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PERCEPTION OF AVAILABILITY AND ACCESSIBILITY OF COMPUTER BASED TEST FACILITIES AMONG UPPER BASIC SCIENCE STUDENTS IN SABON GARI AND ZARIA, NIGERIA

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Abstract
This study investigated the perception of availability and accessibility of Computer-Based Test facilities (CBT) among upper basic science students in Sabon Gari and Zara Local Government Areas of Kaduna State, Nigeria. Two research questions, two null hypotheses guided the conduct of the study. The methodology employed descriptive survey research design. A sample of 380 students were selected from a population of 33,425. Questionnaire titled perception of availability and accessibility were validated with reliability coefficient of 0.7 used for data collection. Chi-square test to determine significant difference in the perceived availability and accessibility of computer facilities among students. Mann-Whitney U test to compare the mean scores of the two LGAs on the perception of CBT effectiveness. Results indicate significant differences between the two Local Government Areas in facility availability and accessibility and the perceptions of effectiveness were similar. The findings highlight the need for equitable resource distribution and improved ICT access to enhance CBT implementation among basic schools' students. Recommendation among others, is to improve ICT infrastructure and access in schools, especially in underserved areas.

Keywords: Perception, Computer-Based Testing (CBT), availability, accessibility, Sabon-Gari, Zaria, Kaduna-State, Test-Usage.

Introduction

A Computer-Based Test (CBT) is electronic replacement of traditional pen-and-paper examination exercises such as JAMB, UTME, WAEC and NECO for integrity, efficiency and accuracy by reducing examination malpractice and delay in results. The transition represents a significant paradigm shift in Nigeria's educational assessment landscape. The landscape of education has witnessed a profound integration of technology into education has transformed teaching and learning processes and revolutionized pedagogical practices (Swargiary, 2024). Computer-Based Testing (CBT) has emerged as a significant innovation, gaining traction in educational institutions worldwide (Ogunlade, et al., (2021). In Nigeria contexts, studies have attributed differences in CBT uptake success to hardware availability, training quality and learning environment support (Oriogu, et al., 2021) Accessibility in this study is a process by which essential facilities for the transforming paper-pen to CBT effectively. In Nigeria, CBT is used for various assessments, including entrance examinations (Obioma *et al.* 2020). CBT addresses challenges associated with traditional paper-based assessments, such as examination malpractice (Abubakar & Adebayo, 2021), by enhancing security and efficiency (American Psychological Association, 2022). CBT also offers benefits like lower costs and instant feedback (JAMB, 2022; Ojerinde, 2023). The Joint Admissions and Matriculation Board (JAMB) spearheaded the transition to CBT in Nigeria (Ojerinde, 2023). Despite the advantages, CBT implementation faces challenges, including infrastructure limitations (Okoronkwo, 2020). One significant innovation in this digital era is the adoption of Computer-Based Testing for learners' evaluations. Therefore, the study investigates perception of availability and accessibility of CBT usage of upper basic science students in Sabon Gari and Zaria Local Government Area (LGA) Kaduna state.

Statement of the Problem

The transition from paper-based testing to computer-based testing for major examinations in Nigeria is still a work in progress. There is limited research on students' experience with CBT and how its availability and accessibility influence their academic performance. In the context of the study, upper basic science students in Kaduna state are now expected to take CBT for evaluation purposes. There might be uneven digital availability and accessibility of it. It is important to understand factors that may hinder their learning and mastery of basic science concepts. To fill the knowledge gap, the study aims to find out the perception in Sabon Gari and Zaria LGAs, Kaduna State.

Objectives of the study:

The objectives of this study are to:

i. To investigate the perception of availability and accessibility of computer facilities for CBT among upper basic science students of the study.
ii. Examine difference in the perception of upper basic science students in Sabon Gari and Zaria Local Government Areas on the effectiveness of CBT**.**

Research questions:

Bases on the objectives of the study, the research questions are:

i. What level of perception is availability and accessibility of computer facilities for CBT among

upper basic science students in the study area?

ii. What is the difference between perception of upper basic science students of Sabon Gari and Zaria Local Government Areas on the effectiveness of CBT?

