

ARTIFICIAL INTELLIGENCE AND EDUCATIONAL EVALUATION: A MULTIDIMENSIONAL ASSESSMENT OF TEST QUALITY, LEARNING ANALYTICS, MONITORING EFFICIENCY, AND DECISION SUPPORT IN NIGERIAN UNIVERSITIES

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Abstract

This study examined the role of Artificial Intelligence (AI) in Educational Evaluation in Nigerian Universities with emphasis on Test Quality, Learning Analytics, Monitoring Efficiency and Decision Support in Nigerian Universities. A descriptive survey design was used. The population consisted of 12,480 academic staff, postgraduate students, quality assurance officers, examination and records officers, and ICT/e-learning administrators. Multistage sampling was used to select a sample of 430 respondents. The Artificial Intelligence and Educational Evaluation Questionnaire (AIEEQ) was used to collect data, which was validated by experts and had a Cronbach's Alpha reliability coefficient of 0.90. The research questions were answered by means and standard deviations, and the hypotheses were tested at the 0.05 level of significance using simple linear regression. Results indicated that AI had a significant impact on test quality ($\beta = .781, p < .05$), learning analytics ($\beta = .756, p < .05$), monitoring efficiency ($\beta = .742, p < .05$), and educational decision support ($\beta = .803, p < .05$). The study suggested the adoption of institutionalization of AI-based evaluation systems, incorporation of AI-based analytics, and enhancement of monitoring platforms.

Keywords: Artificial Intelligence, Educational Evaluation, Assessment, Nigerian Universities.

Introduction

Artificial Intelligence (AI) has revolutionized numerous aspects of human life, such as healthcare, finance, agriculture, manufacturing, and education.

In the field of education, AI has transitioned from being a tool to be used alongside to a powerful tool that can be used to enhance teaching and learning, assessment, institutional administration, and evidence-based decision-making. AI technologies are being increasingly used in universities around the world to enhance the quality of education, institutional efficiency and accountability (UNESCO, 2023; OECD, 2021). This has had a profound impact on the field of educational evaluation, bringing more intelligent, accurate, and data-driven methods to the assessment, monitoring, and decision-making process. Educational evaluation is an integral part of all educational systems as it offers evidence to assess the effectiveness of teaching, learning, institutional performance and policy implementation. Stufflebeam and Shinkfield (2014) define evaluation as a systematic process of gathering, analysing and interpreting information to inform educational decisions. Educational evaluation is a set of interrelated processes that include testing, measurement, monitoring, and evaluation. Testing is the process of using instruments to evaluate learners' knowledge, skills, and competencies, while measurement is the process of assigning quantitative values to educational attributes. Monitoring focuses on the continuous tracking of educational activities and outcomes, whereas evaluation integrates evidence from various sources to determine the extent to which educational goals have been achieved (Nitko & Brookhart, 2024). In the past, the evaluation of education in Nigerian universities has been mainly based on paper-based exams, manual marking, periodic quality assurance, and traditional monitoring approaches. While these strategies have helped to improve accountability, they can also be linked to delays in data processing, scoring errors, lack of diagnostic feedback, and challenges in providing timely evidence for decision-making (Federal Ministry of Education, 2021). The complexity of higher education, with its rising number of students, online learning platforms, and quality assurance requirements, has revealed the shortcomings of conventional assessment approaches and necessitated the development of more effective and intelligent systems. Artificial Intelligence is the ability of computer systems to carry out tasks that typically require human intelligence, such as learning, reasoning, prediction, pattern recognition, and decision making (Russell & Norvig, 2021). AI in education assessment is a paradigm shift from traditional assessment methods to intelligent systems that offer real-time, adaptive, and evidence-based insights. AI technologies can handle vast amounts of educational data collected from learning management

systems, online assessments, digital classrooms, and institutional databases, aiding in the more precise assessment of students, programmes, and institutions (Luckin et al., 2026).

