

Research Article

The influence of Artificial Intelligence on the academic performance of students in higher institutions in Oyo state, Nigeria

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Abstract

With modern technologies, artificial intelligence (AI) has brought a great change to higher education, giving new opportunities to learn and succeed in academic activities. In developing countries such as Oyo State, Nigeria, it has not been studied well though. This paper explores the impacts of AI technologies to academic performance of students in universities and polytechnics concerning learning engagement, assessment results, and challenges associated with it. A mixed methods design was used, which involved quantitative data, which is an online survey of 250 students, and qualitative data using semi-structured interviews of 25 respondents. It is shown that personalized learning (46%), research support (34%), and concerns about over-reliance on AI (24%), are the most frequent uses of the AI among the students. Whereas almost two-thirds of students judged their academic results to be above average, 90% stated that the policies at their institutions on AI were moderately effective. The paper indicates that AI would help to improve educational achievements when introduced in a responsible way within the academic frameworks. In order to maximize its advantages, the study proposes the need to improve digital literacy efforts to make digital students employ AI successfully and autonomously, to create a balanced-use of AI in order not to over-depend on it, as well as to establish coherent institutional policies concerning AI usage. The ethical principles and the responsible introduction of AI should be embraced by institutions to promote thinking critically and harness the potentials of the AI in individualizing learning and enhancing the educational outcomes.

Keywords: Artificial Intelligence, Academic Performance, Higher Education, Oyo State, Technology-Enhanced

1. Introduction

Artificial intelligence (AI) has become a disruptive technology in the sphere of higher education, and its applications are quite broad: intelligent tutoring systems, automatic assessment systems, and intelligent adaptive virtual learning spaces. Such technologies aim to boost the process of teaching and learning, offering a better feedback and exchanging the students (Bearman et al., 2023; Cotton et al., 2023). The Nigerian state of Oyo has been extending the use of AI technologies in universities and polytechnics in line with the high demand in higher education. These AI-based solutions can provide individual learning experiences, and the possibilities of these systems to enhance the performance of students are high (Alhumaid et al., 2023; Ogundipe and Adebayo, 2024). The main applications of AI used in the field of learning today are adaptive learning,

learning-analytics dashboards, and chatbots, which find application in the provision of instant feedback and the tailoring of the learning material to the specific requirements of the students (Bhutoria, 2023; Cao et al., 2024).

Nevertheless, there are issues associated with the widespread adoption of AI in education. The serious obstacles that could impede a fair distribution of these innovations are infrastructural inequality, ethical issues, and overdependence on technology (Selwyn et al., 2023; Oke and Oladipo, 2023). Such barriers are more eminent in resource constrained circumstances, most of which are prevalent in much of sub-Saharan Africa. In spite of the AI promise, the extent of its influence on the learning behavior and academic performance is not well understood and it is necessary to take a closer look at how the technologies could be applied

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in particular settings such as Oyo State. Although studies have spread information on the positive potential of AI, specifically in offering personalized feedback (Crompton and Burke, 2023; Khosrow et al., 2024), there is increasing apprehension of the adverse impact of AI on independent critical thinking and reasoning (Bearman et al., 2023; Chan and Hu, 2023). In addition, demographic factors that include gender, field of study, and socio-economic background are vital in the process of adopting AI in tertiary institutions (Alhumaid et al., 2023).

The paper examines the educational application of AI in the institutions of higher learning in Oyo State, Nigeria and provides a useful evidence relevant to the local community and wider global community on the application of AI in education. The research has its importance as it may help educators, institutional leaders and policymakers understand the way AI may be implemented into the higher education systems in a responsible manner to ensure maximum benefits are achieved and the potential negative impact of AI is reduced. The impact of AI on the academic performance of students, especially in engaging and critical thinking, is necessary to support the reduction of effective institutional frameworks and policies that could address ethical and inclusive application of AI technologies in teaching.

The growing implementation of AI tools in tertiary institutions in Oyo State has both advantages and disadvantages. Although, adaptive learning and immediate feedback increase the access to information, too much use, ethical concerns, and unequal access can jeopardize its usefulness (Oke & Oladipo, 2023; Selwyn et al., 2023). It is still unclear to what extent the technologies really enhance students' performance. This paper explores the implications of differential patterns of AI use for student achievement, including the potential of misuse of AI to compromise the pedagogical benefits that can be gained from its use.

This study aimed to evaluate the influence of artificial intelligence on the academic performance of students in higher institutions in Oyo State, Nigeria, with the following objectives:

- (i) To determine the frequency and purposes of AI tool usage among students.
- (ii) To analyse the relationship between AI usage patterns and academic performance.
- (iii) To identify AI functions that enhance or hinder achievement.
- (iv) To propose strategies for optimising AI use in tertiary education.

