

Deployment of Artificial Intelligence on the Implementation of Teaching and Research Programmes of Tertiary Institutions in FCT, Abuja, Nigeria

Okani Doris Ugo-onyeka PhD¹

¹ Department of Educational Management, Faculty of Education, University of Abuja, Nigeria



DOI : -

Sections Info

Article history:

Submitted: December 23, 2022

Final Revised: January 11, 2026

Accepted: February 16, 2026

Published: March 14, 2026

Keywords:

Artificial Intelligence
Implementation of Teaching
Research Programmes

ABSTRACT

Objective: This study examined the deployment of Artificial Intelligence in the implementation of teaching and research programmes in tertiary institutions in the Federal Capital Territory (FCT), Abuja, Nigeria. **Method:** The study adopted a correlational survey research design. A sample of 230 respondents comprising academic staff and postgraduate students was selected using a simple random sampling technique. Data were collected using a structured questionnaire titled Artificial Intelligence Deployment and Teaching and Research Programme Implementation Questionnaire (AIDTRPIQ). The instrument was validated by experts in Educational Management and Educational Technology, while reliability was established using the Cronbach Alpha method which yielded a reliability coefficient of 0.82. Data were analyzed using descriptive statistics and Pearson Product Moment Correlation (PPMC) at a 0.05 level of significance. **Results:** The findings revealed that Artificial Intelligence deployment significantly influences the implementation of teaching programmes ($r = 0.68, p < 0.05$) and research programmes ($r = 0.72, p < 0.05$) in tertiary institutions in FCT Abuja. The study concluded that AI technologies enhance teaching effectiveness through adaptive learning systems, automated assessment tools, and intelligent tutoring systems. AI also improves research productivity by facilitating large data analysis, literature review automation, and knowledge discovery. **Novelty:** The study recommended increased funding for AI infrastructure, development of institutional policies for AI integration, and continuous training programmes to improve AI literacy among academic staff and students in Nigerian tertiary institutions.

INTRODUCTION

The rapid advancement of digital technologies has transformed many sectors of the global economy, including education. One of the most transformative technological innovations in contemporary education is Artificial Intelligence (AI) [1] [2]. Artificial Intelligence refers to computer systems and technologies designed to perform tasks that normally require human intelligence, such as learning, reasoning, decision-making, pattern recognition, and problem solving. In the context of education, AI has emerged as an important tool for improving teaching, learning, and research processes in higher institutions across the world [3][4]. Tertiary institutions play a critical role in national development through the provision of advanced knowledge, professional training, and research that drives innovation and socio-economic growth. Universities, polytechnics, and colleges of education are expected to produce skilled manpower and generate new knowledge through research activities. The achievement of these mandates increasingly depends on the adoption of modern technologies that can enhance teaching effectiveness and research productivity. Artificial Intelligence has therefore become a key driver of innovation in tertiary education systems globally [5][6][7].

In many developed countries, AI technologies are already being integrated into teaching and research activities in universities. AI-powered learning management systems, intelligent tutoring systems, automated grading tools, virtual teaching assistants, plagiarism detection software, and data analytics platforms are widely used to improve teaching delivery and learning outcomes. These technologies enable personalized learning, support adaptive teaching strategies, and allow instructors to monitor students' academic progress more effectively [8][9]. AI also reduces administrative workload for lecturers by automating routine tasks such as grading and content organization, thereby allowing them to focus more on teaching and mentoring students [4][10]. Artificial Intelligence has significantly improved the implementation of research programmes in higher education institutions. AI tools facilitate literature review, data analysis, predictive modeling, and knowledge discovery. Machine learning algorithms enable researchers to analyze large datasets quickly and accurately, while AI-based software supports academic writing, plagiarism detection, and research data management. These technologies have enhanced research efficiency and innovation in universities around the world [11][12].

In Nigeria, the integration of Artificial Intelligence in tertiary education is gradually gaining attention as institutions seek innovative ways to improve teaching quality and research productivity. The Federal Capital Territory (FCT), Abuja, hosts several prominent tertiary institutions, including universities, polytechnics, and specialized research institutes. These institutions are expected to lead academic innovation and technological advancement in the country. The effective deployment of AI technologies in teaching and research programmes within these institutions remains relatively limited. Although some tertiary institutions in FCT Abuja have adopted digital learning platforms and research software, the full potential of Artificial Intelligence in supporting teaching and research implementation has not yet been fully realized. Factors such as inadequate ICT infrastructure, limited funding, lack of technical expertise, insufficient training for academic staff, and absence of institutional policies on AI integration often hinder the effective deployment of AI technologies in tertiary institutions [6][13].

