An Assessment of the Challenges and Prospects of Computer Based Test (Cbt) in Joint Admissions And Matriculation Board (Jamb)

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Abstract
The introduction of Computer Based Test (CBT) in Nigeria was greeted with mixed feelings as many argued that Nigeria was not ripped enough to have embraced a computerized examination of this magnitude organized by JAMB. While the CBT has recorded appreciable improvement in terms of reduction in examination malpractice, speed in the marking and processing of candidates results, among others. However, the implementation of CBT is also faced with multiple problems. This paper, therefore, examines the challenges and prospects of CBT. Data was collected from the secondary sources because there is a considerable literature on the subject matter. While the Content analysis was employed for analysis and discussion. The paper found out that, to a greater extent, CBT has done away with rampant cases of examination malpractice, missing results, and delays in the release of the result. The paper also revealed that there are challenges associated with the integrity of the computerized examination, the problem of ICT infrastructure, poor internet network, inadequate computers and cybersecurity among others. The study concludes that Nigeria cannot afford to lag behind when the whole world is going web-based in the conduct of many of her activities. The major recommendation in the study was that compulsory teaching of computer literacy at the secondary school level, provision of ICT infrastructure, and disqualification of Fraudulent private cyber cafes from participating in JAMB's CBT examination.

Keywords: *Challenges, prospects, Computer Based Examination.*

INTRODUCTION

Computer-Based Testing (CBT), also known as Computer-Based Assessment or e-assessment/testing is a method of administering tests in which the responses are electronically recorded, assessed, or both. It is commonly available for several admissions tests throughout the developed countries and developing countries over the years have started adopting this strategy to improve on examination tests.

Computer-based tests offer several benefits over traditional paper-and-pencil or paper-based tests. The technology-based assessment provides opportunities to measure the complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods (Bodmann and Robinson, 2004). Consequently, in Nigeria, employers now conduct aptitude test for job seekers through electronic means; the universities and other tertiary institutions are registering and conducting electronic examination for their students through the internet and other electronic and networking gadgets. Similarly, different examination bodies in the country such as West Africa Examination Council (WAEC), National Examinations Council (NECO), National Business and Technical Examination Board (NABTEB), and National Teachers' Institute (NTI), among others register their students through electronic means (Olawale and Shafii, 2010). Computer and related technologies provide powerful tools to meet the new challenges of designing and implementing assessments methods that go beyond the conventional practices and facilitate to record a broader repertoire of cognitive skills and knowledge (Mubashrah, Tariq and Shami, 2012).

In Nigeria, the mandate to conduct entrance examination into tertiary educational institutions (Universities, Polytechnics, Colleges of Education & related/similar institutions) is vested in a body called Joint Admissions and Matriculation Board (JAMB). Thus, every year, JAMB conducts Unified Tertiary Matriculations Examination (UTME) and forwards the results to the candidates' institutions of choice for selection and admission. Over the years, the UTME by JAMB has been a paper and pencil test (PPT) form, and has been characterized by a lot of fraudulent practices ranging from leakage of examination papers, use of machineries of all sorts by candidates, bribe-taking by examination officials,

impersonation, use of unauthorized gadgets, and so on (Osuji, 2012).

In order to eliminate or minimize the incidence of the vices, and/or other reasons, JAMB in 2013 introduced the computer-based testing (CBT) form of UTME and gave massive publicity and sensitization on it. JAMB gave the advantages of CBT to include increased delivery of test items that have been calibrated and delineated according to their pertinent item characteristics: instructional level objectives, difficulty level, discrimination level and functionality of distracters, efficient administration of examination and scoring of tests, reduced costs for many elements of the testing lifestyle and logistics, improved test security resulting from electronic transmission and encryption for total eradication of breaches of examination security, unbiased test administration, reduction in the spate of examination security breaches, and improvement in the quality and standard of education in the long run.

