PREDICTORS OF STUDENTS' PERFORMANCE IN COMPUTER TEST IN EMMANUEL ALAYANDE COLLEGE OF EDUCATION, OYO

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Abstract

This study examined factors predicting students' performance in Computer Based Test (CBT) of Post-UTME examination conducted for NCE programme at Emmanuel Alayande College of Education, Oyo. A descriptive survey design was employed and adapted questionnaire was used to collect data from the respondents. The population of the study consists of all candidates that took part in the CBT Post-UTME examination conducted for NCE programme at Emmanuel Alayande College of Education, Oyo during 2015/2016 academic session. An incidental random sampling technique was used to select three hundred respondents from the population of the study and two hypotheses were formulated for the study. Data collected were analysed using one-way ANOVA and multiple regression analysis at 0.05 level of significance. The results of the study showed that computer familiarity (F (28,299) =1.632, P (0.026<0.05)) and computer anxiety (F (28,299) =1.280, P (0.016<0.05)) jointly made significant effect on the performance of the students in CBT. But computer characteristics (F (28,299) =0.836, P (0.707>0.05)) did not jointly made significant effect on the performance of the students in CBT. Also, the results indicated that computer familiarity made the highest significant effect on the performance of the students in CBT, it accounted for 45.0% of the total variance of students' performance in CBT (B=0.450, p = .000, p<0.05), next was computer anxiety which accounted for 32.1% of the total variance of students' performance in CBT (B=0.321, p = .000, p<0.05). However, computer characteristics accounted for 9.7% of the total variance of student' performance in CBT and non-significant at 0.05 (B=.097, p=.180, p>0.05). The study recommends that students should be adequately exposed to training on general use of computer at both primary and secondary education level before being exposed to CBT, and governments and computer professional bodies should organize ICT workshop training for secondary school students to sensitize them and improve their beliefs and perception towards the use of computer.

Introduction

One specific form of ICT for assessment is the Computer-Based Testing (CBT), also known as Computer-Based Assessment or e-assessment/testing. It is a method of administering tests in which the responses are electronically recorded, assessed, or both. It is commonly available for several admissions tests throughout the developed countries (Monday, Akon & Blessing, 2014).

Sorana-Daniela and Lorentz (2007) define Computer based test (CBT) as tests or assessments that are administered by computer in either stand- alone or dedicated network, or by other technology devices linked to the internet or world wide web, most of them using multiple choice questions (MCQs).

Advantages of using computer technology for educational assessment in a global sense have been recognized and these include lower administrative cost, time saving and less demand upon teachers, among others (Oduntan, Ojuawo&Oduntan, 2015). Computer-based tests offer several benefits over traditional paper-and-pencil or paper-based tests. Technology based assessment provide opportunities to measure complex form of knowledge and reasoning that is not possible to engage and assess through traditional methods (Bodmann& Robinson, 2004).

In Nigeria, employers of labour now conduct aptitude test for job seekers through electronic means; universities and other tertiary institutions are registering and conducting electronic examination for their students through the internet and other electronic and networking gadgets. Similarly, different examination bodies in the country such as West Africa Examination Council (WAEC), National Examinations Council (NECO), National Business and Technical Examination Board (NABTEB), and National Teachers' Institute (NTI), among others, register their students through electronic means (Olawale&Shafii, 2010). Computer and related technologies provide powerful tools to meet the new challenges of designing and implementing assessments methods that go beyond the conventional practices and facilitate means to record a broader repertoire of cognitive skills and knowledge (Mubashrah, Tariq &Shami, 2012).

In Nigeria, the mandate to conduct entrance examination into tertiary educational institutions (Universities, Polytechnics, Colleges of Education and related/similar institutions) is vested in a body called Joint Admissions and Matriculation Board (JAMB). Thus, every year, JAMB conducts Unified Tertiary Matriculations Examination (UTME) and forwards the results to the candidates' institutions of choice for selection and admission. Over the years, the UTME by JAMB has been in a paper and pencil test (PPT) form, and has been characterized by a lot of fraudulent practices ranging from leakage of examination papers, use of machineries of all sorts by candidates, bride taking by examination officials, impersonation, use of unauthorized gadgets, and so on (Osuji, 2012). In order to eliminate or minimize incidence of the vices, and/or other reasons, JAMB in 2013 introduced the computer based testing (CBT) form of UTME and gave massive publicity and sensitization on it. JAMB gave the advantages of CBT to include increased delivery of test items that have been calibrated and delineated according to their pertinent item characteristics (instructional level objectives, difficulty level, discrimination level and functionality of distractors, efficient administration of examination and scoring of tests, reduced

costs for many elements of the testing lifestyle and logistics, improved test security resulting from electronic transmission (Monday, Akon & Blessing 2014).

