COMPUTER-BASED-TEST (CBT) EVALUATION INNOVATION: PROSPECTS IN CURRICULUM IMPLEMENTATION IN NIGERIA

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INTRODUCTION

Education is the means through which learners are informed and transformed to become useful citizens. In all facets of any educational endeavours especially during curriculum implementation, there must be some evaluation. Evaluation aids accountability, feedback and provides records in the education system. Curriculum evaluation is one of the components of the curriculum and takes place during curriculum implementation. It is a vital element in curriculum implementation that helps to determine the outcome of any educational objective/goal. Over the years, the most recognized mode of curriculum evaluation used during curriculum implementation is examination. Examination is what is used to determine the extent learning objectives have been achieved. It is also commonly referred to as assessment or tests (Jamil, Tariq & Shami 2012). Examination can come at the end of the year, semester or course duration or term depending on which level of education. It could also come at the end of any level of education-Primary, Secondary or Tertiary.

At any of these stages, the students are made to take two types of evaluation – formative and summative evaluation. Formative evaluation is those tests quizzes, oral questions posed at the learners by the teacher in the course of teaching and learning in the classroom. Formative evaluation is an immediate activity that can take place at the beginning, middle and end of a lesson. While summative evaluation comes in form of external/standardized examinations/tests at the end of a term, semester or programme of study. These tests come in the form of practical, essay, multiple choice popular known as objectives and subjective questions and the mode of taking the tests over the years was paper and pen based. However, due to series of challenges such as examination malpractices, paper leakages, poor logistics, large population and cost, the mode of taking examination

especially standardized test demanded for modification and change. This brought about the introduction of innovative Computer-Based form of evaluation testing into the education system.

This chapter discusses:
- ➢ Meaning of Computer-Based Test
- ➢ Historical development of Computer-Based Test
- ➢ Features of Computer-Based Test
- ➢ Importance and Benefits of Computer-Based Test
- ➢ Drawbacks of Computer-based Test
- ➢ Prospects of CBT during pandemics

Meaning of Computer-Based Test

Over the years, the paper-pencil/pen based test has been used to conduct various assessments, but recently the computer-based mode of testing has become popular (Nwaozor, 2022; Abubakar & Adebayo, 2014; Joshua, Joshua and Ikiroma, 2014; Adesulu, 2012 & NG scholars, 2013). Computer Based Test is the taking of a test in computer instead of on paper. Computer-Based Test CBT, also referred to as (**Computer Based Assessment**) is any form of assessment or evaluation *(formative or summative assessment*) that is conducted electronically with the use of information technology (Simdol Technologies, 2019). Olumorin, Fakomgbon, Fasasi, Olowale & Olafare (2013) described CBT as tests or assessments that are administered by the use of computer through technological devices linked to the intranet and in certain cases, internet. To Abubakar & Adebayo (2014) CBT as an assessment that practices giving quizzes and tests on the computer instead of using pencil and paper. Alabi, Issa & Oyekunle (2012) defined Computer-based test as "a method of administering tests in which the responses are electronically recorded, assessed, or both". The above views sum up the concept of CBT as a form of organized system of assessment technique that involves the use of computer, intranet and internet in testing the learner. Thus, Computer-based test tends to examine the whole or part of the curriculum that the learner has been exposed to during curriculum implementation. Summarily, CBT is the conducting of any form of academic test through the computer with the aid of the internet or intranet without the use of paper, pencil or pen.

Historical Development of Computer-Based Test

Historically, Computer Based test has been in use globally before now. Not much history is known about the exact date of the origin of CBT. Daramola (2018) stressed that computer-based test has been in existence since 1960s. Computer-Based Tests (CBTs) have gained popularity in the recent times as popular standardized entrance examinations such as University Matriculation Tertiary Examinations(UTME) conducted by Joint Admission and Matriculation Board (JAMB) are now conducted in a computer-based format. Olumorin et al (2013) stated that CBT gained popularity when used in administering the United States Medical Licensing Examination (USMLE) in 1999. Furthermore, Olumorin et al. (2013) revealed that CBT was introduced into Nigerian education system around 2011 by the Electronic Test Company (ETC) with its computer centers located in various universities across the nation.

