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TRANSITIONING FROM TRADITIONAL TO AI-BASED EDUCATIONAL ASSESSMENT IN NIGERIA: PROSPECTS AND CHALLENGES

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Abstract

This paper explores the potentials of artificial intelligence (AI) to transform educational assessment in Nigeria system historically challenged by inconsistency, lack of students' feedback, bureaucracy, and examination malpractices. Drawing on secondary literature and employing the AI-Ethical Assessment Transformation (AI-EAT) Model, the paper conceptualizes assessment reform as a process mediated by AI

innovations that enhances validity, reliability, and efficiency, and ethical and policy enablers promote fairness, accountability, and inclusiveness. The paper espoused that automated scoring of essays, adaptive testing, and learning analytics have the potential to raise the level of objectivity and individualized feedback, yet such initiatives are doomed to fail in the case of weak governance frameworks covering the problem of data privacy, algorithm bias, and inequality in access. The educational measurement theory, sociotechnical systems theory and algorithmic governance ethics to depict that the combination of technological innovation, institutional preparedness and ethical control is needed in order to achieve sustainable AI use in assessment and evaluation in Nigeria's educational system were incorporated. Thus, it is concluded that an inclusive policy designed to align with the international standards of transparency and educational equity is critical for effective AI integration in assessment practices.

Keywords: Artificial intelligence, Educational assessment, traditional practices, Policy framework, Nigeria.

Introduction

Educational assessment is a cornerstone of pedagogical practices, serving as a mechanism for evaluating learning outcomes, guiding instruction, and informing policy. In Nigeria, traditional assessment methods such as standardized testing, manual grading, and summative evaluations have long dominated the educational landscape. However,

these approaches face increasing scrutiny for their limitations in fairness, scalability, and adaptability. The development of educational testing has emerged as one of the challenges of the twenty-first century in education, especially in developing situations where the traditional testing framework cannot sustain the contemporary principles of validity, reliability, and inclusiveness. Irregularities in grading, lateness in feedback, bureaucratic tendencies in administration, and malpractices in examination, among others, persist in undermining the validity of education results and the ability of the assessments to promote meaningful education (Ndume et al., 2014; Oyedeji, 2016). Such systemic vulnerabilities indicate that there has always been a mismatch between assessment practices and the fundamental educational purpose, which is to assess learning holistically and to inform improvement as opposed to grading. Furthermore, the assessment practice in Nigeria's educational system is still deeply rooted in paper-based examinations and manual grading, which, despite their historical nature, are unsuitable to the needs of dynamic and technology-based learning.

Globally, educational system is undergoing a significant transformation, driven by the integration of Artificial Intelligence (AI) into assessment practices. Traditional assessment methods characterized by paper-based exams, manual grading, and standardized testing are increasingly being replaced or supplemented by AI-based systems that promise greater efficiency, objectivity, and personalization. Artificial intelligence (AI) development across the globe provides a chance to overcome these limitations, proving in a timely way to introduce automation, adaptively, and data-driven decision-making into the educational assessment processes. AI applications like automated essay marking, adaptive testing, learning analytics, and intelligent tutoring systems have shown the possibility to enhance accuracy, deliver timely feedback, and personalize learning (Swiecki et al., 2022; Gnanaprakasam & Lourdusamy, 2024; Agbarakwe & Chibueze, 2024). These technologies are in line with the global trends towards competency-based educational systems and formative assessment, which focus not only on what learners know but also on their learning and application of knowledge. Introduction of AI into assessment practice is thus a paradigm

shift of the traditional memory-based testing to the dynamic learner-centered testing.

Yet, with this promise of technology, complicated ethical and governance issues are raised in Nigeria. Thus, this paper explores the theoretical underpinnings of this shift, critically examining the limitations of traditional methods, the potential of AI-based innovations, and the ethical and policy implications of their adoption in Nigeria.

Traditional Educational Assessment Practices in Nigeria and the Challenges

Nigeria's assessment system has been shaped by colonial legacies, emphasizing rote memorization and standardized testing. Testing institutions such as the West Africa Examination Council (WEAC) and the National Examination Council (NECO) have institutionalized summative evaluations as the primary mode of assessment for completion of secondary examination. In Nigeria, the educational assessment system is still predominantly represented by the traditional paper-based tests and manual grading, which tend to be inefficient, unfair, and rigid in terms of

international efficiency, equity, and flexibility. These historic mechanisms, despite their historical entrenchment in the educational culture of the country, have difficulties in responding to the present day requirements of learning processes undertaken in a quick, precise, and individualistic manner. The validity and reliability of student evaluations have been pointed out by scholars like Agbarakwe and Chibueze (2024) and Ndume et al. (2014) as an issue in that inconsistencies in grading and feedback cycles undermine the evaluation process. The subjectivity of human beings and the subjectivity of the raters often distort the outcomes, therefore, providing results that do not reflect the learning progress and do not provide practical information on how pedagogy can be improved. Moreover, the absence of timely feedback mechanisms inhibits formative learning since students get feedback much later, when it is too late to take corrective measures.

