A comparative Analysis of Joint Admissions and Matriculation Board's (JAMB) Performance, Pre and Post Electronic migration

Hussaini Danladi (Ph.D.) , Audu Kafwa Dodo (Msc)

[#] *Joint Admissions and Matriculation Board (JAMB), Abuja, Nigeria*
[*] *Taraba State University, PMB 1167, Jalingo*
Mathematical Science Department, Taraba State, Nigeria

Abstract
The task of conducting examination and ensuring that competent persons are admitted into tertiary institutions of learning in Nigeria is vested in JAMB. This means that JAMB is expected to be upright in its task of making sure that the process that brings about the selected candidates for admission is indespicable, transparent and void of any form of malpractice. To achieve this mandate, JAMB has over the years made marginal reforms on its Paper Pencil Test method until it become obvious that the limitations were almost uncontrollable. This led to the introduction of Computer Based Test. This too, according to the observers is riddled with shortcomings. This paper therefore compares the two methods with a view to establishing which is more result-oriented and attuned to the realities of the modern time. Data was collected using questionnaire which was administered on the selected staff of JAMB and students from University of Abuja, FCT College of Education Zuba, and Dorben Polytechnic Bwari, Abuja who were admitted through JAMB's CBT. Analysis was done using the SPSS. The paper found out that CBT has done far better than the PPT. The paper concludes that, at a time like this when the whole world is going digital, Nigeria cannot continue to be consumed in the old cost consuming PPT. Consequently, the paper recommends that government should improve on provision of ICT infrastructure, and that computer as a subject should be taught in all Secondary Schools in Nigeria.

Keywords: *Comparative, Analysis, Performance, Electronic Migration.*

I. INTRODUCTION

In Nigeria, the mandate to conduct entrance examination into tertiary educational institutions (Universities, Polytechnics, Colleges of Education and related/similar institutions) is vested in Joint Admissions and Matriculation Board (JAMB). Thus, every year, JAMB conducts Unified Tertiary Matriculations Examination (UTME) and forwards the results to the candidates' institutions of choice for selection and admission. UTME is a qualifying entrance examination into tertiary institutions. Before this innovation, UTME has been a paper and pencil test based. This traditional method was shrouded with series of frustrating challenges such as bribing of JAMB officials, impersonation, leakage of examination paper, delays in starting exams and postponements or cancellations, existence of illegal examination centres (magic centres), delays in releasing results and lots more thus necessitating the introduction of CBT in 2013 with the intention of getting rid of the previous abnormalities as mentioned. The migration of JAMB from the Paper Pencil Test (PPT) to the Computer Based Test (CBT) aimed at addressing the challenges of the PPT is still characterized with some of the abnormalities experienced before the introduction of the CBT and to some extent even worse. Some of these challenges can be seen in the administration of the test in batches instead of compressing the entire exercise to take place in one day, dearth of technical staff to the extent of hiring from sister agencies to assist in the administration of the CBT which is capable of compromising the integrity of the exams, centres available could barely serve the number of candidates that registered for the Computer-Based Unified Tertiary Matriculation Examination (UTME) in some locations, there are cases of collapsed centers due to failure of power supply, poor infrastructure especially in rural areas. Apart from the foregoing, there are also cases of centers that extended the network to some hidden locations for malpractice, limited financial resources, lack of cybersecurity to protect JAMB's information database from hackers and other cyber-attacks.

Despite these numerous challenges, JAMB's CBT has come to stay and has been tacitly supported by the government. However, it is curious to investigate which performance of JAMB could be assessed as

better given that the two systems have their limitations.

II. STATEMENT OF THE PROBLEM

Attempts at ensuring that JAMB service delivery in the conduct of effective and efficient examination has culminated in the reforms that have shaped its mode of operation. An important aspect of this reform is the adoption of e-Governance particularly in the area of e-Application. Although the progress of JAMB in the area of e-Application is noticeable, how JAMB has fared in the other aspects of e-Governance is unclear requiring an empirical assessment. Traditionally, JAMB had conducted her examinations using the paper-pencil test (PPT) model. This mode of examination is reportedly characterized by inefficiency and inaccuracy (Retnawati, 2015). Although the alternative computer-based test (CBT) has its own challenges, xthese challenges are primarily of the technology failure (Oduntan, Ojuawo, & Oduntan, 2015). This paper, therefore, seeks to compare the performance of JAMB under the PPT with the CBT to determine which system is more operationally effective.

