Student Satisfaction Experience and Infrastructural Facilities on Computer Based Test, in Tertiary Institutions in Lagos State, Nigeria

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Abstract
In this study, investigation was made on student computer literacy, institutional infrastructural facilities associated with the conduct of CBT, and CBT satisfaction experience of the students, in tertiary institutions in Lagos State. The study adopted the survey research design, and the purposive sampling technique was used in sampling the students, covering different departments in the institutions. Three questionnaires structured along four-point Likert Scale were used to collect data. These instruments are Student Computer Literacy (r=0.81); CBT Infrastructure and Facility (r=0.79); and Student CBT Satisfaction Experience (r=0.84) questionnaires. Data were analysed using frequency counts, percentage and Pearson Product Momment Correlation. From the results, recommendations were made that CBT should be adopted to evaluate courses that have large population of undergraduates, and that the staff of tertiary institutions should continuously be trained on best practices in CBT. Also, a national standard should be stipulated for student satisfaction experience in CBT.

Key words: Computer Based Test, Satisfaction experience, Computer literacy, Infrastructural facilities, Student population

Background to the study

Computer Based Test (CBT) is used to evaluate teaching and learning achievements, as well as aptitude in education. CBT simply refers to assessments mediated or enabled by computer. Such assessment is prepared, administered and evaluated using a computer. Students suppose to be computer literate to take this test. Student computer literacy, as well as infrastructural facilities at their disposal could be considerable elements to determine student satisfaction on CBT experience. So, it is worthwhile to see how these could be enhanced with intent towards improved quality of education.

The digital technology of CBT is verifiably dictating the direction for immediate future and next furthermost future of assessment approach in education. In a report by Zilles, West, Herman and Bretl (n.d) and, opinions of Adkins and Linville (2017), sharing their experience on CBT, they advocated on why "Every University Should Have a Computer-Based Testing Facility". They explained that since each student has a unique examination, the students in their institution were allowed to schedule their examinations at a time convenient to them, providing flexibility to the students within a specified day range, and this has prevented conflict examinations; even, helping very large classes to be tested despite small facility. Also, because examination scheduling and proctoring is handled completely by the Computer Based Test Facility itself, there is reduction in anxiety for some students.

To substantiate the claim by Khaleel (2017) that a major challenge of CBT is the quick deterioration of digital platform as a result of obsoleteness, disaster or virus attacks, K**asa and Auwalu (2018) reported that** lack of infrastructure posed a very significant challenge. In addition, K**asa and Auwalu (2018) highlighted the** challenges as inadequate technology infrastructures and frequent power outage, being the bane to CBT application. Considering its benefits, this technology would determine future development in teaching and learning activities. Another important benefit of CBT, among enormous others, is that it is motivating the students or learners to be computer literate.

As attributed by Suryadi (2015), students are Y-generation because of their curiosity to explore new things, including new technology. Meanwhile, Suryadi and Rahmawati (2018) posited that unwillingness of managers and learners to change from Pencil Based Test (PBT) to CBT is a prevailing challenge, because they considered the CBT to cause anxiety and fear due to their low ICT literacy level. However, Suryadi and Rahmawati (2018) found that students enjoyed taking CBT assessment for non-formal education. According to Osuagwu, Akamere, Joseph and Agunenye (2018), CBT has some benefits (see p.43); challenges (see p. 44) and prospects (see p. 45). Also, **Ajinaja (2017,** see **p. 60) also accounted for gains, pains and future of CBT in Nigeria. Likewise,** Marriott and Keong Teoh (2012, p. 6) enumerated some benefits and challenges of CBT, as well its features. Analysing all these assertions, the CBT satisfaction experience by the learners suppose to be paramount.

Though **Kuo-shu and Tzu-Pu (2012)** described student satisfaction as the student's positive feelings or attitude towards his/her learning activities, (p. 142), Ahmad, Pramono and Suratno (2009) **posited** satisfaction as a function of the difference between perception and expectation. However in this current study, CBT satisfaction experience is defined as the extent to which the students who sat for the examination found the set-up and services of the CBT centre as efficient and pleasant. This should be in terms of educational environment, computer system performance, application software operation, internet network performance, electricity supply, responsiveness of administration, fairness of invigilation, reliability of security, quality of test, timely evaluation and proper communication process via digital technologies.