Another problem with which teachers have to contend is the large administrative burden of preparation and grading of assessments and results control, which is a significant issue that Ndume et al. (2014)

describe as one of the fundamental inefficiencies of the Nigerian system. Such administrative needs not only constrain the time of instructions, but also diminish the creative and interactive nature of teaching that leads to deep learning. Moreso, worrying is a frequent occurrence of examination malpractice (including unauthorized use of materials and manipulation of results), endangering the quality of evaluation results (Oyedeji, 2016). Such practices are facilitated by a number of factors such as poor supervisory capacity, infrastructural shortages and systemic corruption, which undermine the faith people have in academic certification.

These structural weaknesses are exacerbated by the issues that revolve around resources. Large-scale examination has huge bottlenecks in terms of high costs of printing materials, engaging invigilators, and acquiring venues. Such expenses are skewed towards the institutions that are underfunded and have to use limited resources to sustain the old testing models. Behind the logistical inefficiencies, there is a more profound pedagogical problem: the dominant method of assessment tends to support the memorization over the comprehension of the material,

which has reinforced the idea of the surface-level learning and disregarded higher-order cognitive skills (Swiecki et al., 2022; Saputra et al., 2024). This excessive dependence on rote-based forms of assessment is inhibitory to learner creativity, critical thinking and problem-solving, which are the core capabilities of being successful in the current knowledge economy.

The sum of these deficiencies highlights an institutional mismatch between the practices of assessment and the transformative purposes of contemporary education. As the world is moving towards agile, data-driven, and student centric solutions, the Nigerian institutions are stuck with analog solutions that provide limited feedback, low reliability, and low adaptability. This persistent gap provides a compelling reason to implement artificial intelligence-based advancements that can automate, deliver fair grading, and personalize learning experiences.

AI Ethical Assessment Transformation (AI EAT) Model.

Assessment reform can be described as mediated and moderated with the help of the AI EAT Model (see figure 1). The antecedent that requires the

search of improvement is the traditional assessment limitations in Nigeria. The operations of AI capabilities act as a mediating engine to automate scoring, customize tests to ability, and provide real time feedback, all of which increase validity, reliability, efficiency, and integrity of assessment practice (Swiecki et al., 2022; Gnanaprakasam and Lourdusamy, 2024; Mahamuni et al., 2024). These gains are determined by the ethical and policy enablers, which necessitate the educator to be provided with privacy protection, audit of algorithms, explainability, fair accessibility, and continual professional learning (Patki et al., 2023; Mutawa, 2024; Abubakar et al., 2024; Wang, 2025). In highly governed and capacity normative cases, AI generates quantifiable quality of assessment and promotes inclusive and data-driven pedagogy; in poorly governed and capacity normative cases, it poses threats of bias, opaqueness, and unequal benefit growth (Bulut et al., 2024; Ofem & Chukwujama, 2024; Fachrurrazy et al., 2025).