In 2013, CBT was officially adopted in Nigeria by JAMB for the sole purpose of using it to administer their UTME standardized examinations (Ng, Scholar, 2013 & Adesulu, 2012). In other words, the adoption of CBT by JAMB made the CBT mode of assessment popular in Nigeria. According to Thurslow, Lazarus, Albus, Hodgson (2010) computer-based test has emerged as one of the recent "innovative" approaches to assessments pursued by all nations. The introduction of the computer-based test form of assessment for the conduct of the University Tertiary Matriculation examination (UTME) by Joint Admission and Matriculation Board (JAMB) in 2013 brought an innovation in curriculum evaluation in Nigeria (NG scholars, 2013). Currently, many institutions of learning in Nigeria have adopted the CBT form of testing in conducting their general studies courses, Post-UME aptitude tests and other internal examinations (Alabi, Issa & Oyekunle 2012; Ndunagu, 2014 & Joshua, Joshua & Ikiroma 2014). For instance University of Ilorin, Federal University of Technology Akure and Federal University of technology, Minna are maximizing the use of CBT mode of assessment (Olumorin *et al*, 2013).

CBT is also currently being used to conduct employment, scholarship and promotion tests by big organizations, ministries and corporations in the oil and gas sector, banks, and government security institutions among many others. According to NG Scholars (2013), examining bodies such as West African Examination Council (WAEC) and National Examination Council (NECO) are also considering adopting the CBT mode of assessment in the

conducting their varied standardized examinations. The Computer-Based Test has complemented the Paper-Pencil Test (PPT) mode of assessment solely used previously to administer all standardized examinations in Nigeria.

Features of Computer-Based Test
Computer-Based test requires the use of a computer thus the name computer based test. It does not select which type of computer as it could be taken with a laptop, desktop, tablet or even a smart phone. The most important thing needed is to let the device have a keyboard mouse pad, selection arrows or an external mouse for selection of answers. Most times it requires the connection to an internet network in order to obtain the link that will release the questions and timing. In a computer-based test, candidates are required to use the screen and mouse to answer questions (Ejim,2018). The candidates are to flip through the questions and answer from the test questions which appear on the computer screen in front of them. It gives the candidate the opportunity of going back to answer questions not yet answered.

It may be conducted on a stand-alone computer or on a computer network (*over an intranet or the Internet*). It does not require the use of any particular land location because CBT makes use of computer which can be operated at any location.CBT unlike Paper-Based Test (PBT), is a form of electronic assessment whose conduct and grading requires little or no human effort as such no much external supervision is required during examination except technicians who hangs around in case of any technical hitch.

In using CBT, test items are generated for each candidate through test rearrangement format to eliminate 100% all forms of examination malpractice experiences in public examinations especially in Nigeria (Ogoamaka, 2016). This makes it impossible for two candidates to be answering the same questions at the same time in a particular location. Ogomaka (2016& 1999) studies, respectively agreed that test rearrangement was used previously to eliminate copying in examination by testee. CBT also applies test formulation format in constructing their test. Comprehensive test formulation involves the utilization and coverage of the three domains of learning outcome namely cognitive, affective and psychomotor during test construction (Ogomaka, 2016 & Tracy, 2015). The

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CBT utilizes test formulation format effectively in other to accommodate every area of the curriculum to be examined. This calls for adequate content coverage of various curricula by subject teachers. Online testing can even include multiple references and have multiple levels and a lot of different question types (Bodmann & Robinson (2004). Thus, careful construction of test items by teachers for formative and summative evaluation during implementation, with great consideration for the domains of learning will give the students added advantage during CBT.

