STUDENTS' PERCEPTION OF THE COMPUTER BASED TEST (CBT) FOR EXAMINING GENERAL STUDIES IN UNIVERSITY OF JOS, (2015 – 2018).

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Abstract

In recent years, the Computer Based Test (CBT) has been considered as a viable alternative to the unmanageable undergraduate population of students in Nigerian universities. This is in spite of the peculiar nature of some courses that hinders its total implementation. This study investigates the students' perception of Computer Based Test (CBT) for General Studies (GST) courses in the University of Jos, Nigeria. Using the diffusion of innovation theory as basis for scholarly argument, this study examined the potential for using student feedback in the validation of assessment. A manageable sample of 485 students who cut across all levels (100 to 400) in university of Jos, who had taken the CBT/GST examination was surveyed; and questionnaire was used for data collection. The result also showed that, the environment provided by the system, receiving results automatically using the CBT system, threat felt when taking GST/CBT examination compared to the paper-based, as well as the positive experience it offers are important design considerations for the GST/CBT examinations. Students therefore requested early orientations before the examinations and if possible such orientations should be made part of the GST lecture series itself. Also, since the GST/CBT assessment mode has been used for some years in the university, students feel the urge to have GST/CBT guide or manual to enable them read ahead of time. The document will enable to identify grey areas and that need to be addressed during the orientation exercise.

Keywords: General Studies, Computer Based Test, Mode, Assessment

Introduction

Information and Communication Technology (ICT) has greatly changed the techniques for examination/assessment in recent years. In high institutions, the structure of educational measurement and its procedure generally has been moving towards Computer Based Testing (CBT). Computer Based Tests are methods of administering tests or assessments through a computer which can be in a stand-alone or through a specific dedicated network designed for such purposes. CBT can also be administered by a technology device(s) that are connected to the internet or World Wide Web. Most of CBT assessment use Multiple Choice Question (MCQ) (Sorana-Daniela, 2007). According to Peter, C. Bill, I., & David, S. (2004) CBT have been used since the 1960s to test knowledge and problem solving skills. The system has provided educators and instructors with numerous opportunities to publish, design a schedule, provide lectures, carry out research/surveys, and conduct quizzes and exams.

There are two broad categories of CBT, however, the most common type is where a candidate fill in his or her responses on a paper form, which is then fed to a computer Optical Mark Reader (OMR). This reads the form, scores the paper and may even report on the test reliability. The second type of CBT is where computers or devices provide an assessment platform or interface for students to put in their answers and receive feedback via a computer. This type is commonly used in the University Tertiary Matriculation Examination (UTME) and in several universities across Nigeria to conduct examinations. Either way, an effective method of student assessment is necessary in courses such as the General Studies (GST), as well as all areas and levels of education in high institutions. This is key, owing to increase in students' enrolment, ever-escalating work commitments for academic staff, and the advancement of internet technology.

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The utilization of CBT has always been an attractive proposition for high institutions in Nigeria including the University of Jos (Darrell, 2003). Since it was introduced, computer-assisted test systems have impacted the technique and generation of General Studies examination in the university. In recent years, universities in Nigeria have witnessed an upsurge in students' enrolment, making the conventional method test assessment and evaluation, time consuming.

A solution to examination in large classes of students such as the General Studies (GST) obviously lies in the use of CBT. GST/CBT examination was introduced in 2012 primarily to address this problem and other related issues. Specific advantages of CBT as technique for test administration as compared to the traditional Paper and Pencil Testing (PPT) have been demonstrated in many related works as described thus:

> CBT is not just an alternative method for delivering examinations; it represents an important qualitative shift away from traditional methods such as paper based tests. Despite, these advantages available in computerized test administration CBTs are not intrinsically better than paper-and-pencil tests (Peter, Bill, & David, 2004, p.89)

Some studies have even found that testing format does not affect test scores and as such CBT can be considered a valid and acceptable testing mode (Fyfe, Meyer, Ziman, Sanders, & Hill, J (n.d).

As Computer Based Test is commonly used to conduct several examinations nowadays, the need to establish whether the test performance among candidates is comparable to that of paper based assessment has continue to attract attention among scholars. Researchers in this area have carried out several studies to examine the differences in performance of CBT and the traditional paper-based versions. The outcome indicated that while the CBT assessment is similar in format to the pencil and papers tests, it has very insignificant effect of the overall test performance of candidates (Darrell, 2003).