JAMB conducted the 2013 edition of the UTME with three test options, namely the traditional Paper and Pencil Test (PPT), Dual-Based Test (DBT), and Computer-Based Test (CBT). The DBT and CBT which were novel introduction were largely successful in spite of some challenges. JAMB announced that from 2015, CBT will be used to conduct all UTME to achieve the objectives of ensuring 100 per cent elimination of all forms of examination malpractice that had been a major challenge in the conduct of public examinations in the country (Vanguard, 8th November 2012). It is not out of point to note that JAMB has been able to overcome some challenges as recorded before the introduction of the CBT. This paper, therefore, examined the challenges faced by JAMB in the conduct of CBT as well as its prospects of overcoming these challenges.

OBJECTIVES OF THE PAPER

The paper intends to achieve the following objectives:

a. To assess the challenges and prospects of CBT in Joint Admissions and Matriculation Board (JAMB).
b. Ascertain whether the CBT has achieved some degree of success since inception and;
c. Recommend appropriate measures to improve the proper implementation of CBT by JAMB

METHODOLOGY

This study made use of only qualitative data for analysis. The choice of qualitative data was informed due to a large volume of existing literature on this subject matter. To this end, the content analysis was employed in carefully selecting the relevant information that provided adequate information on

the challenges inhibiting the use of CBT in JAMB and the likelihood of overcoming these challenges.

AN OVERVIEW OF COMPUTER BASED TEST

A Computer Based Test System (CBTS) is a form of assessment in which the computer is an integral part of question papers' delivery, response storage, marking of response or reporting of results from a test or exercise (Whillington 2000). It can be a multiple-choice question-based examination system that provides an easy to use environment for both Test Conductors and Students appearing for Examination. The main objective of a CBTS is to provide all the features that an Examination System must-have, with the interfaces that do not scare its users (Baddi 2010).

An online examination system is an application that allows an institution to examine the Internet (or intranet). Various companies, institutions and organizations have opted for this method of conducting examinations because it is quicker, easier and convenient. This system makes it easier for examiners to conduct exams and collate results. The application provides the facility to conduct online examination anywhere and at any time. Today, most institutions are conducting their exams online to eliminate the bottlenecks associated with pen and paper type of examination. Technology has supported online examinations successfully for several years and has progressively enhanced the process over the years to have room for more students and ensure a smoother online examination. However, one of the biggest challenges to online examination is cheating using technology.

E-exam simply is the process by which examinations are delivered, taken and scored electronically. It entails questions being deployed onto computer workstations (intranet and internet) and candidates answering the questions on to the computer. The process of writing exams is thus completely paperless. It is sometimes referred to as CBT (Computer-based testing) or CBA (Computer-Based Assessment).

E-examination refers to the use of computers by candidates in a high-stakes supervised (proctored) assessment, generally simultaneously in a fixed period. Adebayo and Abdulhamid's survey (2010) showed this definition has been widely accepted in private and public institutions of higher learning as well as in high schools by identifying common practices. Adebayo and Abdulhamid's survey indicate several examination bodies in Nigeria preferred e-examinations to manual examinations (in which students use "pen on paper"). Staff and students preferred e-examinations because of their flexibility, security, integrity, and ease of use.

According to Taylor (2005), as cited in Newhouse [2013], a Computer-Based Testing could be delivered on a stand-alone personal computer, within an isolated Local Area Network (LAN) or through the

use of online technologies such as web-pages over the Internet. The two types of CBTS are:

i.   Linear Test - This involves a full-length examination in which the computer selects different questions for individuals without considering their performance level.

ii. Adaptive Test - Here the computer selects the range of questions based on individuals" performance level. These questions are taken from a very large pool of possible questions categorized by content and difficulty (Alabi, Issa and Oyekunle 2012).

Oduntan, Ojuawo and Odunntan (2015), define computer-based tests as "assessment that are administered by computer in either stand-alone devices linked to the internet or world-wide-web (www.), most of them using multiple-choice questions." Abubakar and Adebayo (2014) opine that some major reasons for introducing CBT tests for UTME were to inhibit the rate of examination misconduct and also to speed up the release of results. The stance of this paper is that these reasons can be accepted as tangible if results produced using CBT forms are satisfactorily valid and reliable. Test validity is described as the extent to which a test measures what it is designed to measure and nothing else.