There are two main types of computer based testing. The most familiar type is where candidates fill in their responses on a paper form, which is fed into a computer optical mark reader. This reads the form, scores the paper and may even report on the test reliability. The second type of computer based testing is where computers provide an assessment interface for students; they input their answers and receive feedback via a computer (Peter, Bill & David, 2004).

Emmanuel Alayande College of Education, Oyo introduced CBT form of Post-UTME screening exercise during 2015/2016 academic session. Two thousand, eight hundred and forty four (2,844) candidates' partook in the first batch of the CBT examination while three hundred and eighty four, three hundred and ninety one took part in the second and third batches of the examination respectively (Field Survey, 2015).

Whilst recognising the system level advantage of CBT, it is important to explore the reasons, why these students being assessed with this platform perform woefully because the assumption of comparability between the CBT and PBT without proper investigation within that particular testing context is inappropriate (Saad, 2009).

The extent to which test takers have experience of using computers has been argued to influence their performance on computerized test (Brown, 1997). Those who have worked in the field of CBT and computer familiarity note that computer familiarity is considerable in number of ways. For example Taylor, Kirsch, Eignor and Jamieson (1999), in their study, state that computer familiarity includes experience, frequency of use, type of use, number of courses involving computers, owning a computer, access to computers, attitudes towards computers, and related technologies. Taylor et al (1999) constructed a measure of computer familiarity. They believed that computer familiarity is a factor which has sub-factors like access, attitudes, and computer use. Goldberg and Pedulla (2002) found that students' computer familiarity was significantly associated with test performance in CBTs. Students with lower computer familiarity scored lower on CBTs than students with moderate and higher computer familiarity. But some studies suggested that computer familiarity was not related to performance difference between CBT and PPT groups (Clariana & Wallance, 2005; Bennett, Braswell, Oranje, Sandene, Kaplan & Yan, 2008).

According to Brown (1997), computer anxiety refers to the fear experienced when interacting with a computer or anticipating an interaction. Some believe that computer anxiety to some extent overlap with computer confidence and these two are essentially the same (Levine & Smidth, 1997). Some of the symptoms of anxiety are worry and self-concern that they may interfere with the tasks that test takers want to do in a test. Although available evidence show that computer anxiety can have a negative effect on test score but some researchers believe that both using computers and taking tests are considered as potential sources of anxiety (Gos, 1996).But McDonald (2002) found that test anxiety alone can have a significant impact on test performance. Generally anxiety may result from limited computer experience or the test taking

situation or both of them. Glaister(2009) reported that students who possess medium and high levels of computer anxiety perform worse than those with low levels in a CBT. But some studies reported that computer anxiety was not statistically significant for performance in CBT (Ogunmakin & Osakuade, 2014; Stowell& Bennett, 2010).

Some researchers also concluded that computer hardware characteristics, such as monitor resolution, screen size and responsiveness, affect student test scores (Csapó, Ainley, Bennett, Latour, & Law, 2010; Florida Department of Education, 2006). Monitor size can affect student's performance because smaller monitors display the same amount of information as larger ones, but the information looks smaller, making it harder to read the same question. Similarly, screen resolution affects the size of the text and how much information is shown (Csapóet al., 2010). In addition, slower computer response times during online testing can have a negative impact on student performance (Florida Department of Education, 2006).It is against these backdrops that this study is carried out to examine the factors predicting performance of the students' in computer based test.

Statement of the Problem

Institutions across the globe are migrating toward the use of Computer Based Test (CBT) to test students' knowledge. The fear about CBT form of entrance examination is perhaps understandable given the poor infrastructure in the public institutions of learning, particularly in the rural communities in Nigeria. The management of Emmanuel Alayande College of Education, Oyo recently implemented the use of CBT form of Post UTME entrance examination for NCE programme during 2015/2016 academic session.The performance of the students that took part in the CBT Post UTME examination was found to be poor compared with the result of the students in Paper and Pencil Test (PPT).

It was noted that Post UTME entrance examination conducted for NCE programme is primarily taken by sets of candidates which are drawn from different sectors of Nigerian populace (e. g. geographical location, school proprietorship), and therefore possess varied background and varied levels of computer literacy and proficiency. Some of the test takers reported that, it is more difficult to navigate back to rework problems. Some are resistant to the computerized testing process because they were accustomed to takingnotes and circling question and/or answers for later review. Others claimed that they read more quickly and more easily on paper than on a glaring computer screen. While electronic glitches are rare, they have been known to occur, for instance where computer crashes can void the efforts of large numbers of test takers.

