

Student Experience and Perceptions of Computer-Based Testing in Higher Education: Evidence from Oyo State Institutions

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Abstract

This study examined student experience and perceptions of Computer-based Test (CBT) mode of examination in higher institutions of learning in Oyo State, Nigeria. The study adopted a descriptive survey research design with a sample of 200 undergraduate students selected across public and private institutions using stratified sampling techniques. Data was collected using a researcher-designed questionnaire titled Computer-Based Test mode of examination Questionnaire (CBTMEQ) and analyzed using frequency, percentage, and Relative Significance Index (RSI). The results revealed that students had positive experiences in computer-based test mode of examination, with 84.0% of students reporting positive experiences. The study also showed that students had a fairly effective to very effective experience with the use of Computer-based test mode of examination, with 49.5% describing it as fairly effective and 47.0% as very effective. The study concluded that students considered the use of Computer-Based Test mode of examination as effective and recommended the continuous use of Computer-Based Test mode of examination with adequate facilities.

Keywords: Computer-based testing, student experience, effectiveness, higher education, educational assessment

Introduction

During the past few years, technology has significantly reshaped the method of assessment. Technology has helped us in so many ways. Things that are difficult and no matter how we have to do it with our hands, technology has helped us to make it way easier for us by producing equipment and machines that help us to achieve it without stress. ICT may be the intelligence that helps. In education aspect, Information Communication Technology has made education easier to achieve. One of the ways ICT has helped education is the use of computer-based testing (CBT). Computer-based testing might be a form of E-examination used to assess students or examiners. It is a more refined means of examination used in place of pen and paper. In essence, it is an assessment of students with the use of computers as an alternative method to pen and paper.

In CBT, computer technology is used in the administration of achievement or performance in form of test. Such assessments have been gradually supplanting paper-and-pencil tests in educational assessment since their introduction. A Computer Based Test System (CBTS) is a form of assessment in which the computer is an integral part of question papers' delivery, response storage, marking of responses or reporting of results from a test or exercise (Whillington 2000). It can be a multiple-choice question-based examination system that provides an easy-to-use environment for both Test Conductors and Students appearing for the Examination.

An effective method of student assessment is necessary as well as areas and levels of education. Due to an increase in student numbers, ever-escalating work commitments for academic staff and the advancement of internet technology, the use of computer-assisted assessment has been an attractive proposition for many higher institutions (Darrell, L.B.). In computer-based testing (CBT), computer technology is employed, which means the candidates use computers to answer questions presented on the monitor. The test-taker submits the answer using a keyboard or a mouse. Therefore, computer-based exams take place in a client-server environment. The attractiveness of CBT lies in its potential to expand, in multiple ways, the way educational assessment is conducted.

Since it was introduced to Nigeria, it was welcomed with mixed feelings as some said Nigeria is not developed enough to use it and others believed it was a step forward to a better form of examination. Though since its introduction, it has gone through many changes and development as it has greatly reduced malpractice and recording of missing candidates' answer sheets. Computer-based tests offer several benefits over traditional paper-and-pencil or paper-based tests.

The Computer-based assessment provides opportunities to measure the complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods. Consequently, in Nigeria, employers now conduct aptitude tests for job seekers through electronic means; the universities and other tertiary institutions are registering and conducting electronic examinations for their students through the internet and other electronic and networking gadgets.

When it was introduced to higher institutions of learning in Oyo during the COVID-19 era, some students supported the idea while some students did not support it. Those who supported said it will help by not delaying the semester and those against it complained about not having a computer to do the examination and using a phone is not convenient. From the Oyo Higher Institution of learning students' perspectives of the CBT, there have been varying experiences and perceptions regarding its effectiveness and usability.

Statement of Problem

The management of higher institutions in Oyo town implemented the use of Computer-based tests (CBT) for examinations to test students' knowledge during COVID-19 and since then continued using the CBT for undergraduate students. Though the advantages of using computer technology for educational assessment have been recognized which includes No impersonation, Time saving, Lower administrative cost. While recognizing these advantages, it is important to explore students' experiences and perceptions regarding the effectiveness of CBT systems. From the students' perspective judging from their experiences, there are varying views about computer-based test examination effectiveness and usability. In view of these varying perspectives, this study therefore seeks to undertake an assessment of students' experience and perception of Computer-based test examination effectiveness in Universities in Oyo State.

