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Int J Edu Sci, 20(1-3): 18-24 (2018)
DOI: 10.1080/09751122.2017.1346563

Students' Suitability of Computer Based Test (CBT) Mode for Undergraduate Courses in Nigerian Universities: A Case Study of University of Ilorin

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KEYWORDS Assessment. Computer Based Test. Information and Communication Technology. Students' Suitability and Computer Assisted Language Learning

ABSTRACT Student assessment has been seen to be a crucial way of testing the students' ability and performance in learning especially in a formal setting of the educational system. The process of assessing students in our educational system has gone a long way in determining the quality of the students produced. However, with the increasing numbers of students in most of the universities in Nigeria, there is an urgent need for an automatic means of student assessment for fast and better performances. Computer Based Test (CBT) has been the fastest way of assessing students due to the increasing population of the undergraduate students in Nigeria Universities. The concerns regarding the challenges in assessing some courses motivated this research work to examine its suitability through analysis study. Five hundred and twenty (520) undergraduate students of University of Ilorin, Nigeria from various faculties who have taken different courses through CBT mode were surveyed using the questionnaire as a research instrument for data collection. The test of this study proved acceptability of using CBT based system for the evaluation of students in the various educational establishment of learning across the world using University of Ilorin as case study.

INTRODUCTION

The use of technology has made the world to be a global village and the innovation of ICT has also made a break-through in globalizing education (Bamigboye and Adelabu 2017). Students are becoming proficient in the use of ICT which is fast gaining reputation throughout the whole world (Adeyemo 2010). In the educational sectors, the computer system has been a vital tool in learning, most especially it has greatly been used for classroom instruction, record keeping and students' computation of results (Daiyabu and Sani 2016).The fast advancement of ICT and its introduction in educational system has changed the world from the information technology age to the knowledge age which finally results in the rise of technologies in various ways (Choi and Byun 2017). However, these have help in solving several problems of teachers in facilitating the conduct of examinations persistently. The computer-based method of testing can promote learning effectively by testing variety of skills, understanding, and knowledge. The popularity of the CBT test has recently increased, with this increase. It is likely that the use of CBT for test assessment will be the primary mode of assessment in future. As students become more accustomed to using computers for educational purposes, many instructors begin to teach their courses in online or blended formats that may result in transferring all or some of the class instruction and testing activities from face-to-face to online platforms (Prisacari and Danielson 2017). The manual system of conducting the examination, which has been in existence for several years is becoming outdated due to problems connected with the system which includes, examination malpractices, examination venue capacity constraints, lack of comfort for examination candidates, the cost of printing examination materials, delay in results computation and human error. CBT has recently appeared as one of the most demanded viable forms of alternative assessment throughout the world. Along with the development of computer-assisted language learning (CALL) in education, applying computers as accepted assess-

ment tools seems to be inevitable especially in academic settings (Khoshsima et al. 2017). The efficiency and innovation in student assessment have increased because of computers integration which has made the standardization of test administration conditions, which is also an advantages uses of CBT. No matter the population size, CBT assists in assessing the participants at the same time and condition. The challenges of the traditional ways of student assessment bring about the necessity for computerization of student examination system.

Oladapo (2013) concludes that information technology has been the main building block of present society in a very short while of time. Most of the country in the global world now realized and understand well the basic skills and concept most especially in the educational sectors due to numerous advantages of ICT. IT gadgets are made available everywhere which now makes the present world to be referred to as digital age (Ando et al. 2016).

Literature Review

In this modern age, technology has meaningfully restructured almost every area of our life including the educational system which is not left out, most especially students' ways of assessment (Shute and Rahimi 2017). The method of conducting examinations in Nigeria has taken a new dimension due to the recently introduced computer-based test (CBT) system which has indicated the modern ways of student's evaluation method. This modern system has been accepted by a lot of universities in Nigeria to conduct their examination both internal and external. The success behind this new system can be attributed to the acceptance by other examination body, like Joint Admission Matriculation Board (JAMB) which has used CBT to conduct her examination for students. This innovative ways of student assessment started with two Universities in Nigeria, that is, Covenant University and University of Ilorin who has served as pioneer institutions for the use of CBT in student assessment.

