ASSEREN Journal of Education Vol. 9 No. 1, July, 2023 83-91

EMERGING ISSUES IN ASSESSMENT AND TESTING: ATTITUDE TO COMPUTER-BASED TESTING AND UNDERGRADUATES' ACADEMIC ACHIEVEMENT AMONG UNIVERSITIES IN KATSINA STATE, NIGERIA

ABDULLAHI ADAMU DAN'INNA, PH.D.[1] & IHEKWABA CHINYERE NGOZI, PH.D.[2]

[1]DEPARTMENT OF SCIENCE AND VOCATIONAL EDUCATION, UMARU MUSA YAR'ADUA UNIVERSITY, KATSINA, KATSINA STATE, NIGERIA

[2]DEPARTMENT OF EDUCATIONAL PSYCHOLOGY, ALVAN IKOKU UNIVERSITY OF EDUCATION, OWERRI, IMO STATE, NIGERIA

Abstract

This study was aimed at discussing computer-based testing (CBT) as an emerging issue in the field of assessment and testing in Nigeria, and whether undergraduates' attitude to CBT affects their academic achievement among universities in Katsina state. Two objectives were established, and two hypotheses were developed and tested. A correlational design was used in the study. The population of the study comprised 34,050 undergraduates, spread across 15 faculties and 79 departments in all the three universities in Katsina state. The study's sample consisted of 378 undergraduates selected using a multistage sampling technique and in accordance with Research Advisors (2006) guidelines. Data were collected using an instrument developed by the researchers titled 'Computer-Based Testing Attitude Scale' (CBTAS), and was analysed with the aid of IBM® SPSS® Statistics v.23, using Pearson Product Moment Correlation and Independent Samples t-test. The study's findings revealed that there was a significant relationship between scores in attitudes to CBT and academic achievement scores among undergraduates in Katsina state ($r = .758$, $P = .000$), but there was no significant difference in the mean scores of attitudes to CBT between male and female undergraduates in Katsina state ($t = 1.631$, $df = 376$, $P = .104$). Based on the findings, the researchers recommended that undergraduates, both male and female, maintain a favourable attitude about CBT in order to succeed academically. This can be achieved by being friendly with computer and other related gadgets, and by making use of smartphones through participating in online learning and testing platforms.

Key words: Emerging Issues; Assessment; Attitude; Computer-Based Testing.

Introduction

Computer-based testing is a method of administering tests in which responses are electronically recorded, assessed, or both. This involves an applicant sitting in front of a computer, with the questions displayed on the computer monitor and the candidate submitting responses by keyboard or mouse (Alabi, Issa, & Oyekunle, 2012; Onyibe, Juliana, & Abdulhakim, 2015). Nowadays, CBT is not only an alternate technique of delivering examinations; it marks an essential qualitative change away from old methods such as paper-based testing.

The use of CBT to assess students' academic success in Nigeria is considered an emerging issue, despite the fact that the practice has been used for many years in other developed and developing countries. In this regard, Drasgow (2002), Kim and Huynh (2007), and Wainer (1990) believe that computerised testing began in the early 1970s, but limited computer capabilities and high prices hampered its application. With the introduction of new technologies, computerised testing has begun to be developed and utilised in large-scale testing programmes such as licensure, certification, admissions, and psychological exams.

Mojarrad, Hemmati, Gohar, and Sadeghi (2013) observed that for several years, the Graduate Record Examinations (GRE) were conducted in a computer-adaptive fashion. Similarly, in 1998, the Test of English as a Foreign Language (TOEFL) began its transition to computer-adaptive testing. The new TOEFL Internet-Based Test (IBT) was recently launched in a non-adaptive version and administered online. The 'No Child Left Behind' Act of 2001 (NCLB) (Public Law No: 107-110) enforced increased testing requirements and tight timelines, resulting in new techniques for states to monitor kids' performance more effectively (Kim & Huynh, 2007).

Foster (2011), as cited by Luecht and Sireci (2011) stated that one of the first large-scale computerised adaptive testing programmes to go operational was the College Board's ACCUPLACER® Testing Programme, which comprised four tests in 1985: Reading Comprehension, Sentence Skills, Arithmetic, and Elementary Algebra. These exams were created to help place new college students in English and mathematics courses. As a result, the test was rather low-stakes. The first high-stakes CAT was the Novell Corporation's Certified Network Engineer (CNE) Exam. In 1990, the CNE was made available online at Drake Prometric Testing Centres, followed by the online CAT in 1991. This was followed by Education Testing Service's (ETS) Graduate Record Examination (GRE), which was operationally deployed as a computerised-adaptive testing at Sylvan testing centres across the U.S. as of 1992.

