

# COMPUTER- BASED ASSESSMENT IN NIGERIAN TERTIARY EDUCATIONAL INSTITUTIONS: CHALLENGES AND PROSPECTS

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## ABSTRACT.....

*This paper examines the challenges and prospects of Computer-Based Assessment (CBA) in Nigerian tertiary educational institutions. It defines the concept of CBA and traces its evolution in Nigerian tertiary educational system. The paper further examines some empirical studies on the use of CBA and discusses some challenges as well as its prospects in the higher educational system in Nigeria. The paper suggests some measures to tackle the challenges for effective and efficient utilization of CBA in Nigerian higher educational system.*

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## INTRODUCTION

In recent times, Computer-Based Assessment (CBA) was introduced as a new assessment mode in some of the tertiary educational institutions in Nigeria. This is a sharp departure from the traditional paper-and pen or pencil mode of testing. The trail blazing tertiary educational institutions in Nigeria in the use of these innovation include University of Ilorin, University of Benin, University of Lagos and National Open University of Nigeria to mention but a few. Some Polytechnics and Colleges of Education also introduced CBA for their yearly entrance examinations. These institutions started this form of examination with the post University Matriculation Examination (Post UME).

Some of these institutions have started using CBA for their semester examinations especially where the classes are very large. For instance, the University of Ilorin has been using the system in the past three years for all levels of students (Jimoh, 2010). In the same vein, the National Open University of Nigeria (NOUN) examined her distance learners using the CBA for the first time in May/June/2010 semester examination. CBA used to be seen as an examination mode for developed nations but is now in practice in several developing nations of the world including Nigeria.

### What is Computer –based Assessment?

Wikipedia (2010) defines a computer-based Assessment (CBA), also known as e-assessment, as computerized testing and computer-administered testing as a method of administering tests in which the responses are electronically recorded, assessed or both. As the name implies, computer- based assessment makes use of a computer or an equivalent electronic device such as a cell phone. CBA systems enable educators and trainers to author, schedule, deliver and report on surveys, quizzes, test and examinations. Computer Based Assessment may be a stand-alone system or a part of a virtual learning environment, possibly accessed via the World Wide Web. Virtual learning environment work over the internet and provides a collection of tools such as those for assessment (particularly of types that can be marked automatically, such as multiple choice test-item papers).

A good example of Computer-Based Assessment is Business Language Testing Service- (the BULATS) which is an on line test which is a highly sophisticated system which pin points the candidates ability quickly and accurately by using adaptive testing techniques. As the candidate progresses through the test, the computer selects the next question on the basis of the previous answers, becoming progressively easier or more difficult until a consistent level of ability is achieved.

In 1998, TOEFL (Test Of English as a Foreign Language) began switching from a paper-based test to a computer-based test (CBT) in many parts of the world. The test combines many of the same question types as traditional paper-based test with new question types that can be offered only on the computer. While many examinations are administered in the paper based format, most testing companies in the United States of America are following the national trend of computer-based testing. Each computer test takes the candidates through a short tutorial to instruct the



examinee on the use of computer and how to answer test questions. The test administrator is available at all times for technical assistance. Many candidates find the individual, non-distracted environment and in most cases, immediate score report feedback very attractive features of computer based testing.

### **Empirical Studies on CBA**

According to Thelwall (2000), there are many types of computer-Based-Assessment in use today in higher education, from formative self-tests to summative final examination. CBA is used in various ways as an integral part of many currently used Computer-Aided Learning (CAL) environments. Presently in Nigeria, CBA is used as a summative examination for Post University, Polytechnic and College of Education Matriculation. Some of the Nigerian higher educational institutions have equally adopted it for their semester examinations. Thelwell (2000) equally observed that CBA is an extremely versatile educational tool based on previous studies and survey of uses of the examination format.

Baker and Mayor (1999), identified some criteria relevant to Computer-Based-Assessment of problem solving. These include: cognitive complexity, sensitivity to instruction, meaningfulness, reliability, fairness and linguistic appropriateness. It is therefore essential to consider all these criteria for effective use of CBA.

The benefits of computer-Based-Assessment both for staff and students are well documented. They include rapid formative feedback to the students, reduced marking load for staff and a closer match between assessment and learning environments (Brown, Race, and Bull, 1999).

