The Use of Innovative Technologies in the Assessment and Certification Processes in National Business and Technical Examinations Board (NABTEB), Nigeria

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Abstract

The role of assessment and certification processes in the education sector can only be ignored at the peril of quality of nations' educational systems as there is yet no alternative means of ascertaining the quality of human resource development of any nation. Examining bodies are thus saddled with the responsibilities of assessment and certification in the various national educational systems. Hitherto, most examining bodies were using manual approaches for assessment and certification processes. Today, assessment and certification processes are witnessing rapid technological changes. This paper, therefore examines the current state of assessment and certification processes in a Nigerian examining body and also the degree to which the application of technologies has positively affected assessment and certification processes. A three-part validated questionnaire, with reliability coefficient of 0.934 using Crobanch Alpha Coefficient Formula was administered on 1110 respondents randomly selected from among the staff of NABTEB and vocational teachers from selected colleges in all the states of Nigeria. The finding was that the application of technologies has positively enhanced the processes of assessment and certification by NABTEB. It was, therefore, recommended that increased usage of technologies to further enhance the quality of assessment and certification processes in the Nigerian examining system be further encouraged.

Keywords: Assessment; Certification; Technologies; High-Tech; Examining Bodies;

Introduction

The world today is experiencing globalization in all areas of life especially in education which is regarded as the bedrock for any national development. In the education sector, all examining bodies are faced with the challenges of globalization, following the changes in assessment and certification processes and the need to ensure quality assurance. The trademark of any examining body is "quality assurance delivery" and in order to achieve this, examining bodies are required to be regularly exposed to innovations in their assessment processes such as the use of new technologies. According to Simiyu in Adegbija , Fakomogbon and Daramola (2012), the term technology as applied to education includes ways of organizing events and activities to achieve educational objectives as well as the materials and equipment involved in the education process. Technologies are very vital for the achievement of various educational objectives in terms of:

(i) Improving the quality of education by ensuring that the assessment and certification processes are valid and reliable.
(ii) Expanding the citizenry access to education at all levels.
(iii) Control of all the negative practices presently encountered before the advent and application of the new technologies.
(iv) Maximizing profit and reducing costs.
(v) Provision of quick and fast services.
(vi) Provision of information relating to effective and efficient decision

The new technologies available for use in examining bodies include among others:

◆ Computers.
◆ Internet.
◆ E-learning packages.
◆ Finger Biometrics.
◆ Handheld detectors.
◆ Optical scanners
◆ Examiners Marks Sheet (EMS) and Optical Mark Reader (OMR)
◆ Digital machines for certificate embossment
◆ Computer hardware, software, applications etc.

These technologies have brought about with them changes in both the performances of staff of examining bodies that are fully computerized in general and the quality of assessment and certification processes in particular. This work is therefore carried out to ascertain the extent of use of such innovative technologies, their impact on the assessment and certification processes in NABTEB examinations and the perceptions of different types of schools on the enhancement of operational efficiency through the use of innovative technologies.

National Business and Technical Examinations Board (NABTEB) established in 1993 is one of the examining bodies in Nigeria. Its establishment emerged as a result of some issues associated with West African Examination Council (WAEC) being the only examining body in Africa as at that time. One of such issues was the overloaded activities of the Council. Hence the need for the establishment of NABTEB to relieve the Council of the conduct of examinations leading to the award of National Business Certificate (NBC) and National Technical Certificate (NTC) among others.

Since the inception of the Board, it has been setting and conducting Common Entrance Examination for selection of candidates into state and federal technical colleges in Nigeria for certification purposes. NABTEB, as an examining body, designed its format and nature of the

examination in order to achieve its goals and objectives. In so doing, processes leading to the assessment and award of certificates come up in stages namely:

    (i) pre-examination;
    (ii) during examination; and
    (iii)post-examination.