Importance and Benefits of Computer-Based Test Evaluation Innovation in Curriculum Implementation
The introduction of CBT was nationally accepted and recognized because of its importance and benefits to education. Among the major importance of CBT was that it shifted testing mode from Paper-Pencil-Test to CBT mode. CBT brought about a new and authentic way of taking testing as a result of advancement in technological capabilities. For instance with simulations, video clips, pictures and shapes students can be tested on social skills, surgery and any other practical related subjects. It restored credibility to results, improved the standard of education, and promoted learning. Moreover, CBT ensures curriculum content coverage, enhanced efficiencyin immediate scoring and feedback in the case of multiple-choice question examinations. Also CBT promotes cost-effectiveness, improved study habit and hard work among teachers and students.

Simdol technologies (2019) highlighted some of the general benefits of CBT to include:
- faster scoring, reporting, and access to results.
- Accuracy, consistency and reliability of results, thus provides uniformly precise scores for test-takers.
- Test-takers can edit their answers on screen during the exam without wasting ink or paper.In other words, CBT do not give room for messy teacher, student and classroom. The test most times is easy to understand and the timer and hint functions (in some examinations) allow test-takers to get the best from their examination performance.
- In some listening tests, the use of headphones for the listening elements of tests means that examiners can adjust the volume to suit individual needs. Thus, filter noise and promote concentration.
- Examiners and examinees don't need ink and paper, so it saves cost.That is, it saves the candidates the cost of writing other

examination materials such as pen, pencil, eraser, ruler, sharpener, calculators etc.

Other benefits of CBT are:

CBT removes many of the logistics issues and stresssuch as shipping of test materials to and fro varied testing locations from the test centers.It removes the cost of printing and shipping encountered in Paper Pen/pencil testing (PPT), making it more convenient and efficient for the test sponsor as well as the candidate. It also removes the cost of storage and providing security protection to paper test materials. In CBT, secured test environment enables conducive testing because candidates are subjected to different screening processes that go beyond the usual standard ID verification. Under CBT, finger/thumb printing are sometimes combined with other biometric technology to establish candidate identity. The use of cameras is also employed via the systems to ascertain credibility of candidates. Recently, to enhance test credibility and reduce internet related malpractices, as soon as candidates' logs in for CBT examination, other features like goggle, in the computer system are configured in such a way that it will automatically disable so as not to allow the candidate source for answers (Sareen, 2018). Computer Based tests have the ability to automate a very time consuming task, marking and monitoring progress. Chalmers (2011) cited in Olumorin *et al* (2013) in enumerating the benefit of CBT sees it as a test that can be used in a supervised or non-supervised environment, and can allow students to check their own progress through self-assessment. It can also be used for testing lower-order skills (such as knowledge, understanding and application) as well as higher-order skills to improve the students' analysis, synthesis and evaluation skills with more complex application software (Thurslow, Lazarus, Albus, & Hodgson, 2010).

Enumerating moreof the numerous benefits of CBT which include the following:
1. CBT can be taken all year round in most locations. Students can appear for the tests when and where it is convenient for them. They don't need to travel to a particular location to take the exam, so it is helpful for the students from remote areas as well as disabilities/challenged person.
2. The window for taking the test can vary between one week and three weeks. So far in Nigeria, that option is yet to be utilized as JAMB and other institutions using the CBT still uses defined centers and specified dates options.

3.   It reduces the time taken to complete a test and is more convenient as compared to paper-based tests. The applicant is allotted a certain amount of time to answer questions. He/she cannot go back to change the answers. This reduces the total time taken while attempting the test.

4.   Different versions of the test papers are created, equivalent to each other in terms of the content and difficulty level. This way, one test taker can see only a small proportion of the questions, and since there are different versions, every test taker gets different questions. So, that way, the risk of cheating in a computer-based test is limited.