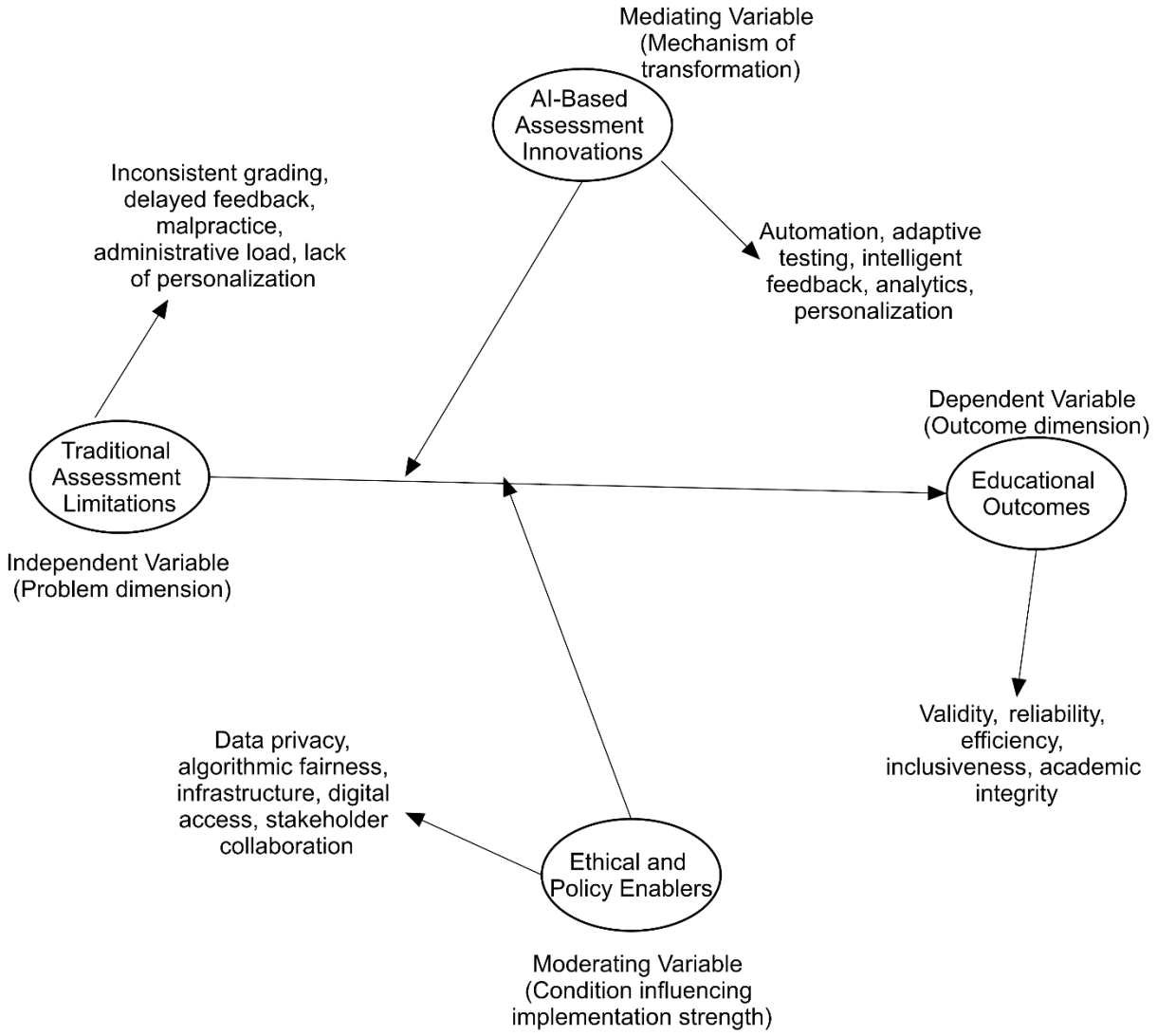

Figure 1: AI EAT Model

Source: The Author (2025).

Advancing Validity, Reliability, and Efficiency through Artificial Intelligence in Educational Assessment

Artificial intelligence can have phenomenal possibilities of enhancing the validity, reliability and general efficiency of educational assessment

practices in Nigeria. In a system that is largely referred to as having inconsistent grading, delayed feedback, and high administrative requirements, the incorporation of intelligent technologies provides a strategic move to transform the manner in which learning outcomes are measured. Due to the reduced subjectivity and inconsistency that undermine the integrity of conventional evaluation, automated assessment systems not only automate processes but also reduce them, as noted by Ogunsakin (2024). With the incorporation of accuracy and transparency in the evaluation processes, artificial intelligence would help educational institutions to become more consistent with the international standards of measurement and accountability.

The most obvious development is generalized in the area of automated essay scoring, where natural language processing algorithms evaluate written answers according to a set of predefined linguistic and conceptual criteria. This method minimizes the errors in the human decry of raters and provides uniformity among large groups of students (Gnanaprakasam and Lourdusamy, 2024). Evaluation of the essay using

automated methods offers high-speed and standardized scores hence, enhancing validity and fairness. On the same note, adaptive testing is another radical change where there is currently a shift away, to the inflexible, one size tests towards responsive models, which dynamically alter question difficulty, based upon the performance of individual students. This type of flexibility creates a more precise measure of student ability and makes learning assessment more authentic (Mahamuni et al., 2024; Supianto, 2023).