Given the growing importance of Artificial Intelligence in modern education systems, it has become necessary to examine how AI deployment influences the implementation of teaching and research programmes in tertiary institutions. Understanding the extent to which AI technologies support academic activities will help policymakers, university administrators, and researchers design strategies for improving the quality of tertiary education in Nigeria. It is against this background that this study investigates the deployment of Artificial Intelligence in the implementation of teaching and research programmes of tertiary institutions in the Federal Capital Territory (FCT), Abuja, Nigeria.

1. Statement of the Problem

Tertiary institutions are expected to provide high-quality teaching and produce innovative research that contributes to national development. Many tertiary institutions in Nigeria face several challenges in the implementation of their teaching and research programmes. These challenges include inadequate instructional resources, heavy workload on academic staff, slow research processes, limited access to advanced research tools, and ineffective teaching methods that do not adequately meet the learning needs of students. Artificial Intelligence has the potential to address many of these challenges

by enhancing teaching delivery, supporting personalized learning, improving research efficiency, and facilitating data-driven decision making in higher education. Despite these potential benefits, the adoption and deployment of AI technologies in Nigerian tertiary institutions remain relatively low compared to institutions in developed countries [14][15][16].

In the Federal Capital Territory (FCT), Abuja, several tertiary institutions are expected to serve as centers of academic excellence and innovation. However, the extent to which Artificial Intelligence is being utilized to support the implementation of teaching and research programmes in these institutions is not clearly known. Limited ICT infrastructure, insufficient funding, inadequate digital skills among academic staff, and lack of institutional policies on AI integration may hinder effective deployment of AI technologies. The absence of adequate empirical evidence on the role of Artificial Intelligence in enhancing teaching and research programmes in tertiary institutions in FCT Abuja creates a knowledge gap that needs to be addressed. Therefore, this study seeks to examine the deployment of Artificial Intelligence and its influence on the implementation of teaching and research programmes in tertiary institutions in FCT Abuja, Nigeria.

2. Objectives of the Study

The main objective of this study is to examine the deployment of Artificial Intelligence in the implementation of teaching and research programmes in tertiary institutions in FCT Abuja, Nigeria.

The specific objectives are to:

1. Examine the influence of Artificial Intelligence deployment on the implementation of teaching programmes in tertiary institutions in FCT Abuja.
2. Determine the influence of Artificial Intelligence deployment on the implementation of research programmes in tertiary institutions in FCT Abuja.

3. Research Questions

The study will be guided by the following research questions:

1. How does the deployment of Artificial Intelligence influence the implementation of teaching programmes in tertiary institutions in FCT Abuja?
2. To what extent does the deployment of Artificial Intelligence influence the implementation of research programmes in tertiary institutions in FCT Abuja?

Research Hypotheses

The following null hypotheses will be tested at 0.05 level of significance:

1. H_{01} : There is no significant relationship between the deployment of Artificial Intelligence and the implementation of teaching programmes in tertiary institutions in FCT Abuja.
2. H_{02} : There is no significant relationship between the deployment of Artificial Intelligence and the implementation of research programmes in tertiary institutions in FCT Abuja.

METHODOLOGY

Research Design

This study adopted a correlational survey research design to investigate the deployment of Artificial Intelligence (AI) in the implementation of teaching and research programmes in tertiary institutions in the Federal Capital Territory (FCT), Abuja, Nigeria. The choice of the correlational survey design was considered appropriate because the study aimed at examining

the relationship between the deployment of Artificial Intelligence and the effectiveness of teaching and research programmes in tertiary institutions. The design allowed the researcher to collect data from respondents within their natural institutional environment without manipulating any of the study variables. The correlational survey approach is commonly used in educational research to determine the extent of association between two or more variables. In this study, the design helped to determine whether the use of Artificial Intelligence tools in tertiary institutions influences the implementation of teaching and research activities.

Area of the Study

The study was conducted in tertiary institutions located in the Federal Capital Territory (FCT), Abuja, Nigeria. Abuja is the administrative capital of Nigeria and hosts several universities, polytechnics, and colleges of education that play important roles in teaching, research, and human capital development. The presence of relatively improved digital infrastructure and the increasing adoption of technology in institutions within the FCT make the area suitable for examining the deployment of Artificial Intelligence in teaching and research programmes.

