

STAKEHOLDERS' PERCEPTION OF THE USE OF COMPUTER BASED TEST (CBT) IN UNIFIED TERTIARY MATRICULATION EXAMINATION (UTME)

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ABSTRACT

The study examined the perception of stakeholders on the use of computer-based test (CBT) in unified tertiary matriculation examination (UTME). It was hypothesized that different stakeholder groups (parents, teachers and students) will not differ significantly in their perception of the use of CBT in UTME and that the main and interaction effects of gender and location on the stakeholders' perception will not be significant. Descriptive survey design was adopted for the study. The sample comprised 680 stakeholders as respondents. Simple random sampling was used to draw the schools, the intact classes, and teachers used for the study. Mean and standard deviation were used to answer the research questions while 3-way Analysis of Variance was used to test the hypotheses. The results of the study showed that: stakeholders have positive perception of the use of CBT in UTME; gender and location have no influence on stakeholders' perception of the use of CBT in UTME. It was recommended that the Joint Admission and Matriculation Board should increase their awareness campaign so that more people will embrace this mode of testing.

Introduction

The importance of assessment in education cannot be over emphasized. It is essential not only to guide the development of individual students but also to monitor and continuously improve the quality of programmes, inform prospective students and their parents and provide evidence of accountability to sponsors of education. Assessment utilizes varieties of tools such as tests, questionnaire, rating scales, observation etc. Thus, assessment goes beyond mere testing. However, for selecting students for entry into higher institutions (such as the one conducted by the Joint Admission and Matriculation Board, JAMB), test may be used. Nworgu (2003) sees a test as a structured situation comprising a set of questions to which an individual or test taker is expected to respond in which there are preferred answers to the questions. Those questions contain some desirable characteristics which the examiner or tester is expecting from the examinee(s). The responses made by the examinee(s) are indications of the extent of the desired characteristics possessed. A test may be administered orally, on paper, on a computer or in a confined area that requires a test taker to physically perform a set of tasks. Nearly every aspect of assessment/test can be supported by technology in one way or another, from the administration of individual tests and assignment, to the management of assessment across a faculty or institution, from automatically marked on-screen test to tools to support human marking and feedback.

In the past few years, technology has significantly reshaped the method of assessment. Technologies in teaching and learning shifted the paradigm from paper-pencil based to computer – based systems of assessment which are usually referred to as e-assessment, Computer-Aided/Assisted Assessment, (CAA), Computer –Based Assessment/Test, (CBA or CBT) and Web-Based Assessment (Joint Information System Committee, JISC, 2007). Although, these

terms may be used interchangeably, there are some differences among them. However, the interest is on CBT.

The British Psychological Society; [BPS, 2002] refers to CBA or CBT as any psychological assessment or test that involves the use of digital technology to collect, process, and report the result of that assessment. Sorana – Daniela and Lorentz (2007) see Computer-Based Test as test or assessment that is 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. The computer provides an assessment interface for examinee and they input their answers and receive feedback via a computer.

Computer Based Test offers several benefits over traditional paper-and-pencil or paper-based test. Some of these advantages, among others are:

- Lower long-term costs
- Instant feedback to student,
- Precision measurement through the adaptation of test content to individual student competency
- Greater flexibility with respect to location and timing of examinations
- Improved reliability (machine marking is much more reliable than human marking)
- Greater storage efficiency
- Enhanced question styles which incorporate interactivity and multimedia [Obioma, Junaidu & Ajagun, 2013].

Despite the benefits of CBT, there are some limitations of this mode of testing. Some of these limitations among others are:

- CBT is limited in the item types that are allowed. Essay questions are difficult to administer on CBT.
- A degree of computer literacy is required if users are not to be disadvantaged by CBTs.
- CBT requires enormous fund for its initial set up
- CBT is susceptible to hacking of the database of the question items. There is risk of total loss of examination data or a lower security of sensitive personal data (Alderson, 2000).

In spite of the above listed limitations of CBT, parastatals in Nigeria such as the Nigeria Immigration Service, Nigerian Armed Forces and tertiary institutions such as University of Uyo, University of Ilorin, University of Nigeria, Nsukka, National Open University of Nigeria etc, are registering and conducting electronic examinations for their students through the internet and other electronic networking gadgets (Abubakar & Adebayo, 2014). The Joint Admission and Matriculation Board (JAMB) conducted the 2013 and 2014 edition of the Unified Tertiary Matriculation Examination (UTME) with three tests options – the traditional paper pencil test (PPT), Dual Based Test (DBT) and Computer Based Test (CBT). Commenting on the exercise, the Minister of Education under Dr Goodluck Ebere Jonathan’s administration, Mallam Ibrahim Shekarau, asserted that the CBT which is a novel introduction was relatively successful in spite of some challenges especially in the area of infrastructure (Okoronkwo, 2015). JAMB in 2015 adopted completely the CBT mode in the conduct of its examinations. The Registrar of JAMB, Professor Dibu Ojerinde noted that the CBT mode will improve the Board’s service delivery; reduce the incidence of breaches of examination security and help Nigeria operate global best practices (Aboderin, 2012).