The pre-examination process is all about the activities carried out before the commencement of examinations. These among others include: the planning, sales of forms/scratch cards, processing of entry schedules, item construction etc. All these activities are carried out simultaneously by the different departments of the Board with the intention of achieving one goal – successful conduct of examinations.

In the past, all these activities were done manually. For instance the sales of forms (Nov/Dec series), completion and submission of entry schedules (May/June series) by the principals and proprietors of different schools were cumbersome, tedious and chaotic. The processing of the entry schedules, preparation of packing lists, stamping of photo-albums etc. by NABTEB staff were time consuming, tedious and fraught with errors and delays. Increase in candidature experienced by the Board worsened the situation because the processes became more compounded. But with the advent of the new technologies, the Board was able to overcome some of these challenges and the idea of manual processing of entry documents became irrelevant.

In the actual administration of test, the Board in the past made use of the appointed centre supervisors and monitoring officers for the examinations. The only monitoring gadgets used in reporting the conduct of the examination were the monitoring proforma and the photo-albums to checkmate examination irregularities such as impersonation. The usage of the photo-album was a problem because of its bulkiness especially in the case of large centres. Technologically, the monitoring exercise is made easier and less strenuous now. For instance the new computer photo card print-out of the candidates has removed the problems associated with carrying bulky photo-albums of different examination centres. It has also reduced impersonation because the candidates passport photographs are engrossed on the print out. Biometric fingerprints as a supplement to the photo-card-print-out is now used to checkmate impersonation, as suggested by Adeoye (2010), here the candidates are meant to clock in before the commencement of the examination. Also the use of Hand-held security scanners has helped the monitoring officers to detect metal objects not acceptable in examination halls.

The post examination processes involves a lot of activities ranging from the retrieval of examination answers scripts to verification and release of results. As earlier said, most of these activities are carried out simultaneously by different departments of the Board. The activities at this stage were manually processed and as such were faced with a lot of challenges. For example, the scoring of the candidates' answer scripts (both essay and objective) and the collation of marks were very difficult and time consuming and as such there were apparent delays in the release of results. The objective tests were scored manually using the templates and the essay scores were captured and analyzed manually as well. The mean score and standard deviation of the candidates were completed with stress. In attempting to attenuate the challenges associated with the collation of marks, the Board embraced the use of new technologies such as DRS (i) 400/800, Axiom Asin 980 mallow scanners to facilitate machine scoring of the objective

answer sheets. The Examiners Marks Sheet (EMS) has also been made available for the examiners to capture correctly and speedily the candidates' scores after marking. The EMS is an optical document that enables the computer capture the candidates' original scores as recorded by the examiners without the manual process. The Optical Mark Reader (OMR) is also used to capture the final total score of the individual candidates in order to facilitate machine scoring of the objective test. The major challenge associated with transferring of marks from the script to Marks and Attendance Sheets (MAS) and finally to EMS by the examiners is checkmated by using checkers whose major responsibility is to correct mistakes arising from the transfer. The statistical analysis of the result is computed with easy detailing the statistical information such as the standardization of the overall scores, the mean scores, standard deviation and the reliability co-efficient of the test through standardization and validation.

Assessment and certification processes are among the areas that have witnessed tremendous technological innovations over the years which in turn brought out drastic changes in educational sector. Its applications so far, have enhanced the assessment and certification processes in NABTEB as well. The importance of assessment in educational sector cannot be over – emphasized and as such should be taken very seriously because any wrong assessment done affects the lives of the candidates. Assessment is a complex process in formal context (Nicol, 2008).

NABTEB assessment processes are geared toward external assessment that leads to the award of certificates. In order to have quality assessment, Nworgu (2009) noted, that the quality of the individual items and the entire instrument should be ensured. Also, some factors such as increase in candidates' enrolment and grading system which affect the processes of assessment should be taken into consideration. In recent years, NABTEB is experiencing increase in the enrolment of candidates and this poses a challenge in the assessment and certification processes. In order to ensure valid and reliable assessment, the embracement and application of the new technologies become inevitable.