The computer-based test is the use of computers to administer tests. Other terminologies used to describe Computer Based Test (CBT) include Computer Assisted Testing (CAT), Computerized Assessment, Computer-Aided Assessment (CAA), Computer Based Assessment (CBA), Online Assessment, Web-Based Assessment, Technology-Enhanced Assessment, Automation Assessment, and E-Assessment or Test or Examination (Mubashrah, Tariq and Shami, 2012; Obioma, Junaidu and Ajagun, 2013; Alabi et al., 2012). Computer Based Test means the candidate sits in front of a computer and the questions are presented on the computer monitor and the candidate submits the answers through the use of keyboard or mouse (Ogunlade et al., n.d). Automation of educational assessments, be it school-based assessment or other public examinations, can be described as the application of technology for the assessment of learning outcomes; using machines to perform those operations which hitherto was performed wholly or partly by teachers or employees (Obioma, et al., 2013).

Alabi et al. (2012) described computer-based testing as a method of administering tests in which the responses are electronically recorded, assessed, or both. Computer Based Test (CBT) is grouped into linear/fixed CBT and adaptive CBT. Linear and fixed computer-based test, most similarly to paper-based testing is the random method which can be used to administer a fixed set of items to provide a modest test security benefit. Alabi et al., (2012) defined a linear CBT as a full-length examination in which the computer selects different questions for individuals

without considering their performance level. In CBT adaptive testing, when an examinee answers a question correctly, the next test item has a slightly higher level of difficulty. And the difficulty of the questions presented to the examinee continues to increase until a question is answered incorrectly. Then a slightly easier question is presented. Alabi et al. (2012) further explained that in a computer adaptive test, each test-taker receives questions that are at the level of difficulty for his or her ability. After each question is answered, the computer uses the answer and all previous answers to determine which question will be presented next. This means that different test-takers, even in the same hall on the same day will receive different questions. With this approach; collusion, giraffine, and many other forms of examination malpractices will be eliminated using CBT technique.

The effectiveness of a computer-based testing system depends largely on factors such as standardization, security, examination conditions, and mode of administering the examination, cost and so on. Some of these factors have been identified in the literature as follow:

i.   A CBTS is cost-effective especially when deployed in the conduct of a mass-driven examination as there will be no need to print questions or answer booklets (Fagbola 2013).

ii. Adewale et al (nd) inferred that human errors can be eliminated and examination malpractice eradicated when a CBTS is adopted in the process of examination. In the same vein, Akunyili (2010) in her presentation in Amsterdam on 'ICT and E-government' stated that manually marked scripts were more prone to errors than computer marked ones.

iii. In their system design, Adebayo (2014) stated that security will be more effective since the system includes biometric fingerprint authentication, picture capture and data encryption and decryption.

iv. Al-Amri (2007) also stated that the standardization of test administration conditions is one of the benefits offered by CBTS. No matter the size of the test-takers, CBTS helps test developers to set the same test conditions for all participants.

v.   Bodmann and Robinson (2004) in their study investigated the effect of several different modes of test administration on scores and completion times. They observed that undergraduate students completed the computer-based assessment test faster than the paper-based assessment test.

vi. Jamil, Tariq and Shami (2012) presented that technology-based assessment provides opportunities to measure the complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods.

vii. Osang (2012) in his study of electronic examination in Nigeria suggested that course coordinators prefer electronic examination to pen and paper examinations as it requires lesser administrative tasks for the coordinators and enhances a timely release of the examination result.

CHALLENGES OF COMPUTER BASED TEST IN JAMB

Baker-Eveleth et al. (2006) observed that implementing computer exams requires a secure testing environment, one that prevents students from seeking answers by scanning their computer hard drives, instant messaging or emailing friends, or browsing the internet. To Fagbola et al. (2013), lack of standardized/unified CBT development model alone undermines the success of the e-examination platform for real-time adoption in practice. Fluck et al. (2009) believe that online assessment may not be effective for evaluating creativity, problem-solving ability, critical thinking, reflection, or authentic learning; collectively the characteristics of deep and effective learning. Other challenges militating against the full adoption of CBT in Nigeria and other developing countries are highlighted below:

Inadequate ICT infrastructure: These include hard-wares, soft-wares and bandwidth accessibility. Obioma et al. (2013) observed that much of the infrastructures for automated examinations are either obsolete or overstretched in terms of capacity, accessibility, reliability and security. Again, the absence of internet facilities in our rural areas requires students travelling long distances to urban centres to have access to the internet. Broadband penetration needs to be fast-tracked to reduce the cost of internet bandwidth access in Nigeria.