Population of the Study

The population of the study comprised academic staff and postgraduate students in selected tertiary institutions in the Federal Capital Territory, Abuja. These groups were selected because they are actively involved in teaching, learning, and research activities within tertiary institutions and are therefore in a better position to provide reliable information on the use of Artificial Intelligence technologies in academic programmes.

Sample Size and Sampling Technique

A sample size of 230 respondents was selected for the study. The respondents consisted of academic staff and postgraduate students drawn from selected tertiary institutions in the Federal Capital Territory, Abuja. The study adopted a simple random sampling technique in selecting the respondents. This sampling method ensured that every member of the population had an equal opportunity of being selected for the study. The use of this sampling technique also helped to reduce bias and ensured that the sample adequately represented the population.

Instrument for Data Collection

Data for the study were collected using a structured questionnaire designed by the researcher. The instrument was titled "Artificial Intelligence Deployment and Teaching and Research Programme Implementation Questionnaire (AIDTRPIQ)." The questionnaire was divided into two sections section A contained items relating to the demographic information of respondents such as gender, academic status, and institutional affiliation. Section B contained items designed to measure the key variables of the study, including the deployment of Artificial Intelligence in teaching activities, the use of AI in research processes, and the effectiveness of teaching and research programme implementation. The questionnaire items were structured using a four-point Likert scale consisting of Strongly Agree (SA) – 4, Agree (A) – 3, Disagree (D) – 2 AND Strongly Disagree (SD) – 1. This scale allowed respondents to indicate the degree to which they agreed or disagreed with each statement presented in the questionnaire.

Validity of the Instrument

To ensure that the instrument measured what it was intended to measure, the questionnaire was subjected to face and content validation. Experts in Educational Management and Educational

Technology reviewed the instrument to determine the clarity, relevance, and adequacy of the items in addressing the objectives of the study. Their suggestions and corrections were carefully incorporated in order to improve the quality of the instrument before it was administered to the respondents.

Reliability of the Instrument

The reliability of the instrument was determined using the Cronbach Alpha method. A pilot test of the questionnaire was conducted using respondents from a tertiary institution outside the study area. The responses obtained from the pilot study were analyzed to determine the internal consistency of the instrument. The analysis produced a reliability coefficient of 0.82, indicating that the instrument was reliable and suitable for use in the study since the value exceeded the commonly accepted benchmark of 0.70 for social science research.

Method of Data Collection

The researcher administered the questionnaire to the selected respondents with the assistance of a few trained research assistants. The purpose of the study was clearly explained to the respondents to encourage their cooperation and ensure accurate responses. A total of 230 questionnaires were distributed, and all were successfully completed and returned by the respondents. This resulted in a 100 percent retrieval rate, which provided sufficient data for the analysis.

Method of Data Analysis

The data collected from the respondents were analyzed using both descriptive and inferential statistical methods. Descriptive statistics such as mean and standard deviation were used to answer the research questions, while Pearson Product Moment Correlation (PPMC) was used to test the two hypotheses formulated for the study. All hypotheses were tested at the 0.05 level of significance. The decision rule was that the null hypothesis would be rejected if the calculated p-value was less than 0.05, and accepted if the p-value was greater than 0.05.

RESULT AND DISCUSSION

Hypothesis One

H₀₁: There is no significant relationship between the deployment of Artificial Intelligence and the effective implementation of teaching programmes in tertiary institutions in FCT, Abuja.

Table 1. Relationship between AI Deployment and Teaching Programme Implementation. (N = 230)

Variables	N	Mean	SD	r-value	p-value	Decision
AI Deployment	230	3.74	0.82			
Teaching Programme Implementation	230	3.61	0.79	0.68	0.000	Reject H ₀₁

The analysis revealed a correlation coefficient (r) of 0.68 with a p-value of 0.000, which is less than the 0.05 level of significance. Therefore, the null hypothesis was rejected. This indicates that deployment of Artificial Intelligence significantly influences the effective implementation of teaching programmes in tertiary institutions in FCT, Abuja.

Hypothesis Two

H₀₂: There is no significant relationship between the deployment of Artificial Intelligence and the effectiveness of research programmes in tertiary institutions in FCT, Abuja.