From the perspectives of the candidates themselves, there appear to be some mixed reactions. Past studies showed that more candidates anticipated problems with the conduct of the CBT assessment before the exam (Darrell, 2003). The study also showed that, despite less number of students being confident about CBT before completing the assessment, more students expressed preference for CBT after the test assessment. Other studies such as Peter, C. Bill, I., & David, S. (2004) indicated students' preference for CBT over the traditional paper and pencil test. Despite their preferences, there are other students who reported that the main disadvantage of CBT was increase in anxiety among students who are not familiar with computer application (Darrell, 2003 & Sanders [n.d]) these categories of students can be considered as being "technophobic".

Students' perception on the merits and demerits of CBT assessment and evaluation are important, since user perceptions and criticisms are crucial in the acceptance, implementation and improvement of the system. Going forward, while acknowledging the advantages associated with CBT assessment in high institutions, it is important to explore the relationship between the assessment mode and the behaviour of the students being assessed (Johnson & Green, 2004). It is possible that in spite of the perceived advantages offered by the computer mediated assessment, it may or may not affect the perceptions of students involved in the GST/CBT in the University of Jos differently than if they were engaged in the traditional pen and paper based assessment (Johnson & Green, 2004)

To this end, several key issues are worthy of investigation, such as issues related to quality factors that may influence students performance in General Studies courses and students perceptions regarding the GST/CBT assessment itself. Also, the fact that students' perception of the GST/CBT examination is an under-explored topic is enough justification for a research in this area.

Statement of The Problem

The advantages of using computer technology for educational assessment in a global sense have been recognized; these include lower administrative cost, time saving and less demand upon teachers among others. While recognizing these system-level advantages, it is important to explore the relationship between assessment mode and the

behaviour as well as perception of the students being assessed (Johnson & Green, 2004). Because the assumption of comparability between CBT and paper based test without proper investigation within that particular testing context, is inappropriate (Saad, 2009).

The management of University of Jos has in 2012 implemented the use of CBT to conduct General Studies (GST) examination. Over the years there are reported cases of difficulty to navigate back to rework problems encountered by students during exams. Some students are resistant to the entire CBT process because they are accustomed to taking notes and circling question and/or answers for later review (Saad, 2009). Others say 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. All these conflicting positions serve as the justification for this study. In general, the points of concern are students' attitudes about grades, attitudes about convenience and control, validity. Some students in the University of Jos have a general anxiety about the computer itself, while others are more concerned about their level of computer experience/application. Some other technical issues in CBT that affect students' response to the designed CBT examinations questions are: Use of the mouse, font-size, screen clarity, screen size, screen resolution, display rate and scrolling (John, Cynthia, Judith, & Tim, 2002). These aspects are captured in the survey instrument of this study.

It is therefore anticipated that, providing specific information about students' perception of CBT in undergraduate GST courses in the University of Jos may enable refinement of the current use of CBT. This is because subjects' attitudes and feelings towards a test is an important factor in test design, since, if it is ignored, there may well be adverse effect on test scores (Coniam, 1999). Hence, the use of questionnaire is adopted to tap reactions to carry out survey of students undertaking GST/CBT exams.

Research Questions

The following six research questions were formulated in addressing the problems identified in this study:

1. What are the peculiar issues to GST/CBT assessment in university of Jos?
2. What are the general constraints on the use of CBT for General Studies courses in the University of Jos?
3. What are the factors that influence students' attitudes to GST/CBT assessment mode in the University of Jos?
4. What are the effects of the GST/CBT test administration mode on students' performance i.e students' scores?
5. What is the relationship between prior computer experience and performance in GST/CBT examinations in University of Jos?
6. What practices are helpful to improve GST/CBT examinations in the University of Jos?