Objectives of the Study

The main objective of this study is to assess student experience and perceptions of Computer-based Test (CBT) mode of examination effectiveness in higher institutions of learning in Oyo State. The specific objectives are:

1. Examine the students' experience in Computer-based Test (CBT) mode of examination in

Oyo State higher institution of learning.

2. Determine the effectiveness of Computer-based Test (CBT) mode of examination from students' perceptive in Oyo State higher institutions of learning.

Research Questions

The following research questions guided this study:

1. What are the students' experiences when using CBT?
2. How effective is CBT mode of examination from students' perspective in Universities in Oyo State?

Significance of Study

The findings from this study would provide information for the management of higher institutions in Oyo State and ICT directorate on students' experience in Computer-based Test (CBT) mode of examination in the studied higher institution of learning. The study will also create awareness among higher institution management of the effectiveness of Computer-based Test (CBT) mode of examination from students' perceptive.

Literature Review

Concept of Computer-Based Test

CBT may be defined as a way of using a computer to give exactly the same test as one in a paper-and-pencil format. It may also be described as computer-based testing as a method of administering tests in which the responses are electronically recorded, assessed or both. It often refers to assessments that are administered by computer in either standalone devices linked to the internet or world-wide-web (WWW), most of them using multiple choice questions. Sonali Rawat (2020) viewed Computer-Based Test as the dawn of online assessment in examination industry. He argued further that computer-based test (CBT) is a medium, or a technique to conduct an online Examination without pen & paper.

Bennett (2015) stated that computer-based test represents a modern way of answering an examination question, replacing the written pen and paper (PNP) format. He further explained that CBT is a combination of networks, hardware and software as well as means of communication, collaboration and engagement that enables the processing, management and

exchange of data, information and

knowledge. It can be understood to be a complex of artificial techniques and knowledge for solving an instructor's problem involving marking pen and an examination (Bennett, 2015).

Conole & Warburton (2005) defined CBT as 'the use of computers for assessing students' learning'. It is required to think, reconsider, and modify or change the traditional test methods. Electronic assessment tools have reduced the load of teachers and facilitated exams execution purposefully because of the inclusion of ICTs in education.

Benefits of CBT over Pen and Paper

Kuzmina (2010) as cited by Abdul Ngafif (2017) pointed out benefits of using computer (web-based exam) as a tool to test. Those benefits are 1) reduced testing time, 2) increased test security, 3) provision of instant scoring (the test can be discussed while the whole thing is fresh in the subjects mind; in selection where the number of candidates again immediate results are valuable; where a huge number of subjects is tested this facility is not so important), 4) better use of professional time, 5) reduced time lag, 6) greater availability: individuals can be tested in a computer setting individually or in groups, usually in more user-friendly environments than the large classroom auditoriums where paper and pen tests have been administered traditionally. 7) greater accuracy: computers can combine a variety of data according to specific rules; humans is less accurate and less consistent when they attempt to do this.

Walker et al. (2004), as cited by Olafare& Boor (2018) itemized benefits of CBT over traditional paper-and-pencil or paper-based tests as follows: (1) It enhances speed of delivery, administration and scoring efficiency, (2) improved test security, consistency and reliability, (3) faster response rate among others. Similarly, Samson (2017) identify benefits of CBT over Pen and paper to includes: (1) Security, (2) Secure test environment, (3) Consistency, (4) Conveniency and efficiency, (5) Innovation, data management and analysis, (6) submission, auto-marking and examination result report generation.

Students' Experience in Computer-based Test (CBT) Mode of Examination

Jimoh, Yussuff, Akanmu, &Enikuomehin (2013) conducted research on students' experience of CBT mode of examination. The study revealed that should students had positive experience as they prefer computer-based test system better in writing their examinations than paper -- based

test. Fluck, Pullen and Haper (2009) revealed that computer-based test is easy to use for students as the features of computer-based test make it go beyond conventional practices and features.

Hooshang Khosnsima, Seyyed & Nathan conducted research on Computer-based (CBT) vs. Paper-based (PBT) testing: mode effect, relationship between computer familiarity, attitudes, aversion and mode preference with CBT test scores results showed that 61% of their respondents stated that they liked the CBT environment because they could read one question on each page, they should click to highlight the correct answer and they were able to see the time on the corner of the screen.