In this digital age of global community and, the era of Computer Based Test (CBT) in educational sector, computer technology conveniently influences most human activities, directly or indirectly. According to Kuo-shu and Tzu-Pu (2012), abundant research in the effectiveness of e-learning and computer-based teaching and testing has been made available for educators. Such is finding of Napitupulu, Rahim, Abdullah, Setiawan, Abdillah, Ahmar, Simarmata, Hidayat, Nurdiyanto and Pranolo (2018) that three of campus service facilities that have the lowest index based on user perception on campus are computer and multimedia laboratory in classroom and Wi-Fi network. However, not much study regarding students' opinions or satisfaction toward computer-assisted evaluation has been done. Globally, there are a lot of researches on distance learner satisfaction, learner CBT perception, on-line learning attitude, blended learning satisfaction and acceptance of web-based, but there is insufficiency of studies specifically on student CBT satisfaction experience.

Every candidate of any examination that is designed as CBT is expected to be knowledgeable with basic computer literacy. An extension of benefits of computer technology in education is the exploration of on-line student registration and checking of examination results. Invariably, the students deserve satisfaction experiences on the CBT, as well as on the infrastructural facilities for the CBT. Moreover, looking critically at this technology approach in educational sector, it supposes to decongest examination centres but reverse is the case. These are prevailing challenges of CBT in Nigeria, at least among a number of other challenges. Therefore, this study investigated student satisfaction experience and infrastructural facilities on computer based test, in tertiary institutions in Lagos state, Nigeria.

Objective of the study

The objectives of this study are to:

1. examine undergraduate students' computer literacy skills for CBT.
2. investigate CBT infrastructure and facilities available to undergraduate students in tertiary institutions in Lagos state.
3. examine CBT satisfaction experience of undergraduate students in tertiary institutions in Lagos state.

Research questions

Three research questions were answered as follows:

1. What computer literacy skills for CBT do undergraduate students in tertiary institutions in Lagos state have?
2. What CBT infrastructure and facilities are available to undergraduate students in tertiary institutions in Lagos state?
3. What is CBT satisfaction experience of undergraduate students in tertiary institutions in Lagos state?

Hypothesis

One null hypothesis was formulated and tested at 0.05 level of significance.

1. There is no relationship between availability of the CBT infrastructure/facilities and the CBT satisfaction experience of undergraduate students in tertiary institutions in Lagos state.

Significance

This study would provide relevant empirical information that could be used to take well informed decision towards planning, as well implementing the integration of CBT approach in tertiary institutions. It would also help to stimulate and ascertain purposive qualitative monitoring, on the practices of CBT in educational sector, nationwide in Nigeria.

Methodology

The survey research design was used in this study. The population for the study was all undergraduate students in tertiary institutions in Lagos state, Nigeria. Only the undergraduate students in five tertiary institutions (one polytechnic and four universities), that had CBT centres, and whose institutions used CBT, participated in this study. The purposive sampling technique was used to select participants for the study. A total of 145 participants which comprised 106 undergraduate students and 39 staff of tertiary institutions were used. Data were collected with researchers' designed and validated questionnaires. The three instruments were further subjected to reliability test by single administration of the instrument on 15 undergraduates and 10 invigilating staff who were replica but not part of the samples in the study. Reliability co-efficient of the instruments used for data collection in this study were very strong with – Student Computer Literacy Questionnaire - SCLQ (0.81); CBT Infrastructure and Facility Questionnaire - CIQ (0.79), as well as Student CBT Satisfaction Experience Questionnaire - SCSEQ (0.84). The links for the digital instruments (on-line questionnaires) were sent by the researchers to the WhatsApp platforms of academics and non-teaching staffs (who invigilate CBT); as well as to the WhatsApp platforms of undergraduate students who have been partaking in CBT examination. All the respondents participated voluntarily in the study and those responses received were computed for final analyses. Data collected were subjected to descriptive analysis of mean and inferential statistical analysis of correlation.

Results

Research question 1:

What computer literacy skills for CBT do undergraduate students in tertiary institutions in Lagos state have?

