

**THE AUTOMATION OF EDUCATIONAL ASSESSMENT IN NIGERIA:  
CHALLENGES AND IMPLICATIONS FOR PRE-SERVICE TEACHER  
EDUCATION**

by

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## **Abstract**

*The use of technology in educational assessment is relatively new in Nigeria. The achievements of Joint Admissions and Matriculations Board (JAMB) in the automation of public examinations which began with on-line checking of candidates examination centres, and later e-registration of candidates for the Unified Tertiary Matriculation Examinations (UTME), e-marking of the UTME and release of students examination results in a record-breaking-time of one week; to actual conduct of e-examinations in designated centers is proof of the invaluable role of technology in tackling the numerous challenges of assessing students' learning outcomes in Nigeria. But can technology alone transform assessment? What systemic reform is required for teacher education to respond to global trends and changes in classroom assessment practices? This paper examines the implications of automating the assessment of students' learning on the curriculum standards, pedagogy and teacher professional development practices in Nigeria.*

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## **Introduction**

The ongoing reform in the education sector puts premium on public examination results as the yardstick for determining standards and quality of education delivery in the schools. There is a general conviction among policy makers that feedback from the performance of candidates in public examinations, not only provide information about the educational progress of learners in a systematic way, but is also indicative of the quality of teaching and learning that takes place in the classroom. Thus, in her strive to assure standards and quality in education delivery in Nigeria, the Federal Ministry of Education (FME), through its relevant agencies is making concerted efforts to improve the reliability of national examination systems in the assessment of candidates' academic performance. As a key deliverable in the 'Four Year Strategic Plan for the Development of the Education Sector' in Nigeria, the automation of assessment practices is currently at the front burner of educational discusses in Nigeria. The ultimate goal is to deploy technology to support all aspects of national assessment operations in Nigeria, from on-line registration of candidates; computer-based administration of examinations and the scoring of examination scripts; to the management of assessment feedback within and across institutions (FME, 2012).

Automation refers to the use of inanimate electronic or mechanical devices such as computers or other machines for the execution of tasks. It is the process of having a machine or

machines accomplish tasks which hitherto were performed wholly or partly by humans. In other words, automation is the replacement of manual operations with computer procedures and other machinery. As a technology, automation can be applied to almost any human endeavor, be it manufacturing, office, teaching - learning, administrative or assessment tasks and operations. Automation of educational assessments, be it school-based assessment or public examinations, can be described as the application of technology for the assessment of learning outcomes. It involves the use of machines to perform those operations which hitherto was performed wholly or partly by teachers or employees of examination bodies. In a generic sense, automation of assessment is synonymous with 'technology-enhanced assessment'. Technology-enhanced assessment refers to a wide range of ways in which information communication technologies (ICT) can be used to support assessment, feedback and other related activities (Wikipedia, 2011). It includes computer-based assessment (CBA) or computer-based Testing (CBT), e-assessment and on-line assessment.

The increasing ubiquity of Information Communication Technology (ICT) and its powerful influence on the lives of people is evident. The education industry in Nigeria cannot but leverage the endless possibilities of ICT for improving all aspects of teaching, learning and assessment; and for meeting the constantly changing preferences of clients globally. Thus this paper highlights the extent of automation of examination processes vis-à-vis the existing structures for its success. Specifically, the discourse in this paper focuses on:

- nature of automation in public examination systems in Nigeria and the associated challenges,
- the systemic reform measures required for optimal deployment of technology in the assessment of learning outcomes in the education system; and
- implications on curriculum standards, teaching and learning and teacher professional development practices in Nigeria.

### **The Evolution of Automation in Public Examination in Nigeria**

The early beginnings of automation in public examination systems could be traced to the use of punch card machines by the West African Examination Council (WAEC) for handling all aspects of examinations from the capture of candidates' registration information to the printing of certificates. The punch-card machines was replaced in the 1970's with Optical Mark Reader (OMR), which not only shortened examination processing time (Ojerinde, 2011) but also increased the efficiency of scoring of multiple choice examination items.