The process of testing student digitally in university education is to change the state of test administration but the integration has not yet being fully utilized in Nigerian universities. Most past studies on Computer-Based Test in Nigeria universities have considered attitudes toward computer-based test and effectiveness of Computer-Based Test on students' academic performance but did not measure other constructs such as usefulness, ease of use and fairness of the CBT (Olafare et al. 2017). Using ICT tools like CBT for the student's Examination assessment has greatly help in creation of gradable activities like test and examination. Students' performance can be practically measured using computer based simulations, which in setting of questions and automatic grading. Computer system has greatly help through its use for students testing that has resulted in the new innovation ways of testing which is independent processes of conducting examination knows as Computer-Based Testing (CBT). Presently, the areas that currently need attention and urgent exploration by the researchers are to study the effect of the testing mode by comparability and equivalency of the data obtained from this present innovation and the existing ways of testing, that is, the conventional Paper-and-Pencil-Based Testing (PBT) and the computerized tests (Hooshang et al. 2017).

In various academic areas, students' assessment has been moving away from the traditional ways of conducting examination, towards the computer-based testing mode (CBT), which is defined as a method of testing or assessing students managed by computer in stand-alone or dedicated network, or other technological devices connected to the internet or, which can be in various question types like, easy type, multiple choice questions (MCQs) and True and false (Sorana-Daniela and Lorentz 2007).

Reid et al. (2016) reported a research on comparing the preference and acceptability of using computer-based testing with a student's response system for conducting MCQs questions in nursing education for undergraduates. The use of CBT is becoming acceptable due to the affordability of computer system by most of the schools which have greatly made it possible for the institution to use computer system for test and assessment delivery achievable (Usman et al. 2017). CBT has become a common way of test delivery for admission and certification assessment. Many educational organizations have been using CBT as an alternative or only way of test delivery (Mills et al. 2004). To an extent, the movement to the CBT Mode has been a success but as the awareness is increasing day by day we must make sure that psychometrics are intro-

duced to ensure people's confidence, most especially those that have so much confidence in the traditional method of assessment (Ashenafi 2017). The benefit of CBT on reduction in examination malpractices because of the security features which have been observed as global best practices. Fast acceptance of this innovation is a product of the advantage most schools derived from the use of CBT mode compare to the traditional way of assessment, considering the increase in the population of students in Nigerian Universities (Balogun et al. 2016). Few of the advantages include examination transparency, consistency and reliability, enhancement of test security, administration and scoring efficiency and quicker response rate (Ricketts et al. 2002). Development of an online web application which allows questions in MCQS formats which can be graded instantly (Akinsanmi et al. 2010) carried-out another research survey on a large scale evaluations of studies examining performance differences of paper-based version of tests and CBT and have realized that when CBT is used in place of pencil and paper tests, it has a slight or no effect on assessment performance. Williams (2007) determined the relationship between a reasonable number of tests and better attitudes of student, and his respondents were found to be largely more positive toward the CBT facility than toward the paper and pencil testing. Presently, University of Ilorin is using a hybrid method of student assessment (both the traditional method and the CBT Mode) unlike previously which the only means of assessment is the traditional method (paper and pen) which is used as students' evaluation. Recently because of the increased in students population, the CBT mode was introduced to reduce the pressure of conventional examination method which is time-consuming in term of students evaluation and assessment (Jimoh et al. 2012). CBT test has gained more popularity over the use of paper and pencil test, due to several benefits derive from the use of computer based test technology (Khoshsima and Toroujeni 2017). These benefits include better administration, automated scoring system and reduction in the cost of test production in case of paper and pen (Olufemi et al. 2014). To comprehend these creditable benefits of CBT and keeping in line with the global word in practicing the best practices, many Nigerian tertiary institutions have begun to embrace the use of CBT for test assessment. The Post Unified Tertiary Matriculation Examination (Post UTME) is clear evidence in this context (Balogun and Olanrewaju 2016).

Hence, the initial poor academic performance of the student in CBT caused by anxiety using the computer system in writing test but later disappeared and CBT examinations produced notable academic success for several students (Tella and Bashorun 2012). In a study whose results confirmed that University of Ilorin students' perception towards the use of CBT is more than half of students population has clearly proof their preference for CBT than PPT (Scalise et al. 2006) to also prove a strong perception that CBT increases students' performance in learning.

