Int. j. adv. multidisc. res. stud. 2025; 5(4):933-937

Received: 10-06-2025
Accepted: 20-07-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Perceptual Analysis of the Use of Computer-Based Examination in Tertiary Institutions in Nigeria

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Abstract

Sequel to the seeming wide acceptability and clamour for the use of computer-based examination for the Senior Secondary Schools Certificate Examination (that is WAEC, NECO and NABTEB) as well as the conduct of JAMB UTME over the years, this paper attempted a critical analysis of lecturers' perceptions of the use of computer-base examination (CBE) in tertiary institutions in Nigeria. In furtherance of this, analysis, the concept of perception, concept of computer-based examination, advantage of CBE, were elucidated. Also, relevant literatures were reviewed on: lecturers' perception of the use of CBE by students; students' acceptability of CBE; and their perception based on school type. The paper suggested that students should be well sensitized on the advantages of CBE other models of testing; there should be adequate, sound computers that are well networked in schools for effective enhancement of the use of CBE, among others.

Keywords: Perception, Analysis, Examination, Computer-based, Tertiary Institutions

Introduction

Computer-Based Examination (CBE) is the use of computers to administer examinations. The student to be examined is required to sit facing the computer and the questions are presented in the computer monitor and the candidate is directed to answer the questions by using the keyboard and the mouse. The use of computer to administer an examination helps to minimize almost entirely the use of papers and thereby reducing cost and stress in the collation and marking.

In the tertiary institutions across Nigeria, a combination of essay examination and practical examination had been used mostly as mode of evaluating students' knowledge. In the past few years, students' enrolment in the tertiary institutions has increased tremendously and the traditional educational examination method makes marking stressful for lecturers and time consuming in terms of the examination time for evaluation and assessment. I is argued that CBE mode of assessment also has within its credibility the ability of cubing examination malpractice, (Uysal and Kuzu, 2019) [30].

Compute and related technologies provide powerful tools to meet the new challenges of designing and implementing assessment methods that go beyond the conventional practices and facilitates to record a broader repertoire of cognitive skills and knowledge (Osei, 2017) [25]. About a decade ago, Joint Admission and Matriculation Board (JAM) started adopting he CBE mode o examination with a bid to controlling the rate o examination malpractices. Other tertiary institutions (whether public or private) have also started using e-exams system for heir tests and/or exams.

The perception of lecturers students and other stakeholders of tertiary institutions on the use of CBE in the conduct of examination in tertiary institutions in Nigeria is germane, especially at this time that the world has decided to embrace ICT integration and Artificial Intelligence. From personal interview, lecturers have different opinions about the efficacy of CBE mode of assessment. Some seemed to be in total support of the CBE; while others still prefer the traditional mode of assessment. It, therefore, becomes imperative to ascertain if lecturers' perceptions differ by school type and sex. It is in view of the foregoing that this paper attempted a perceptual analysis of the use of computer-based examination in tertiary institution in Nigeria. The perception of other stakeholders was not considered in his paper.

Concept of Perception

Perception, according to Schiffman (2017) [29], in a process by which an individual receives, selects and interprets stimuli to

form a meaningful and coherent picture of the world. It is about our feelings, recognition and interpretation of sensory information. Perception also includes how we respond to the information we receive; a process where we take in sensory information from our environment and use that information in order to interact with our environment.

According to Jandt (2015) [11], perception is unique to each person; it begins a three-step process of selection, organization and interpretation. It has also been found that perceptions differ due to physical environment of the service settings and cultural background (Limaye, 2020) [16], and differences in sex (Ndhlovu and Seguder, 2020) [18]. These indicated that a clear understanding of how perceptions are formulation of strategies to manage individual perceptions of performance.

The perception of lecturers is unique in that they tend to respond to things or perceive ideas differently especially in policy formulation. The perception of lecturers on the use of computer-based examination as mode of evaluation of students in tertiary institutions in very important as many of them may vary in opinions on the subject matter. The opinions of lecturers to the use of CBE as mode of assessing students cannot be overemphasized.

Concept of Computer-Based Examination

Computer-Based Examinations are the form of assessment in which the computer is an integral part of questions papers; delivery, response storage, marking of response or reporting of results from a test or exercise (Whittington, 2020) [31]. The rapid advancement of Information and Communication Technologies (ICT) in teaching and learning has shifted in paradigm from paper-pencil-based (or paper-pen-based) to computer-based system of examinations which are usually termed as Computer Assisted Testing, Computerized Assessment, Computer-Based Examination (CBE), e-Assessment, Computer Based Assessment (CBA), Outline Assessment, Web-Based Assessment and Computer Aided Assessment (CAA) (Uylsal and Kuzu, 2019) [30].