The declaration of universal primary education in Nigeria, and the attendant upsurge in the number of candidates registering for public examinations expectedly raised concerns over the quality, and security of candidates' data and the entire examination procedures. The spate of education sector reforms, from the 1980s to date, gave further impetus for automation of examination procedures in Nigeria. Thus by 2004, the National Examinations Council (NECO) had introduced e-registration of candidates for its examinations, online MTN-SMS results checker and online verification and confirmation of examination results. With these developments, candidates were able to access their results from any part of the country with their mobile phones; while educational institutions could verify and confirm the authenticity of candidates' examination results with ease. With the publication of the 'Roadmap for the Nigerian Education Sector' in 2009, the application of technology in public examinations has been extended to the electronic capture of candidates' biometric data for authentication and admittance of candidates into examination halls; and the battle against examination malpractice is gradually being won by technology.

Still in the bid to reform assessment practices in Nigeria, the Joint Admissions and Matriculation Board (JAMB) pioneered the first Computer-Based Test (CBT) in public examinations in the 2013 Unified Tertiary Matriculation Examination (UTME). The UTME is an examination administered once a year, by JAMB to all candidates seeking admission into Nigerian public and private Monotechnics, Polytechnics, Colleges of Education and Universities. The expectation, based on the 'Four Year Strategic Plan' is that by 2015, automation of public examinations would be widespread, and CBT would be widely used by other public examination bodies in Nigeria, particularly the West African Examinations Council (WAEC) and the National Examinations Council (NECO) for the assessment of candidates' performances.

The CBT administered by JAMB is an on screen presentation of multiple choice knowledge tests. The computer mark or assess the responses provided by candidates. As a candidate finishes the examination, the system gives him/her a pictorial presentation of his/her performance on the spot. While the final results are made available to candidates on the same day through short message service (SMS), e-mail or by candidates checking JAMB examination results portal.

### **Benefits of Automating Examination Systems**

Notable among the immediate benefits of the UTME's CBT is the 'same-day' release of students' results. The UTME's CBT also offers candidates an option, away from paper-and-

pencil test. Candidates sitting the UTME in 2013 had three options, (i) the CBT, (ii) Paper-and-Pencil and (iii) part-computer, part paper–and-pencil test i.e. the Dual-Based Test (DBT). These options were not available prior to the introduction of UTME’s CBT. The introduction of CBT also improved the efficiency of the UTME, enhanced its credibility, as well as reduce incidence of breaches of examination security (Ojerinde, 2013). It is envisaged that by 2015, when UTME would be administered 100% through computer-based testing, JAMB would no longer print millions of question papers as it’s the case currently. Neither would JAMB have to distribute bulky question papers to examination towns and centres across the country by road, thereby drastically reducing risk on human life and cost of conducting the UTME.

Other benefits the education sector and its clientele stand to derive from automated assessments and examinations include:

1. lower long-term costs
2. instant feedback to students
3. extensive and efficient use of existing item banks
4. precision measurement through the adaptation of test content to individual students competency
5. creation of digital records of student growth and development which can easily be passed along from grade to grade
6. greater flexibility with respect to location and timing of examinations
7. improved reliability (machine marking is much more reliable than human marking)
8. improved impartiality (computerised marking does not 'know' the students so does not favour nor make allowances for minor errors)
9. greater storage efficiency - tens of thousands of answer scripts can be stored on a server compared to the physical space required for paper scripts
10. enhanced question styles which incorporate interactivity and multimedia.
11. increased productivity and low operational variability.
12. accommodation of candidates with special needs.

### **Challenges of Automating Public Examinations in Nigeria**

Albeit the numerous advantages of automating examinations, still there are reservations about its viability in Nigeria. It is not uncommon for automated assessment to be received with mixed reactions by stakeholders. Livingston and Condie (2006) reported that while students readily embraced online learning and assessment programme, teachers did not. Same was the

case with the 2013 Computer -Based Test (CBT) administered by the Joint Admissions and matriculations Board (JAMB), where as many as 91, 610 candidates willingly opted for the CBT amidst skepticism surrounding its introduction (Vanguard, 2013). Foremost amongst the reasons for doubting the viability of automated assessment in Nigeria is dearth of infrastructure required for its successful uptake. Much of the infrastructures for automated examinations are either obsolete or overstretched in terms of capacity, accessibility reliability and security. Still associated with infrastructure for the automation of examinations is the absence of internet facilities in rural areas requiring that candidates travel long distances to get internet access; and the challenge of erratic power supply. The automated examinations and assessments involves on-the-spot scoring and release of examination results and assessment feedback. This calls for functional state of the art ICT hardware and database software; internet connectivity in most schools irrespective of location and constant electricity to power the computers.