In addition to enhancing the precision of the assessment, artificial intelligence plays a key role in efficiency in grading and feedback provision. The automated grading systems save a lot of time that teachers spend in marking their scripts and computing marks. This does not only get rid of the issue of a grading backlog typical of institutions in Nigeria, but also enables teachers to spend a greater portion of time on mentoring and enriching the curriculum (Apetorgbor et al., 2024). It is also notable that real-time feedback mechanisms have emerged. Smart platforms are now able to deliver real-time feedback on what students submit and can

assist the learner to identify mistakes, further clarify on the concept and keep the learner motivated. This form of immediacy encourages a process of constant learning and keeps students proactive in monitoring their own progress (Ogunsakin, 2024).

Individualized educational assistance is another aspect of change. The intelligent tutoring systems can interpret the patterns of learner interaction and adjust the instructional material to the needs of each learner, as well as prescribe remedial actions based on the pace and the abilities of each learner (Agbarakwe and Chibueze, 2024; Hrich et al., 2025). When combined with learning analytics, these systems produce high amounts of data that can be interpreted by educators to reveal the latent trends in student performance. The information obtained through this kind of analysis can help teachers in creating specific interventions which will, in turn, increase the quality and inclusivity of the education delivery (Apetorgbor et al., 2024).

Although these are the benefits of using artificial intelligence in assessment, there are issues that surround its implementation. These

innovations are only successful under the condition of the existence of credible digital infrastructure, sufficient funding, and a high rate of technological literacy. Unsubstantiated power supply, insufficient connectivity and access to digital tools are some of the greatest impediments in most institutions in Nigeria. Another set of ethical issues is associated with student data management, the openness of algorithmic choices, and the danger of overreliance on robots (Ofem and Chukwujama, 2024; Abubakar et al., 2024). To reach these problems, there is a need to have investments coordinated, educators' capacity building, and the formulation of clear ethical and regulatory guidelines that would help in correct usage.

Basically, artificial intelligence is transforming what educational assessment can attain in situations where there is inefficiency and inequality. Properly put in place, it does not only rectify the shortcomings of traditional approaches but also puts Nigerian education on the path of innovativeness, responsiveness, and equity.

Innovation of AI-Based Assessment Tools in the Nigerian Educational System Amidst Ethical and Policy Challenges

The success of AI-based assessment tools will rely on the interaction between the teachers, students, and administrators with the tool. The successful work of systems in automation and feedback optimization is often achieved in institutions that have invested in educator training, digital infrastructure, and supportive leadership structures (Apetorgbor et al., 2024 & Hrich et al., 2025). On the contrary, those schools that do not have such sociotechnical alignment are still not able to turn the use of AI into pedagogical gain. This finding affirms the claim made by Agbarakwe and Chibueze (2024) that the adoption of educational technology use in Nigeria should be perceived as an adaptive social process, instead of being a technological upgrade.

The socio-technical perspective describes why digital disparity is still in the middle of transformation consequences. The lack of infrastructure asymmetry, power supply, and connectivity disproportions forms a dual-level educational system whereby urban schools are progressing towards the age of AI while schools in the countryside fall

further behind. In the absence of proactive policy tools to close this gap, there are no intentional ways in which AI is expected to exacerbate pre-existing inequities. The third theoretical prism, algorithmic governance ethics, makes it clear why there is the normative aspect of this transformation. The paper observed that the policy environment in Nigeria is still at an infantile stage although it is starting to appreciate the need to have some form of ethical oversight. The existing frameworks, including the NITDA AI Policy, do not include specifications of how algorithms are going to be transparent, protect user data, and provide remedies in case of an error in automated decision-making (Patki et al., 2023; Mutawa, 2024; Wang, 2025). This disjuncture is seen as an alarm of Bulut et al. (2024) that unrestrained AI systems can reproduce the social biases that exist in the information. According to the literature, these risks might be overcome by incorporating audit procedures, explainable AI standards, and persistent tests of bias, promoting the trust of people in AI-based assessment systems (Farooqi, 2025; Fachrurrazy, M., Beddu, R., Efendi, E., Firmansyah, F., Jamaluddin, F., & Siliwadi, D.N. (2025)

The AI-EAT Model presents a logical explanation of the way in which reform can take place. The theory of educational measurement recognizes the why of change validity and fairness; sociotechnical theory recognizes the how, interaction of technology, people and institutional structures; and algorithmic governance ethics identifies the conditions of transformation that make the transformation fair and accountable. The three-fold theoretical amalgamation depicted that sustainable AI implementation involves technological innovation in addition to ethical stewardship.