Statement of the Problem

The implementation of the CBT for student assessment by the management of the University of Ilorin was a great innovation and this is as a result of enormous benefits, in using computer technology in education. The advantages of using CBT is well recognized globally which include fast assessment, exam time saving, lower administrative cost and automated grading. But despite all these benefits derived from using CBT for test assessment some of the respondents still complain of various challenges they are facing in this context. Students with low computer skill reported that the navigation process of the CBT exams is of great challenge, most especially navigation from the current questions to the previous questions in case of change of mind in options (Al-Amri 2009). Some respondents also said they read quickly and more easily on paper than on an electronic screen because they are familiar with taking notes and circling question and/or answers. Also, the points of concern are students' attitudes about CBT test, attitudes about anxiety, efficiency and score reporting. Another concern of this study is also in the areas of accessibility to computer facilities and IT garget. Other technical issues in CBT that affect students in attempting to questions are: Using the mouse, screen resolution, font size, screen clarity, the size of the screen, interface navigation and scrolling.

Purpose of the Study

The aim of this study is to explore the students' suitability of computer-based test (CBT)

mode in Nigeria universities with an emphasis on undergraduate courses, through a field survey.

Objectives

1. Using gender difference among the undergraduate students to prove their computer basic skills in accepting the use of CBT mode for test assessment.
2. Using gender difference among the undergraduate students to prove their attitude to the use of CBT mode for test assessment.
3. Using gender difference among the undergraduate students to prove the rate at which students have access to computer facilities.
4. Also using other factors like unstable electricity and government.

Research Questions

This research seeks to answer the following questions:

1. What is the gender difference of University of Ilorin students in accepting CBT suitability?
2. What is the level of computer basic skill among the undergraduate student of the University of Ilorin in their suitability of CBT?
3. What is the attitude of University of Ilorin undergraduate students toward the use of CBT for test assessment?
4. How often university of Ilorin student have access to computer facilities?

METHODOLOGY

This research work was conducted among the undergraduate students of the University of Ilorin, Nigeria that has been using CBT for their test assessment. A qualitative approach was used through Survey questionnaires which were administered to a sample of 520 students with CBT experience using sampling technique. The returned questionnaires were 500 which show a response rate of about 96.5 percent out of which were 333 males and 167 female. Data analysis was done using SPSS tools.

Research Design

The qualitative method of research was used in this context, why the method of obtaining data was a field survey using a well-structured questionnaire. The study population consists of 500 Undergraduate students of the University of Ilorin, who has enrolled and tested under the CBT mode of assessment in the university CBT Center. Data Collection approach that was used for this study is a questionnaire designed by the researcher based on student's adequacy to the use of computer-based testing (CBT). It was designed in such a way that it provides solutions to all the research questions. The technique of data analysis was based on the 500 questionnaires which were validly returned and administered in the survey. The data was analyzed using specs and the result of the analysis has finally justified the adequacy of CBT acceptance among African University students, using the University of Ilorin as a case study.

RESULTS

This section shows the results of the research work which include the formulated hypothesis and analysis.

Research Hypothesis

Table 1 presents the results of the findings with respect to each of the three formulated hypothesis:

Hypothesis 1

This states that there is no significant difference between male and female computer basic skills among undergraduate students in University of Ilorin.

Hypothesis 2

This states that there is no significant difference between male and female attitude towards CBT among undergraduate students in University of Ilorin.

Hypothesis 3

This states that there is no significant difference between male and female access to computer facilities among undergraduate students in University of Ilorin.

The results in Table 1 show that there is a significant difference between male and female computer basic skills among undergraduate stu-

Table 1: Standard deviations and t-test values of male and female' basic skills among undergraduate students

Factors	*Sex*	*No. of cases*	*Mean*	*SD*	*Calculated t-value*
Computer basic skills	Male	333	21.51	21.51	32.39*
	female	167	12.17	12.17	
Attitude towards CBT	Male	333	32.98	32.98	36.68*
	Female	167	17.83	17.83	
Access to computer facilities	Male	333	18.67	2.08	29.00*
	Female	167	11.74	3.22	
Other factors	Male	333	7.29	0.95	26.24*
	female	167	4.17	1.7	

NB *Significant at 0.05 level
Critical t-value = 1.96, df = 498

dents in University of Ilorin because the calculated t-value of 32.39 is greater than the critical value of 1.96 at 0.05 level of significance. Also the results for male and female attitude towards CBT among undergraduate students in University of Ilorin was significantly different, the calculated t-value of 36.68 is greater than the critical value of 1.96 at 0.05 level of significance. Also, male and female access to computer facilities among undergraduate students in University of Ilorin, the calculated t- value of 29.00 is greater than the critical value of 1.96 at 0.05 level of significance. The researchers consider the other factor for male and female that is necessary for ensuring the performance of CBT among undergraduate students in the University of Ilorin. It shows that significant difference exists among other factors. Therefore, the null hypothesis for students' suitability of computer-based test (CBT) mode for undergraduate courses in Nigerian Universities was rejected, indicated that significant difference exists among students' suitability of computer-based test (CBT) mode for undergraduate courses in Nigerian Universities.