The following research questions guided the study:

1. How frequently do students in Oyo State's higher institutions use AI tools?
2. For what purposes are these AI tools applied?
3. How do students perceive AI's effect on study habits?
4. How do students rate their academic performance in relation to AI?
5. Does AI facilitate or impede assessment preparation?

6. What distractions or challenges accompany academic AI use?

This study has quite useful insights to the major stakeholders in the education sector. In the case of teachers, it will be evidence-based in the way in which AI can be incorporated without compromising the academic rigor. The findings can be used by institutional leaders to enact policies and ethics that will guide AI use, which aligns with the values of education. In the case of students, the research will elucidate the pros and cons of AI so that they can apply those tools in a conscientious way. Moreover, the study also aids in the facilitation of inclusive digital transformation, which provides evidence to should policymakers to make AI available in education, particularly in resource-limited contexts (Oke and Oladipo, 2023). The research also deepens the international dialogue on technology-enhanced learning especially in the developing countries (Zhai et al., 2023).

2. Methodology

This paper employed a mixed method design, that is, quantitative and qualitative designs. Stratified random sampling was employed to select the participants in the universities and polytechnics in Oyo State having an estimated population of 10,000 students. The sample size of 250 was reached in a calculator that was set at a 95 percent confidence level and a 5 percent level of error, which guaranteed statistical significance and the representativeness of the sample.

A questionnaire was used to collect data in the form of a Google Form, having multiple-choice, Likert-scale, and open-ended questions concerning the use of AI, its effectiveness, and how students felt about it. Moreover, the semi-structured interviews (n=25) with the participants of the study sampled purposely were implemented to collect a qualitative information about the implications of AI on their experiences. Descriptive statistics, such as means, frequencies and percentages, were used to verify quantitative data. The texts of the interviews were thematically coded to see patterns and themes prevalent in both data sets and triangulated to increase validity (Creswell and Plano Clark, 2023).

In order to restore the validity and reliability of the device, the content validity was attained by reviewing it by experts in educational technology and research methods. The construct validity was achieved through compatibility of the questions and questions to the existing literature and reliability was also achieved through internal consistency of Likert-scale questions. Quantitative and qualitative data triangulation supported the findings also. Issues of ethics such as informed consent, anonymity and the use of the data in the research only purposes were highly observed.

3. Results and Discussion

Responses analysed from the questionnaire are presented below.

3.1 Answers to research questions

Research Question 1: *How frequently do students in Oyo State’s higher institutions use AI tools?*

Nearly half (48 per cent) of respondents used AI tools for more than four hours a day; 32 per cent for three to four hours a day; 15 per cent for one to two hours a day; and 5 per cent for less than an hour.

Table 1. Frequency of AI Tool Usage

Duration of Daily Use	Percentage (%)
< 1 hour	5
1–2 hours	15
3–4 hours	32
> 4 hours	48

High daily engagement reflects AI’s perceived usefulness (Cao et al., 2024) but may also foster dependence.

Research Question 2: *For what purposes are these AI tools applied?*

Table2. Effect on Study Habits

Effect on Study Habits	Number	Percentage (%)
Not detrimental	170	68
Reduces critical thinking	60	24
Neutral	20	8

Sixty-eight per cent (68%) thought AI was not detrimental to study habits; 24 per cent thought it reduced critical thinking and 8 per cent were neutral. According to respondents, the

Students mainly used AI for personalised learning (46 per cent), research (34 percent), and administration (20 percent).

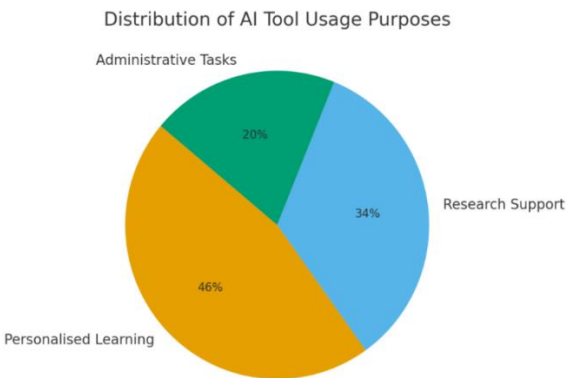


Figure1. Pie chart showing distribution of AI usage purposes

This pattern shows preference for adaptive learning tools, confirming AI’s instructional rather than purely procedural role (Bhutoria, 2023; Crompton & Burke, 2023).

Research Question 3: *How do students perceive AI’s effect on study habits?*

major advantage was efficient task management, similar to Bearman et al. (2023).