DIFFUSION OF INNOVATION IN THE GST/CBT TEST ADMINISTRATION

The use of new innovation championed by Information and Communication Technology (ICT) in tertiary institutions across the world has intensified. It has proved to be effective in increasing productivity and enhancing academic performance. One of such innovation is the Computer Based Test (CBT) which aids in test administration and assessment in schools. In the University of Jos for instance, the Computer Based Test was introduced eight years ago to conduct general studies exams, witnessing huge successes in efficiency and timely delivery of results in the process. However, the diffusion of innovation in GST/CBT test administration and processes that led to its eventual adoption did not come easy, as it is the case with any new idea being introduced into a system. The diffusion of innovation model has been studied for many years, and is one of the most popular models in the academia(Sherry & Gibson, 2002). Several disciplines such as political science, public health, communications, history, economics, technology, and education use this model. The model was defined as a widely used theoretical framework in the area of technology diffusion and adoption (Dooley, 1999 and Stuart, 2000)

According to Rogers (2003), adoption is a decision of "full use of an innovation as the best

course of action available" and rejection is a decision "not to adopt an innovation" (p. 177). Rogers defines diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). As expressed in this definition, innovation, communication channels, time, and social system are the four key components of the diffusion of innovations. In this case, the innovation here is the GST/CBT test administration; the communication channel implies various explanations on what it entails, its pros and cons as well as the process that led to its eventual adoption in the University of Jos. The GST/CBT examination as a development in test administration followed similar other initiatives that are deeply rooted in the diffusion of innovation principles anchored on five different stages.

The innovation-decision process starts with the knowledge stage. In this step, an individual learns about the existence of innovation and seeks information about the innovation. "What?," "how?," and "why?" are the critical questions in the knowledge phase. During this phase, the individual attempts to determine "what the innovation is and how and why it works" (Rogers, 2003, p. 21). According to Rogers, the questions form three types of knowledge. The management in the Division of General Studies, University of Jos has gone passed this stage several years ago; as far as the GST/CBT innovation as a mode assessment is concerned.

The second step is the persuasion step which occurs when the individual has a negative or positive attitude toward the innovation, but the formation of a favourable or unfavourable attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection. Rogers, (2003, p. 176) explained further:

> The individual shapes his or her attitude after he or she knows about the innovation, so the persuasion stage follows the knowledge stage in the innovation-decision process. Furthermore, while the knowledge stage is more cognitive- (or knowing-) centered, the persuasion stage is more affective- (or feeling-) centered. Thus, the individual is involved more sensitively with the innovation at the persuasion stage. The degree of uncertainty about the innovation's functioning and the social reinforcement from others (colleagues, peers, etc.) affect the individual's opinions and beliefs about the innovation.

At the decision stage in the innovation-decision process, the individual chooses to adopt or reject the innovation. While adoption refers to "full use of an innovation as the best course of action available," rejection means "not to adopt an innovation" (Rogers, 2003, p. 177). If an innovation has a partial trial basis, it is usually adopted more quickly, since most individuals first want to try the innovation in their own situation and then come to an adoption decision.

At the implementation stage, an innovation is put into practice. However, an innovation brings the newness in which "some degree of uncertainty is involved in diffusion" (p. 6). Uncertainty about the outcomes of the innovation still can be a problem at this stage. Thus, the implementer may need technical assistance from change agents and others to reduce the degree of uncertainty about the consequences. The GST/CBT as a test administration mode has since been implemented in the University of Jos; the degree of uncertainty about it viability has since vanished.

At the confirmation stage the individual looks for support for his or her decision. According to Rogers (2003), this decision can be reversed if the individual is "exposed to conflicting messages about the innovation" (p. 189). However, the individual tends to stay away from these messages and seeks supportive messages that confirm his or her decision. Thus, attitudes become more crucial at the confirmation stage. Depending on the support for adoption of the innovation and the attitude of the individual, later adoption or discontinuance happens during this stage. This final stage justifies the current study; the need to confirm the position of GST/CBT examination as mode for test administration among students. The outcome will provide areas of strength and weakness in the entire process and further the cause of action for improvement going forward.

Table 1: A brief review of some related studies

Author	Year	Purpose	Method used	Findings
Johnson et al	2004	Examined relationship between assessment mode and students' perception of CBT	Content analysis	Questions computer appears to be difficult than if it were to be on paper
Williams	2007	Looked at attitude of pre-hospital undergraduate students undertaking a web-based examination as an adjunct to the traditional paper-based examination mode	Survey questionnaire among 94 students	Showed students' satisfaction and performance during the CBT mode
Powers &O'neil	1993	Assessed the degree of contribution of CBT to performance among some students of mathematics	Survey /questionnaire	Showed no serious impact on test performance
Erturk&Sanli	2004	Students' perception of online test assessment	Questionnaire and interview among 46 students	CBT was perceived as an effective testing mode
McVay	2002	Examined disparity in students' performance between CBT & paper based test modes	Survey	Indicate disparity exists
Millsap	2000	Investigated likely disparity between the two testing modes among 585 military recruits	Content analysis	Found that the different modes did not affect the results of students
Russel et al	2003	Investigated factors behind low performance in CBT among students	Survey	Concluded that, the low performance can be attributed to inability to practice/review past questions