Test quality is one of the key aspects of AI in educational assessment. Test quality is the degree to which assessment tools measure intended learning outcomes in a valid, reliable, fair, and consistent manner. High-quality tests have psychometric characteristics of validity, reliability, objectivity, fairness, discrimination, and practicality (AERA, APA, & NCME, 2024). AI can help improve the quality of tests by generating items, adapting tests, scoring tests automatically, detecting plagiarism, and analyzing test psychometrics. Machine learning algorithms can be used to analyze students' answers to detect poorly functioning items, estimate item difficulty, and enhance item banks. AI also enables Computerised Adaptive Testing (CAT), which adapts the difficulty of the test according to the performance of the examinees, thus enhancing the precision of the measurement while minimizing the time required for the test (Wainer, 2020). Research has demonstrated that AI-based assessment systems can enhance the accuracy of scoring, minimize human mistakes, and offer instant feedback to students (Zawacki-Richter et al., 2019; Holmes et al., 2019).

Learning analytics is another key aspect. Learning analytics involves gathering, processing and studying learner data to improve the teaching and learning process (Siemens & Long, 2021). Universities generate a lot of data when learning management systems such as Moodle, Blackboard and Google Classroom are used. AI-driven learning analytics can transform these data into valuable information, such as predictive academic outcome, student engagement, risk student identification and personalised learning. AI-powered predictive models also can assist lecturers and administrators in determining the learning obstacles in early and intervening at the proper time, as indicated by Ferguson (2022). Furthermore, research has shown that learning analytics can contribute to a better retention, engagement and learning outcomes, by continuously monitoring and offering personalized support to the learners (Ifenthaler & Yau, 2020).

The third key element of AI-driven assessment in education is tracking efficiency. Monitoring is an ongoing process of observing and tracking

learning activities and learning outcomes, with the aim of ensuring the effectiveness of the educational institution. Manual checks, periodic reporting and other traditional monitoring methods can be subjective and time-consuming. With AI, monitoring is more efficient as it gathers real-time data then offers intelligent dashboards, predictive systems and automated reporting. Holmes, Bialik and Fadel (2019) noted that AI tools can monitor classroom engagement, teaching methods, and assessment practices, as well as other institutional metrics in real-time. In such instances, universities can identify the emerging problem(s) early on and act in time.

The fourth dimension of the use of AI in learning is decision support. Educational decision support is the use of information that is relevant to the planning, allocation of resources, review of curriculum, quality assurance and strategic management. AI systems offer evidence-based insights to administrators and policymakers via predictive analytics, recommendation engines, data visualisation tools and intelligent dashboards (Daniel, 2019). These capabilities help universities to streamline admissions processes, improve programme quality, improve quality assurance systems, and use resources more efficiently. Over the last decades, evidence-based decision making has gained increasing relevance in higher education as a result of the complexity of education systems and the increasing need for institutional accountability (OECD 2021).

The potential of AI in test quality, learning analytics, efficiency monitoring and educational decision support, however, is not widely explored. Though various studies have studied the application of AI in learning and education, there is a dearth of empirical study on the multiple dimensions impact of AI on education assessment in Universities in Nigeria. The majority of the current research has been on the use of AI in individual applications, and not on how it can impact the quality of assessment, learning analytics, institutional monitoring, and evidence-based decision-making. To fill this void, a comprehensive investigation of the impact of AI in educational assessment in Nigerian universities is needed. This evidence will guide the optimization of the utilization of AI and improve educational evaluation systems (UNESCO, 2023) at university level, the policy level, the educational evaluators level, and the quality assurance agency level.

Many universities globally have already embedded Artificial Intelligence (AI) to improve the effectiveness, efficiency and accuracy of assessment and evaluation. However, the application and utilization of AI in the measurement and evaluation of education in Nigerian universities are yet to be fully and fairly developed. Some institutions use computer-based testing, plagiarism detection software, learning management systems (LMS) and other digital tools, but they don't necessarily form part of a single, AI-driven assessment system. Consequently, many University actors still rely on an ad hoc assessment system, on a regular monitoring, on unexploited analytics of learning, and on fragmented or delayed data to guide institutional decisions. These constraints may reduce capacity to effectively evaluate education, delay interventions, and reduce capacity to improve institutional performance and academic quality in a timely way.

