

Role of Computer in Instruction, Assessment and Administrative Delivery of Education Goals in the University of Maiduguri, Nigeria

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Abstract

Information and Communication Technologies have come to transform and reshape the school structures, curriculum, pedagogies, assessment and evaluation. Despite these advantages, very few institutions of learning in Nigeria have been able to explore the inherent benefits of ICT to the fullest. The quest to attain Educational ends in response to the fast changing Society has indeed become a great challenge to the Nigerian Curriculum. Instructional delivery is the bridge between understanding and assimilation of knowledge. It is no longer news that developed Nations have moved from Desktop Computing Technology to what is now known as Cloud and Automated Computing and recently Computer Based Test (CBT). Improving the instructional delivery method requires a whole lot of work. To this effect, this paper focuses on the ways to transform the Traditional driven methods of instructional and administrative delivery which in all ramifications are inactive. There are barriers hindering wholesome ICT integration in the University of Maiduguri such as inadequate power supply, lack of fund to equip schools, leadership focus and direction. Perhaps when the Universities, Government and stakeholders surmount these barriers, then we can propel to that paperless classroom. The paper further demonstrates how instructional delivery via computer transforms the thinking and impact on learners and general administration of Schools. It reflects on some of the impact and challenges of using CBI, CAI, CBT and recommends an optimum solution to the adaptation and use of the new Technologies to improve learning, evaluation and administrative delivery in the University of Maiduguri, Nigeria.

Keywords: Instructional Delivery, Administrative delivery, Computer Based Instruction, Computer Based Test

Introduction

Technology can have a reciprocal relationship with Teaching and general administration of Education. The emergence of new Technologies pushes Educators to understand and leverage them for Classroom use. However the on-the-ground implementation of these Technologies in Classroom can (and does) directly influence how these Technologies improve learning. While many new Technologies have emerged through history, so has the cry for Educators to find a meaningful way to incorporate them into Classroom—be it the typewriter, the Television, the Calculator or the Computer. Undoubtedly, without these recent Technologies in Classroom, strong lessons can still be achieved, but there is a sharp disconnect between the way Students are taught in Schools and the way the outside world approaches Socialization, Meaning-Making and accomplishment.

It is welcoming that Nigerians are trying to adopt the simple Computer basics in educating the young ones. To scale this development with what is obtainable in the developed world, we are thousands of miles behind. This significant gap has sunk the effectiveness and efficiency of using Computer aided instruction in improving the learning curve. Some argue that Nigerian factors are largely responsible while others maintain that our educators are fundamentally induced to the usage of crude Teaching/Instructional delivery methods. These problems have eaten deep and are still creating a very wide cognitive gap between the theoretical classes and what is obtainable in the teaching/learning industry. Thus, rendering the Nigeria curriculum irrelevant to the Nations' domestic needs hold sway.

Yesterday's Instructional Delivery Method via Computer

The introductions of modern Computer Technologies in Classroom have followed the same pattern. Before the advent of micro Computers in the 1980s, Mainframe Computers were used to deliver drill and simple tutorials for Teaching Students. When Micro Computers began populating Classrooms, the natural inclination was to use them in the same way. The 1983 survey of Computer uses showed that drill and practice is the most common use of Micro Computers (Davey, 2011).

Later in 1980s Educators began to perceive the importance of Computers as productivity tools. The growing popularity of word processing, databases, spreadsheet, graphic programs and desktop publishing was enabling the administration of schools to become more productive. Students in classroom began using word-processing, graphics packages and desktop publishing to enhance their learning ability. This tool conception pervaded Computer use which Daramola (2011) shows that a well-informed teacher was extensively using text processing tool (word processors), analytic and information tools (especially databases and spreadsheet), graphics tools (paint program and desktop publishing) along with instructional software (including problem solving

program).