The model also has propositions that are consistent with empirical synthesis over the literature review. The initial hypothesis that AI use-related intensity is associated with an increase of the validity and efficiency was repeatedly proven by adaptive testing and automated grading research (Mahamuni et al., 2024; Supianto, 2023). This second suggestion, that privacy and transparency protection reinforces such effects, was supported by studies that emphasized the significance of auditability and explainable algorithms (Patki et al., 2023; Farooqi, 2025).

The third hypothesis, which inclusive outcomes are higher with equitable access and teacher capacity, was confirmed by policy reviews indicating that infrastructure investment and professional development have a direct effect on the reach and equity of AI implementation (Abubakar et al., 2024; Sands, 2025; Ojokheta & Omokhabi, 2024).

The discussion shows that the educational reform in Nigeria, as a result of AI adoption, is a technical modernization process and an ethical transformation of assessment practices. Successful change is not about technology, but the convergence of measurement principles, human capacity and governance ethics. The AI-EAT Model therefore offers an integrative framework that is used by policymakers and learning institutions to develop strategies that will improve the reliability of assessment and safeguard the rights of students as well as guaranteeing fair access to the digital education future. The Ethical concerns includes;

Data Privacy: AI systems collect vast amounts of student data, raising concerns about consent, storage, and misuse.

Algorithmic Bias: If trained on biased datasets, AI tools may perpetuate inequalities, disadvantaging marginalized groups.

Transparency and Accountability: Stakeholders must understand how AI decisions are made and have mechanisms to challenge unfair outcomes.

Student Autonomy: Overreliance on AI may undermine student agency and reduce human interaction in learning.

Conclusion

This paper discussed how the educational assessment in Nigeria can be changed using artificial intelligence and ethical governance. Using only secondary data and informed by AI-Ethical Assessment Transformation (AI- EAT) Model, it can be shown that in Nigeria, traditional assessment behavior is still limited to structural, procedural and ethical flaws that undermine validity, reliability and equity. The lack of uniformity in grading, timeliness of feedback, examination malpractice, and excessive

administrative work have all contributed to the decreased credibility and formative nature of assessments at different levels of education (Ndume et al., 2014; Oyedeji, 2016; Agbarakwe & Chibueze, 2024).

The reviewed literature confirms the usefulness of AI-based innovations, automated essay scoring, adaptive testing, and learning analytics, which can address these limitations and introduce accuracy, efficiency, and personalization (Swiecki et al., 2022; Gnanaprakasam & Lourdusamy, 2024). AI increases grading accuracy and timeliness through automation and validity and student engagement through adaptively and evidence-based teaching through analytics. However, the advantages are conditional with the set of powerful ethical and policy enablers that grant equitable access, data privacy, and algorithmic transparency (Patki et al., 2023; Mutawa, 2024; Farooqi, 2025).

The findings contribute to the propositions of the AI-EAT Model:

- Preexisting constraints (X) produce reform pressure throughout the evaluation machine.

- The innovations that involve AI-based (M) are inter-mediating factors that trigger change.
- The relationship between innovation and outcomes is moderated by the presence of ethical and policy enablers (Z).

When the interaction between these constructs is balanced and well controlled, the results of the educational outcomes (Y) can be achieved, such as validity, reliability, efficiency, and inclusiveness.

The theoretical combination of the educational measurement theory, the socio-technical systems theory, and the algorithmic governance ethics offers a multidimensional perspective on reform: AI makes the measurement more objective (measurement), institutional cooperation makes the use more usable (sociotechnical), and ethical governance makes the process more equitable (governance ethics). Therefore, the change in the sphere of assessment in Nigeria is not a mere technological change but a systemic change the interdependence of tools, people, and norms in an inter-reinforcing process.

Recommendations

The following recommendations are made:

1. Government agencies must come up with a national framework of AI in assessment at the policy level that lays down data protection, an algorithm transparency and periodic audit mechanisms
2. Algorithms accountability should be institutionalized by the Federal and state education ministries, together with NITDA and NUC, by conducting an external review of AI tools to identify bias and adapt to the international ethics of artificial intelligence
3. The equitable access should also be encouraged to narrow the rural-urban digital divide by urgently investing in broadband connectivity, digital laboratories, and power supplies
4. Institutions like universities and secondary schools need to implement hybrid assessment models (both automation and human moderation) that would allow balancing efficiency and contextual judgment.

5. The capacity building of educators is important, periodic professional development courses in AI literacy, data analytics, and ethics will prepare teachers to effectively monitor and interpret AI-generated outputs
6. The institutions must also set up data governance committees that will control the management of data, student permission, and algorithmic evaluation of performance.

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