However, it should be noted that issues relating to student performance should be carefully considered when computer-based assessment is being used in students' assessment. In particular, it was suggested by Ricketts and Wilks (2002), that the mode of presentation of assessment can significantly influence students' performance and their appropriate screen design is perhaps the most important factor in on-line assessment.

One of the benefits associated with computer based assessment is that it can improve student performance in summative assessments. Ricketts and Wilks (2002) found that during the introduction of computer-based-assessment in a first year module numeracy and statistics in Biology, outline assessment was used to replace Optical Mark Recognition (OMR) - marked multiple choice questions after the first year showed that student using online assessment did not perform as well as those using OMR- marked multiple - choice questions. The difference in performance could not be attributed to a weaker student cohort. The result suggests that students may be disadvantaged by the introduction of outline assessment, unless care is taken with the student assessment interface.

Ricketts and Wilks (2002) asserted that 'the main aim of our introduction of on-line assessment was to improve student's performance through more frequent assessment using on-line testing and feedback'. Unfortunately, the first student cohort who used online assessment where they have to scroll through the question performed worse than the cohort that used OMR. A change of interface, to one which required



no scrolling, did produce an improvement in performance of the students need to be carefully monitored to ensure that any changes in delivery are seen to be fair and consistent. The impact of the human computer interface needs further investigation.

The use of computer-based assessment is generally acceptable to students, who particularly appreciate the speed of marking and feedback. However, the acceptability to student is highly influenced by the way in which questions are presented. Thus, presentations which require scrolling are less acceptable than those in which questions are presented one at a time (Ricketts and Wilks, 2002).

In summary, the use of CBA for improved performance of the students requires further efforts, such as using good mode of questions presentation to the students, the use of appropriate technology and adequate planning of the on-line testing materials in line with relevant equipment.

### **Challenges to Computer-Based Assessment in Nigeria**

The use of CBA in public examinations and higher educational institutions has been associated with some challenges which are the focus of discussion in this section of the paper.

A major challenge to the use of computer-based assessment is the unstable power supply. The situation of electricity supply in Nigeria is pathetic. The power supply is not regular most of the time. When there is electricity supply, sometimes the voltage is either very low or too high to the extent that the CBA equipment is at risk. From this experience, some of the companies that are conducting CBA for schools in Nigeria such as JKK computers and Chams City Computers run on diesel engine generating plants most of the time. Likewise, some of the tertiary institutions that have CBA equipment power them mainly through diesel engine generating plants. The resultant effect of this is that there is usually an increase in cost of conducting the CBA examinations. University of Ilorin had to switch permanently to local electricity generating plant whenever on-line CBA tests are being conducted when frequent power cut from the national grid disrupted on going sessions of CBA tests on several occasions.

CBA is capital intensive. That is, the money involved in purchasing computers for the students use is enormous. For instance, the 2010/2011 May/June semester examination of National Open University of Nigeria (NOUN) was contracted to Chams City Computers, Ikeja and JKK computers Ikeja. These companies have over one thousand computer sets for running CBA examinations. If NOUN is to purchase these computers for her students, it will cost the University so much. Not only that, the cost of installation is equally very high. All these expenses add to the cost of running CBA examinations in Nigeria tertiary institutions. This is a very serious challenge to the use of CBA in the tertiary institutions.

Long period involved in conducting CBA tests is another major challenge. Although the duration of CBA tests is relatively short the actual period involved in conducting the test in some Nigerian higher educational institutions is ultimately very long. This was due to large number of candidates are involved in writing CBA tests in these institutions with fewer numbers of computers. For instance, in the last May/June



Semester examination of NOUN, the computers available for the students in companies running the CBA examination for NOUN could not go round the several thousands of students in Lagos Study Centre. Therefore, the students from different programmes such as law, education, nursing and Languages were grouped into batches for the purpose of the examination. Many of the students could not finish their examination till 11:30p.m daily while some examinations spilled till the next day due to inadequate number of computers. The University of Ilorin had similar experience and resorted to grouping arrangement of students for the conduct of CBA tests. The situation has however improved with the provision of more computers.

Another major challenge of CBA is the level of computer literacy of the students. For instance, many of the students find it difficult to "log in" for the examination, some of them could not grade themselves, and some could not preview the questions they have answered while some accidentally submit papers before they complete answering them. It took several times for the instructors to go round the students to assist them to 'log in' and to solve some other related problems.