Table 1: Descriptive statistics on Student Computer Literacy Skills for CBT

S/n	Description of computer literacy skills for CBT	Mean	Decision
1	I can boot computer system	3.43	Agreed
2	I can identify all the parts of computer system	3.46	Agreed
3	I can identify MS Word icon on the functional computer system	3.58	Agreed
4	I can lunch/open MS Word application on the computer system	3.71	Agreed
5	I can select portrait/landscape for page layout on MS Word	3.59	Agreed
6	I can select size of font and font style on MS Word	3.70	Agreed
7	I can use keyboard to type alphabets/figures on MS Word	3.74	Agreed
8	I can move and manipulate mouse conveniently and confidently	3.75	Agreed
9	I can move cursor easily to target point on the computer systems	3.75	Agreed
10	I can use mouse to highlight, copy and paste on MS Word	3.76	Agreed
11	I can shut down computer systems	3.76	Agreed
12	I can open or save document (file) on MS Word	3.72	Agreed
13	I can minimize or maximize window on MS Word	3.68	Agreed
14	I can drag and drop file (graphic) using mouse (cursor) on MS Word	3.65	Agreed
15	I know how to use "Shift/Delete/Space -bar/Back-space/Enter keys, on the computer system keyboard	3.82	Agreed

N = 106 (100%) Decision: Scale 2.50 is used for decision

As shown in Table 1, all the 106 undergraduate students agreed to have the computer literacy skills examined by items 1 to 15 on the SCLQ because all the items were higher than the 2.5 scale used for decision. The item 1 has the lowest (3.43) and item 15 the highest (3.82) but both are far greater than the 2.5.

Research question 2:
What CBT infrastructure and facilities are available to undergraduate students in tertiary institutions in Lagos state?

Table 2: Descriptive statistics on CBT Infrastructure/facility availability

S/n	Description of infrastructure and facility available for CBT	Mean	Decision
1	There was computer laboratory (examination hall) for CBT	3.31	Agreed
2	There was adequate number of computer systems in the exam. hall	2.95	Agreed
3	All the computer systems were being used for CBT	2.80	Agreed
4	There was provision of extra mouse/keyboard to replace malfunctioning devices	2.72	Agreed
5	There were appropriate furniture to place the computer systems being used for CBT	3.05	Agreed
6	There were appropriate seats at the computer systems for CBT candidates	3.15	Agreed
7	There were enough seats for all the candidates at the computer systems for CBT	2.87	Agreed
8	There were functional internet/intranet facilities	2.97	Agreed
9	The internet/intranet at the CBT centre were fast	2.59	Agreed
10	The internet/intranet at the CBT centre were stable	2.62	Agreed
11	There was stable electricity supply at the CBT centre	2.69	Agreed
12	There was appropriate electricity generator as back-up for electricity	3.00	Agreed
13	There were UPS or Inverter or Solar energy as back-up for electricity at the CBT centre	2.49	Disagreed
14	There were air-conditioners/fans at the CBT centre	2.87	Agreed
15	There were adequate lights and illumination at the CBT exam. hall	3.18	Agreed
16	There were CCTV (security) cameras monitoring CBT exam. Hall	2.51	Agreed
17	There were decent toilets for use of CBT candidates at the centre	2.46	Disagreed

N = 39 (100%) Decision: Scale 2.50 is used for decision

Table 2 revealed that all the 39 staff (invigilators) agreed that the infrastructure and facilities for the CBT were adequately available in their individual institutions except on infrastructure and facilities in items 13 and 17; which they disagreed since the scales 2.49 and 2.46 respectively were lower than 2.5 scale used for decision. Among the infrastructure and facilities that were adequately available, the item 16 has the lowest (2.51) and item 1 the highest (3.31), and the highest is far greater than the 2.5 decision scale.

Research question 3:

What is CBT satisfaction experience of undergraduate students in tertiary institutions in Lagos state?

Table 3: Descriptive statistics on Student CBT Satisfaction Experience

S/n	Description of student CBT satisfaction experience	Mean	Decision
1	I was satisfied with the computer system provided for the CBT	3.23	Agreed
2	I was satisfied with the internet/intranet speed and network for the CBT	3.08	Agreed
3	I was satisfied with stable supply of electricity	3.23	Agreed
4	I was satisfied with the immediate response from staff to solve complaints about CBT	3.85	Agreed
5	I was satisfied with fairness of staff in attending to each candidate at CBT centre	2.94	Agreed
6	I was satisfied with levels of human and material securities provided at the CBT centre	3.04	Agreed
7	I was satisfied with activities of invigilators who invigilated candidates for CBT	3.01	Agreed
8	I was satisfied with activities of administrative staff who checked identification details of candidates for CBT	3.17	Agreed
9	I was satisfied with period of time provided for the CBT at the centre	2.90	Agreed
10	I was satisfied with duration of time to do the CBT on the computer system	2.91	Agreed
11	I was satisfied with communication of messages from CBT centre to the candidates who sat for the CBT	2.91	Agreed
12	I was satisfied with neatness of the CBT centre and its environment	3.26	Agreed
13	I was satisfied with performance of software on the computer system for CBT	3.09	Agreed
14	I was satisfied with provision of information to easily locate CBT centre	3.03	Agreed
15	I was satisfied with indication of range of candidates' seat numbers at the entrance of the CBT examination halls	2.91	Agreed
16	I was satisfied with numbering of desks to make candidates locate their CBT seats with ease inside the examination halls	2.75	Agreed
17	I was satisfied with orderliness of arranging large population of candidates who came to the centre for CBT	2.88	Agreed
18	I was satisfied with provision of a place to stay for the CBT candidates who were waiting for their turn (and when it was raining) at the CBT centre	2.38	Disagreed
19	I was satisfied with provision of toilet facilities at the CBT centre	2.41	Disagreed
20	I was satisfied with provision of air-conditioners/fans at the CBT centre	3.11	Agreed
21	I was satisfied with flexibility and convenience of CBT time-table	2.95	Agreed
22	I was satisfied with communication of CBT results to the candidates	2.66	Agreed