Table 2. Relationship between AI Deployment and Research Programme Implementation. (N = 230)

Variables	N	Mean	SD	r-value	p-value	Decision
AI Deployment	230	3.74	0.82			
Research Programme Implementation	230	3.68	0.76	0.72	0.000	Reject H ₀₂

The analysis showed a correlation coefficient (r) of 0.72 with a p-value of 0.000, which is less than 0.05 significance level. Hence, the null hypothesis was rejected. This implies that AI deployment significantly improves the implementation of research programmes in tertiary institutions in FCT, Abuja.

Findings

The study examined the deployment of Artificial Intelligence (AI) in the implementation of teaching and research programmes in tertiary institutions in the Federal Capital Territory (FCT), Abuja. Two hypotheses guided the analysis. Data collected from 230 respondents were analysed using inferential statistics at 0.05 level of significance.

Discussion of Findings

The findings of the study revealed that the deployment of Artificial Intelligence significantly enhances the implementation of teaching programmes in tertiary institutions in the Federal Capital Territory. The result indicates that AI technologies such as intelligent tutoring systems, automated grading tools, virtual learning assistants, and adaptive learning platforms improve instructional delivery, facilitate personalized learning, and support efficient academic management. AI also enables lecturers to analyze students' learning patterns and adjust instructional strategies accordingly. This improves teaching effectiveness, student engagement, and learning outcomes.

The finding is consistent with studies of Ogunode, & Ejike; Ogunode & Olowonefa; Oke & Fernandes; Zawacki-Richter et al. that reported that AI applications in higher education improve instructional efficiency and learning experiences [4][13][17][18]. AI-powered platforms allow educators to deliver digital content, automate routine tasks, and support online learning environments, thereby enhancing teaching productivity and quality.

The second finding revealed that AI deployment significantly influences the effectiveness of research programmes in tertiary institutions. Artificial intelligence technologies support research activities through data mining, machine learning analysis, literature review automation, plagiarism detection, and research data management. AI tools also assist researchers in processing large datasets and generating predictive models, which significantly improve research productivity and innovation. This result aligns with existing literature of Holmes et al.; Chen et al.; Dwivedi et al.; Ogunode, & Ukozor; Ogunode, & Gregory; and Jordan & Mitchell that concluded that AI enhances research efficiency by accelerating data analysis, improving knowledge discovery, and enabling interdisciplinary research collaboration [5][10][11][12][19][20][21][22]. In many universities globally, AI is

increasingly used to support scientific research, academic writing, and data-driven decision-making.

CONCLUSION

Fundamental Finding : Based on the result, the study concluded that Artificial Intelligence plays a significant role in enhancing both teaching and research activities in tertiary institutions. **Implication :** Therefore, the integration of AI into tertiary education is essential for improving academic productivity, research innovation, and institutional competitiveness. **Limitation :** Without addressing these factors, the potential benefits of AI in higher education may not be fully realized. **Future Research :** The effective utilization of AI requires adequate technological infrastructure, trained personnel, and supportive institutional policies.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. **Government and educational authorities** should increase funding for the deployment of Artificial Intelligence technologies in tertiary institutions to enhance teaching and research programmes.

University management should develop institutional policies and strategic frameworks that support the integration of AI into teaching, learning, and research activities AND should be organized for lecturers, researchers, and students to improve their digital and AI literacy skills.

REFERENCES

- [1] J. Alagbe, O. Awodele, and I. Ayorinde, "Is Nigeria ready for artificial intelligence in schools?" Punch Newspaper, Jun. 22, 2023. [Online]. Available: <https://punchng.com/is-nigeria-ready-for-artificial-intelligence-in-schools/>
- [2] A. B. Alba and L. C. Trani, "Extent of utilisation of Information and Communication Technology (ICT) by selected secondary school teachers of city schools division of Malolos: Basis for the development of strategic action," International Journal of Education and Research, vol. 6, no. 1, pp. 181-188, 2018.
- [3] R. Luckin, W. Holmes, M. Griffiths, and L. Forcier, Intelligence Unleashed: An Argument for AI in Education. London, U.K.: Pearson Education, 2016.
- [4] O. Zawacki-Richter, V. I. Marín, M. Bond, and F. Gouverneur, "Systematic review of research on artificial intelligence applications in higher education," International Journal of Educational Technology in Higher Education, vol. 16, no. 1, p. 39, 2019. doi: 10.1186/s41239-019-0171-0.
- [5] W. Holmes, M. Bialik, and C. Fadel, Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Boston, MA, USA: Center for Curriculum Redesign, 2019.
- [6] UNESCO, Artificial Intelligence and Education: Guidance for Policy-Makers. Paris, France: UNESCO, 2021.
- [7] N. J. Ogunode, O. P. Agbade, and U. O. Bassey, "Barriers to effective usage of artificial intelligence in tertiary institutions in north-central Nigeria," Web of Semantics: Journal of Interdisciplinary Science, vol. 1, no. 1, pp. 38-43, 2023.
- [8] A. A. Amuchie, "Availability and utilisation of ICT resources in teaching and learning in secondary schools in Ardo-Kola and Jalingo," Journal of Poverty, Investment and Development, vol. 8, no. 1, pp. 94-100, 2015.
- [9] N. M. Borbajo, M. H. Malbas, and L. R. Dacanay, "Reforming education: The global impact of integrating artificial intelligence in the classroom environment," American Journal of