Source: Field Study, 2018

Methodology

A number of previous related works reviewed identified quantitative approach using survey questionnaire as appropriate method of investigating students' perception of testing mode (Ozden, & Erturk, 2004; Powers & O'neill, 1993; Russell & O'connor, 2003). This study employed the same approach with the items of the instrument developed around previous studies. The study is limited in terms of sampling using convenient sampling frame of 485 undergraduate students who across all levels (100 – 400 levels). The study used the Likert Scale procedure for data analysis, the method is applied as one of the most fundamental and frequently used psychometric tools in educational and social sciences research. A four point scale with a criteria mean of 2.5 was used.

Results and Discussion

Table 2: Level of the respondents

Level	Frequency/Percentage
100	142(29.8%)
200	133(27.9%)
300	109(22.9%)
400	92(19.3%)
Total	476(100%)

Source: Field Study, 2018

Table 4 above presents frequency and percentage distribution of the respondents based on their level in the University of Jos. Majority of the students used for the study were in 100 and 200 level. The two set made of 142 and 133 respondents amounting to 29.8 percent and 27.9 percent respectively. 109 (22.9%) of the respondents were in 300 level; while 19.3 percent were in their final year.

Table 3: Level of computer familiarity

Level of computer literacy	Frequency/Percentage
High	72(15.2%)
Average	352(73.9%)
Low	52(10.9%)
Total	476 (100%)

Source: Field Study, 2018

The level of familiarity of the computer application among students in the University of Jos was not that bad as indicated in table 5 above. A whopping 73.9 percent, that is 352 out of the 476 respondents have fair knowledge of computer application. 72(15.2%) of the respondents were quite familiar with computer application, in other words their computer familiarity is high. This figure is contrast with 52(10.9%) of the 476 respondents whose level of computer familiarity is very low.

Table 4: Problem(s) encountered during GST/CBT examinations

Constraints	Frequency/Percentage
Problems with logging on	69(14.5%)
Problems with selecting/editing answers	48(10.1%)
Problems with submitting answers	39(8.2%)
Problems with navigating the site	84(17.6%)
Did not encounter any problem	236(49.6%)
TOTAL	476(100%)

Source: Field Study, 2018

Table 5: Students' most prevalent attitudes towards the use of computer based test in examining GST courses in the University of Jos.
Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

	4	3	2	1	(2.5)	
ITEMS	SA	A	D	SD	ί	Decision
GST/CBT exam was a positive experience	189	164	78	45	3.0	Accepted
GST/CBT exam was confusing	19	22	277	158	1.7	Rejected
GST/CBT exam was tedious	68	89	175	144	2.1	Rejected
GST/CBT exam got me scared	51	61	207	157	2.0	Rejected
GST/CBT exam was conducted in a conducive environment	204	187	67	18	3.2	Accepted
GST/CBT was better than a paper-based exam	174	188	81	33	3.1	Accepted
I prefer GST/CBT exam to pen and paper exam	174	181	78	45	3.0	Accepted
The GST/CBT exam has enhanced my test score/performance	167	173	79	57	2.9	Accepted
The GST/CBT exam has adversely affected my test score/performance	36	74	205	161	1.9	Rejected

Source: Field Study, 2018

Table 6: Ways to improve GST/CBT exam in University of Jos
Guide: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

	4	3	2	1	(2.5)	
ITEMS	SA	A	D	SD	ί	Decision
Prior computer experience has effect on GST/CBT exam	165	193	62	56	2.9	Accepted
The need for early educational presentations/orientations on GST/CBT exams	149	206	74	47	2.9	Accepted
The use of group meetings, and forum to address issues on GST/CBT exams	59	56	196	165	2.0	Rejected
The need for GST/CBT exam guide/manual document to students	231	182	39	24	3.3	Accepted
Sample test on GST/CBT to address pre-CBT exam anxiety among students.	191	179	59	47	3.0	Accepted

Source: Field Study, 2018

Table 6 above shows various problems encountered by students during GST/CBT exams. The outcome showed that close to half (236) of the respondents used for survey did not encounter any problem during the GST/CBT exams, that amounted to about 49.6 percent. However, 84(17.6%) respondents indicated that they faced problem of navigating during the CBT/GST exams. Other common problems encountered during the GST exams include logging-on to the site, editing or changing answers.