In Nigeria, the Joint Admissions and Matriculation Board (JAMB), established by Decree No. 2 of 1978 (amended by Section 5 of Decree 33 of 1989), is tasked with conducting entrance exams for universities, colleges of education, polytechnics, and other related or similar institutions (Alabi, Issa, & Oyekunle, 2012). Thus, every year, JAMB administers the Unified Tertiary Matriculation Examination (UTME) and distributes the results to the students' preferred universities for selection and admission. Over the years, JAMB's UTME has been in a paper and pencil test (PPT) format, and, according to Osuji (2012), as cited by Joshua, Joshua, and Ikiroma (n.d.), has been characterised by a number of fraudulent practices ranging from examination paper leakage, the use of various machines by candidates, bribery by examination officials, impersonation, the use of unauthorised gadgets, among others.

In order to eliminate or minimise these vices, and other reasons, JAMB in 2013 introduced the computer-based testing form of UTME and gave it massive publicity and sensitisation (Joshua, Joshua & Ikiroma, n.d.). JAMB gave the advantages of CBT to include increased delivery of test items that have been calibrated and defined according to their appropriate

item characteristics. Many stakeholders condemned this innovation by JAMB on the spot, some called for its complete cancellation, others for delayed implementation, while some raised questions with sincere intention of understanding the innovation, and some supported the innovation, seeing it as a means of Nigeria aligning with the rest of the technological world.

With this innovation, the then Minister of Education and the JAMB Registrar were summoned by the House of Representatives to explain reasons behind the policy somersault that lead to change in takes off of the policy from 2015 (back) to 2013; the law that empowers JAMB to contract out the conduct of examination to private firms; and who are these firms? However, JAMB conducted the 2013 edition of the UTME with three test options, namely: the traditional PPT; dual-based test (DBT); and CBT. The DBT and CBT were largely successful in spite of some challenges (Joshua, Joshua & Ikiroma, n.d.). JAMB has announced that from 2015 CBT will be used to conduct all UTME to achieve the objectives of ensuring 100 per cent elimination of all forms of examination malpractice that had been a major challenge in the conduct of public examinations in the country (Vanguard, 8th November, 2012).

As observed by Alabi, Issa and Oyekunle (2012), universities in Nigeria began the post-JAMB screening examinations in 2005, as a way of validating the scores obtained by candidates in the UTME organised by the JAMB, with University of Ilorin as one of the first, using the PPT format, which continued up till 2007. Prospective candidates for admission into the university for the 2008 / 2009 academic session were notified at the end of the 2007 / 2008 academic session (which ended May 2008) that the university senate had decided that the admission exercise would be by CBT. This innovation had its own set of initial obstacles, particularly in terms of effective coordination of the exercise, which took place at several centre sites across the country with a high degree of irregularity. Other universities later joined.

In Katsina state, Umaru Musa Yar'adua University introduced CBT during 2014 / 2015 session. It was used to select out the prospective candidates who scored 180 points and above. Later CBT was used for testing students' academic achievement in general courses. Later, in Al-Qalam University Katsina (AUK) and Federal University Dustin-ma (FUDMA), CBT was introduced during 2015 / 2016 and 2016 / 2017 academic sessions respectively. Many of these universities' lecturers expressed concern regarding the conduct, validity, and reliability of this kind of exam administration. Some urged for its immediate revocation, while others posed questions in the hope of better understanding the rationale behind the invention. This necessitated quick training of examination stakeholders (such as Heads of Departments, Faculty Examination Officers, Departmental Examination Officers, and other ICT personnel) via workshops and seminars. This innovation, as earlier observed by Alabi, Issa and Oyekunle (2012), represents a great deal of improvement over the former PPT method given the many benefits it came with, which include among others standardised examination questions, prompt and easy conduct by both the candidates and the concerned staff, elimination of incidence of malpractices, missing results and manipulations, quick release of results, generation of databank for admitted and registered students, secured test items, unbiased test administration and

scoring, faster decision making and adequate coverage of course syllabus in examination questions.

The study of attitudes has been an important area of interest to many psychologists due to their possible impact on learning. Attitude is defined as a learned tendency to evaluate things in a certain way (Cherry, 2014). This can include evaluations of people, issues, objects or events. Such evaluations are often positive or negative, but they can also be uncertain at times. This definition also agrees with that of Hogg and Vaughan (2005), who defined attitude as a relatively enduring organisation of beliefs, feelings, and behavioural tendencies towards socially significant objects, groups, events or symbols.