In general, the point of concern is that what are the factors leading to poor performance of these students in CBT. Some examinees have a general anxiety about the computer itself, while others were more concerned about whether their level of computer experience. Some other technical issues in CBT that affect students' performance are the use of the mouse, font size, screen clarity, screen size, screen resolution, display rate and scrolling. The user interface-item layout, presentation graphics has been known to affect examinees as they may have difficulty with certain aspects of it, or they may object to particular element of adaptive test delivery.

Objective of the Study

This study was carried out to examine factors predicting students' performances in CBT. Specifically, this study sought to:

(i) examine the effect of computer familiarity on the performance of the students in CBT;

(ii) examine the effect of computer anxiety on the performance of t h e students in CBT; and,

(iii) examine the effect of computer characteristics (such as monitor resolution, screen size, and responsiveness) on the performance of the students in CBT.

Hypotheses

(i) There is no significant composite effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo.

(ii) There is no significant relative effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo.

Significance of the Study

The outcome of this study would be of use to students, management of Emmanuel Alayande College of Education, Oyo, secondary school teachers, professional organisations and researchers. Extensively, this study would create awareness to different examinations bodies in Nigeria to ascertain factors significantly determining performance of students in e-testing.

The study would also help the management of Emmanuel Alayande College of Education, Oyo to find out what has been the student's constraint in the use of computer based testing or any form of e-testing and to also improve on their mode of setting question in e-testing. This study would also provide the management of Emmanuel Alayande College of Education, Oyo with useful information on the level of ICT literacy of students hence, assisting them in training and retraining their staff to help teach the skill to students.

The outcome of this study would also be beneficial to various professional bodies as well empower management of Emmanuel Alayande College of Education, Oyo to formulate policies that would make e-assessment a way of assessing student.

Finally, the findings of this study would eventually be a source of reference for all stakeholders in the area of educational processes and products for planning befitting educational programmes for our nation in the nearest future. The study would provide researchers in all areas of study with the opportunity to access empirical evidence in their quest for further studies on CBT's acceptance by the students in higher institution of learning in Nigeria.

Methodology

The descriptive research design of the survey type was employed in the study. The population of the study consists of all the students that partook in the CBT Post-UTME examination conducted for NCE programme at Emmanuel Alayande College of Education, Oyo during 2015/2016

academic session. An incidental random sampling technique was used to select three hundred (300) respondents from the population.

The researcher adopted the use of questionnaire tagged Factors Predicting Performance in Computer Based Test (FPPCBT) to collect data from the sampled respondents. The questionnaire was made up of four sections. Section A focused on demographic data such as sex, age, course of study, CBT score etc. Section B was ten items computer familiarities scale (adapted from Lee, 1986), section C was twelve items on computer anxiety scale (adapted from Heinssen, Glass & Knight, 1987) and section D was six items on computer characteristic scale (adapted from Bridgemen, Lennon &Jackenthal, 2001). Respondents were asked to respond to the items therein on a four-point Likertscale of Strongly Agree (SA) = 4 points; Agree (A) = 3 points; Disagree (D) = 2 points and Strongly Disagree (SD) = 1 point.

The validity of the instrument is assured because the researcher adopted the use of validated instruments. To ensure the reliability of the instrument, the instrument was administered on twenty (20) respondents aside from the sample of the study. The reliability and internal consistency of measurement scales was measured using Cronbach's Alpha (α). The Cronbach's Alpha of 0.85 was obtained which indicate good reliabilities of the scales.

The instrument was administered on the sampled respondents through the assistance of their head of department at each school. The administration of the questionnaires was done on different days at the five schools in the campus. All the 300 questionnaire items were fully completed by the respondents and collected back. Data collected was analysed using regression analysis at 0.05 level of significant.

Results

Hypothesis 1: There is no significant composite effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo.

Table 1
One way ANOVA showing composite effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT

Computer Familiarity	*Sum of Squares*	Df	F	P
Between Groups (26.948)	*754.542*	28	1.632	.026*
Within Groups (16.509)	*4474.055*	271		
Total	*5228.597*	299		
Computer Anxiety				
Between Groups (42.705)	*1195.749*	28	1.280	.016*
Within Groups (33.351)	*9038.251*	271		
Total	*10234.000*	299		
Computer Characteristics				
Between Groups (32.405)	*907.338*	28	.836	.707
Within Groups (38.766)	*10505.658*	271		
Total	*11412.997*	299		
Note that Mean Square error of the variables are in parentheses * p<0.05 level of significant indicated that both computer familiarity and computer anxiety jointly made significantly effect on the performance of the students in CBT				

Source: Field Survey, 2015

Table 1 showed that both computer familiarity (F(28,299) =1.632, P (0.026<0.05)) and computer anxiety(F (28,299) =1.280, P (0.016<0.05)) jointly made significant effecton the performance of the students in CBT. But computer characteristics (F (28,299) =0.836, P (0.707>0.05)) did not made significant effect on student performance in CBT. Therefore, the null hypothesis which states that there is no significant compositeeffect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT is accepted.