III. OBJECTIVE OF THE STUDY

The major objectives of the paper include the following:

a. To carry out a comparative analysis of JAMB's performance on pre and post-migration to CBT.
b. Determine whether the post-migration to CBT has more advantages than the pre-migration period.
c. Recommend appropriate measures to JAMB on the best operation to adopt in the process of the conduct of her examination.

IV. STATEMENT OF HYPOTHESIS

H0: There is no significant relationship between the quality of JAMB's performance pre and post-migration to electronic examinations.
H1: There is a significant relationship between the quality of JAMB's performance pre and post-migration to electronic examinations

V. COMPUTER BASED TEST

A Computer Based Test System (CBTS) is a form of assessment in which the computer is an integral part of question papers' delivery, response storage, marking of response or reporting of results from a test or exercise (Whillington 2000). It can be a multiple-choice question-based examination system that provides an easy to use environment for both Test Conductors and Students appearing for Examination. The main objective of a CBTS is to provide all the features that an Examination System must-have, with the interfaces that do not scare its users (Baddi 2010).
An online examination system is an application that allows an institution to conduct examination via the Internet (or intranet). Various companies, institutions and organizations have opted for this method of conducting examinations because it is quicker, easier and convenient. This system makes it easier for examiners to conduct exams and collate results. The application provides facility to conduct online examination anywhere and at any time. Today, most institutions are conducting their exams online to eliminate the bottlenecks associated with pen and paper type of examination. Technology has supported online examinations successfully for several years and has progressively enhanced the process over the years to have room for more students and ensure a smoother online examination. However, one of the biggest challenges to online examination is cheating using technology.
E-exam simply is the process by which examinations are delivered, taken and scored electronically. It entails questions being deployed onto computer workstations (intranet and internet) and candidates answering the questions on to the computer. The process of writing exams is thus completely paperless. It is sometimes referred to as CBT (Computer-based testing) or CBA (Computer-Based Assessment).
E-examinations refer to the use of computers by candidates in a high-stakes supervised (proctored) assessment, generally simultaneously in a fixed period. Adebayo and Abdulhamid's survey (2010) show this definition has been widely accepted in private and public institutions of higher learning as well as in high schools by identifying common practices. Adebayo and Abdulhamid's survey indicate several examination bodies in Nigeria preferred e-examinations to manual examinations (in which students use "pen on paper"). Staff and students preferred e-examinations because of their flexibility, security, integrity, and ease of use.

VI. THE CONCEPT PERFORMANCE

Despite the great relevance of individual performance and the widespread use of job performance as an outcome measure in empirical research, relatively little effort has been spent on clarifying the performance concept. Still, Campbell (1990) described the literature on the structure and content of performance "a virtual desert". However, during the past 10 to 15 years, one can witness an increasing interest in developing a definition of performance and specifying the performance concept.
Authors agree that when conceptualizing performance, one has to differentiate between an action (i.e., behavioural) aspect and an outcome aspect of performance (Campbell, 1990; Campbell, McCloy, Oppler, & Sager, 1993; Kanfer, Roe, 1999). The be-havioral aspect refers to what an individual does in the work situation. It encompasses behaviours such as

assembling parts of a car engine, selling personal computers, teaching basic reading skills to elementary school children, or performing heart surgery. Not every behaviour is subsumed under the performance concept, but only behavior which is relevant for the organizational goals: "Performance is what the organization hires one to do, and do well" (Campbell et al., 1993). Thus, performance is not defined by the action itself but by judgmental and evaluative processes (Ilgen& Schneider, 1991; Motowidlo, Borman, &Schmit, 1997). Moreover, only actions which can be scaled, i.e., measured, are considered to constitute performance (Campbell et al., 1993).