Today's Instructional Delivery and Assessment Method via Computer

The development of inexpensive multimedia Computers and the eruption of Internet in the mid-1990 quickly changed the nature of Educational Communication tools (e-mail and Computer Conferencing, blogging) and Multimedia title used according to Apampa (2010) have dominated the role of Technologies in the Classroom ever since. What the Students produce is often by using the Computer to reproduce what the Teacher or textbook told them or what they copy from the internet. Interestingly, the IT world is now moving to the era of cloud Computing which turnover has remarkably prove to be of great benefit to Studies in Universities and related tertiary institution in instructional delivery, Management, Storage and Retrieval. Schools use the cloud to store presentations, videos, documents, pictures, grades, test data, Students records, Mail, Contacts, Calendars, Notes, Lists Passwords, Books and so much more. The numerous services can be overwhelming but with a little understanding we can leverage the cloud in our daily routine to make things a little bit easier.

In the world of cloud computing we need a reliable Internet connection for uploading, downloading and collaborative editing of any documents. No doubt, Cloud computing has the potential to transform Classrooms into paperless learning Environment; allowing for personalized, differentiated anytime and collaborative learning for our Students.

An electronic examination (also called computer based assessment –CBA, Computer Based Testing-CBT or e-exam for short) is a test conducted using a personal computer (PC) or an equivalent electronics device, in which the delivery, responses and assessment is effected electronically; e-exams were developed more than four decades ago for professional certification in the IT industry and progressively evolving as a preferred alternative to Paper Pencil Test (PPT) in schools, universities, recruiting firms as well as private and public organizations.

Nigerian universities are increasingly adopting computer based testing (CBT) to replace the traditional paper-based test for academic assessment of students like other universities globally. The successes of transition from paper-based test (PBT) depend on the extent and ability of testing professionals to communicate the benefits and limitations of CBT to stakeholders (George, 2012). The use of CBT for assessment can provide several benefits for educators and test-takers. It is on this note that Jegede (2008) concludes that CBT is a system which spurs development in education as well as other sectors of the economy. CBT usually assist to ensure that candidate's identity in the examination hall is efficiently cross-checked. Computer-based test (CBT) is an efficient way for test sponsors to provide a secure, consistent environment for certification and licensure as it also enhance students' experience (Abubakar & Adebayo, 2014).

CBT have advantages over Paper-based test, both for lecturers that give the test and for the students who participate in the test. CBT allows for more accurate, secure, rapid and more controlled test administration. Administration of test on the computer helps to minimize almost entirely the use of paper printing. This could also reduce administration costs as well as environmental impact. Also, because computers can successfully mark any objective sections (where answers have a clear, binary right or wrong answer) almost instantaneously, the need to pay humans to go through with marking grids is erased. This increases the speed of the results and feedback as well as cutting costs and of course improving the accuracy of marking (Pinner, 2011).

Olutola (2011) identified a number of positive prospects of CBT as: It is more efficient than Paper-based tests; a year-round testing; a Flexible scheduling; an Individualized testing environment; a faster score reporting within few minutes after last submission, immediate viewing of scores on screen; convenient to undergraduates, graduates, and the larger university community; ability to access all tests that are demanded by students and the community at large; a worldwide testing opportunities for distance and transient students; local and centralized registration and billing systems and enhanced consistency and security.

Computer-Based Test in the University Maiduguri

To establish and maintain high quality standards, the Nigerian Universities and the National University Commission (NUC) have a shared responsibility in addressing the following key areas, according to Osman, (2011).

i. Minimum academic standard ii. Accreditation iii. Carrying capacity & admission quota iv. Visitation v. Impact assessment vi. Research & development vii. Publications and research assessment viii. Structures, infrastructures and utilities.

Since the inception of the Universities in Nigeria, the conduct of examinations as well as the process of producing results has been fraught with various problems leading to inability to release results on time, inability of some students to get their results and several incomplete results. These problems have become embarrassing to the universities with comment, like delay in the release of examination results failure to graduate undergraduate students since inception and many others (Osunde, 2009).

The problems associated with conventional methods in the university made National Universities

Commission (NUC) recommended the introduction of management information system (MIS) to Nigerian universities in 1987 to alleviate the problem of data collection, information processing and storage in the universities (Tell, 2011). The urging need for improvement led to the total adoption of technology into the university system.