From the definitions of general attitude to computer offered by Blignaut, Burger, McDonald and Tolmie (2009) and Ololube (2009), we define students' attitudes towards computer-based testing as a complicated mental state that influences their choice of action or behaviour when completing tests and examinations on computers. It is a student's evaluative propensity or tendency to prefer taking tests and examinations on computers and other related gadgets over the traditional oral or paper and pen format. This definition is consistent with that of Tella and Bashorun (2012), who defined students' attitudes towards computer-based testing as their methods of thinking and sentiments about taking computer-based tests.

Students' attitude to CBT plays a crucial role in the implementation of CBT successfully (Khoshsima & Hashemi Toroujeni, 2017). Their attitudes to CBT can be influenced by some other contextual factors such as age, gender, and socioeconomic status among others. Although students' attitudes to computer may have a direct relationship with their prior computer experience, these two constructs are entirely different from each other. As mentioned earlier, attitude to computer can be assessed under many components such as anxiety, confidence, liking, and usefulness. These components were regarded as a source of information while developing items that made up the computer-Based Testing Attitude Scale.

Finally, with the introduction of CBT as an assessment technique in Katsina state universities, experts have expressed worry over students' academic progress. Poor academic performance was seen in these universities; thus, it is critical to study the underlying cause of this problem, which the researchers hypothesised could be attributed to students' attitudes towards this mode of test administration. Therefore, the purpose of this study was to discuss CBT as an emerging issue in assessment and testing in Katsina state, as well as to determine whether there is a significant relationship between students' attitudes towards CBT and their academic achievement in CBT, and whether students' attitudes towards CBT differ by gender among undergraduates in Katsina state.

The following objectives were stated to guide the study:

1. To determine whether or not there exist any significant relationship between attitudes to computer-based testing and academic achievement among undergraduates in Katsina state.
2. To determine whether or not attitudes to computer-based testing differ due to gender

among undergraduates in Katsina state.

Research Hypotheses

The following hypotheses tested at 0.05 level of significance:

Ho1. There is no significant relationship between scores in attitudes to computer-based testing and academic achievement scores among undergraduates in Katsina state.

Ho2. There is no significant difference in the mean scores of attitudes to computer-based testing between male and female undergraduates in Katsina state.

Methodology

The design adopted for the study was a correlational design. This is a kind of quantitative research design which involves determining relationship among two or more variables. The main aim of conducting correlational research is to determine the nature, degree and direction of the relationships between variables and using these relationships to make predictions.

The population of this research comprised all the undergraduates in all the three universities in Katsina state. These universities were Al-Qalam University Katsina (AUK), a private university; Federal University Dutsin-ma (FUDMA); and Umaru Musa Yar'adua University Katsina (UMYU), a state University. Altogether, there were 34,050 undergraduates, spread across 15 faculties and 79 departments in all the three universities in Katsina state. The sample for the study comprised 378 undergraduates, derived using multistage sampling procedure and supported by Research Advisors (2006) guideline. Out of this number, 162 (42.86%) were males and 216 (57.14%) were females.

Data was collected using an instrument developed by the researchers titled 'Computer-Based Testing Attitude Scale' (CBTAS), and was analysed with the aid of IBM® SPSS® Statistics v.23, using Pearson Product Moment Correlation (PPMC) and Independent Samples t-test statistics. The CBTAS was trial tested using 300 samples selected from undergraduates in 300 level in the Faculty of Education, Umaru Musa Yar'adua University Katsina. Internal consistency reliability index of the scale was determined using Cronbach's Alpha statistics, and the result obtained was $\alpha = .873$. Hence, the scale had very good internal consistency reliability index. Also, construct validity indices of the scale were determined, using both Exploratory and Confirmatory Factor Analysis, and the results showed that the scale had a very good measure of both convergent and discriminant validity indices. Hence it was suitable for data collection.

Results

Ho1. There is no significant relationship between scores in attitudes to computer-based testing and academic achievement scores among undergraduates in Katsina state.

To test this hypothesis, Pearson Product Moment Correlation statistic was used, and the output results were as presented in Table 1:

Table 1: Relationship between Scores in Attitudes to Computer-Based Testing and Academic Achievement Scores among Undergraduates in Katsina State

Variables		Attitude to Computer-Based Testing	Academic Achievement
Attitude to Computer-Based Testing	Pearson Correlation	1	.758**
	Sig. (2-tailed)		.000
	N	378	378
Academic Achievement	Pearson Correlation	.758**	1
	Sig. (2-tailed)	.000	
	N	378	378

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1 indicated that, *r = .758, P = .000.* Now since the p-value (.000) was less than the alpha value (.05), the null hypothesis was not accepted and the alternate hypothesis was accepted. So, the researchers concluded that there was significant strong positive relationship between scores in attitudes to computer-based testing and academic achievement scores among undergraduates in Katsina state.