The outcome aspect refers to the consequence or result of the individual's behaviour. The above-described behaviours may result in outcomes such as numbers of engines assembled, pupils' reading proficiency, sales figures, or number of successful heart operations. In many situations, the behavioural and outcome aspects are related empirically, but they do not overlap completely. Outcome aspects of performance depend also on factors other than the individual's behaviour. For example, imagine a teacher who delivers a perfect reading lesson (a behavioural aspect of performance), but one or two of his pupils nevertheless do not improve their reading skills because of their intellectual deficits (outcome aspect of performance). Or imagine a sales employee in the telecommunication business who shows only mediocre performance in the direct interaction with potential clients (the behavioural aspect of performance), but achieves high sales figure for mobile phones (outcome aspect of performance) because of a general high demand for mobile phone equipment.

In practice, it might be difficult to describe the action aspect of performance without any reference to the outcome aspect. Because not any action but only actions relevant to organizational goals constitute a performance, one needs criteria for evaluating the degree to which an individual's performance meets the organizational goals. It is difficult to imagine how to conceptualize such criteria without simultaneously considering the outcome aspect of performance at the same time. Thus, the emphasis on performance being an action does not solve all the problems.

Moreover, despite the general agreement that the behavioural and the outcome aspect of performance have to be differentiated, authors do not completely agree about which of these two aspects should be labelled 'performance'.

VII. METHODOLOGY

The study employs survey research design to generate data for the study. The use of survey data underscores the empirical nature of the study because it establishes the relationships that exist among the variables studied

The population of this study is made up of the entire Staff of JAMB which is 829 as at December 31st 2017 which cuts across all cadre and departments and admitted students for UTME from 2013-2017 (24,647) in the case of University of Abuja, 2015-2017 (5776) for College of Education Zuba and 2016-2017 (253) for Dorben Polytechnic, Bwari-Abuja. This is because FCT College of Education Zubaand Dorben Polytechnic, Bwari runs 3 and 2 years programme respectively.

The stratified sampling technique was adopted to reflect the characteristics of research population in JAMB (829), University of Abuja (24,647), FCT College of Education, Zuba (5,776) and Dorben Polytechnic, Bwari (253). Out of the total population of 31,505 a sample size of 381with the aid of 2006 Research Advisors Table for determining sample size was used at 95% confidence level.

The Statistical Package for Social Science (SPSS) was used to carry out the descriptive and inferential analysis of data. The data obtained from the field survey were presented, analysed, and interpreted through the use of frequency tables and simple percentage. This became necessary to give a vivid description of all relevant variables in the survey conducted. The preference for this method was due to the pattern in which the questionnaires were framed such that nominal data can be easily converted into percentages.

TABLE I

Data Presentation

Table 1: Descriptive Analysis of the effectiveness of performance of Jamb after migration to electronic examinations

S/N	Statement	Category		Response Categories				Total	Mean Score	Decision
			SA (5)	A (4)	UD (3)	D (2)	SD (1)			
1.	E-exams through CBT has improved the efficiency and quality of JAMB exams.	Staff Students	24 129	5 149	1 15	0 16	0 20	30 329	4.77 4.07	Agree Agree
2.	CBT has reduced cheating by a difficult shuffling of questions available for each candidate	Staff Students	18 132	11 115	1 40	0 24	0 18	30 329	4.57 3.97	Agree Agree
3.	CBT saves time, cost and minimises clerical mistakes associated with PPT	Staff Students	21 109	7 148	2 39	0 17	0 16	30 329	4.63 3.96	Agree Agree
4.	CBT reduces distractions that constitutes a nuisance when using PPT	Staff Students	16 89	12 164	2 41	0 16	0 19	30 329	4.47 3.88	Agree Agree
5.	CBT is user-friendly, easy for testing and ensures close monitoring by supervisors	Staff Students	21 99	8 140	1 50	0 18	0 22	30 329	4.68 3.84	Agree Agree
	$Grand\ Mean = \frac{Staff}{Student} = \frac{4.62}{3.94} = \frac{Agree}{Agree}$									

Source: Field Survey, 2019.