Telia and Bashorun (2012) conducted research on students' experience in Computer-based Test (CBT) mode of examination. The results demonstrated that the University of Ilorin students, their respondents, have positive experience towards CBT as more than half of them indicated a preference for CBT over PPT.

Effectiveness of Computer-based Test (CBT) Mode of Examination

Olafare, Sabainan Christopher & Anne (2017) conducted research on students' perception of Computer-Based Test in Nigerian Universities and their result revealed that computer-based test mode of examination is effective because students perceived computer-based test as useful. Aojula, Barber, Cullen & Andrews (2006) also reported that CBT is effective as it increases students' computer knowledge. Similarly, Aldersoon (2000) reported that students perceived computer-based test to be effective because its useful for assessment. Jimoh, Yussuff, Akanmu, & Enikuomihin (2013) revealed that students found computer-based test system better in writing their exams than the paper pen testing.

Sanni and Mohammad (2015) conducted a study on the views of students on the use of computer-based test for the conduct of UTME. The study found that the introduction of CBT for UTME examination attracted most of the students' attention and therefore led to CBT preference over the conventional way of writing the examination. The study revealed further that CBT can reduce examination malpractices and enhance security as opposed to paper-and-pencil test.

Abdul Ngafif (2017) identified effectiveness of CBT over Paper and pen mode of examination by listed some basic problems associated with the use of the conventional testing system: (1) students tend to do cheating, (2) the sleepy supervisors, (3) the inconsistency of test time, and the risk of losing the answer sheet. To overcome those problems, the researcher applies a concept called

web-based exam system, which uses three main tools to run the system. The result shown that online mode of examination (online testing system) can overcome the problems found in conventional testing system.

Methodology

Research Design

The study adopted a descriptive survey research design. Survey design allows the researcher to obtain information from a representative sample of a particular population on phenomenon of interest to the researcher. Since the researcher has no intention to manipulate any variable in the study, this design is found appropriate for a study of this nature.

Population of the Study

The population for the study comprised all undergraduate students of higher institutions in Oyo State.

Sample and Sampling Technique

The sample size for this study comprised 200 undergraduate students. A stratified sampling technique was used to select 200 students across public and private institutions in Oyo State. With fifty students each selected from Alayande College of Education, Oyo, Federal School of Surveying, Oyo, Ajayi Crowther University, Oyo, and Atiba University, Oyo respectively.

Research Instrument

The instrument used to collect data for this study is a questionnaire titled: CBT mode of examination Questionnaire (CBTMEQ). This instrument was a researcher-designed instrument. The items on the instrument were developed after an extensive review of literature in the related studies. The CBTMEQ consisted of five sections. Section A addressed the personal data of the students such as the name of institution, ownership of institution, department, gender, age, and

current level of education. Section B comprised twelve (12) items that students experience in the CBT mode of examination. These items took on a four-point Likert Scale response format of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). Section C comprised nine (9) items on the effectiveness of CBT mode examination from students' perspective. These items took on a four point Likert Scale response format of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1).

Validity and Reliability of the Instrument

In order to ensure the validity of the instrument, the drafted copies of the instruments was subjected to the scrutiny by the researcher's supervisor and other experts in the field of Guidance and Counseling, Test and Measurement and Computer. The observations, comments, suggestions and corrections from these experts were effected.

To determine the reliability of the instrument, 40 copies of the instrument were administered on students outside the locale of this study. Their responses to the instrument were scored and data generated was subjected to a reliability test via, internal consistency approach based on Cronbach's Alpha. The Cronbach's Alpha reliability coefficient values for sections B and C respectively were .73 and .82. These reliability coefficients are found high enough for the instruments to be used for the study.

Method of Data Analysis

The data collected from student's responses were analyzed using descriptive analysis of frequency, percentage, and Relative Significance Index (RSI) to analyze the research questions raised.

Results

4.1 Research Question 1: What is the students' experience in Computer-Based Test (CBT) mode of examination in Oyo State higher institutions of learning?

In order to answer this research question, students' responses to 12 items measuring the experience were subjected to a descriptive analysis of frequency and percentage. The results showed varying responses across different aspects of CBT experience.

