects. Cross-disciplinary collaboration can lead to innovative approaches and insights, addressing complex challenges in education and beyond.
- Universities should support evidence-based practices in integrating AI into teaching and research. This involves conducting rigorous empirical research to assess the impact of AI tools and technologies on student learning outcomes, lecturers' workload, and research productivity.
- Universities should develop clear guidelines to ensure that students use AI tools ethically, thereby avoiding issues such as academic dishonesty or overreliance on AI for problem-solving.
- Governments and institutions should invest in digital infrastructure (e.g., power, internet, AI labs) to facilitate implementation.

7.0 Recommendations Ethical Considerations

This research was carried out under the ethical approval of the respondents.

8.0 References

1. Agbo, F. J., Sanusi, I. T., & Abubakar, A. A. (2021). Artificial intelligence in Nigerian education: Opportunities and Challenges International Journal of Information Systems and Social Change, 12(4), 34-4
2. Asemi, A. & Asemi, A. (2018). Artificial intelligence (AI) application in library systems in Iran: A taxonomy study. Library Philosophy and Practice (e-journal). <https://digitalcommons.unl.edu/libphilprac/1840>.
3. Baker, J., & Smith, M. (2021). The impact of adaptive learning systems on academic achievement: A review of recent developments. Journal of Educational Technology Research, 45(2), 127–140.
4. Charles, O. (2018). Effects of instructional materials on secondary school students' academic achievement in social studies in Ekiti State, Nigeria. World Journal of Education, 6(1), 32–39.
5. Chen, H., & Wang, Y. (2022). Interactive learning environments: The role of artificial intelligence in student engagement. International Journal of Artificial Intelligence in Education, 34(1), 44-60.

6. Ferreira, P., Teixeira, J. G., & Teixeira, L. F. (2020). Understanding the impact of artificial intelligence on services. ResearchGate. <https://www.researchgate.net/publication/338838117>
7. Grajek, S. (2020). Educause Horizon Report: Teaching and Learning Edition. Educause
8. Huang, R., Tlili, A., Chang, T.-W., Zhang, X., Nascimbeni, F., & Burgos, D. (2020). Disrupted classes, undisrupted learning during the COVID-19 outbreak in China: Application of open educational practices and resources. *Smart Learning Environments*, 7(1), 1–15.
9. Isola, A. (2019). The impacts of Artificial Intelligence (AI) on business and its regulatory challenges. *International Journal of Law and Policy*, 1(1). 1–10.
10. Jabar H. Yousif. (2018). Artificial intelligence in e-learning-pedagogical and cognitive aspects. *Proceedings of the World Congress on Engineering*, 1, 997–1002.
11. Khan, W.Z., Rehman, M.H., Zangoti, H.M. & Afzal, M.K. (2020). Industrial internet of things: Recent advances, enabling technologies and open challenges. *Computers and electrical engineering*, 81, 106522
12. Lu, Y., Zhang, X., & Li, J. (2021). Personalized learning with AI: Impacts on academic competence. *Journal of Learning Analytics*, 8(3), 11–25.
13. Martinez, R., & Soto, A. (2022). AI for accessibility: Enhancing learning for students with special needs. *Computers in Education*, 164, 103897.
14. Mircea, M. (2023). Impact of artificial intelligence on education. *Research Association for Interdisciplinary Studies. Conference Proceedings*, June 8-9.
15. Nwogu, F. C. (2021). The Impact of Artificial Intelligence on Library Collections and Services in Nigeria. *Journal of Library and Information Science*, 19(1), 32–43.
16. Okorie, N. & Elom, C. O. (2020). Integrating artificial intelligence into teaching and learning in Nigeria: Challenges and prospects. *Journal of Educational Innovation*, 5(1), 22-34.
17. Onah, C. I., & Offor, G. U. (2020). Ethical Issues in the Use of Artificial Intelligence in Nigerian Education. *African Journal of Educational Technology*, 9(2), 44-59.
18. Oniovoghai E.M., Idiodi E.O., and Urhiewhu L.O. (2023) Artificial Intelligence (AI) In Service Delivery to Academic Library by Librarians in Nigeria, *International Journal of Library and Information Science Studies*, 9(2), 41-53.
19. Owoeye, R. & Onuoha, K. (2022). Artificial Intelligence and Expert Systems: An Intelligent Library. *International Journal of Innovation and Research in Educational Sciences*. 5(4), 476–478.
20. Popenici, S. & Kerr, S. (2017). Exploring the Impact of Artificial Intelligence on Teaching and Learning in Higher Education. *Research and Practice in Technology-Enhanced Learning*, 12(2), 1-13.
21. Richard, E. (2022). An Overview of Neural Networks. *American Journal of Neural Networks and Applications*. 5(1), 7–11.
22. Sequeira, A. H. (2018). Artificial intelligence and library services in Nigerian universities: Opportunities and challenges. *Library Philosophy and Practice*, 2018(1), 1–14.
23. Smith, K. (2020). Artificial intelligence and academic libraries: A review of the literature. *International Journal of Library Science and Research*, 10(2), 9–20.

Data availability statement

Data will be made available on request.

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Conflict of Interest

The authors declare no conflict of interest relevant to this study.