Table1 above presents the item by item descriptive analysis of JAMB students and staff response to the question; what is the level of JAMB's efficiency after migration to electronic examinations? The mean score of the items for the two categories of respondents were all greater than the 5 – Likert scale measurement average i.e. 3.0. The result also indicated that the grand mean rating of the JAMB staff (mean = 4.62) was greater than the grand mean rating of the students (mean = 3.94). Since the grand means of both categories were greater than the 5 – Likert scale measurement average (mean = 3.0), it can be concluded that the staff and students agreed that the level of JAMB's efficiency after migration to electronic examinations is high.

H_0: There is no significant relationship between the quality of JAMB's performance pre and post-migration to electronic examinations.

To examine the difference in the quality of JAMB's performance for pre and post-migration to electronic examinations, the mean responses on pre-migration to electronic examinations and post-migration to electronic examinations were subjected to a descriptive Statistics and independent-sample t-tests as presented in table 2 below.

VARIABLES:

INDEPENDENT VARIABLE = Pre and Post-migration to electronic examination

DEPENDENT VARIABLE = mean responses on the quality of JAMB's performance

Table 2. T-Test result of the pre and post quality of JAMB's operations

Periods	Total	Mean	Std. Deviation	T-testt	critical	d.f.	P – Value	95% Conf. Interval Upper	Lower
Pre Migration	42	3.381	1.03482	2.208	1.96	327	0.028	0.7159	0.04128
Post Migration	287	3.7596	1.03844						

The study found that the quality of JAMB performance during post-migration to electronic examination had statistically significantly higher mean *(3.7596 ± 1.0384)* when compared to the quality of performance during pre-migration period *(3.381 ± 1.03482),* with mean difference = 0.43, $t_{(327)}$ = 2.208 and p = 0.028.

Since the calculated t-test of 2.208 was greater than the t-critical of 1.96 and the p-value of 0.028 was less than the level of significance = 0.05 at 327 degree of freedom (D.F.), the null hypothesis is rejected and the alternative hypothesis is accepted.

The conclusion reached based on the decision above is; there is a significant difference in the quality of JAMB's performance pre and post migration to electronic examinations, this implies that the quality of JAMB performance is better after the migration to electronic examination.

VIII. DISCUSSION OF FINDINGS

Statistics from research question four showed that both students and JAMB staff agreed on all the issues raised in the questionnaires except item 5 where JAMB staff disagreed that locating CBT centres is stressful and affect their performance in the examination with χ=2.73. The students' position conforms to the findings of Obioma et al. (2013) who observed that much of the infrastructures for automated examinations are either obsolete or overstretched in terms of capacity, accessibility, reliability and security. Again, the absence of internet facilities in our rural areas requires students travelling long distances to urban centres to have access to internet. However, result from the analysis indicates that the respondents agreed to a higher extent that JAMB ICT infrastructures are adequate for electronic examinations.

The test of hypotheses shows that in hypothesis four, the null hypothesis was rejected and the alternative hypothesis accepted with cal t-test 2.208 > t-critical 1.96 and P-value of 0.028 less than the level of significance 0.05. Since the calculated t – test of 2.208 was greater than the t-critical of 1.96 and the p – value of 0.028 was less than the level of significance = 0.05 at 327 degree of freedom (d.f.), the null hypothesis is rejected and the alternative hypothesis is accepted which shows there is a significant difference in the quality of JAMB's operations pre and post migration to electronic examinations, this implies that the quality of JAMB Performance is better after the migration to electronic examination.

IX. CONCLUSIONS

The findings of this study laid credence to the fact that the adoption of CBT has given JAMB an improved performance over the PPT. This improvement is itself a product of a global shift from use of papers to electronic transactions, which Nigeria cannot afford to ignore. Even though, it has not been all smooth with JAMB's CBT, it represents a significant milestone for improved efforts at perfecting the whole process of electronic examination in Nigeria. To this end, this paper recommends the following:

i. The government should improve on the provision of ICT infrastructure so as to ensure increased public confidence in JAMB's CBT
ii. Computer as a subject should be taught in all Secondary schools in Nigeria to familiarize candidates with necessary skills not only to participate in JAMB's examination but also, to face other necessary computer operations.
iii. Provision of computer sets to secondary schools should be increased to afford the students the opportunity to acquaint themselves with the use of computer.

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