Key findings from the descriptive analysis revealed that:

61.5% of students strongly disagreed that they had not heard about CBT before, indicating high awareness

77.5% of students (30.0% strongly agreed + 47.5% agreed) were comfortable using computers to write examinations

72.0% of students (22.0% strongly agreed + 50.0% agreed) felt the timing of CBT examination was not biased

81.5% of students (25.5% strongly agreed + 56.0% agreed) indicated that CBT examination was undertaken in a conducive environment

77.5% of students (22.5% strongly agreed + 55.0% agreed) believed that CBT examination ensures fairness and equity

To determine the overall experience of students, their responses to the 12 items were scored and cumulated. The minimum and maximum responses obtainable were 12 and 48. High scores on this scale represent positive experience and vice versa. All negatively worded items were reversed in scoring before cumulating the responses. Scores of 12 through 30 on this scale were adjudged as Negative experience while scores of 31 through 48 were adjudged as Positive experience.

Table 1: Students' Experience in Computer-Based Test (CBT) Mode of Examination in Oyo State Higher Institutions of Learning

Experience Score Range Frequency (f) Percentage (%)

12-30	32
31-48	168

Negative 16.0

Positive 84.0

Total 200 100.0

Results show that out of the 200(100.0%) students that participated in this study, 32(16.0%) had a negative experience while 168(84.0%) had a positive experience. As shown in the result, the experience of the majority of students in the higher institution of learning in Oyo State in the use of CBT was positive.

4.2 Research Question 2: How effective is CBT mode of examination from the perspectives of students in higher institutions of learning in Oyo State?

Students' responses to 9 items designed to measure CBT effectiveness were subjected to a descriptive analysis of frequency and percentage. Key findings include:

89.5% of students (33.5% strongly agreed + 56.0% agreed) indicated that CBT has given them greater awareness of its use

87.0% of students (33.0% strongly agreed + 54.0% agreed) believed that CBT has helped in the conduct of large number of students within a time frame

80.0% of students (26.0% strongly agreed + 54.0% agreed) found the speed of using CBT for examination satisfactory

83.5% of students (35.5% strongly agreed + 48.0% agreed) agreed that CBT helps to reduce missing scripts

74.5% of students (24.5% strongly agreed + 50.0% agreed) indicated that CBT makes examination easier for them

To determine the effectiveness of CBT, students' responses to the 9 items were scored and

cumulated. The minimum and maximum responses obtainable were 9 and 36. High scores on this scale represent more effectiveness, and vice versa. Scores of 9 through 18 on this scale were adjudged as Not Effective, scores of 19 through 27 as Fairly Effective, while scores of 28 through 36 were adjudged as Very Effective.

Table 2: Students' Description of Effectiveness of Computer-Based Test (CBT) Mode of Examination in Oyo State Higher Institutions of Learning

Description of Effectiveness Score Range Frequency (f) Percentage (%)

9-18	7
19-27	99
28-36	94

Not Effective 3.5 Fairly Effective 49.5 Very Effective 47.0 Total 200 100.0

Results show that out of the 200(100.0%) students who participated in this study, 7(3.5%) described CBT as not effective, 99(49.5%) described it as fairly effective, while 94(47.0%) described it as very effective. As shown in the result, while 49.5% of the students described CBT mode of examination as fairly effective, 47.0% described it as very effective.

Discussion

The results of this study have shown that the majority of the students in higher institutions had positive experiences in the use of the Computer-Based Test Mode of Examination in higher institutions of learning in Oyo town. In arriving at this conclusion, the data obtained from students' experience in Computer-Based Test Mode of Examination was considered along with the students' scores on items measuring their experience in the computer-based test mode of examination, leading to the same conclusion that the majority of students have positive experience.

This finding corroborates the outcome of Aojula, Barber, Cullen & Andrews (2006) that computer-based test mode of examination(CBT) has a positive experience for students as it increases their

computer knowledge. Similarly, Jimoh, Yussuff, Akanmu, Enikuomehin & Salman (2013) reported that students found CBT as a positive experience as they prefer CBT in writing their examination than traditional paper and pen testing.

The results revealed Computer-Based Test Mode of Examination had fairly effective to very effective experience on the student results. This study is consistent with an earlier study carried out by Fagbola(2013), which revealed that CBT mode of examination has been very useful in evaluating large students in various institutions across the world. Similarly, other findings, such as Tella and Bashorun (2012), revealed that students consider CBT mode of examination over PPT. Also, Okocha, Toluwani and Owolabi (2017) revealed that students are more interested in using CBT for examinations and tests than PPT.