DISCUSSION

From the result of finding its shows, the significant difference exists among the student's suitability of computer-based test CBT for undergraduate courses over the use of paper and pencil. These advantages have been validated by Olufemi et al. (2014) who suggested that embracing ICTs, in the universities can also improve admission process. This evidence has clearly shown that students of this university had found that use of CBT mode is more effective in conducting their examination than the traditional method of writing examination on the following factors: computer basic skills, attitude towards CBT, and access to computer facilities among undergraduate students in University of Ilorin on student adequacy of computer based test.

CONCLUSION

From this study, it can be concluded that the introduction of CBT into Africa universities is suitable and appropriate as this will bring into line the same standard with others Universities in the technological world.

RECOMMENDATIONS

The main focus of this study was too essentially appraised the students' suitability of CBT mode for undergraduate courses in Nigeria universities.

Based on this study, it is considered very vital to make the following recommendations:

1. The government should encourage the use of CBT by providing necessary infrastructure in all universities in the country.
2. Proper evaluation and feedback mechanism should be performing regularly on the use of CBT for test assessment.
3. Policy on the use of ICTs should be fully implemented by the Government and also adequate fund should be made available to all universities.
4. Provisions of ICT equipment and facilities must be made available right from the secondary schools till the universities level.
5. Teachers and students should create positive attitudes toward the use of CBT.

6. Adequate training should be given to both teachers and students that are yet to be ICT compliance so that they will be encouraged to meet up with this new demand.
7. The CBT application must be designed in a way that it will be users friendly so as to encourage the users.
8. The government should create more CBT or ICT Centre in another university that doesn't have one just like the standard CBT Centre of University of Ilorin.
9. CBT use will not only reduce exam misconducts but would ensure the quick or timely release of examination results.

REFERENCES

Abubakar AS, Adebayo FO 2014. Using computer based test method for the conduct of examination in Nigeria: Prospects, challenges and strategies. *Mediterranean Journal of Social Sciences*, 5(2): 47.

Adeyemo SA 2010. The impact of Information and Communication Technology (ICT) on teaching and learning of Physics. *International Journal of Educational Research and Technology*, 1(2): 48-59.

Ando T, Yamamoto-Hanada K, Nagao M, Fujisawa T, Ohya Y 2016. Combined program with computer-based learning and peer education in early adolescents with asthma: A pilot study. *Journal of Allergy and Clinical Immunology*, 137(2): AB157.

Akinsanmi O, Ruth OT, Soroyewun MB 2010. Development of an e-assessment platform for Nigerian Universities. *Research Journal of Applied Sciences, Engineering and Technology*, 2(2): 170-175.

Alabi AT, Issa AO, Oyekunle RA 2012. The use of computer based testing method for the conduct of examinations at the University of Ilorin. *International Journal of Learning and Development*, 2(3): 68-80.

Al-Amri SS 2009. *Computer-based Testing vs. Paper-based Testing: Establishing the Comparability of Reading Tests through the Evolution of a New Comparability Model in a Saudi EFL Context.* PhD Thesis. UK: University of Essex.

Ashenafi MM 2017. Peer-assessment in higher education–twenty-first century practices, challenges and the way forward. *Assessment & Evaluation in Higher Education*, 42(2): 226-251.

Balogun AG, Olanrewaju AS 2016. Role of computer self-efficacy and gender in computer-based test anxiety among undergraduates in Nigeria. *Psychological Thought*, 9(1): 58-66.

Bamigboye OO, Olusesan AA 2017. An analysis on impact of social media for learning in Eastern Cape Universities, South Africa. *International Journal of Educational Sciences*, 17(1-3): 69-75.

Choi Y, Byun T 2017. Constraint-based test generation for automotive operating systems. *Software & Systems Modeling*, 16(1): 7-24.