5.   Test takers with disabilities can also take examinations through CBT. Braille keyboards are available for those who are visually disabled. Text can be enlarged or presented in a manner which enhances its readability. It can also be read aloud to assist candidates who have a hearing disability.

6.   You can also get your individual testing environment and will not have to share a table with someone. This makes the testing environment comfortable for the test taker.

7.   The test also has a basic online tutorial to guide the students before the test begins so that those who are not familiar with CBTs can attempt itbefore the actual examination (Ejim, 2018&Adesulu, 2012).

8.   It gives all testers and testee the opportunity to be digital compliant as CBT have become currently a global phenomenon.

Drawbacks of Computer-Based Test

Computer-based tests also have few disadvantages. Drawbacks of CBT are as follows:

1.   It is an expensive option and this factor can deter many government organizations from opting for it. Some test construction and delivery firms such as Pearson, Prometric, VUE and TCS are usually way above the budget for the government-run examinations (Sareen, 2018).

2.   There is a possibility of a technical glitch, power outrage or a system failure.

3.   There is an uneven distribution of internet network as the internet network in some areas can be poor.

4.   Administering CBT involves the additional need for adequate facilities, test-security, equipment security protection, back-up procedures in case of technological failure, and time for staff and students to get acquainted with new technology.

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5.   Poverty and lack of possessing personal laptops that will enable a testee take CBT at their own location is another major drawback especially in developing nations.

6.   In Nigeria, according to *Abubakar & Adebayo (2014),* CBT faces some critical drawbacks amongst this are economic factor, security, software, poor ICT culture, policy and implementation; and power failure.

Most of these drawbacks can be tackled through public relation campaign and reorientation, web campaign, post test feed-back for diagnostic and decision making, regular power supply (Abubakar & Adebayo, 2014). Furthermore, these challenges can also be tackled through increase in funding and procurement of new equipment, implementation of ICT policy through continuous utilization of CBT, soliciting of assistance from the private sector, alumni and international donor agencies, elimination of all forms of conservatism through continuous training and retraining of teachers, students and ICT operators and enhancing security. Greene (2020) revealed that Ed tech companies are ready to partner with government and public schools towards supplying computers, tablets and free softwares to students to promote learning and assessment.

Prospects of CBT during Pandemics
        In the year 2020, the world all over witnessed a serious disease pandemic -coronavirus also known as Covid-19 that affected the lives of every living being. The outbreak of covid-19 made the government of varied nations to introduce many measures to reduce deaths. Some of the measures introduced include total and partial lockdowns, social distancing, wearing of face mask, washing of hands or use of hand sanitizers and no gathering of more than 50 people in one place. Nigeria lockdown began in March 30, 2020 and schools were shut down indefinitely (Chukwuma-Nosike & Offorma, 2020). It brought several changes into the school system especially in curriculum implementation. It introduced e-learning or e-curriculum implementation using the computer with different software devices like webinar, zoom, google meet, wakalet, skype and virtual classroom. The aim of all these was for learning to continue in spite of the lockdown.

Although online teaching and learning is not totally new to the education system of many countries, since the pandemic there had been a sudden and

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spontaneous new paradigm shift from traditional face to face classroom learning to digital learning to avoid students staying at home without learning or attending school (Laiza, 2020). Learning and curriculum implementation may seem to have been addressed through the use of various online internet handles that have become actively useful since the lockdown as a result of the pandemic. The assessment aspect of curriculum implementation was seemed not received adequate attention during the lock down. Evidence shows that many national standardized examinations such as SSCE, NECO, JSSCE, NCCE, Primary Six Certificate Examination and Post UTME that were supposed to take place during the pandemic period were all shifted indefinitely as a result of the lockdown.For instance, examinations that should have finished around July 2020 started from August 2020 (Oliseh, 2020).The late starting of standardized examinations as a result of the pandemic has affected the education system considerably in such areas as extended school year calendar and admission processes especially in Nigeria.