Technology based assessment provides opportunities to measure complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods. In the broadest sense, e-assessment (CBE) is the use of information technology for any assessment related activity (Wikipedia, 2015) [32]. This definition embraces a wide range of students' activities ranging from the use of word processor to on screen testing. One to the obvious similarity to e-learning, the term e-assessment is becoming widely used as a generic term to describe the use of computers within the process.

Computer-based examination is a way of conducting examinations with the use of computer as a medium. Computer-based examinations are the form of assessment in which the computer is an integral part of the examination CBE can be used to promote more effective learning by testing a range of skills, knowledge and understanding. Assessing and managing information as used as managing and developing communication skills are possible to assess online which cannot be assessed in regular essay based examinations (Brown *et al*, 2019) [4].

Advantages of Computer-Based Examination

CBE is increasingly becoming widely used in Nigeria tertiary institutions. Its advantages over traditional (paper-based) assessment include:

1. Lower long term cost: CBE may cost less in the long run than paper and pen test, but if technology continues to rapidly evolve, cost savings may not occur in the foreseeable future (Kettler, *et al*., 2020) [13].
2. Greater flexibility with regard to timing and location.
3. Instant feedback mechanism to students: with CBE, multiple choice items can be scored immediately the students stop answering. Students known their grade almost immediately after they stop answering questions.
4. Measurement Efficiency: all designers will like their tests to be both short and reliable. Short tests make teachers and students happy by taking less time away from other activities. CBE designers differ in measurement efficiency, which can be defined as "reliability divided by test length". Efficient test is one that offers more measurement precision per item.
5. Test validity/security: concern regarding security go hand-in-hand with the consequences or stakes attached to a test's scores. Tests uses for placement or formative purposes may be relatively immune because students would derive no benefits from cheating. However, admissions or exit tests are generally more consequential and hence require more attention to security.
6. Preference: Most surveys reveal that students overwhelmingly prefer testing on computer to testing on paper (Cassady and Gridly, 2015) [5]. The extent of preference is likely to grow with successive generations of students, whose exposure to and use of computers will be increasingly widespread, at ever0younger ages.
7. Improved impartiality: machine marking does not know the students and so does not favour or make allowances for minor errors. Favouritism on the part of lecturers will be eliminated with the aid of CBE.
8. Improved Reliability: machine marking is more reliable than human making. There is the possibility of marking errors from marking of hundreds of scripts of students and not having uniformity in marking all the scripts.
9. Increased convenience: this convenience is in self-proctoring. Computerised testing is operational and those who use test scores. The paper-and-pen tests usually require someone to distribute test booklets and answers sheets, keep track of time limits and collect materials at the end of the test.
10. Greater Storage Efficiency: thousands of answer scripts can be stored on a server compared to the physical space required for paper scripts.

Disadvantages of Computer-Based Examination

1. E-assessments are expensive to establish and not suitable for all kinds of assessment (such as extended question responses).
2. Poor ICT culture, policy and implementation: the ICT revelation is yet to register the necessary impact in the testing of students and civilian population nationwide. The absence of policy has not helped co-ordinate ICT projects and programmes being carried out separately by various agencies operating in the education sector, and will lead to resource wastage and duplication (Osei, 2017) [25].
3. Poor funding: E-learning and ICT application to education in general may come of age in Nigerian Schools. Schools in Nigeria are fund-starved to provide needed books, furniture, laboratories and adequate

classrooms let alone being given adequate funds to high-tech equipment (computer and accessories) and internet connectivity (Okoro, 2021) [22].

4. Poor information infrastructure: Lack of requisite telecommunications infrastructure capable of transporting multimedia messaging is a major challenge. Most parts of the country are yet to be covered by telecom services. Schools located in such areas will experience ICT connectivity problems.
5. Poor failure/problem: Non availability of electric power and telecommunications infrastructure in a considerable part of the country is a problem. Matrix telecommunication currently covers 76% of the national territory, but mobile telephones companies generally power their base stations during private electric power generators since Discos re unable to guarantee supply of power.

Lecturers Perception of the Use of CBE by Students

The lazy and nebulous conduct of examinations in Nigeria has been worrisome and its aftermath effects could be a disaster to the students and other stakeholders of education. Many lecturers have argued that the traditional mode of evaluation is not a true reflection of students' knowledge and capabilities to a great extent, and in most cases, a show of shame viewed against the number of ceased and cancelled results released by the examination conducting bodies (Osamor, 2021) [24].