Ho1. There is no significant difference in the mean scores of attitudes to computer-based testing between male and female undergraduates in Katsina state.

To test this research hypothesis, t-test independent samples statistic was used and the output results were as presented in Table 2:

Table 2: Difference in the Mean Scores of Attitudes to Computer-Based Testing between Male and Female Undergraduates in Katsina State

Group	N	Mean	Std. Deviation	df	t	p
Male	162	87.09	9.35	376	1.631	.104
Female	216	85.52	9.19			

From the results in Table 2, *t = 1.631, df = 376, P = .104.* Based on this result, since the p-value (.104) was greater than the alpha value (.05), the null hypothesis was retained. Therefore, the researchers concluded that there was no significant difference in the mean scores of attitudes to computer-based testing between male and female undergraduates in Katsina state.

Discussions

The findings of this study showed that there was significant strong positive relationship between scores in attitudes to computer-based testing and academic achievement scores among undergraduates in Katsina state. This implied that as students develop a positive attitude towards CBT, it will reflect in their academic performance. This is so because universities and other tertiary institutions in the state and the country are shifting from paper-based to computer-based testing, and for students to achieve their academic goals, they must be friendly with computers and other related learning gadgets so as to develop a positive attitude towards CBT. This conclusion supports Alabi, Issa, and Oyekunle's (2012) argument about the derivable benefits of computer-based testing.

In a contrasting finding, it was observed by Khoshsima, Hashemi Toroujeni, Thompson, and Ebrahimi (2019) that no statistically significant correlation between CBT test scores and computer familiarity, and that no statistically significant relationship was observed between computer attitudes and CBT test scores. However, the researchers observed statistically significant relationship between computer aversion and CBT test scores. Although this finding is not in agreement with the finding of the current study, it might not be unconnected to one of the major setbacks noted in the data collection instrument used by those researchers (i.e., the Computer Aversion, Attitudes, and Familiarity Index). It was noted that there was no evidence of proper construct validation, and as such the instrument may not be able to measure students' attitude to CBT reliably, and so the analysis as well as the results might be faulty.

Another possible reason may be as a result of research location differences, as well as the existing policies and practices in the two research locations (Iran and Nigeria). This is due to the findings of Okoli, Ubangha, and Egberongbe (2018), who had similar finding with the current study, and the fact that the two studies were conducted in the same country; Nigeria. The finding of Khoshsima, Hashemi Toroujeni, Thompson, and Ebrahimi (2019) was similar to that of Jamil (2012) and his research was conducted in Pakistan, which is in the same continent as Iran.

However, the second finding indicated clearly that undergraduates across universities in the state, irrespective of their gender, have similar positive attitude to computer-based testing. This may not be unconnected to the fact that many universities are incorporating computers as integral part of test administration as a result of large number of students. So, CBT is becoming more accepted and adopted, and students must accept the fact that they must interact with computers and have positive attitude to CBT so as to achieve their study target.

This finding is in support of that of Tella and Bashorun (2012), who discovered that students generally have positive attitude towards CBT, irrespective of their gender, (and by extension their programme of study), and that more than average of the respondents prefers CBT to paper and pencil test. However, the finding contradicts that of Jamil (2012) who observed varying attitude differences between students from different departments. The finding also contradicts that of Yurdabakan and Uzunkavak (2012) who discovered that there was a significant difference between the attitudes of private school students and state school students, in favour of students from state schools. The difference between these two findings and that of the current study may be as a result of differences in the research location, as well as the research setting, and these may act as mediating variables that might alter results of a study if not properly controlled.

Conclusion

In conclusion therefore, based on the outcome of this study, the researchers concluded that, even though CBT is seen as an emerging issue in assessment and testing in Nigeria, but significant positive relationship was found to exist between attitudes to computer-based testing and academic achievement among undergraduates in Katsina state, and that computer-based testing is gender friendly as undergraduates across different types of

universities in Katsina state have similar positive attitude to computer-based testing, irrespective of their gender.

Recommendations

It is recommended that undergraduates, both males and females, need to continue to have positive attitude to CBT in order to achieve success in their academic affairs. This can be achieved by being friendly with computer and other related gadgets, and by making use of smartphones through participating in online learning and testing platforms.

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