Beyond this, there is a dearth of empirical data on the effect of AI on different dimensions of education assessment in universities in Nigeria. The role of its effectiveness in validity, reliability, fairness and efficiency in assessment; its potential in the learning analytics and early identification of learning difficulties in students; its potential for the ongoing monitoring of academic processes; and its usefulness in supporting curriculum improvement, quality assurance, resource allocation, programme evaluation and strategic planning are areas of uncertainty. Therefore, the aim of this study is to assess and test the multidimensional aspects of AI and educational evaluation as an empirical tool for improving effective, transparent, reliable and data driven educational evaluation system in the Nigerian Universities which entails the quality of the tests, learning analytics, monitoring efficiency and decision support.

The study aimed to examine the role of Artificial Intelligence (AI) in Educational Evaluation in Nigerian Universities with emphasis on test quality, learning analytics, monitoring efficiency and decision support in Nigerian Universities. Specifically, the study aims to:

1. To find out the level of impact of Artificial Intelligence on test quality in Nigerian universities.
2. Determine the role of Artificial Intelligence in learning analytics in Nigerian universities.
3. Discuss the role of Artificial Intelligence in improving monitoring efficiency in Nigerian universities.

The following research questions were used to guide the study:

1. How much does Artificial Intelligence affect the quality of tests in Nigerian universities?
2. What is the contribution of Artificial Intelligence to learning analytics in Nigerian universities?
3. What is the level of effectiveness of Artificial Intelligence in improving monitoring efficiency in Nigerian universities?

The following null hypotheses were tested at 0.05 level of significance:

1. Artificial intelligence has little impact on the quality of tests in Nigerian universities.
2. Artificial intelligence does not make any meaningful contribution to learning analytics in Nigerian universities.
3. AI does not greatly improve monitoring efficiency in Nigerian universities.

Methodology

The study was driven by the increasing use of Artificial Intelligence (AI) technologies in higher education and the need to explore their role in improving educational assessment practices. The study used descriptive survey research design. The population consisted of 12,480 academic staff, postgraduate students, quality assurance officers, examination and records officers, and ICT/e-learning administrators from selected Nigerian universities. A multistage sampling technique was used to select a sample size of 430 respondents using Taro Yamane's formula which included stratified, purposive, proportionate and simple random sampling techniques. The sampling was done in successive stages to ensure adequate representation of the different geographical and administrative units covered by the study. The three (3) local government areas were first selected from 3 states. Secondly, three (3) public senior secondary schools were selected from the sampled local government areas. Third, the right classes were chosen in the sampled schools. Finally, a suitable random sampling procedure was used to select individual students from the sampled classes until the desired sample size of 430 respondents was achieved. The researcher developed questionnaire named Artificial Intelligence and Educational Evaluation Questionnaire (AIEEQ) was used to collect data. The instrument was face and content validated by experts in Educational Measurement and Evaluation. The overall Cronbach's Alpha

reliability coefficient for the pilot study was 0.90, which is considered high internal consistency. The questionnaires were retrieved immediately after completion where possible. If immediate collection was not possible, an agreed date was provided for collection. The returned questionnaires were reviewed to verify that they were completed correctly and that there were no major sections or items that were not answered. Completed questionnaires were coded and ready for statistical analysis. The data obtained were analyzed using Mean and Standard Deviation to answer the research questions and Simple Linear Regression Analysis was used to test the hypotheses at 0.05 level of significance.

Results

Research Question One: To what extent does Artificial Intelligence influence test quality in Nigerian universities?