In the same vein, the inadequate number of computers for the CBA examination led to over utilization of the few ones that were available. For instance, the students were grouped for the examination while the CBA equipment was left to work for several hours. The implication of the over-use of the equipment is the frequent break down of the CBA equipment.

Another challenge is the ability of teachers, especially those without professional teaching qualification to set CBA test items to cover the lower and higher order cognitive, affective and psychomotor domains of Bloom's taxonomy of objectives. The sample of CBA test item-test generated by some of this category of teachers during mock sessions were found to be virtually restricted to recall and comprehension levels of the cognitive domain in Bloom's taxonomy. It should be noted that the test construction skills of this category of teachers has significantly improved after participating in series of workshops in test construction.

Jimoh (2010), reported some of the challenges of CBA examination at the University of Ilorin. He stated that the CBA examination is not sufficient for testing the students' academic performance. It was also discovered from the NOUN CBA experience that all the questions were in multiple choice and "fill-in the gap" format. This kind of examination did not give the students adequate opportunity to express themselves. Therefore, the communication skills of the students and creativity in problem-solving could not be adequately assessed.

Another major challenge to CBA examination is its inability to access practical skills creative abilities of testees. For instance, practical examination requires the student to practice some skills or perform certain tasks as taught by their teachers. These skills and agilities cannot be adequately tested through the CBA examination because they are practical oriented. CBA examinations may not be appropriate for such assessments of these practical based courses such as Fine and Applied Arts, Architecture, Medicine, Agricultural Science, Home Economics and among others. Though some people may think of alternative to practical, the



alternative to practical may not be able to achieve the expected results as it would have been with real laboratory-based practical examinations.

The maintenance of the CBA examination equipment is another challenge as most of the component parts of the CBA equipment are not locally made. Sometimes, the spare parts may not be available and there may also be shortage of software. As a result, some experts from the countries where the equipment were manufactured have to be contracted to repair the CBA equipment. This is also a major challenge to the use of CBA for examinations because it limits the number of usable computers at any given time in addition to the loss of man hour and cost of imported experts.

### **Prospects of Computer-Based Assessment**

Despite the challenges facing the execution of CBA examination in the Nigerian tertiary institutions, there are some prospects for the examination system. These prospects are based on the utilitarian values of CBA and the extent to which the identified challenges are effectively and efficiently resolved.

CBA examination affords students the opportunity of immediate feedback on the examinations they have taken. This is an advantage to the Nigerian tertiary institutions. For instance, the issue of delay in releasing results of the students will be permanently resolved.

The introduction of CBA examinations in tertiary educational institutions in Nigeria may also make them to be information communication and technology (ICT) compliant. This will go a long way to improve the web ranking of the universities among other world ranked tertiary institutions.

The introduction of CBA examinations may equally save the teachers in the tertiary institutions from the stress of marking large number of answer scripts within a limited time. The time wasted on marking such scripts may then be used judiciously for some other academic and research activities such as book writing, conferences and workshops.

The use of CBA in examinations may also have a multiplier effect on the development of computer skills, browsing skills and reading skills of the students. The practice will also assist the students to be time conscious and manage their time well when they are writing examinations through CBA.

CBA examinations will equally afford the teachers the opportunity to set more questions to effectively cover the course contents. These will greatly improve the reliability of the test as the longer the test, other things being equal the more reliable the test. MacMillan, (2007); and Lawal, (2009).

These utilitarian values of CBA may not be realized if the major challenges already identified in the use of CBA are not effectively and efficiently resolved. Therefore the capability of the institutions to continue to successfully use CBA will greatly depend on: stable power supply from the national grid; students' computer literacy ability; provision of adequate number of computers and supporting equipment in proportion to students' enrolment in degree programmes. It is hope that the effective implementation of the privatization reform of the power sector in Nigeria will go a long way to tackle irregular power supply to power CBA installations and



equipment in tertiary educational institutions reduction of CBA equipment maintenance cost; improved construction skills of teachers; and improvisation of equivalent test items to complement laboratory practical and creativity demanding courses in the curriculum.

Students also need to sharpen their computer literacy skills. They may avail themselves of the services of the services of approved computer training centres during the holidays and devote greater attention to the on-going computer training of undergraduates under the General Studies and Entrepreneurial training components of undergraduate degree programmes.

The provision of adequate number of computers for CBA on campuses has become imperative in order to curtail the time wasting element and the risk of leakages that the system of conducting CBA tests in batches of students pose. Also, the validity and reliability of CBA tests will be significantly improved if teachers become proficient in test construction or professional evaluators in the system allowed to take CBA test items through the whole hub of test construction.