Hassan D, Sanda S 2016. Stakeholders' awareness and acceptability of computer based Unified Tertiary Matriculation Examination (UTME) in Bauchi Metropolis, Bauchi State-Nigeria. *Journal of Educational Policy and Entrepreneurial Research*, 3(5): 96-100.

Hooshang K, Seyyed HT, Farzane SS 2017.The impact of digital item presentation on the intermediate level language learners' testing performance and attitudes towards onscreen test in private language learning context. *Journal of Applied Linguistics and Language Research*, 4(3): 196-211.

Jimoh RG, Shittu AJK, Kawu YK 2012. Students' perception of computer based test (CBT) for examining undergraduate chemistry courses. *Journal of Emerging Trends in Computing and Information Sciences*, 3(2): 125-134.

Khoshsima H, Hosseini M, Toroujeni SMH 2017. Cross-mode comparability of Computer-Based Testing (CBT) versus Paper-Pencil Based Testing (PPT): An investigation of testing administration mode among Iranian Intermediate EFL learners. *English Language Teaching*, 10(2): 23.

Khoshsima, H, Toroujeni SMH 2017. Transitioning to an alternative assessment: Computer-based testing and key factors related to Testing Mode. *European Journal of English Language Teaching*, 1-21.

Oladapo CO 2013. Promoting Quality Education in Nigeria: The Role of the Stakeholders. *Lead Paper Presented at the 3rd National Conference of the School of Education, Federal College of Education (Technical) Akoka,* Yaba,5-8 August, Lagos.

Olafare FO, Akinoso SO, Omotunde C 2017. Students' perceptions of computer-based test in Nigerian Universities. *Nigerian Journal of Educational Technology,* 1(2): 2017.

Olufemi OA, Oluwatayo OJ 2014. Computer anxiety and computer knowledge as determinants of candidates' performance in computer-based test in Nigeria. *British Journal of Education, Society & Behavioural Science*, 4(4): 495-507.

Oluwatosin Omotehinwa T, Durojaye D Samson 2013. Computer-based test: Security and result integrity. *International Journal of Computer and Information Technology* (*IJCIT)*, 2(2): 324-329.

Prisacari AA, Danielson J 2017. Rethinking testing mode: Should I offer my next chemistry test on paper or computer? *Computers and Education*, 106: 1-12.

Reid J, Robinson D, Lewis C 2016. Assessing the evidence: Student response system versus computer based testing for undertaking multiple choice question assessment in undergraduate nursing education. *Pediatr Neo-natal Nurs Open J*, 3(1): 10-14.

Ricketts C, Wilks SJ 2002. Improving student performance through computer-based assessment: Insights from recent research. *Assessment & Evaluation in Higher Education*, 27(5): 475-479.

Sanni AA, Mohammad MF 2015. Computer Based Testing (CBT): An assessment of student perception of JAMB UTME in Nigeria. *Computing, Information Systems, Development Informatics and Allied Research Journal*, 6(2): 1-16.

Scalise K, Gifford B 2006. Computer-based assessment in e-learning: A framework for constructing "intermediate constraint" questions and tasks for technology platforms. *The Journal of Technology, Learning and Assessment*, 4(6): 1-45.

Sorana-Daniela B, Lorentz J 2007. Computer-based testing on physical chemistry topic. *International Journal of Education and Development using Information and Communication Technology*, 3(1): 94-95.

Shute VJ, Rahimi S 2017. Review of computer based assessment for learning in elementary and secondary education. *Journal of Computer Assisted Learning*, 33(1): 1-19.

Tella A, Bashorun MT 2012. Attitude of undergraduate students towards computer-based test (CBT): A case study of the University of Ilorin, Nigeria. *International Journal of Information and Communication Technology Education (IJICTE)*, 8(2): 33-45.

Usman M, Iqbal MM, Iqbal Z, Chaudhry MU, Farhan M, Ashraf M 2017. E-assessment and computer-aided prediction methodology for student admission test score. *Eurasia Journal of Mathematics, Science & Technology Education*, 13(8): 5499-5517.

Watts S, Mackenzie A, Griskaitis A, Mewton L, Williams A 2013. CBT for depression: A pilot RCT comparing mobile phone vs. computer. *BMC Psychiatry*, 13: 49.

Williams B 2007. Students' perceptions of prehospital web-based examinations. *International Journal of Education and Development Using ICT*, 3(1): 10 Pages.

Paper received for publication on July 2016
Paper accepted for publication on December 2016