N = 106 (100%) Decision: Scale 2.50 is used for decision

As shown in Table 3, all the 106 undergraduate students agreed to have personally had satisfactory experience on CBT except on items 18 and 19, which they disagreed since the scales 2.38 and 2.41 respectively were lower than 2.5 scale used for decision. Among the items that were satisfactory, the item 22 has the lowest (2.66) and item 4 the highest (3.85), and the highest is far greater than the 2.5 decision scale.

To test the only one stated hypothesis, result is presented below.

Hypothesis 1: There is no relationship between availability of the CBT infrastructure/facilities and the CBT satisfaction experience of undergraduate students in tertiary institutions in Lagos.

Table 4: Correlation analysis on CBT Infrastructure/Facility and Student CBT Satisfaction experience

Variable	N	Mean	Std. Deviation	r
CBT Infrastructure/Facility	39	53.6410	5.44584	
Student CBT Satisfaction experience	106	76.1038	3.52928	-.116
Total	**145**			

In Table 4 above, it is revealed that there was a negative relationship between CBT Infrastructure/Facility and Student CBT Satisfaction experience. The r-value of -.116 also shows a very weak relationship.

Discussion

The high possession of computer literacy skills for CBT by the students could be as a result of their earlier exposure to CBT during University Matriculation Examination. This implies that the students already possess basic computer literacy skills require to participate in blended learning. This could have reduced any anxiety that could be associated with the students taking CBT, which their institutions used to assess some undergraduate courses.

Furthermore, keeping of appropriate maintenance activities by the institutions, on the technology devices being used to conduct the CBT, could have contributed to general satisfaction reported by the students on the CBT in their institutions; contrary to. This substantiates Sukandi (2010) who found a positive relationship between facilities provided by the campus and student satisfaction. These reports could also be associated to good human relations by the staff of the institutions with the students, regarding processes of CBT; and these support assertion of Sun, Tsai, Finger, Chen & Yeh (2008). Implication of this is that the individual student satisfaction should be given priority, and this assertion is in consonance with opinion of Yukselturk and Yildirim (2008).

Referring to hypothesis 1, the implication of the negative correlation is that technology alone is not a certainty for satisfaction in education, particularly not an assurance that the student could have a good satisfaction experience in CBT. So, human factor will determine what technology could achieve. Moreover, the very weak correlation lend credence to it that CBT Infrastructure/Facility may also influence student CBT satisfaction experience.

Conclusion

Globally, the CBT is enjoying increasing acceptance in the educational and training sector, and serious efforts are being converged on improving requisite technologies to sustain it. This is because of its enormous benefits, in particular that the learners are predominantly savvy on digital technology. Nevertheless, no matter the extent at which the jet age students could be technologically considered as knowledgeable – the availability, accessibility and standard of infrastructure/facilities are expedient towards what the learners would experience, in term of satisfaction or otherwise, when subjected to CBT. Though this study is conducted on tertiary institution students, its context could happen to students in every level of education or training, be it formal, non-formal or informal education. This is because CBT could be integrated at any level of education.

Recommendation

With these findings, it is recommended that CBT should be adopted to examine faculty courses that have high population of undergraduates offering it. However, a national standard should be stipulated specifically for student satisfaction experience in CBT. Furthermore, training on best practices should continuously be given to tertiary institutions staff, to prevent direct or indirect inhibition of student satisfaction experience in CBT, in order to harness ultimate benefits that are derivable in CBT.

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