In applying the new technologies, in the assessment and certification processes, one pertinent question needs to be addressed: whether the technology applied is intended to enhance assessment and certification i.e. the purpose of the technology in relation to time and resources. Again one needs to know whether the technology application leads to a better use of staff time (input measured) and the effectiveness of the technology in resolving real assessment and certification issues (process measured). The understanding of the application of the technology helps to make valid judgment of the certificate irrespective of its inherent pitfalls.

Statement of the Problem

Prior to the advent of new technologies, the assessment and certification processes in NABTEB were manual and as such were faced with a lot of challenges: falsification of results, examination misconduct, delay in release of results etc. In recent years, NABTEB embraced the new technologies in order to improve her assessment and certification processes. The issue addressed in this study is the extent to which NABTEB uses innovative technologies to enrich and make assessment tasks more authentic, reliable and valid. With the advent of new technologies, have the certification processes been enhanced? This forms one of the problems addressed in this

study. Another problem addressed has to do with the perceptions of teachers in public and private schools on the use of new technologies which are seemingly different.

Research Questions

The following research questions were raised for a guide;

(i) To what extent are the modern technologies used in the assessment and certification processes in NABTEB examinations?
(ii) Does the use of modern technologies enhance the assessment and certification processes in NABTEB examinations?
(iii)Is there any significant difference in the perceptions of teachers in public and private institutions on the effective use of modern technologies in NABTEB examinations?

Methodology

The study adopted a survey design. The target population comprised all the NABTEB examination centres and the whole of NABTEB staff. A random sampling technique was used to select a sample of 1110 respondents comprising 773 teachers from four out of the six geopolitical zones in Nigeria namely North West, North Central, South West and South South and 337 NABTEB staff from both the headquarters and field offices within the selected geo-political zones.   A questionnaire was used to collect data for the study. The instrument was validated by the experts (consultants).   The reliability co-efficient of the instrument was 0.934 using Cronbach's Alpha method. The data collected were analyzed using descriptive statistics (mean and standard deviation) and independent t-test.

 Results

Research Question 1: To what extent are the modern technologies used in the assessment and certification processes in NABTEB examinations?

Table 1: *Descriptive Statistics of the Extent of Use of Modern Technologies in the Assessment and Certification Processes in NABTEB Examinations*

Use of Technologies	No. of Respondents	Mean	Standard Deviation	Decision
Item Construction is technology driven	1108	3.15	.933	In use
Using sub-system (portal) for tracking record of supervisors and examiners is possible through the use of technology	1110	3.12	.878	In use
Use of assessment materials (OMR, MAS, EMS) are readily available through the use of technologies	1110	3.18	.880	In use
Using technologies to address queries and complaints in verification, confirmation of results and certificates is possible,	1108	3.23	.903	Possible to use

Examination results can be checked with the use of technologies	1109	3.48	.809	In use
The use of technologies makes learning packages accessible.	1109	3.46	.778	In use
Utilization of technologies makes electronic item banking (e-item banking) possible.	1109	3.40	.816	Possible to use
Use of teleconferencing for item moderation is possible,	1109	3.00	.923	In use
Group electronic mailing (e-mailing) is readily available for item moderation,	1110	3.01	.954	In use
Standardization of marking scheme is possible through the use of technologies.	1109	3.16	.895	In use
Electronic marking (e-marking) is possible.	1110	3.14	.954	Possible to use
Technologies make social media possible.	1110	3.35	.853	In use
Technologies are available for marking coordination,	1110	3.00	.996	In use

The result of the data analysis in table 1 indicates that the use of modern technologies has become inevitable in the assessment and certification processes of NABTEB examinations. The result revealed that the respondents, comprising the staff of the Board and teachers from some selected NABTEB centres, indicated that the examination related activities of the Board as listed above have witnessed tremendous application of modern technologies with the mean ranges between 3.00 and 3.48 while the standard deviation ranges between 0.809 and 0.996. This was evident from the high mean scores obtained by the thirteen items which were above the decision rule of mean score of 2.5.