A group of sampled lecturers in the polytechnics in the South South geopolitical zone unanimously agreed that CBE can help avoid the melt down of current paper-based systems, it can assess valuable life skills; and it can be better for users (Okoro, 2021) [22]. For example, by providing on demand tests with immediate feedback and perhaps diagnostic feedback, and more accurate results via adaptive testing, it can help improve the technical quality of tests by improving the reliability of scoring. Therefore, CBE could be a good method to curtail examination malpractice effectively.

Edumadze, *et al*; (2024) [7] assess the awareness and perceptions of lecturers in using e-learning tools for instructional delivery in the university of Cape Coast. The study revealed that many lecturers failed to use e-learning tools because they are not proficient in using them, but they were willing to participate in programmes to equip them with the requisite skills that will make them proficient in using the e-learning tools. Sanni and Mohammad (2015) examined the CBE: An assessment of lecturers' perception of JAMB UTME in Nigeria. The research was to assess testing in examinations. The findings revealed that majority of the respondents confirmed that the CBE could curb examination malpractice; and that they preferred the CBE to the per-and-paper mode of exams.

Anzene (2024) [3] carried out a study on lecturers' perceptions of the usefulness: ease of use and credibility of the CBE in Nigeria tertiary institutions. The study covered some selected public and private tertiary institutions, the study revealed that lecturer had positive rating on perceived usefulness (68.6%), ease of use and credible. The implication was that the perception of the usefulness the ease of the use and the credibility of the CBE would lead to increase in the use of CBE by lecturers in Nigerian tertiary institutions.

Onasanyo, *et al*; (2020) surveyed the attitude of lecturers towards integration of ICT in tertiary institutions in Kwara State, Nigeria. The finding showed that sex has no effects on the attitude of lecturers towards integration of ICT into teaching and research in tertiary institutions. Science oriented lecturers attitude towards integration of ICT in tertiary institutions is higher than other non science oriented lecturers. Less experienced lecturers were more exposed to the use of ICT than moderately and highly experienced lecturers. University lecturers acquired more ICT skills that their counterparts in polytechnic and Colleges of Education. Also, many lecturers across the tertiary institution lacked adequate training and competence in using computer for teaching and research purpose.

Kpolovie and Awusaku (2021) [14] did an ex post facto research which investigated the attitude of lecturers towards the adoption of ICT in teaching and research in federal and state-owned universities in Nigeria. Results revealed that sex and area of specialization had no significant difference in the attitude of lecturers towards ICT adoption in teaching and research. On years of experience, moderately and less experienced lack-ureus were more competent in the use of ICT than their highly experienced counterparts.

Lecturers' Perception of Students' Acceptability of CBE

From lecturers' perceptive of the CBE, there have been a number of mixed reactions. Researchers have shown that more peopled anticipated problems with the computer assisted assessment than actually had them (Erle, *et al*., 2016) [8]. These researches also showed that despite fewer students being confident about CBE before completing the assessment, more students stated a preference for CBE afterwards. Previous study conducted indicated a preference for CBE over PPT (Jimoh, Shittu and Kawu, 2022) [12].

Jimoh, Shittu and Kawu (2022) [12] investigated students' perception of computer-based examination for examining undergraduate chemistry courses in University of Ilorin. The data analysis shows optimistic characteristics of the target context for the CBE implementation as majority (93.6%) said they were competent with the use of computers and 73% saying their anxiety was only mild and low, but not withstanding, they have not fully accepted the testing mode with only 33.6% in favour of it due to the impaired validity of the test administration which they reported as being many erroneous chemical formula, equations and nonetheless identified the achieved success the testing has made such as immediate scoring, fastness and transparency in marking.

Okoche (2021) investigated perception and acceptance of computer bases testing: A case study of Landmark University Students. Results revealed that the acceptance rate of computer-based testing by students was high, though majority of the students were in support of training prior to taking assessments. Also, the acceptance rate of Physics and Chemistry assessment was relatively low compared to other courses. The study also reported sex differences in the acceptance of a CBE and also discovered that college of study determined the acceptance of CBE.

Kyalo and Hopkins (2023) [15] expected the acceptance of online learning (01) for continuous professional development among lecturers at Kenya Medical Training College in 2020. Tow focus group discussions were also held to assess the lecturers' views on issues relating to OL. It was found that there was a high level of acceptability of the idea of undertaking further training using OL as user attitudes towards web-based training were positive. Sanni

(2022) [27] investigated CBE: An assessment of students perception of JAMB UTME in Nigeria the survey research method was adopted. The findings revealed that a majority of the respondents confirmed that the CBE could curb examination malpractice. Majority of the candidates were also found to prefer CBE to the PPT mode of writing exams.
Odunton, *et al*; (2023) examined the comparative analysis of students' performance in PPT and CBE examination system. It was revealed from the study that students were generally becoming interested in the use of modern method of assessment which is the CBE. The data analysis showed that the performance of the students who wrote the CBE was better that the performance of the students who wrote the CBE was better that the performance of the students who wrote the PPT. it was, therefore, concluded that there was need for basic training in general use of computers before exposure to CBE mode of assessment to aid the effectiveness of CBE.