There is also the issue of resistance to change by stakeholders that could constitute stumbling block to automation of public examinations in Nigeria. Perhaps, self-interest and fear of loss of current status are learned conjectures responsible for stakeholders' resistance to automated assessments. Dreher, Reiners and Dreher (2011) observed that for teachers and educators, job-roles and control are the major reasons for resisting automated assessments. They argue that since automated assessments are likely to facilitate a more independent approach to learning for students, teachers who see themselves as "experts that transmit knowledge in the classroom" are challenged and consequently resist its uptake in their classroom practices. For school proprietors and other education services providers, expressed resistance could be as a result of the implicit cost of preparing schools for the uptake of automated assessments. While parents and other stakeholders, may express apprehension that students' performance in automated assessments and examinations are more likely to be influenced by individual computer competencies or any other systematic differences than a true expression of knowledge of the subject matter being measured by the examination.

Finally, the low level of e-education amongst students is also a threat to the uptake of automated assessment. Many school leavers in Nigeria are not computer literate. Neither is computer education compulsory in the schools. Addressing these challenges call for systemic reform of curricula and teacher development practices if the potentials of automated assessments are to be fully harnessed.

## **Systemic Reform for Optimal Deployment of Automated Assessment in Nigeria**

The prospect of evolving new assessment procedures that could significantly improve teaching and learning in the nation's schools makes the introduction of automated assessment of students' learning in Nigeria worthwhile. Technology can support nearly every aspect of the education process, from adding value to teaching learning process, to the administration of individual tests and assignments and the management of assessment within and across educational institutions; etc. But automation alone cannot transform assessment. Clearly, assessment cannot and must not be considered in isolation from the curriculum: what is taught, how it is taught and how students learn.

Today's students face a world that demands new knowledge and abilities. The 21<sup>st</sup> century knowledge economy requires that students have critical thinking ability to be able to analyze and make inferences in a continuously changing environment. Consequently, curriculum reforms in Nigeria promote teaching and learning modes that require learners to frame problems for themselves, formulate plans to address them, assess multiple outcomes and consider relationships, deal with ambiguity, and shift purposes in light of new information. If automated assessment procedures must align with curricula standards and instruction, its methods should go beyond requiring students to demonstrate what they know or can do by selecting the best choice from a small set of responses in a standardized multiple-choice question format. Automated assessments must move towards a more authentic and dynamic assessments that utilise portfolio systems, constructed response, and other higher-order assessment approaches to provide feedback on learning progress.

The emphasis of teaching and learning under the ongoing reform is on the development of skills: skills for learning, skills for life and skills for work. Classroom experiences should comprise of the three domains of learning cognitive, psychomotor and affective learning. Helping the students develop skills requires changes in the assessment at the school and classroom levels as well as new approaches to large-scale and high stake assessments (Soliman, 1999). The reform measures particularly promote the incorporation of continuous assessment (school-based assessment) in the overall assessment feedback mechanism used in determining the academic performances of learners. The rationale is to ensure that assessment practices focus on distinctive features of students learning experiences to secure information that can help improve the quality of both curriculum and teaching. To this end, assessment is an integral part of teaching and learning rather than as an activity separate from instruction. Hence, assessment feedback is valuable to the extent to which it can be used to inform

instruction and enhance students' learning rather than for categorization and elimination purposes (FME 2006).

In Nigeria, Continuous Assessment (CA) instruments are largely prepared and administered by the teacher. Whereas automated assessment if carefully designed can comprehensively and reliably assess students learning in the three domains (cognitive, psychomotor and affective) of learning; continuous assessments is largely focused on assessment of cognitive domain of learning. The psychomotor and affective domains are hardly assessed (Okonkwo, 1999). There is also the issue of lack of comparability and variations in the standards of CA instruments within and across schools which has been traced to the general lack of skills in test construction techniques among teachers. A pragmatic way out is to empower public examination bodies to create Continuous Assessment Resource Banks (CARBs). Again, application of technology comes into play. Computers and other information and communication technologies offer teachers a myriad ways of assessing students learning progress as well as highlight areas that the teachers need to focus on in their own teaching. Teacher education should therefore equip teachers with the necessary ICT skills for making their own work more productive.