Research Question 2: Does the use of modern technologies enhance the assessment and certification processes in NABTEB examinations?

Table 2: *Descriptive Statistics for enhancement of NABTEB examination processes through the use of modern technologies*

Enhancement Areas	No. of Respondents	Mean	Standard Dev.	Decision
Technologies enhance candidates' registration.	1108	3.45	.866	Agreed
Technologies make printing of photo cards easy.	1107	3.44	.901	Agreed
Information and communication technology (ICT) improves the quality of NABTEB examinations.	1109	3.47	.787	Agreed
The embossment of candidates' photographs on the registration forms reduces	1110	3.34	.865	Agreed

impersonation				
The use of technologies enhances examination related statistical analysis	1110	3.35	.808	Agreed
The use of technologies makes item construction easier	1108	3.25	.932	Agreed
The use of technologies enhances sales and purchase of examination forms	1108	3.34	.886	Agreed
The use of technologies reduces difficulty encountered in completion and submission of examination forms	1109	3.40	.851	Agreed
ICT enhances the processing of entry documents.	1108	3.42	.850	Agreed
Technology enhances the processing of examination scores.	1109	3.44	.786	Agreed
Technology improves speedy release of results.	1108	3.50	.814	Agreed
Embossment of candidates' photographs improves authentication of certificates	1110	3.39	.844	Agreed
The use of bio-metric finger print reduces the rate of impersonation.	1110	3.31	.894	Agreed
Hand-held security scanners help to detect metal objects not acceptable in examination halls.	1109	3.23	.940	Agreed
Electronic payment (e-payment) results in prompt payment of examination personnel.	1109	3.29	.915	Agreed
Inserting candidates' names on the OMR objective sheets minimizes examination malpractice relating to objective test.	1108	3.31	.927	Agreed

The result from the analysis of data in table 2 above shows that the use of modern technologies such as handheld scanners, biometric data capturing machine, e-registration, e-payment, electronically pre-numbered examination materials and embossment of candidates' photographs on certificates enhance the assessment and certification processes in NABTEB examinations as evident in the mean scores obtained which range between 3.23 and 3.50 values higher than the decision rule of a minimum l of 2.5.

Research Question 3: Is there any significant difference in the perceptions of public and private institutions on the use of modern technologies in NABTEB examinations?

Table 3: *Independent Samples Test on the Difference in the Perceptions of Public and Private Institutions on the use of Modern Technologies in NABTEB Examinations*

| | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Upper	Lower
Dependent Variable Equal Variances not assumed	1.621	.203	-.613	452.298	.540	-.317	.518	-1.334	.700

Considering the perceptions of the teachers in public (government-owned) and privately-owned institutions among the NABTEB centres on the use of modern technologies in NABTEB examinations, the analysis in table 3 above shows that there is no significant difference in the perceptions of the two groups of schools as the calculated value of t which is -0.613 is less than the critical value of 1.65 at 0.05 alpha level indicating non-rejection of the null hypothesis that there is no significant difference in the perceptions of teachers in public and private institutions on the use of modern technologies in NABTEB examinations. This result is further buttressed by the levene's test with calculated F-value of 1.621 which is not significant at 0.05 alpha-level. The implication is that both groups hold similar view on the use of technologies by NABTEB in the processes and conduct of its examinations.