University of Maiduguri been a second generation University in Nigeria is making use of all the available opportunities of ICT within its disposals that has been helping in most of the institutional practices and processes. One of the uses of ICT for assessment in this regard is the Computer-Based Testing (CBT). It is a method of administering tests in which the responses are electronically recorded, assessed, or both. Both staff and students in the University of Maiduguri are increasingly adopting computer based test to replace the paper-based test for academic assessment of students. This rapid adoption is due to the numerous advantages the schools derived from CBT over the paper-based test considering the large population of students. Some of the advantages include: increased delivery, administration and scoring efficiency, improved test security, consistency and reliability, faster response rate to mention a few (Amin, 2007).

Though paper based testing is still very predominant though some departments in the university, quite a good number have started embracing Computer-based testing technology. The CBT applications used by most of the departments are mainly multiple choice questions. Increase in students' enrolment in the past few years makes the conventional examination method more time consuming in term of the examination time for evaluation and assessment. A solution of examination in large classes of students is an automated testing system and this has been introduced by the University of Maiduguri in the year 2013, primarily to address the population problem.

Information on current and expected future uses of computer-based tests is been revealed by Research and evaluation specialists. Lecturers do administer or use computer-based tests for providing information about interpreting test scores and using the scores appropriately. Also, students prepare appropriately for computer-based tests. Ajunwa (2004) declared that an understanding of how and why users either accept or reject new technologies is paramount to the issue of effective integration of a technology into organizational functions.

Computer in Learning and Administrative Transformation

Study has shown that group of students who use computer aided instruction (CAI) have better result than those undergoing the traditional learning (Alabi et, al 2012). Some studies even demonstrate that students using CAI needed less time to reach the learning objective and achieved better final result than student who does not have access to CAI (Aborisade 2010). Reference from the 1980s found that CAI is as good as traditional education (Fagbola et al, 2013) which later reference indicated that CAI is better than traditional education (Selends, 2009). Computer aided instruction is faster in graphics, usability and capability of combining different media.

New technologies, such as microcomputer and instructional tool, are providing teachers and learners the opportunity to explore ways to learn. If these new technologies are to become an effective component of the teaching/learning environment, educators and media developer must have access to research-based information that will guide them in selecting and developing appropriate instructional applications. Computer aided instruction improved student achievement on the following: mathematics and reading of low achieving students in 5th grade (Agarwal et al..2000); verbal and language skills of preschoolers (Jegede 2008) and early academic skills of preschool students with disabilities (Hitchcock and Noonan 2000). In contrast, another group of studied has found no effect of computer aided instruction on the following: writing skills in a business communication courses (Raji et al, 2010); a fundamental of mathematics course, critical thinking skills of nursing students and the multiplication skills of elementary student with learning disabilities (Alabi et al..2012).

If technologies are used to foster meaningful learning, then they will not be used as delivery vehicles. Rather, technologies should be used as engagers and facilitators of thinking. Based on the researcher conception of meaningful learning, one can suggest the following roles for technologies in supporting meaningful learning in the University of Maiduguri;

Computer as tools to support knowledge construction:

- i. for representing learners' ideas, understandings, and beliefs
- ii. for producing organized, multimedia knowledge bases by learners

Computer as information vehicle for exploring knowledge to support learning by Construction;

- i. for accessing needed information
- ii. for comparing perspectives, beliefs, and worldviews

Computer as authentic context to support learning by doing;

- i. for representing and simulating meaningful real-world problems, situations, and contexts
- ii. for representing beliefs, perspectives, arguments, and stories of others
- iii. for defining a safe, controllable problem space for student thinking

Computer as social medium to support learning by conversing;

- i. for collaborating with others

- ii. for discussing, arguing, and building consensus among members of a community
 - iii. for supporting discourse among knowledge-building communities
- Computer as intellectual partner to support learning by reflecting;*
- i. for helping learners to articulate and represent what they know
 - ii. for reflecting on what they have learned and how they came to know it
 - iii. for supporting learners' internal negotiations and meaning making
 - iv. for constructing personal representations of meaning
 - v. for supporting mindful thinking

Attitude of Students, Teachers and Administrators towards CAI and CBT

Studies carried out on the attitude of students, teachers and administrators towards CAI and CBT can be seen in perspective, thus:

Students' Consideration: survey conducted during the 2014 academic session reports significant result than those of the 2013 where about 75% of students confessed that computer aided instruction is very efficient as it save time, efforts , increase knowledge and performance as it has same capability for Computer based Test. The remaining percentage goes on a contrary view because of the phobia in computer usage. Another studies carried out in the same university on computer literacy subject that its increment rate is geometric.