Despite the enormous benefits inherent in the use of CBT for UTME, as stated by the Registrar of JAMB, mixed reactions have continued to trail its adoption by JAMB. In a report by Aboderin (2012), Mr. Femi, a teacher at Iju Grammar School, Iju – Ishaga, Lagos, said:

“We’ve not had electricity for a long time. I wonder how CBT can work in this school. I feel JAMB needs to put a lot of facilities in place before going ahead with CBT. However, I’m aware that candidates would have the option to choose between PPT and CBT which is good. But that doesn’t change my opinion that JAMB should put the right measure in place before kick starting the CBT.”

In the same report, the Principal, Dairy Farm Senior Secondary School Manager said that the pupils had started receiving seminars on how to take CBT. In her own words:

“Change is constant. I’m a strong believer in CBT. It is high time we break away from the norm. Information and Communications Technology is now what is reigning, we have to keep up with the trend (Aboderin, 2012).”

It is due to these varied opinions that it then becomes pertinent to empirically ascertain stakeholders’ perception on the use of CBT in UTME as perception is seen as an important determinant of human behavior.

Stakeholders involved in UTME includes; students, teachers, parents, JAMB, government etc. However, in this study, students, teachers and parents (parents were represented by Parents Teachers Association Chairpersons and Secretaries) were sampled to represent stakeholders involved in UTME.

Statement of Problem

UTME, an examination conducted by JAMB, is a crucial examination aimed at selecting candidates for higher education in Nigeria. For over three decades, JAMB has conducted the examination using the paper-and-pencil mode. The Board introduced the CBT mode to replace the traditional paper-and-pencil mode of testing in 2013. Despite the successful adoption of CBT by JAMB in conduct of UTME, it is still faced with some challenges, some of which are mostly poor power supplies, among others. This therefore affects the way different individuals see this mode of testing. The success or otherwise of a laudable innovation like CBT depend in part on stakeholders’ disposition towards it. Disposition of individuals generally depend on perception. In the case of CBT, the perception of the stakeholders is yet not well understood. Further, how stakeholders’ perception of CBT will be influenced by such factors as gender and location is not certain. Hence, the problem of this study is: what is the stakeholders’ perception of the use of CBT in UTME? What is the influence of gender and location of stakeholders on perception of the use of CBT in UTME?

Purpose of the Study

This study is aimed at ascertaining stakeholders’ perception of: the usefulness of CBT in UTME; the infrastructural requirement of the use of CBT in UTME; competencies required by students for the use of CBT in UTME; the security issues related to the use of CBT in UTME as well as influence of stakeholders’ gender and location on perception of the use of CBT in UTME.

Research Questions

The following research questions guided this study.

- (1) What is the mean score of stakeholders’ perception of the usefulness of CBT in UTME?

- (2) What is the mean score of stakeholders' perception of the infrastructural requirement of CBT in UTME?
- (3) What is the mean score of stakeholders' perception of the competencies required by students for the use of CBT in UTME?
- (4) What is the mean score of stakeholders' perception of the security issues related to the use of CBT in UTME?
- (5) What is the influence of gender on stakeholders' perception of the use of CBT in UTME?
- (6) What is the influence of location on stakeholders' perception of the use of CBT in UTME?

Hypotheses

The following hypotheses were formulated to guide the study and tested at 5% level of significance:

- (1) There is no statistically significant difference in the mean perception scores of stakeholders (parents, students and teachers) on the use of CBT in UTME.
- (2) There is no statistically significant difference in the mean scores of male and female stakeholders' perception on the use of CBT in UTME.
- (3) There is no statistically significant difference in the mean scores of urban and rural stakeholders' perception on the use of CBT in UTME.
- (4) There is no statistically significant interaction influence of gender and location on stakeholders' perception of the use of CBT in UTME.

Methodology

The study adopted the descriptive survey which according to Nworgu (2006) involves collecting data on and describing in a systematic manner, the characteristics, features or facts about a given population. This design is appropriate because the study describes stakeholders' perception of the use of CBT in UTME.