The majority of the students strongly agreed that CBT prevents frequent occurrences of missing exam scripts of students. Abubarkar and Adebayo (2014) and Adebayo and Abdulhamid (2014) reveal that it promotes exam security. This finding also agrees with the study of Nwoke (2017) and Bala (2018), which revealed that the culminating benefit of CBT lies in its ability to curtail examination malpractice.

Conclusion

Based on the findings of this study, it can be concluded that students had a positive experience in Computer-Based Test Mode of Examination. Computer-based test mode of examination has helped to reduce the experiences of missing scripts, examination malpractices and despicable experiences by the students. It has also enhanced students' performance and gives credibility to scores obtained in such exams because marking is more accurate, consistent, and does not suffer from human error. Students perceived CBT as fairly effective to very effective, indicating strong acceptance and positive perception of the technology-enhanced assessment method.

Recommendations

From the findings of this study, the following recommendations were made:

1. Higher institutions should continue the use of Computer-Based Test mode of examination given the positive student experience and perceived effectiveness.

2. Orientation and tutorials should be organized to familiarize students with the testing environment prior to the commencement of the examination. This will help reduce their nervousness and improve their experience.
3. Government policy on computer education at the primary and secondary school levels should be reinforced to make all students computer-literate, thereby enhancing their CBT experience.
4. Higher institutions of learning should improve the efficiency of computer-based test to increase its credibility in testing students and enhance positive student experience.
5. Institutions should invest in user-friendly CBT interfaces and ensure adequate training for both students and staff to maximize the effectiveness of the system.

Contribution to Knowledge

The study provides useful information on students experience of Computer-Based Test Mode of Examination in Nigerian higher institutions. It also provides evidence-based information on the effectiveness of Computer-Based Test Mode of Examination from students' perspective, contributing to the growing body of knowledge on technology-enhanced assessment in developing countries.

References

- Abdul Ngafif (2017), The Use of Web-Based Exam (WBE) to Optimize Students Testing Result. English Language Teaching and Research Journal (ELTR), e-ISSN 2597-4718, Pg 54-60, Vol. 1, No. 1.
- Aojula, Barber, Cullen & Andrews (2006). Computer based, online summative assessment in undergraduate pharmacy teaching: The Manchester experience. DOI:10.1080/15602210600886209.
- Bennett, R. E. (2015). The Changing Nature of Educational Assessment. Review of Research in Education, 39(1), 370-407.
- Conole & Warburton (2005). CBT as 'the use of computers for assessing students' learning'. Educational Technology Research.
- Fluck, pullen and Haper (2009). Computer-based test features and conventional practices. Educational Assessment International Journal.
- Hooshang Khosnsima, Seyyed & Nathan (2019). Computer-Based Test(CBT) Vs. Paper-Based (PBT) Testing: Mode effect, relationship between computer familiarity, attitudes, aversion and mode preference with CBT test scores in an ASIA private EFL context.
- Jimoh, Yussuff, Akanmu, Enikuomihin & Salman (2013). Acceptability of CBT mode for undergraduate courses in Computer Science. Journal of Science, Technology, Mathematics and Education (JOSTMED). Volume 9(2).
- Kuzmina (2010). Benefits of using computer (web-based exam) as a tool to test. Educational Technology Review.

Olafare F. O.& Boor C. M. H. (2018) Educational Research Journals (ISSN: 2141-5161) Vol. 9(3) pp. 50-57.

Sanni AA, Mohammad MF (2015). Computer Based Testing (CBT): An Assessment of Student Perception of JAMB UTME in Nigeria. Computing, Information Systems, Development Informatics & Allied Research Journal, 6(2).

Samson (2017). Benefits of CBT over Pen and paper examination systems. Educational Assessment Review.

Tella and Bashorun (2012). Students' experience in Computer-based Test (CBT) mode of examination. Nigerian Educational Research Journal.

Walker et al., (2004). Benefits of CBT over traditional paper-and-pencil tests. Assessment in Education Review.

Whillington (2000). Computer Based Test System (CBTS) definition and components. Educational Technology Journal.