Staff Consideration: Reports have shown that staff perspective deem it fit to implement CAI for the betterment of students and education as a whole. It was reported that teachers value CAI to traditional learning for its simplicity and effectiveness and have same affinity for CBT in certain courses and discipline. Although severally rejection to the use of CAI by teachers has been marks significantly, studies shows that some teachers are fundamentally induced to the usage of crude teaching/instructional delivery methods. These as a result of their inability to adapt to computer and such group of teachers placed on performance analysis, are outdated and their service is just as worthless as a white elephant.

Professional Consideration: In considering the use of computer aided instruction on an intervention or instructional material some research studies have indicated that the use of computer aided instruction improved student achievement on the following: mathematics and reading of low achieving students in 5th grade (Zhang, 2009); verbal and language skills of preschoolers (Zachous 2004); and early academic skills of preschool students with disabilities (Hitchcock and Noonan 2000). In contrast another group of studied has found no effect of computer aided instruction on the following: writing skills in a business communication courses (Yi & Hwang, 2005); a fundamental of mathematic course (Urah, 2005); critical thinking skills of nursing students (Hofer, 2007); and the multiplication skills of elementary student with learning disabilities (George 2012).

Instructional Delivery through Computer Improves Thinking

Why do these uses of computer foster meaningful learning? It is because they require that students think and reason. In this, one can argue that students do not learn from teachers or from technologies. Rather, students learn from thinking—thinking about what they are doing or what they did, thinking about what they believe, thinking about what others have done and believe, thinking about the thinking processes they use—just thinking and reasoning. Thinking mediates learning. Learning results from thinking. What kinds of thinking are fostered when learning with computers? Causal reasoning is one of the most basic and important cognitive processes that underpins all higher-order activities, such as problem solving. Hume called causality the “cement of the universe” (Terzhins 2011). Reasoning from a description of a condition or set of conditions or states of an event to the possible effect(s) that may result from those states is called prediction. A baseball pitcher predicts where the ball will go by the forces that he or she applies when pitching the ball. When an outcome or state exists for which the causal agent is unknown, then an inference is required. That is, reasoning backward from effect to cause requires the process of inference. A primary function of inferences is diagnosis. For example, based on symptoms, historical factors, and test results of patients who are thought to be abnormal, a physician attempts to infer the cause(s) of that illness state. Thinking causally is also required for making explanations. Explaining how things work requires learner to identify all the causal connections among the things being explained.

Causal thinking is really more complex than learners understand. In order to understand and apply causal relationships, learners must be able to quantify attributes of causal relationships (direction, strength, probability, and duration) as well as be able to explain the underlying mechanisms describing the relationship (Fagbola et al, 2013). Why a force does apply to a ball cause it to move in certain direction? Lots of instructional program has been design to foster casual thinking examples of such are gaming software, animation flash presentations and self-tutorial assessment. In these, student can draw a simple analogy simultaneously as he listens and well suggest further steps because presenting information for instance via PowerPoint save the student the pain and time of writing. This creates room for further thinking. Therefore, as students reason along questioning on what next so the effectiveness of what is taught felt appended and builds upon

Relatively, building thinking is the utmost goal of education, learner learn to change the society if learners think ahead of the society so in return the society wear a new look. Here it is clear that by building

thinking, we are directly building the society, creating new individuals and making our education labor supportive.