Table 1: Mean and Standard Deviation of respondents on the influence of Artificial Intelligence on Test Quality in Nigerian Universities

S/N	Item	Mean	SD	Decision
1	AI enhances the credibility of exam questions.	3.61	0.63	Agree
2	AI assists in developing reliable assessment instruments.	3.58	0.67	Agree
3	AI can assist with automatic item analysis following exams.	3.64	0.59	Agree
4	AI improves the quality of computer-based examinations.	3.55	0.70	Agree
5	AI identifies unclear and poorly worded test questions.	3.47	0.72	Agree
6	AI enhances fairness in students' assessment.	3.49	0.68	Agree
7	AI enhances automated scoring accuracy.	3.60	0.64	Agree
8	AI minimises human errors during scoring.	3.66	0.61	Agree
9	AI facilitates adaptive testing according to students' abilities.	3.43	0.75	Agree
10	AI enhances overall test quality in universities.	3.71	0.56	Agree
	Cluster Mean	3.57	0.66	Agree

The cluster mean of 3.57 was higher than the criterion mean of 2.50, which shows that respondents agreed that Artificial Intelligence has a positive effect on test quality in Nigerian universities. The standard deviation is low (0.66), which means that the opinions of the respondents are consistent.

Research Question Two: What is the contribution of Artificial Intelligence to learning analytics in Nigerian universities?

Table 2: shows the mean and standard deviation of the respondents on the contribution of Artificial Intelligence to Learning Analytics in Nigerian Universities

S/N	Item	Mean	SD	Decision
11	AI detects students who are at risk of failing academically.	3.53	0.68	Agree
12	AI predicts students' academic performance.	3.56	0.65	Agree
13	AI can aid in personalised learning.	3.49	0.72	Agree
14	AI processes students' learning behaviours.	3.60	0.61	Agree
15	AI provides timely academic feedback.	3.54	0.69	Agree
16	AI enhances learning engagement.	3.46	0.73	Agree
17	AI assists lecturers in monitoring students' progress.	3.62	0.60	Agree
18	AI is able to analyze assessment data effectively.	3.59	0.64	Agree
19	AI improves students' retention through predictive analytics.	3.48	0.71	Agree
20	AI enhances institutional learning analytics.	3.65	0.58	Agree
	Cluster Mean	3.55	0.66	Agree

The overall mean of 3.55 was higher than the criterion mean of 2.50, suggesting that respondents agreed that Artificial Intelligence plays a significant role in learning analytics in Nigerian universities. The standard deviation is low (0.66), which means that the opinions of the respondents are consistent.

Research Question Three: What is the effectiveness of Artificial Intelligence in improving monitoring efficiency in Nigerian universities?

Table 3 shows the mean and standard deviation of the respondents on the contribution of Artificial Intelligence to Learning Analytics in Nigerian Universities.

S/N	Item	Mean	SD	Decision
21	AI improves continuous monitoring of academic activities.	3.60	0.63	Agree
22	AI offers real-time institutional reports.	3.58	0.66	Agree
23	AI aids in quality assurance monitoring.	3.55	0.68	Agree
24	AI enhances the monitoring of teaching effectiveness.	3.47	0.72	Agree
25	AI automatically records student attendance.	3.51	0.69	Agree
26	AI identifies examination malpractice.	3.66	0.58	Agree
27	AI enhances monitoring of institutional performance.	3.57	0.65	Agree
28	AI enhances accreditation monitoring.	3.48	0.71	Agree
29	AI minimizes delays in institutional reporting.	3.53	0.67	Agree
30	AI enhances monitoring efficiency generally.	3.69	0.55	Agree
	Cluster Mean	3.56	0.65	Agree

The cluster mean of 3.56 was higher than the criterion mean of 2.50, which shows that the respondents agreed that Artificial Intelligence is effective in improving the efficiency of monitoring in Nigerian universities. The standard deviation is low (0.65), which means that the opinions of the respondents are consistent.

Test of Hypotheses

Hypothesis One: Artificial Intelligence does not have any significant impact on the quality of tests in Nigerian universities.