Research Question 4: *How do students rate their academic performance in relation to AI?*

Table 3. Self-Evaluation of Performance

Performance Score	Number	Percentage (%)
Very good	75	30
Good	100	40
Average	67	27
Poor	8	3

In Table 3, forty per cent (40%) of respondents rated their performance as **Good**, 30% **Very good**, 27% **Average** and 3% **Poor**. AI is known to influence achievement as indi

cated by self-rated positive perceptions (Bhutoria, 2023).

Research Question 5: *Does AI facilitate or impede assessment preparation?*

Table 4. AI and Assessment Preparation

AI and Asssment Preparation	Number	Percentage (%)
Very useful	55	22
Useful	120	48
Unhelpful	62	25
Very unhelpful	13	5

Table 4 shows mixed results: 22% of respondents found AI to be very useful, 48% useful, 25% unhelpful and 5% very unhelpful. AI can assist with feedback and revision but

may interfere with independent reasoning (Chan & Hu, 2023) . Research Question 6: What distractions or challenges accompany academic AI use?

Table 5. Challenges and Distractions

Challenges and Distraction	Number	Percentage (%)
Occasional technical or cognitive problems	75	30
Distraction	100	40

Seventy two per cent (72%) had occasional technical or cognitive problems. 28 per cent were distracted often underlining the need for digital literacy training (Alhumaid et al., 2023).

4. Discussion

The results of the study conducted in Oyo State show the increasing position of AI in higher education, as well as indicate issues surrounding its implementation. The frequency of AI use (Research Question 1) is quite high because it is perceived to be helpful to boost learning, but this also speaks of the potential dependency since it is practiced in a context with limited resources, such as Oyo State. The liking towards personalized learning (Research Question 2) demonstrates that students begin adopting AI as an academic support tool more often, particularly because it provides them with an opportunity to have a customized learning process.

Nevertheless, the issues that were mentioned in Research Question 3 regarding the potential effect of AI on critical thinking are especially applicable to Oyo state, in which the quality of education may be affected by the different rates of digital literacy of people and the availability of technological opportunities. Although AI can facilitate academic performance (Research Question 4), there is a necessity to make sure that students do not use technology too much and instead learn to think on their own.

Mixed reaction to the role of AI in preparation of assessment (Research Question 5) gives reason to suggest that AI can be helpful in feedback and revision, but still the students in Oyo State might only be getting used to the potential. The research problems and barriers found in

Research Question 6 indicate that institutions that exist in Oyo State need to invest in technological infrastructure and digital literacy initiatives to maximize the application of AI.

On balance, the given paper accentuates that AI should be implemented in a balanced way that would facilitate the improvement of the learning process and decrease the risks of dependency and critical thinking. The results indicate that to be effective at the actual implementation of AI in the field of higher education in Oyo State, the institutions in this sphere should be able to offer sufficient support frameworks, handle the problems of infrastructure, and treat the use of AI ethically and responsibly.

5. Conclusion

Conclusively, artificial intelligence has a great effect on the academic performance of students in higher institutions in Oyo State Nigeria, but subtly. AI encourages efficiency and personalisation of learning and increases engagement but also introduces the risks of being overly reliant and because it is not accessible to everyone. For educational institutions to develop educational achievements without jeopardizing the future of the children, they need to strike the right balance between technological innovation and intellectual discipline. While the institutional infrastructure of AI is essential to ensure that its benefits are equitably and ethically distributed in a learning environment, responsible AI takes a more comprehensive approach and explicitly mandates that institutional frameworks be defined and put into practice.

Recommendations:

- Educational institutions are advised to utilize digital literacy programs to enable the students to enjoy the benefits of using AI in their work and overcoming

any technical difficulties with a minimum of distractions (Alhumaid et al., 2023). This will make AI use a smooth process and make it more effective in the process of learning.

- In order not to over-rely on AI, schools must promote it as a support artificial intelligence but still focus on critical thinking and independent learning (Bearman et al., 2023; Cao et al., 2024). A moderate style will promote the development of cognitive skills as well as technology.
- The implementation of AI in the curriculum needs to be in such a manner that it does not replace the traditional-method of teaching but contributes to more personalized learning without affecting critical thinking (Bhutoria, 2023; Crompton and Burke, 2023). This will allow but not replace independent problem-solving.
- Institutions ought to create concrete policies regarding the use of AI in academic questions with the ethical principles and disclosure to ensure that AI does not deteriorate academic achievements to the disadvantage of academic honesty (Oke and Oladipo, 2023; Selwyn et al., 2023). The benefits of AI can be used in the most optimal way and ethical standards can be adhered to.

Abbreviations

AI Artificial Intelligence

Author Contributions

B. T. Adeyemi: Conceptualization, methodology, Writing- original draft,

A. O. Adeyemi: Methodology, Analysis of result, Writing- Review and Editing.

Conflicts of Interest

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