Epileptic Power supply: The challenge of erratic power supply in Nigeria has defied all attempts by various governments. The irregular and frequent interrupted power supply in Nigeria is a perennial problem affecting every aspect of the economy including education (Oye et al., 2011). Most rural communities are not connected to the national grid, the implication is that schools located there cannot undertake practical effectively. During JAMB's online UTME, cases of power failure interrupting the examination abound.

Students/candidates inadequate skills in ICT: Many school leavers in the country are not computer literate. Even many teachers in the primary and secondary schools cannot boot a computer not to talk of using any application. With these 'analogue' teachers to impart ICT skills to students, the students cannot be adequately equipped for CBT. And this anxiety explains why the resistance to JAMB's full use of CBT in 2015 UTME by students, parents and even teachers. Nigeria does not only lack ICT infrastructure, but it also lacked the human skills and knowledge to fully integrate ICT into secondary school education (Ilesanmi &Lasisi, 2015).

The integrity of examination managers: Outside tertiary institutions ICT centres, other CBT centres in Nigeria are privately owned cyber-café. One of the key reasons advanced for migrating from PPT to CBT is to curb the rampant cases of examination malpractices in the country, the integrity of these businessmen in adhering to the laid down procedure for biometric data capturing during registration and verification during the examination cannot be guaranteed. Experience in SSCE examination has shown that most of the privately-owned schools are for purely economic gains leading to all sorts of examination malpractices. These exam 'miracle' centres syndrome may be transferred to CBT centres if urgent measures are not taken. All tiers of government in collaboration with the corporate organization through public-private partnership (PPP) should build, equip and maintain standard CBT centres at least four in each of the 774 local government areas in the country. This will facilitate e-examination in the country and ensure fairness and equity to the examinees.

Acceptability: There are series of reasons different stakeholders are kicking against automation of examination in Nigeria. Dreher et al. (2011) cited in Obioma et al. (2013) observed that for teachers and educators, job-roles and control are major reasons for resisting automated assessment. They argued that since automated assessments are likely to facilitate a more independent approach to learning for students, teachers who see themselves as "expert that translate knowledge in the classroom" are challenged and consequently resist its uptake in their classroom practices. For school proprietors and other education services providers, an economic factor may be the reason for resisting the uptake of CBT.

Ilesanmi &Lasisi (2015) noted that ICT has remained a low financial priority in most educational systems in Africa. To conserve fund that would be used to acquire computers, internet facilities and other needed infrastructure, some school proprietors may want to evade the positive change CBT has brought to our educational system. For candidates and students, poor ICT skills could be the only genuine reason for not embracing CBT in this era.

Software factors: Currently, there is no software or multimedia that has universal application as far as CBT is concerned. School curriculum and education standard differ from one country to the other. Fluck et al. (2009) observed that assessment of student knowledge and skills within a web browser window or delivered by bespoke assessment software (specifically crafted for a particular set of questions) provides a restricted environment which prevents the demonstration of abilities associated with the use of specialist software or a combination of applications. Again, corrupt software or network failure can cause rescheduling of the examinations.