Model Summary

Model	R	R Square	Adjusted R ²	Std. Error
1	0.781	0.610	0.609	0.392

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	105.632	1	105.632	687.443	0.000
Residual	65.768	428	0.154		
Total	171.400	429			

Coefficients

Variable	Unstandardized B	Beta	t	Sig.
Constant	0.743		6.92	0.000
Artificial Intelligence	0.812	0.781	26.22	0.000

The regression coefficient showed that Artificial Intelligence had a significant positive effect on test quality ($B = 0.812$, $\beta = 0.781$, $t = 26.22$, $p < .001$). This suggests that, with a one-unit rise in the use or application of Artificial Intelligence, test quality is likely to rise by 0.812 units, while other factors remain unchanged. The standardised beta coefficient ($\beta = 0.781$) also shows that Artificial Intelligence has a positive and significant impact on test quality. Hence, the probability value ($p = 0.000$) is less than the level of significance ($p < 0.05$), the null hypothesis is rejected and the alternative hypothesis is accepted, therefore, Artificial Intelligence significantly predicts test quality in Nigerian universities.

Hypothesis Two: Artificial Intelligence has no significant contribution to learning analytics in Nigerian universities.

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.756	0.572	0.571	0.411

ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	96.852	1	96.852	572.811	0.000
Residual	72.399	428	0.169		
Total	169.251	429			

Coefficients

Variable	Unstandardized B	Beta	t	Sig.
Constant	0.851		7.66	0.000
Artificial Intelligence	0.768	0.756	23.93	0.000

The result indicates that there is a strong and positive correlation between Artificial Intelligence and the dependent variable ($R = 0.756$). The model accounts for 57.2% of the variation in the dependent variable ($R^2 = 0.572$), which is a significant amount of predictive power. The regression model is statistically significant, $F(1, 428) = 572.811$, $p < .001$, indicating that the model is statistically significant and that Artificial Intelligence has a significant effect on the outcome. Moreover, the regression coefficient ($B = 0.768$; $\beta = 0.756$; $t = 23.93$; $p < .001$) shows that there is a significant positive relationship between the use of Artificial Intelligence and the dependent variable. The overall results indicate that the dependent variable is positively influenced by Artificial Intelligence with a significant value.

Hypothesis Three: Artificial Intelligence does not significantly improve monitoring efficiency in Nigerian universities.

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.742	0.551	0.550	0.427

ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	91.773	1	91.773	525.615	0.000
Residual	74.744	428	0.175		
Total	166.517	429			

Coefficients

Variable	Unstandardized B	Beta	t	Sig.
Constant	0.902		8.11	0.000
Artificial Intelligence	0.741	0.742	22.93	0.000

The result shows that there is a strong positive correlation between Artificial Intelligence and the dependent variable ($R = 0.742$). The variance in the dependent variable is accounted for by Artificial Intelligence ($R^2 = 0.551$) and the remaining variance is accounted for by other factors ($R^2 = 0.449$). The regression model is statistically significant, $F(1, 428) = 525.615$, $p < .001$, suggesting that the model is statistically significant and that Artificial Intelligence has a significant effect on the dependent variable. The coefficient results ($B = 0.741$; $\beta = 0.742$; $t = 22.93$, $p < .001$) further confirm a significant and strong positive effect. The overall results indicate that Artificial Intelligence has a significant and positive impact on the dependent variable.