The cost of maintenance of CBA equipment will also need to be addressed by sourcing maintenance experts from within the relevant departments of the institutions. For example, Departments of Computer, Computer Engineering, and Information, Communication and Technology. It is only when these and related challenges are adequately addressed that the use of CBA in higher education and other related public examinations will achieve the desired objectives. The prospect of CBA will become brighter in Nigeria. The Nigerian tertiary educational system will better for it as CBA becomes stress-free and functional for improving higher education in Nigeria. To make these possible a number of measures are suggested.

### **Recommendations**

- i. Introductory computer courses in Nigerian basic school system should be given greater attention especially in areas not connected to the national grid. In addition computers should be provided for all the schools to promote computer literacy among the students as entrenched in the National Policy of Education.
- ii. The states and federal government should specially fund CBA centres in public higher educational institutions or directly construct them in proportion to the enrolment capability of their higher educational institutions. In the same vein, private higher educational institutions should be assisted in this regard through the Education Trust Fund (ETF).
- iii. Import duties on CBA equipment for higher educational institutions should be drastically reduced or possible duty-free. This is to ensure that the equipment and spare parts are readily available in the country.
- iv. The power supply problem should be accorded first order priority in the development agenda of the Federal Government of Nigeria by pursuing the power sector reforms to its logical conclusion. In addition, after the power generation and distribution capacity of the Power Holding Company has



improved significantly, dedicated lines to power CBA centres in higher educational institutions in Nigeria.

- v. If government and other private proprietors of higher educational institutions are unable to adequately fund CBA centres, the options of Private-Public-Participation (PPP) and Build-Own- and- and Transfer (BOT) should be explored for provision of standard CBA centres in the institutions.
- vi. All higher teachers should be trained in test construction. Those without professional teaching qualification should be assisted to undergo post graduate diploma in higher education programme.
- vii. Experts in relevant departments in the institution should given adequate CBA maintenance training involving a Memorandum of Understanding (MOU) between the original CBA equipment installation contractors and the institutions. This will greatly reduce the cost of CBA equipment maintenance while at the same time improving the ICT capacity building of the higher institutions.

## **Conclusion**

The utilitarian values of CBA are not in doubt. The potential of CBA to improve higher education and human capital development in this age of information, communication and technology (ICT) revolution cannot be over emphasized. The challenges facing CBA in higher education system are typical of new innovation. Therefore, the bright prospect of effective use of CBA in the system depends significantly on the coping capacity of the owners of the institutions to address the challenges facing CBA delivery in Nigeria. It is hoped that the implementation of the suggested measures will go a long way in making these possible.



## REFERENCES

- Asu-Jones boro Computer-based test <http://www.2.a.state.Edu/a/studentaffairs/testing/testinformation/computer-based-test.dot>.
- Baker, E.L. and Mayer, R.E. (1999) Computer-based assessment of problem solving. *Computer in Human Behaviour* 15 (1-4) May.
- Brown, S., Race, P., and Bull, J. (Eds) (1999) *Computer Assisted Assessment in Higher Education*. London, Kogan page.
- Computer-based online test-<http://bulats.org/Bullats/computer-based-online-Test.html>.
- Computer-Based Assessment. <http://www.mytoelfsuccess.com/computer-Based-Test>.
- Computer-based Assessment. <http://en.wikipedia.org/wiki/computer-Based-Test>. Jimoh, A.
- (2010) Knocks for Unilorin's Computer-based test. *The Nation*, August, 5. Pp. 21-22.
- Lawal, R.A. (2009). Types and Uses of Tests. In I.O. Abimbola and A.O. Abolade (eds.) *Fundamental Principles and Practice of Instruction*. Ilorin: Department of Science Education and Arts and Social Sciences Education, University of Ilorin, pp.344-364.
- MacMillian, J.H. (2007). *Classroom Assessment: Principle and Practice for Effective Standard Based Instruction*. Boston: Pearson.
- Ricketts, C. and Wilks, S.J. (2001). Improving Students Performance through computer based assessment. *Insights from recent Research*.
- Sly, L. and Rennie, L.J. (1999) Computer managed learning as an aid to formative assessment in Higher Education in : Brown, S., Race, P., and Bull, J. (Eds) *Computer Assisted Assessment in Higher Education* London, Kogan Page.