### **Conclusion**

Assessment is currently at the centre of Nigeria's efforts to reform the education sector and restore standards and quality in education delivery. The focus is on automating examinations and assessment procedures for a more responsive and valid assessment of learning. In keeping with a learner-centered curriculum, assessment is part of the teaching process, requiring increased personal contact with and observation of learners, and more and varied ways of obtaining information about learning progress. Automated assessments therefore must evolve and utilise appropriate techniques that reflect the nature of interactions between learners and teachers' classroom activities. Nevertheless, as desirable as automated assessment may be, logistics, funding, resistance to change by stakeholders, infrastructure, curricula and teacher development are some of the challenges that could impede the optimal utilization of its potentials to transform the curriculum, teaching and learning.

Addressing these challenges first and foremost require that computer education be made compulsory and e-learning is fully entrenched in our educational institutions and particularly in teacher education programmes. This will reduce the weariness currently being expressed by stakeholders. Secondly, there is the envisaged high cost of the startup of such an automated



assessment system, especially the development of an item bank for adaptive testing purposes. However, this is necessary in order to be able to start the system, which of course would not be different with paper-and-pencil tests (Björnsson, 2008) albeit with greater value.

Finally, deploying automated assessment in all schools and for all examinations will require considerable resources, both in terms of infrastructure, as well as in the technical and specially trained personnel to oversee and administer the assessments.

## References:

- Björnsson, J. K. (2008) Changing Icelandic National Testing From Traditional Paper and Pencil based Test to Computer Based Assessment: Some Background Challenges and Problems to Overcome. In Friedrich Scheuermann & Angela Guimarães Pereira (Eds.) Towards A Research Agenda on Computer-Based Assessment
- Dikli, S. (2006). An Overview of Automated Scoring of Essays Journal of Technology, Learning and Assessment Vol. 5 p.1-35.
- Dreher, C. Reiners, T and Dreher, H. (2011) Investigating Factors Affecting the Uptake of Automated Assessment Technology Journal of Information Technology Education, Volume 10
- Federal Ministry of Education (1985) *A Handbook on Continuous Assessment*. Ibadan: Heinemann Educational Books (Nig.) Ltd.
- Federal Ministry of Education (2006) Summary of Decisions of the 52<sup>nd</sup> Meeting of the National Council on Education.
- Federal Ministry of Education (2007) *National Strategy for Teacher Quality and Development*.
- Federal Ministry of Education (2012) *4-Year Strategic Plan for the Development of the Education Sector: 2011 - 2015*
- Livingston, K., & Condie, R. (2006). The impact of An Online Learning Program On Teaching And Learning Strategies. *Theory into Practice*, 45, 150-158
- Martin, R. (2008) New Possibilities and Challenges for Assessment Through the Use of Technology In Friedrich Scheuermann & Angela Guimarães Pereira (Eds.) Towards A Research Agenda on Computer-Based Assessment.
- Ojerinde, D. (2011) Public Examinations in Nigeria Melrose Books and Publishing Ltd
- Ojerinde, D. (2013) Classical Test Theory (CTT) versus Item Response Theory (IRT): An evaluation of the comparability of item analysis results'' A lecture delivered at the Institute of Education, University of Ibadan, **May 23, 2013**
- Okonkwo, S. C. (1999) An Evaluation of Continuous Assessment Standards and Practices in Nigerian Secondary Schools *Journal of Quality Education* Vo. 6 p. 125 -135
- Scalise, K. & Gifford, B. (2006). Computer-Based Assessment in E-Learning: A Framework for Constructing "Intermediate Constraint" Questions and Tasks for Technology Platforms. *Journal of Technology, Learning, and Assessment*, Vol. 4 (6).

Soliman, I. (1999) *Assessing Students Learning* . University of England

Vanguard online news, (2013) <http://www.vanguardngr.com/2013/04/o...utme-saturday>

Wikipedia, the free encyclopedia (2011) E-assessment [en.wikipedia.org/wiki/e-assessment](http://en.wikipedia.org/wiki/e-assessment)