The result in table 7 above shows that from the respondents' perspective, the most prevalent case with the GST/CBT administration in the University of Jos is the success it made in providing a conducive environment for students during the examinations. The result clearly recorded a table mean of 3.2, which was also expressed by the participants in other studies such as (Williams, 2007). Also receiving the GST examination automatically using the CBT system in the University of Jos has been identified by the respondents as the most important positive experience, the item was accepted with a table mean of 3.0 as indicated on the table; this was also identified by Saads (2009) in his study. The students also prefer GST/CBT examination which they agreed to be better as compared to paper based test. The respondents were equally assertive in their conviction that the GST/CBT examination did not in any way scare or confuse them. The two items were rejected with a table mean of 2.0and 1.7 respectively.

Table 8 above shows the evaluation items on effective ways to improve GST/CBT examination in University of Jos. The agreeability mean of respondents is high at over 3.3. The table indicates that there is need for GST/CT examination guide or document to students so they can study the processes and procedures ahead of the examination. Sample tests questions and answers to address pre-anxiety' is the most efficient means of enhancing acceptability of GST/CBT as a testing mode among students. It recorded a table mean of 3.0 signifying another unanimous acceptance of the item by the respondents. With a mean score both of 2.9 respondents suggests 'educational presentations and orientations prior to the GST/CBT examinations can be the next most effective means of promoting GST/CBT approval by students in the University of Jos. However, the idea of using group meeting and forum to address issues on GST/CBT examinations was rejected by students with a table mean of 2.0indicated in the table above. The findings of this study also revealed that, erroneous questions and inadequate time were among major cause of students' failure with GST/CBTmode of assessment. It can therefore be concluded that, examination questions prepared for this mode should be made error-free and also, the timing should be adequate. The result also showed that, the environment provided by the system, receiving results automatically using the CBT system, threat felt when taking CBT exam compared to the paper-based, the positive experience it offers and its efficiency are important design considerations for the GST/CBT examinations. As far as performance i.e test score is concerned, respondents are of the discernment that CBT test mode had effect on their scores.

The researcher thereby conclude that there is need for basic training on general use of computer before exposure to GST/CBT mode of assessment since prior computer experience has a positive influence on performance. It can also be concluded one area that needs further inquiry as far as the GST/CBT examinations are concerned in the University of Jos is, whether the mode of the test itself has fulfilled the required benchmark for assessing students' knowledge in general studies as a whole. This is in view of the fact that the GST/CBT exams has some key limitations, such as the inability to test students' writing skills in English; and working out some symbols that requires some elements of mathematical calculations among others.

Conclusion and recommendations

Gathering information on the possible ways of improving the GST/CBT test from students is vital as they would be able to signify better, what issues the testing had actually confronted them with. A number of recommendations have been made, some of which coincided with what was found in Saad (2009) study such as: using bigger font size and making the presentation more attractive. However, Saad (2009) had categorized recommendations by students into two, which are those that are easily

implemented and the ones which could be intractable. Fortunately, all recommendations found in this study fall under the category of the tractable ones and can even be classified as fundamental good practices required for any CBT settings. Students have really been vociferous with respect to time set, as time seems to run out before achieving tasks. A situation which makes students feel they have been deprived of the opportunity of expressing their ability, similar to something as stated by (John et al., 2002).

Questions also seem to be abstruse and for such errors, the extent to which test scores reflect students' capabilities is impaired. For this reason, students suggested strict editing of the question items before administering them. To address the strenuous pre-test environment students requested early orientations before the examinations and if possible such orientations should be made part of the GST lecture series itself. Nevertheless, studies have identified this to be a common problem for all CBT settings but the problem could be lessened to a greater extent. Since the GST/CBT assessment mode has been around for some years now, students feel the urge to have GST/CBT guide or manual to enable them read ahead of time. The document will enable them to identify grey areas and seek answers during the orientation exercise. Also because of cases where correction of software can corrupt scores, students recommended the use of more robust software to prevent, detect and correct mistakes in the future.

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