This study was carried out in Nsukka Education Zone of Enugu State. The population of the study consisted of 4,620 senior secondary school three (SS3) students, 1,995 teachers as well as 110 PTA chairpersons and secretaries from the 55 government owned senior secondary schools in Nsukka education zone. The 20% of the 55 government owned senior secondary schools (that is 11 schools) in Nsukka education zone were drawn through simple random sampling (lucky dip method). The 10% (462) of SS3 students, 10% (199) of teachers as well as the PTA chairpersons and secretaries (22 of them) of the sampled schools formed the sample for the study. The instrument for data collection in this study was a questionnaire on stakeholder's perception of the use of CBT (QSPCBT) in UTME developed by the researchers. The instrument consists of two sections (A and B). Section A captures the demographic information of respondents with respect to gender, location and whether the stakeholder is a student, parent or a teacher. Section B captures the perception of stakeholders on the use of CBT in UTME as it relates to usefulness, infrastructure, competencies, and security. The instrument is a 25 items likert-type scale instrument with the first, second and fourth clusters having the response option; Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) while the third cluster have the response option: Very High, High, Low, Very Low

The instrument was validated by three experts in measurement and evaluation unit. Their corrections and suggestions were incorporated before the instrument was administered. An estimate of internal consistency (Cronbach alpha) was used to estimate the reliability of the instrument. The reliability coefficient of the first, second, third and fourth clusters of the instrument was found to be 0.74, 0.81, 0.77, and 0.82 respectively while the overall reliability of

the instrument was found to be approximately 0.88. Permission of the principals of the sampled schools was sought before the administration of the instrument. The distribution, completion and retrieval of the questionnaire for teachers and students were carried out on the spot while that of PTA chairpersons and secretaries were mailed to them with the help of the principals in cases where reaching them in person proved difficult. All copies of the questionnaire administered were returned. However, three were not completely filled and thus were not used for the study. Mean and standard deviation were used to answer research questions while three-way analysis of variance (3-way ANOVA) was used for testing all the null hypotheses.

Results

Research Question One: What is the mean score of stakeholders' perception of the usefulness of CBT in UTME?

Table 1: Mean and standard deviation of stakeholders' perception of the usefulness of CBT in UTME

S/N	Stakeholders perception of the usefulness of CBT in UTME	Mean	S.D	Decision
1	Use of computer in preparing results minimizes error.	2.72	1.20	Agree
2	Use of computer in reporting results minimize error.	2.82	1.05	Agree
3	Use of CBT in UTME will eliminate cancelation of candidates result.	2.93	0.94	Agree
4	Immediate feedback prevalent in CBT is a source of motivation.	2.95	0.83	Agree
5	Student fairness and equity is ensured with CBT.	2.20	1.13	Disagree
6	Use of CBT in UTME saves time.	2.98	0.90	Agree
7	Use of CBT in UTME is tedious.	2.77	0.99	Agree
8	Use of CBT increases cost of registration of UTME by student.	2.90	0.99	Agree
	GRAND	2.78	1.00	Agree

From the data in Table 1, it is shown that all the items, except item 5, had a mean above the benchmark of 2.5, this implies that the stakeholders believe that the use of computer in preparing and reporting results minimize error, eliminates cancelation of candidates result, is a source of motivation, saves time, is tedious and increases cost of registration of UTME. The stakeholders disagrees that fairness and equity is ensured with CBT.

Research Question Two: What is the mean score of stakeholders' perception of infrastructural requirement of the use of CBT in UTME?

Table 2: Mean and Standard Deviation of Stakeholders' Perception of Infrastructural Requirement of the Use of CBT in UTME.

S/N	Stakeholders perception of the Infrastructural issues related to CBT	Mean	S.D	Decision
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9	Lack of ICT facilities in most school hinders the acceptability of the use of CBT mode in UTME.	2.82	1.14	Agree
10	Poor power supply in Nigeria hinders the use of CBT mode in UTME.	2.82	1.05	Agree
11	Poor internet connection during examination hinders the use of CBT in UTME.	2.78	1.13	Agree
12	The computer systems used for the examination work perfectly well.	2.76	1.00	Agree
13	CBT halls are conducive enough for examination	2.81	1.02	Agree
	GRAND	2.80	1.07	Agree

The data in Table 2 show that stakeholders believe that lack of ICT facilities, power supply and internet connection hinders the use of CBT in UTME. The stakeholders also believe that the computer works well and the CBT halls are conducive.