Limiting Factors to the Success of CBI and CBT in the University of Maiduguri

Changing instructional and evaluation approaches is no easy task, particularly when technology is involved. Adopting and integrating computer-based instruction and computer based testing strategies has a long history of challenges, but it comes with a great understanding of how to achieve success with them. Some of the impending factors to the success of CAI and CBT in the University of Maiduguri include:

•**Inadequate Personnel:** The adaptation of computer instructional delivery and computer based test method in the University of Maiduguri has been hitched by the inadequacy of trained personnel in educating the teachers on the use of computer instructional delivery tools. These have resulted in massive pull back in the acceptance and implementation of CAI and CBT in classroom in effect stuck us to the traditional methods.

•**Electricity:** Instability in power supply is seen as a significant draw back to full adaptation of computer in the classroom and examination hall. This has degenerate to more cost in fueling and powering laboratories for classes which in turn serve as a push factors to the application of computer based instruction and computer based test in the University of Maiduguri waving the institution far back behind technology.

•**Financial Problems:** The adaptation of a full scale computer classroom requires whole lots of financial support from the federal Government. The cost of training, maintaining, buying and managing computer and its accessories is high and such demand lots of funding from the Government and bodies involved. This serves as an eye mark in the implementation of computer based instruction and computer based test in the University of Maiduguri.

•**Poor Management:** poor management has been identified as the core rock to the implementation of CAI and CBT in the University of Maiduguri. Despite efforts made by the federal Government at funding and implementation of CAI via organization like National Communication Commission (NCC), Pinnacle etc. lack of good management has hindered this development.

•**Computer Phobia:** Most lecturers suffer from this unknown ailment of computer fear which has resulted to non-compliance by most of our educators as such bury the chances of its adaptation in the University of Maiduguri. The actual feelings of Computer Phobia are extremely common.

Gain in Using Computer in Instructional Delivery

The rapid advances in technology, the need for lifelong learning, and the growth of non-traditional students have encouraged the use of the computer as a means of instructional delivery. Some of the advantages for using the computer as a method of instructional delivery are that it:

- i. provides consistency of content delivery;
- ii. provides training to remote locations;
- iii. eliminates cost associated with employees' travel;
- iv. provides means of tracking learner's progress;
- v. provides standardized testing;
- vi. offers learner flexibility in controlling and pacing learning; provides for diverse learning needs;
- vii. provides opportunities for practice through simulation;
- viii. Provides greater retention; and reduces the instructional time by approximately 30 percent.

Gains in Using Computer Based Test (CBT) in the University

- i. Lower long term costs (reduce costs for many elements of the testing lifecycle)
- ii. Administration and scoring efficiency (faster decision-making as a result of immediate scoring and reporting)
- iii. Greater flexibility with respect to location and timing (increased delivery)
- iv. Improved reliability (machine marking is much more reliable than human marking)
- v. Improved test security resulting from electronic transmission and encryption
- vi. Improved consistency, impartiality and unbiased test administration and scoring (machine marking does not "know" the students so does not favor nor make allowances for minor errors)
- vii. Greater storage efficiency-tens of thousands of answer scripts can be stored on a server compared to the physical space required for paper scripts.
- viii. Increased candidate acceptance and satisfaction (lesser complaints)

Conclusion

The role of computer in teaching and learning is pivotal. You cannot now deny the fact that what we people are teaching and learning is all now through computers. Computer is fast and efficient and fetches information in the milliseconds or even more than that. Now you are learning online. There are virtual classrooms. You can get learning material on the internet. You can now even give papers on the internet. All education processes are now on computers. Computer is a remarkable device with much more capabilities which are beyond our thinking. It

adaptation by developed nation has yielded positive and more rewarding result especially in the classroom. Therefore Nigerians are given an urgent call to follow suit. But keep in mind that man has created computer and all these programs which computer runs.

Recommendation

- (1) Learners generally learn more using CBI than they do with conventional ways of teaching as measured by higher post-treatment test scores hence the need for provision of adequate human and material ICT facilities/resources in the University
- (2) Learners using CBI and examine through CBT generally do so in less time than those using traditional approaches, hence the need to sustain the tempo as results were made available to the learners within the shortest time possible.

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