Null Hypothesis

The null hypothesis was formulated:

H_{o1} There was no significant difference in the perceive level of availability and accessibility of computer facilities for CBT among upper basic science students in the study areas.

H_{o2} There is no significant difference in perception of upper basic science students in Sabon Gari and Zaria Local Government Areas on the effectiveness of CBT.

Methodology

The methodology employed investigated the perception of availability and accessibility of computer-based tests (CBT) on the performance of upper basic science students in Sabon Gari and Zaria Local Government areas of Kaduna State, Nigeria. The study employed descriptive survey research design. It allows the researchers to gather data on variables without influencing or manipulating the outcome. The targeted population for this study was all Junior Secondary School Two (JSSII) 33,425 studying basic science in public secondary schools located in Sabon-Gari and Zaria Local Government Areas of Kaduna State, Nigeria.

In the first stage, a purposive sampling technique were used to select the public secondary schools that participated in the study. The criteria for selecting the schools include:

i. Presence of a functional computer laboratories and ability of students to access computer-based testing facilities: Only schools with existing computer infrastructure and experience in conducting computer-based assessments were included, as this is a key requirement for the study.

ii. Geographic representation: To ensure a balanced representation, the researcher selected an equal number of public secondary schools from the Sabo Gari LGA and the Zaria LGA. Using the entire populations for the study were not feasible due to constraints. Therefore, sampling was necessary to obtain a representative subset that could be reasonably studied.

iii. Based on these criteria, a total of 10 public secondary schools were selected for the study, with 5 schools from each of the two local government areas. In the second stage, a simple random sampling technique were used to select the upper basic II (JSSII) science students within the chosen schools. The approach ensured each student in the target population had an equal chance of being included in the sample. The ability to efficiently select highly relevant participants for the study objectives.

The researchers obtained the enrolment lists of upper basic II (JSSII) science students from the selected schools. Using a random number generator, the researchers randomly selected 38 students from each of the 10 schools, resulted in a total sample size of 380 upper basic II (JSSII) science students.

Table 1: Sample of the Study

S/N	LGA	School	Total JSSII Students	Sample Students
1.	Sabon Gari	School A, Dakace	184	38
2.	Sabon Gari	School B, Zaria	485	38
3.	Sabon Gari	School C, Secondary School, Bomo	229	38
4.	Sabon Gari	School D, Chindit	243	38
5.	Sabon Gari	School E, D/Bauchi	208	38
6.	Zaria	School F, Kofar Kibo	380	38
7.	Zaria	School G, Kongo	406	38
8.	Zaria	School H, Pada	465	38
9.	Zaria	School I, Zaria	360	38
10.	Zaria	School J, Kufena	360	38
				380

This sample size of 380 students was determined based on the Sample Size of sub group to ensure specific information rich subgroup, missed in a random sample and adequately represented in the study. Determination Table by krejcie and Morgan 1970 which suggested a sample of 380 students was appropriates for a population of 33,425, with a 5% margin of error and a 95% confidence level.

The random selection of the 380 upper basic II (JSS2) science students from the 10 selected public secondary schools provided a representative sample of the target population, allowing the researchers to draw meaningful conclusions about the perception of availability and accessibly of computer-based testing on the CBT effectiveness of upper basic science students in Sabo Gari and Zaria Local Government Areas.

A questionnaire titled of perception of availability and accessibility of Computer-Based Testing (CBT) among Upper Basic Science Students Questionnaire was used to collect primary data from respondents. The questionnaire has four sections and a total of 30 items.

Section 1 contains questions on respondents' demographic information including school, gender, and location. Sections 2, 3 and 4 employ a 5-point Likert scale ranging from Strongly Agree to Strongly Disagree to measure respondents' perceptions on various aspects relating to the dependent and independent variables.