School Type and Lecturers' Perception of the Use of CBE

The perception of lecturers along school type that is, Universities, Polytechnics and Colleges of Education is important in this discourse. Ogunalde and Olafare (2024) [20] conducted a study on lecturers' perception of CBE in Nigerian Universities. A total of 850 lecturers represented the sample for the study. The result revealed that lecturers had positive rating on perceived usefulness (68.6%), ease of use (67.4%), credibility (80.6%) of CBE.
Anekwe and Izuchi (2022) [2] investigated the place of quality assurance using ICT best practices in school-based assessment of students' learning in Nigerian University education. The study was carried out in Federal and State Universities in the South-South and South-East geopolitical regions of Nigeria. The findings indicated that the ICT best practices in SBA have the potentials to achieve quality education. Alabi, Issa and Oyekunle (2022) [1] investigated the use of computer based mode of conducting examinations at the University of Ilorin, Nigeria. It was discovered that the CBE was initially designed to offset the many limitations of the PPT method used for conducting examinations. These limitations included tedious procedures, delay in the release of results, subjective scoring and missing grades, among others.
Attitudes concerning e-learning echoed by scholarly and academic reviews, range from neutral to positive. On one hand, it is noted that e-learning is at least as effective as traditional instructional strategies (Rosenberg, Grad and Matear, 2023) [26]., and that there are no major differences in academic performance between the more traditional and more technology. Oriented modes of instruction (Cavanaugh, 2021) [6]. On the other hand, many reviews go further, reflecting a principally positive attitude towards the impact of e-learning (Mayor, 2023).
In different schools, problems bothering on inadequate capacity of Nigerian Universities to lead the process of integrating ICT in education have been linked to lack of access to infrastructure, affordable and sufficient bandwidth and the human resources capability to exploit the technology. Hence, Nigerian and indeed, African universities are lagging behind in the global ICT context except the University of South Africa and most of those in North Africa, where they have well-developed international relationships along with access to high-speed connectivity (Farrel and Isaacs, 2017) [10].
Emmanuel and Chinedu, (2022) [9] in a study examined the extent to which ICT is integrated into various school subjects in the curriculum as well as students' utilization of and access to ICT =, in order to establish a fact on its implications to e-learning. Findings indicated that except for computer studies, AICT was not integrated into other school subjects in the curriculum. Although ICT is Seldom used, the level of ICT integration into the curriculum had no significant influence on the level of ICT utilization. Alternatively, students' access to ICT package had a significant influence on ICT utilization; majority (68%) never had access to ICT usage.
Sequel to the foregoing review, it was discovered that the computer-based mode of assessment had so many advantages as against any other form of assessment. These advantages, based on lecturers' perceptual purviews, include long term cost, instant feedback to students, greater flexibility with respect to location and timing, improved impartiality, improved reliability, among others. It was also found that there was no difference between the scores obtained by students via computer based test and paper based test, but some researchers concluded that students performed better in CBE examinations. Some researchers also concluded that students performed more in PPT.

Conclusion

Arising from the review of relevant literature, the paper concluded as follows:
Lecturers have positive perception on the use of CBE by students in the tertiary institutions in Nigeria. This indicated that lecturers believed that CBE as mode of examination in tertiary institution would improve the assessment standard in this tier of education sector.
Similarly, lecturers had strong positive perception of students' acceptability of the CBE in the tertiary institutions in Nigeria. They agreed that students would embrace CBE because of its advantages over the traditional method of assessment. It was, therefore, concluded that the acceptance by students could be on the way it is introduced and handled. Lecturers did not differ in their perception of the use of CBE as a mode of assessment of the students in the tertiary institution in Nigeria based on school type.

Suggestion

1. Vice chancellors of Universities, Rectors of Polytechnics and Provost of Colleges of Education should introduce CBE in schools across Nigeria as a mode of assessment of students considering its advantages over the traditional methods of assessment.
2. Students should be well sensitized on the advantages of CBE over other modes of testing so that they can accept it in school.
3. Government as proprietors of the public tertiary institutions should endeavours to provide the necessary facilities for the full implementation of CBE in the institutions.
4. There should be adequate, sound computers, well networked in schools for effective enhancement of the use of CBE.
5. All academic staff should be trained in the use of CBE as a mode of assessment and be provided access to the internet within the campus environment.

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