- Language, Literacy and Learning in STEM Education, vol. 1, no. 5, pp. 16-27, 2023.
- [10] L. Chen, H. Xie, D. Zou, and G. J. Hwang, "Application and theory gaps during the rise of artificial intelligence in education," *Computers and Education: Artificial Intelligence*, vol. 1, p. 100002, 2020. doi: 10.1016/j.caeai.2020.100002.
- [11] M. I. Jordan and T. M. Mitchell, "Machine learning: Trends, perspectives, and prospects," *Science*, vol. 349, no. 6245, pp. 255-260, 2015. doi: 10.1126/science.aaa8415.
- [12] Y. K. Dwivedi et al., "Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy," *International Journal of Information Management*, vol. 57, p. 101994, 2021. doi: 10.1016/j.ijinfomgt.2019.08.002.
- [13] A. Oke and F. A. P. Fernandes, "Innovations in teaching and learning: Exploring the perceptions of the education sector on the 4th Industrial Revolution (4IR)," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 6, no. 2, p. 31, 2020. doi: 10.3390/joitmc6020031.
- [14] J. C. Onah, G. U. Onyebuchi, C. C. Eke, and I. O. Adayi, "Empirical evidence of availability and utilisation of Information and Communication Technology (ICT) in teaching and learning Cultural and Creative Arts in Nsukka Local Government Area," *Journal of the Social Sciences*, vol. 48, no. 3, pp. 446-464, 2020.
- [15] O. S. Olanrewaju, A. I. Kareem, and O. K. Adeshina, "Lecturers' attitude to and use of educational resources available in Colleges of Education in North Central, Nigeria," *Journal of Educational Media and Technology (JEMT)*, vol. 18, no. 1, pp. 85-89, 2014.
- [16] N. J. Ogunode, K. Edinoh, and O. R. Chinedu, "Artificial intelligence and tertiary education management," *Electronic Research Journal of Social Sciences and Humanities*, vol. 5, no. IV, pp. 18-31, 2023.
- [17] N. J. Ogunode and C. N. Ejike, "Artificial intelligence and curriculum implementation of post-basic education and career development (PBECD) in Nigeria," *Journal of Innovation in Education and Social Research*, vol. 1, no. 4, pp. 50-56, 2023.
- [18] N. J. Ogunode and J. A. Olowonefa, "AI education in Nigerian schools," *International Journal of Human Computing Studies*, vol. 5, no. 10, pp. 47-55, 2023.
- [19] N. J. Ogunode and C. U. Ukozor, "Curriculum revolution in higher education: The mighty role of artificial intelligence," 2023. [Online]. Available: <https://ijins.umsida.ac.id/index.php/ijins/article/view/971/1183>
- [20] N. J. Ogunode and D. M. Gregory, "Artificial intelligence (AI) in educational administration," *International Journal on Orange Technologies*, vol. 5, no. 10, pp. 7-16, 2023. [Online]. Available: <https://journals.researchparks.org/index.php/IJOT/article/view/483>
- [21] M. Perifanou, A. A. Economides, and K. Tzafilkou, "Teachers' digital skills readiness during COVID-19 pandemic," *International Journal of Educational Technology*, vol. 16, no. 8, pp. 238-251, 2021. doi: 10.3991/ijet.v16i08.21011.
- [22] S. Pokrivcakova, "Preparing teachers for the application of AI-powered technologies in foreign language education," *Journal of Language and Cultural Education*, vol. 7, no. 3, pp. 135-145, 2019. doi: 10.2478/jolace-2019-0025.

Okani Doris Ugo-onyeka PhD

Department of Educational Management, Faculty of Education, University of Abuja, Nigeria

Email: okanidoris@gmail.com