Specifically, Section 2 has 8 items measuring availability and accessibility of computer facilities. The final section contains 5 items to evaluate respondents' perception on the effectiveness of CBT compared to conventional paper-pencil tests.

A pilot study was conducted to establish the content and face validity of the questionnaire. Reliability was ascertained through a sample, yielding high Cronbach's alpha value above 0.7

The content and face validity of the instruments as established through an expert validation process. Two lecturers from the Department of Science Education at Ahmadu Bello University, Zaria were engaged as experts in the field of educational measurement and science pedagogy.

Descriptive involving frequencies, percentages, was used to answer the two research questions. For the two null hypotheses, the researchers employ appropriate statistical tests:

Results

Research question one: What level of availability and accessibility of computer facilities for CBT as perceived by upper basic science students in the study area?

Table 2: Availability and Accessibility of Computer Facilities for CBT

	Item	Agree	Undecided	Disagree	Total
1.	My school has enough computers for all students during CBT sessions.	219 (57.6%)	83 (21.8%)	78 (20.5%)	380
2.	I can easily access a computer whenever I need it for CBT.	265 (61.3%)	64 (16.84%)	83(21.84%)	380
3.	The computers in my school are well-maintained and functional.	265 (69.7%)	52 (13.7%)	63 (16.6%)	380
4.	I have sufficient time to practice on a computer before taking a CBT.	231 (60.8%)	65 (17.1%)	84(22.1%)	380
5.	The computer facilities in my school are reliable., good internet connection, no frequent breakdowns).	255 (67.1%)	63 (16.6%)	62 (16.3%)	380

The results in Table 2: indicate that a majority of students perceive computer facilities for CBT as available and accessible. Specifically, 57.6% of students agree that there are enough computers for all during CBT sessions. A higher percentage, 61.3%, feels they can easily access a computer when needed, while 69.7% agree that the computers are well-maintained and functional. Additionally, 60.8% of students' report having sufficient time to practice on a computer before taking a CBT, and 67.1% perceive the facilities as reliable.

Research question two: What difference in the perception of upper basic science students in Sabon Gari and Zaria LGAs on the effectiveness of CBT in evaluating science performance?

Table 3: Upper Basic Science Students' Perception of the Effectiveness of CBT

	Item	Sabon Gari (n=190)			Zaria (n=190)		
		Agreed	**Undecided**	**Disagreed**	**Agreed**	**Undecided**	**Disagreed**
1.	I find computer-based tests to be more objective.	133 (70%)	40(21.05%)	17(8.96%)	95 (50%)	40(21%)	55(29%)
2.	CBT provides a fair and accurate assessment of my science knowledge.	124 (65.26%)	35(18.42%)	31(16.32%)	106 (55.79%)	24(12.64%)	60(31.57%)
3.	My performance is better evaluated through CBT.	114 (60%)	55(28.95%)	21(11.05%)	96 (50.53%)	26(13.68%)	68(35.79%)
4.	Immediate feedback on my test responses helps me improve.	143 (75.26%)	20(10.53%)	27(14.21%)	124 (65.26%)	50(26.32%)	16(8.42%)

5.	Using CBT helps me learn and retain scientific concepts better.	130 (68.42%)	45(23.68%)	15(7.89%)	114 (60%)	30(15.79%)	46(24.21%)
6.	Overall, computer-based testing is more effective.	138 (72.63%)	40(21.05%)	12(6.32%)	118 (62.11%)	25(13.16%)	47(24.74%)

The data in Table 3 revealed that students from both Sabon Gari and Zaria perceive computer-based testing (CBT) as an effective method for evaluating science performance. However, students from Sabon Gari exhibit more positive perceptions across all items. For instance, 70% of Sabon Gari students agree that CBT is more objective, compared to only 50% of Zaria students. Additionally, 75.26% of Sabon Gari students feel that immediate feedback from CBT helps them improve, while this perception is held by 65.26% of Zaria students. Therefore, 72.63% of Sabon Gari students believe that CBT is more effective compared to 62.11% of their Zaria counterparts. These differences suggest significant variations in the perception of CBT's effectiveness.