Discussion

The results showed that Artificial Intelligence (AI) has a significant impact on the quality of tests in Nigerian universities. The descriptive analysis revealed that the respondents were in agreement that AI improves the

validity, reliability, fairness, objectivity, and efficiency of assessment processes. In addition, the regression analysis showed that the first null hypothesis was rejected because there was a statistically significant positive effect of AI on test quality. The discovery indicates that AI is playing a crucial role in enhancing educational assessment, automating test creation, aiding psychometric analysis, minimizing human error in scoring, identifying poorly performing test items, and enabling adaptive testing. These capabilities help to create more effective assessment tools that more accurately measure students' knowledge and competencies. This aligns with the findings of Luckin et al. (2026), who found that AI enhances assessment quality through automated item generation, intelligent feedback systems, and personalised testing environments. Likewise, Holmes, Bialik, and Fadel (2019) noted that AI helps to minimize assessment bias, improve scoring accuracy, and increase consistency in educational assessment. In the Nigerian university setting, the discovery suggests that AI can enhance examination management, computer-based testing, continuous assessment, and quality assurance systems. AI can be used to create more reliable and trustworthy assessment results, which can help institutions meet their accountability requirements as they increasingly digitise

The second finding showed that Artificial Intelligence makes a significant contribution to learning analytics in Nigerian universities. The respondents were generally in agreement that AI can help in the collection, analysis, interpretation and use of learning data to enhance teaching and learning. The second null hypothesis was also rejected as the regression analysis showed that AI is a significant predictor of effective learning analytics. The discovery suggests that AI can help universities track students' academic performance in real time, detect students who are at risk of failing academically, forecast learning outcomes, and suggest interventions at the right time. AI-powered learning analytics can thus facilitate evidence-based instructional improvement and personalised learning experiences. This result agrees with Siemens and Long (2021), who described learning analytics as a process of collecting and analysing educational data to optimise learning and improve learning environments. AI can greatly enhance these capabilities by analyzing vast educational data sets quickly and uncovering patterns that might not be identified using traditional statistical methods. The finding is also in line with Ferguson (2022), who found that AI-based learning analytics enhances student engagement,

retention, academic achievement, and institutional planning by using predictive modelling and early warning systems. Similarly, UNESCO (2023) highlighted the significant potential of AI to personalise learning, enhance educational assessment, and facilitate inclusive education practices when used responsibly. The implication is that Nigerian universities can leverage AI-powered learning analytics to bolster academic advising, optimize curriculum delivery, minimize dropouts, enrich students' learning experiences, and facilitate institutional quality assurance.

The results also showed that Artificial Intelligence has a significant impact on the efficiency of monitoring in Nigerian universities. The respondents agreed that AI improves real-time monitoring of academic activities, quality assurance processes, institutional reporting, teaching effectiveness, examination administration, and accreditation compliance. The third null hypothesis was rejected as the regression results showed that AI had a statistically significant effect on monitoring efficiency. This is consistent with Holmes et al. (2019) who stated that AI technologies enhance institutional monitoring through continuous performance evaluation, anomaly detection, quality assurance, and early intervention. Likewise, OECD (2021) noted that AI-based monitoring systems enhance institutional accountability by offering real-time access to educational performance indicators and enabling evidence-based management. The finding also reinforces Stufflebeam's CIPP Evaluation Model, which highlights the need for ongoing monitoring of educational programmes as a key element of good evaluation. AI can support this process by delivering accurate, timely and comprehensive information needed for institutional improvement and programme effectiveness.

Conclusion

The study concludes that Artificial Intelligence is changing the way educational evaluation is done from a mostly manual, periodic, and reactive process to a more intelligent, automated, continuous, and data-driven process. AI's role in educational evaluation holds the promise of enhancing assessment quality, bolstering institutional monitoring, optimising learning analytics, and improving evidence-based decision-making, all of which can significantly impact institutional effectiveness and educational quality.

Recommendations:

The following recommendations are made based on the findings and conclusion of this study:

1. Nigerian universities should establish AI-based test development, psychometric analysis, adaptive testing, and intelligent scoring systems and offer periodic training for lecturers and examination officers.
2. Universities should incorporate AI learning analytics into LMS to track student progress, detect at-risk students, and enable timely academic interventions.
3. AI-powered monitoring platforms, dashboards, predictive tools, and automated reporting systems should be implemented at universities to enhance quality assurance, institutional accountability, and ongoing educational assessment.

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