PROSPECT OF COMPUTER BASED TEST IN JAMB

E-exam simply is the process by which examinations are delivered, taken and scored electronically. It entails questions being deployed onto computer workstations (intranet and internet) and candidates answering the questions on to the computer. The process of writing exams is thus completely paperless. It is sometimes referred to as CBT (Computer-based testing) or CBA (Computer-Based Assessment). This testing method is now being extensively used in many parts of the world today. The use of e-exam simplifies the entire testing cycle, including generation, execution, evaluation, presentation and archiving. This simplification saves time and money while improving reliability. Advocates for the e-exams models argue that it not time-consuming but rather time-saving, (McCormack and Jones 1998, Ryan et al 2000) and identify these advantages:

i. Time-saving; as assessments can be created using software tools and adapted and reused as needed. They can be distributed and collected using a web-based system which saves development and distribution time.

ii. Reduces turnaround time; as the systems enable assessments to be corrected by computers. Reduces time further enables students to use the knowledge obtained from corrected assessments to address further assessments sooner.

iii. Reduces resources needed by replacing human resources with computer resources.

iv. Keeping records of results that can be stored centrally and assessed by interested parties, such as students and staff.

v. A key element in computer-based testing is that fewer people are required to supervise each examination. This will result in considerable cost savings. While the thought of a computer-based assessment or electronic assessment may intimidate those who are unfamiliar with a computer, electronic tests require only minimal computer knowledge and will offer a familiarity tutorial allowing the test-taker to get acquainted with how to move the mouse, answer questions and move through the test. With computer-based assessment comes the possibility of radically changing how assessments are implemented and improving the quality of the information they can yield.

vi. The increasing ease with which data can be used as corrected assignments corrected and stored electronically can be analyzed easier and the data can be used in spreadsheets and other statistical packages.

vii. Now-a- days institutes are organizing exams online. In this module, a user can give online exam of a particular subject and get the results instantly through which the user can know his/her potential and how much more effort he/she needs to put in to get better marks. No time is spent on evaluation that means results are available instantly.

viii. The best available physical and data security techniques to protect the integrity of our tests and to ensure that each candidate takes the exam in a controlled environment. We are proposing stringent security policies and procedures to protect the content of all examinations ensure that candidate taking the test is the person he/she is supposed to be, ensure that the candidate takes the test unaided and maintain the security of data concerning the candidate and the testing session.

With the total conduct of the 2015 JAMB UTME examination (Nigeria's tertiary institution's entrance examination) by CBT, e-testing has come to stay in Nigeria. Again, with the Nigerian Immigration Service (NIS) and other government agencies keying into a computer-based test for recruitment exercise, in the next ten years, all public examinations would have been by CBT. It is also heart-warming to note that the federal government has the plan to build and equip CBT centres one in each of the local government areas of the federation. The former Minister of Education, Mallam Ibrahim Shekarau said that the JAMB CBT centre at Kogo, Bwari in the federal capital territory is a world-class centre; and every state and local government will have that kind of centre in years to come, (Okoronkwo, 2015).

With standard facilities; ranging from functional computers, power generating sets, and internet connectivity among other things, the prospects of CBT in Nigeria is very high. For tertiary institutions, collaboration with corporate organization through PPP and TETFUND is already yielding a positive result. Presently, all tertiary institution in Nigeria has functional ICT centres which are serving as the backbone to the JAMB's UTME CBT resources. Finally, with the increasing ICT education in the primary and post-primary levels of education, candidates will soon be canvassing for CBT because of its effectiveness – year-round testing, flexible scheduling, personalized testing environment, prompt viewing of scores, etc. With this, paper and pencil test (PPT) will die a natural death.

CONCULSION

This paper concludes that the introduction of CBT is apt and capable of driving the desired objectives. However, it is inhibited by factors such as epileptic power supply, poor internet services, and issues around cybersecurity. These, however, can be eliminated through a properly coordinated effort by JAMB in collaboration with other stakeholders. What is urgently required is to gain the buys in of other

stakeholders through a well-designed system of awareness creation and advocacy.

RECOMMENDATION

Based on the findings of this study, the following are recommended:

i. There should be increased collaboration between JAMB and other stakeholders in creating awareness that would douse the fear and myths associated with CBT.

ii. Efforts are also required from JAMB for increasing the number of CBT centres across the nation for easy access by candidates.

iii. Government should improve the provision of electricity to curtail issues of power failure which does not only affect the timing of examination sessions but, also affect the entire network configurations.

iv. The teaching of computer literacy in schools should be encouraged to build computer skills and do away the fears entertained by candidates.

v. To ensure the integrity of JAMB's CBT examination, private cafes that are known for compromising standard reputed for should be disqualified as CBT centres.

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