Testing Null Hypotheses

Ho_1: There was no significant difference in the level of availability and accessibility of computer facilities for CBT as perceived by upper basic science students in the study areas.

To test this hypothesis, a chi-square test was conducted to determine if there was a significant difference in the perceived availability and accessibility of computer facilities among students.

H_{02}: There was no significant difference in the perception of upper basic science students in Sabon Gari and Zaria LGAs on the effectiveness of CBT.

A Mann-Whitney U test was conducted to test this hypothesis, as shown in Table 5

Table 4: Mann-Whitney U Test of upper basic science students' perception of the effectiveness of CBT in evaluating science performance

Location	N	Mean Rank	Sum of Rank	Mann-Whitney U	p-value	Decision
Sabon Gari	190	190.56	36207.00			
				18038	0.99	Retained
Zaria	190	190.44	36183.00			
Total	380					

The results indicated no statistically significant difference in perceptions of CBT effectiveness between students from Sabon Gari and Zaria, U = 18038, p = 0.99 > 0.05. Therefore, based on the Mann-Whitney U test results, the null hypothesis was retained. There was no significant difference found in the perception of upper basic science students in Sabon Gari and Zaria LGAs regarding the effectiveness of CBT. This implies that the students' views on how well CBT assesses science skills and knowledge do not vary significantly

between the two local government areas according to the statistical analysis.

Discussion of Findings

This study investigated the Perception of availability and accessibility of Computer-Based Test (CBT) on Performance among Upper Basic Science Students in Sabon Gari and Zaria Local Government, Kaduna State. Two research questions were answered and two null hypotheses were formulated and tested based on the responses from Usage of Computer-Based Testing (CBT) among Upper Basic Science Students Questionnaire. Analyses of the data obtained were presented in the Table, to in line with the stated research questions and null hypotheses. The study found a significant difference in the perceived availability and accessibility of computer facilities between the LGAs. While over half of students agreed on basic availability, only around 50% felt they could easily access computers and 45% felt facilities were reliable. This disparity between availability and actual accessibility suggests that while schools may have adequate hardware, factors like scheduling limitations, insufficient technical support personnel, and infrastructure issues including unreliable internet connectivity may hinder optimal computer usage. Moreover, unequal allocation of resources between schools in different locations likely results in variable access to functional facilities. Extended technology acceptance (TAM) for adoption of information and communications technology (ICT) in the US construction. If students face challenges accessing computers or frequent downtime, their view of CBT's practical value declines, leading to less positive perceptions of its implementation. Addressing accessibility barriers is therefore important to enhance students' experience and acceptance of technology-based assessments.

Students finding CBT simple yet beneficial for their studies would likely develop more positive views, underscoring the need to improve ICT exposure and skills to foster acceptance of technology-based assessments. Addressing barriers influencing attitudes across environments could help maximize benefits of CBT implementation.

The study found no significant differences between the LGAs in students' perceptions of CBT effectiveness for science assessments. While most viewed CBT positively, no variability was observed across locations. This suggests that despite infrastructure differences, CBT was perceived fairly uniformly as an effective evaluation tool of science skills and knowledge. When technology-based assessments are implemented properly to minimize technical issues, differences in ICT environments may have less impact on format acceptability judgments. Prior research explains these results. Therefore, the results highlight the importance of reliable, well-organized technology integration to promote fair and consistent evaluations.

Recommendations

1 Improve ICT infrastructure and access in schools, especially in underserved areas.
2 Provide training for students and teachers to build literacy.
3 Ensure balance assessment approaches that incorporate both computer based and paper-based test

Conclusion

Equitable resource distribution is crucial for optimizing the benefit of availability and accessibility of Computer Based Test usage among Sabon Gari and Zaria LGAs in Kaduna State.

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