With the introduction and consistent use of computer-based test mode of assessment by JAMB in the last ten years in Nigeria, there should have also been a paradigm shift from the traditional PPT mode of assessment to CBT mode in the face of the pandemic and lock down. Abubakar and Adebayo (2014) stressed that one of the objectives of introducing CBT in Nigeria was to promote the use of electronic testing in Nigeria. Hence, the pandemic would have afforded the nation's education system the opportunity to further spread the use of CBT mode of assessment at all educational levels and in all other standardized examination as it was seen globally. In other words, the pandemic period would have served as an ideal period of trial testing and implementing the use of CBT mode in Nigerian education system. Those examinations that were postponed, cancelled wouldn't have been shifted if the CBT testing was adequately utilized. Ndunagu (2014) emphasized the importance of utilizing CBT and e-examination in assessing students so as to enable them compete favorably with other international scholars.

CBT served an ideal purpose of promoting COVID-19 compliance especially in observing social distancing and reduced crowding during the pandemic and post-pandemic at the same time achieve the desired results, since most students and teachers were using the online format of learning during the period. It afforded the students the chance of staying at their varied locations

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with standard timing and space to take their test and examinations. Since it have automatic grading and security checks, it saves the students from clustering around examination halls, gathering in one place to take examinations and checking of results on the bulletin board experienced in the past their by jeopardizing the safety and lives of the students and the teachers. Adopting CBT as mode of assessment would save the tester and testee time, cost, and easy access of result as well as helped to maintain the academic calendar of the school system. For instance, the cost of marking, grading as well as the time spent and delays experienced during such processes would have been saved. It is pertinent to note that CBT can be registered online at the comfort of your home.

CBT holds more prospects for the education system now that the teaching and learning have shifted and tilted towards technology. As the world at large is embracing e-learning/e-curriculum implementation, it is necessary that e-assessment using computer-based test be adopted. Thus, Nigeria as a nation should research on ways by which CBT can be used to improve and facilitate online assessment in all facets of the education system. This can be achieved by employing observational study of what is being done in other countries and improve on it to get their own framework. Thus, Curriculum and measurement and evaluation specialists should study our own system and be able to come up with customized ideas of what type of CBT mode of assessment the nations requires.

Reappraising the existing CBT method bearing in mind the peculiarity of our nation's assessment need will help to produce appropriate customized CBT that will serve the general needs of the different forms of testing and examinations taken at all levels. This will enhance the nation's evaluation/assessment procedure. It will also equip our learners with additional skills and dexterity for globalworkability standard, while preparing learners in case of any future occurrence.   Therefore, e-assessment (CBT) that is presently used in Nigeria need to be improved to an advanced level, made more durable to meet Nigerian Education system requirement as well as global standard.

Conclusion
The need for timely e-assessment using CBT in Nigeria cannot be over-emphasized. CBT is the change that is replacing PPT and is gradually being

embraced globally especially during this pandemic era. CBT has several importance and benefits that is worth its while. The prospects of adopting CBT fully into the Nigerian Education system will bring a lot of change which will be of immense advantage to both the learners, teachers and nation at large.

Recommendations

Based on the above conceptual explanations and discussions on Computer-based Test, the following recommendations are made:

1. CBT mode of assessment should be adopted into Nigerian education system especially during this pandemic era to help promote compliance to COVID-19 safety guidelines especially on social distancing and no crowding.

2. CBT if properly utilized in our education system will enhance the standard, credibility and acceptability of our examination results nationally and globally.

3. Government should through enactment of policies encourage the use of CBT in our education system to enable Nigerian follow global practices, thereby reducing logistics and security challenges associated with PPT.

4. CBT offers lot of benefits such as cost effectiveness, time and disability-friendly, so should be given due consideration as a complement to PPT.

5. Globally, since after the pandemic the trend of assessment is through CBT, Nigeria should consider going with the trend of events.

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