Research Question Three: What is the mean score of stakeholders' perception of the competencies required by students for the use of CBT in UTME?

Table 3: Mean and Standard Deviation of Stakeholders' Perception of the Competencies Required by Students for the Use of CBT in UTME.

S/N	Stakeholders perceptions of the competencies required for the use of CBT in UTME	Mean	S.D	Decision
14	Ability to type words/figures using the keyboard.	2.79	0.94	Agree
15	Ability to use number keys.	2.69	0.98	Agree
16	Ability to use the mouse to point an area or word on screen.	2.76	1.04	Agree
17	Ability to use mouse clicking options such as left, right and double clicking.	2.68	1.83	Agree
18	Ability to use the mouse to move the cursor (vertically and horizontally) using the scroll button.	3.06	0.90	Agree
19	Ability to use the mouse to open/close a pop-up window	2.64	0.99	Agree
20	Ability to use the screen navigation command (previous/next)	2.70	0.9	Agree
	GRAND	2.71	0.99	Agree

All the items in Table 3 had a mean above the 2.5 benchmark. This implies that the stakeholders perceive the ability to type words/figures, the use of number keys, the use of mouse and the use of screen navigation command as competencies required for the use of CBT in UTME

Research Question Four: What is the mean score of stakeholders' perception of the security issues related to the use of CBT in UTME?

Table 4: Mean and Standard Deviation of Stakeholders' Perception of the Security Issues related to the Use of CBT in UTME.

S/N	Stakeholder perception of the security issues related to CBT	Mean	S.D	Decision
21	CBT prevents impersonation through biometric capturing (thumb printing).	2.94	0.97	Agree
22	CBT reduces cheating by shuffling questions	3.23	0.87	Agree

	available for each candidate.			
23	CBT reduces cheating by presenting a question at a time.	2.59	1.17	Agree
24	CBT does not increase multiple registrations by candidates.	2.87	1.05	Agree
25	CBT prevents leak of UTME questions.	2.80	1.04	Agree
	GRAND	2.89	1.02	Agree

The data in table 4 show that all the items had mean scores above the 2.5 benchmark. This means that stakeholders believe that CBT prevents impersonation, multiple registration and leak of UTME questions. The data also show that stakeholders believe that CBT reduces cheating.

Research Question Five: What is the influence of gender on stakeholders' perception of the use of CBT in UTME?

Table 5: Mean and Standard Deviation Analysis of the Influence of Stakeholders' Gender on Perception of the Use of CBT in UTME

Gender	N	Mean	Std. Deviation
MALE	296	2.84	.38
FEMALE	384	2.74	.34

Table 5 shows that male stakeholders have higher mean perception score than female stakeholders, that is, male stakeholders have more positive perception of CBT than female stakeholders. This can be seen from the gap between the two mean perception scores.

Research Question Six: What is the influence of stakeholders' location on perception of the use of CBT in UTME?

Table 6: Mean and Standard Deviation Analysis of the Influence of Stakeholders' Location on Perception of CBT.

Location	N	Mean	Std. Deviation
Urban	354	2.83	.37
Rural	326	2.75	.35

Table 6 shows that urban stakeholders have more positive perception of CBT than rural stakeholders. This can be seen from the gap between the two mean perception scores of the stakeholders in which mean score for the urban stakeholders is higher than that of the rural stakeholders.

Hypothesis One: There is no statistically significant difference in the mean perception scores of stakeholders (parents, teachers and students) on the use of CBT in UTME.

Table 7: Mean and standard deviation of stakeholders' perception of the use of C BT in UTME

Stakeholders in UTME	N	Mean	Std. Deviation
Parents	22	2.77	.37
Teachers	199	2.80	.34
Students	459	2.79	.37

Total	680	2.78	.36
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Table 8: 3-Way Analysis of Variance of Perception Scores of Stakeholders (Parents, Students and Teachers)*Gender*Location on the Use of CBT in UTME

Source	Type III Sum of Squares	Df	Mean Square	F	Sig
Corrected Model	3.859 ^a	11	.351	2.762	.002
Gender	.063	1	.063	.500	.480
Location	.170	1	.170	1.336	.248
Stakeholders	.068	2	.034	.268	.765
Gender*Location	.043	1	.043	.340	.560
Gender*Stakeholder	.365	2	.183	1.437	.238
Location*Stakeholder	.124	2	.062	.489	.614
Gender*Location*Stakeholder	.088	2	.044	.346	.708
Error	84.829	668	.127		
Total	5358.298	680			

The result in Table 7 shows that teachers have more positive perception of CBT than parents and students. However, the observed difference was proven to be due to chance factor as can be seen in Table 8. The probability associated with F value of .268 is .765. Since this probability value is greater than the 0.05 level of significance, the null hypothesis was not rejected. Hence, the ANOVA above shows that there is no statistically significant difference in the mean perception score of parent, teachers and students on the use of CBT in UTME.