Discussion

The findings in table 1 above revealed that there were no variegated responses on the extent to which modern technologies are used in the assessment and certification processes in NABTEB examinations. The items in the table comprise the processes which are presently managed with the use of modern technologies and the proposed processes to be managed electronically in nearest future such as e-Rater developed by Educational Testing Service (ETS) and Robo-Reader developed by U.S.EdX both for grading of essay tests. The former include such processes as design and use of assessment materials (Optical Mark Reader, Marks and Attendance Sheet, Examiners' Marks Sheet), addressing queries and complaints in verification, confirmation of results and certificates, checking of results, providing e-learning packages, e-item banking, paradigm shift from classical test theory to item response theory in standardizing examination questions/items and e-marking while the latter include teleconferencing marking coordination, item construction, portal for online appointment of the examination personnel such as

supervisors and examiners, e-marking of essay in conformity with the best practices and benchmark in western world where it has been substantiated that software compares favourably with human graders and that e-marking of essay is possible and makes the essay marking objective, easier and time-saving (Ladehinde, 2013). These findings further revealed that the use of modern technologies becomes more prominent in results checking, access to learning packages and item banking as the respondents and candidates are more involved in them than in the others.

The findings in table 2 agree with that of the study earlier carried out in Steve (2013) where it is asserted that it is evident that information and communication tehnology (ICT) helps students to learn and teachers to teach effectively. The study carried out by Agbetuyi and Oluwatayo (2012) on Information and Communication Technology in Nigerian Educational System revealed that the idea of sharing knowledge and the capability of using new resources for learning are enhanced by ICT. For instance, the introduction of the internet on-line registration has reduced the cumbersomeness of sales, completion and submission of forms, both for May/June and Nov/Dec. the processing of the entry schedule was of course made easy. The time consuming stamping of photo-albums is replaced with candidates' photo-cards print-out. The creation of Board's internet website has equally given the candidates a better opportunity of accessing all the information needed concerning the activities of the Board-on-line. The system of item banking is also enhanced. All the mechanical technologies in the offices are now replaced with digital technologies. The era of revision with past question is replaced with e-learning packages for easy accessibility.

These findings are invariance with that of this study which has revealed that the use of modern technologies such as Xeros, Axiom Asin 980 Mallow, DRS 400/800 scanners and Xcalibre software among others, have enhanced the assessment and certification processes in NABTEB examinations as the Board now customizes the candidates' examination materials including OMR objective answer sheets. The new technology embraced by the Board has enhanced the collation and processing of the data for prompt release of results in order to meet up with SERVICOM demands. The new technologies have helped in making the certificates issued to the candidates more reliable and that which are not acquired through impersonation. This is achieved by using digital machine to emboss candidates' passport photographs on their certificates as suggested by Afemikhe (2011). This effort makes the verification of certificates very easy. In terms of payment of examiners, the technology has faced out the cash payment with e-payment which is more reliable and fraud free.

Conclusion

The findings in this study have revealed that the use of innovative technologies has greatly enhanced the assessment and certification processes in NABTEB examinations. Most problems encountered during the manual processing of examination related documents have become attenuated. The paper has highlighted the need for the use of latest and modern technologies by the public examining bodies to facilitate assessment and certification processes. It has also pointed out the areas of operations where the use of modern technologies becomes desirable as it has suggested the creation of portal in website of the examining bodies for the online

appointment of examination personnel. By so doing, public examining bodies will have a data base for all their examination personnel.

Recommendation

In order to increase the success story of the examination bodies in Sub-Saharan Africa, the following strategies are suggested for adoption:

- The technologies used in the developed nations for assessment and certification processes should be embraced by the examining bodies in the developing countries while continuous efforts be made to train staff in the use of such technologies.

- Ensuring a strong tide of close relationship among all the public examining bodies to afford them the opportunities of getting use to the latest technologies available in other continents for enhanced assessment and certification processes.

- The training programme of the International Association for the Educational Assessment (IAEA) should be extended beyond Item Response Theory (IRT) to the use of any technologies in vogue. This will strengthen the understanding of the new resources in assessment and certification processes and ensure uniform assessment standard in Africa as well as other continents thereby giving more international recognition to the certificates awarded to candidates within the continents.

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