Hypotheses 2: There is no significant relative effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo.

Table 2
Regression analysis showing relative effect of computer familiarity, computer anxiety and computer characteristics on the performance of the students in CBT

	B	SE B	.
Constant	8.320	2.452	
Computer Familiarity	.450	.109	.268
Computer Anxiety	.321	.086	.267
Computer Characteristics	.097	.072	.085

B: Unstandardized Coefficients
SE B: Standard Error of Unstandardized Coefficients
B: Standardized Coefficients
R^2: .067 (ps<.05)
Computer Familiarity (*p<.05)
Computer Anxiety (*p<.05)
Computer Characteristics (p>.05)

Source: Field Survey, 2015

Table 3 showed that computer familiarity made the highest significant effect on the performance of the students in CBT, it accounted for 45.0% of the total variance of students' performance in CBT(B=0.450, p = .000, p<0.05), next was computer anxiety which accounted for 32.1% of the total variance of students' performance in CBT(B=0.321, p = .000, p<0.05). However, computer characteristics accounted for 9.7% of the total variance of student' performance in CBT and non-significant at 0.05 (B=.097, p=.180, p>0.05).

Discussion of the Findings

Results of the findings showed that both computer familiarity and computer anxiety made significant effect on the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo. The finding on the significant effect of computer familiarity on the performance of the students inCBT corroborates the result of Goldberg and Pedulla (2002) who found that students with lower computer familiarity scored lower on CBTs than students with moderate and higher computer familiarity. This finding contradicts that of Leeson (2006) which reported that computer experience did not affect students' CBT scores.

The finding on computer anxiety is in line with the result of Glaister (2009) who reported that students who possess medium and high levels of computer anxiety perform worse than those with low levels in a CBT. But this finding contradicts the findings of Ogunmakin and Osakuade (2014) and Stowell and Bennett (2010)which reported that computer anxiety did not significantly affect the performance in CBT. Also, Ogunmakin and Osukuade (2014) found that computer anxiety alone did not show significant influence in CBT performance but inadequate knowledge of computer could trigger computer anxiety which could invariably influence candidates' performance in CBT.

Lastly, finding on computer characteristic support the views of Bridgeman, Lennon and Jackenthal (2001) who reported from their study that monitor size and resolution had no impact on students' scores. But it contradicts that of Florida Department of Education (2006) which reported that computer hardware characteristics, such as monitor resolution,

screen size, and responsiveness affected students' test scores.

Implication of the Findings

The result of the findings indicated that computer familiarity and computer anxiety are the two predominant factors that affect the performance of the students in CBT. The implication of this result is that if we are able to increase the computer familiarity of these students definitely it will lower their anxiety and thereby score higher in the CBT examination. Therefore, student must be well grounded with the knowledge of computer right from the primary education to the tertiary education to enable them acquire required skills and knowledge of computer. Governments and philanthropists should provide adequate computer facilities and gadgets to both primary and secondary schools. Teachers should be trained to acquire skills in ICT and sponsored to attend workshops and conferences in ICT. Government policies on ICTs should be fully implemented and make available adequate fund to enhance the performance of ICT sector as well as reinforced computer curriculum at the primary and secondary school levels to make all students computer-literate.

Conclusion

From this study, it was found that some factors significantly determined the performance of the students in CBT form of Post-UTME screening examination conducted at Emmanuel Alayande College of Education, Oyo. The study affirmed the results of related studies that showed that computer familiarity and computer anxiety accounted for poor performance of the students in CBT. Amongst these two factors, the results of the study showed that computer familiarity contributed mostly to the prediction of students' performances in CBT followed by computer anxiety.

Recommendations

Based on the findings of this study, the Following suggestions are hereby made:

I. Students should be adequately exposed to training on general use of computer at both primary and secondary education level before being exposed to CBT mode of assessment.

ii. Governments and computer professional bodies should organizeICT workshop training for the secondary school students in order to sensitize them and to improve their beliefs and perception towards the use of computer.

iii. Government should equip computer laboratories in secondary schools in Nigeria with adequate hardware and software resources as well as human resources to enable them have access to the use of computer and acquired skills in operating the computer effectively.

iv. Both primary and secondary school teachers should be adequately trained and sponsored to attend workshops and conferences in ICT to enable them acquired required ICT skills sufficient for them to compete with their counterparts at tertiary institutions.

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