Hypothesis Two: There is no statistically significant difference in the mean scores of male and female stakeholders' perception on the use of CBT in UTME.

The result in Table 8 shows that the probability associated with F value of .500 is .480. Since the probability value is greater than the .05 level of significance, the null hypothesis is not rejected. Thus, there is no significant difference in the mean perception scores of male and female stakeholders on the use of CBT in UTME.

Hypothesis Three: There is no statistically significant difference in the mean perception scores of urban and rural stakeholders on the use of CBT in UTME.

The result in Table 8 shows that the probability associated with the F value of 1.336 is .248. Since this probability value is greater than the 0.05 level of significance, the null hypothesis is not rejected. Hence, there is no significant difference in the mean perception scores of urban and rural stakeholders on the use of CBT in UTME at 0.05 level of significance.

Hypothesis Four: There is no statistically significant interaction influence of gender and location on stakeholders' perceptions of the use of CBT in UTME.

From the result in Table 8, under gender \times location \times stakeholders row, it can be seen that the probability associated with the F value of .346 is .708 at .05 level of significance. Since this value is greater than the level of significance, the null hypothesis is not rejected. Thus, there is no significant interaction effect among the three variables (gender, location and stakeholder).

Discussion

The findings of this study revealed that stakeholders have positive perception of the use of CBT in UTME. Stakeholders agree that the use of CBT in UTME minimize error in preparing and reporting results as well as eliminate cancelation of candidates result. Stakeholders are of the opinion that CBT does not ensure students' fairness and equity. This may be due to differences in the computer literacy level of students. Stakeholders also agree that lack of ICT facilities and

poor power supply hinders the use of CBT in UTME. Stakeholders also perceive the various uses of the keyboard and mouse as competencies required by students for the use of CBT in UTME. Stakeholders agree that the use of CBT in UTME can prevent several forms of examination malpractices.

The findings of this study also indicates that, there is no significant difference in the mean perception scores of parents, teachers and students on the use of CBT in UTME, hence the null hypothesis one is upheld. This implies that parents, teachers and students perceive the use of CBT in UTME in a similar way, thus, any difference that may have been observed was due to chance factor.

The findings of this study revealed that male stakeholders have more positive perception of the use of CBT in UTME than females. However, the difference observed was not statistically significant. The result indicates that there is no significant difference in the mean perception scores of male and female stakeholders on the use of CBT in UTME. This finding contradicts that of Ong and Lai (2006) and Ashong and Commander (2012). Ong and Lai (2006) observed gender difference in perception of online learning in favour of male while Ashong and Commander (2012) showed that gender is a significant factor on perception of online learning in favour of females. This current study has been able to show that gender is not a significant factor with respect to perception of the use of CBT in UTME.

The findings of the study revealed that stakeholders location influence their perception of the use of CBT in UTME. This can be seen from the mean perception scores of urban and rural stakeholders as presented on table 6 with urban stakeholders having higher mean perception scores than rural stakeholders. The 3-way ANOVA however revealed that the observed difference is due to chance factor. Thus, the observed difference may not likely be due to technology divide between urban and rural areas.

Implications

It is evident from the study that stakeholders have positive perception of the use of CBT in UTME. This by implication shows that the use of CBT in UTME is a welcomed development and should be encouraged. The Joint Admission and Matriculation Board should thus increase their awareness campaign so that more people will embrace this mode of testing. Stakeholders also agree that lack of ICT facilities and poor power supply hinder the use of CBT in UTME. To this effect, government and other relevant private agencies should work together to provide these amenities for effective incorporation of CBT in UTME.

Male stakeholders' perception of the use of CBT in UTME is higher than that of female stakeholders. The implication of this is that government; parents, teachers and other concerned bodies/individuals should expose student and/or UTME candidates irrespective of their gender to equal opportunity to manipulate computer and other related technology. This will help to bridge the gender gap between male and female.

Even though stakeholders' location does not influence their perception of CBT, JAMB, Government and other relevant agencies should carry their campaign to rural area so that stakeholders in these areas will have better perception of this mode of testing and thus benefit maximally for this laudable innovation. Also ICT facilities should be provided both in the urban and the rural areas so that stakeholders in these areas can have easy access to them and thus become familiar with them.

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