

Digital Proctoring: Challenges and Prospects in Computer-Based Assessment in Nigeria

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Abstract

The uptake of computer-based assessment by most African countries, including Nigeria, has not eliminated the perennial problem of examination malpractice but has further generated novel strategies aimed at increasing academic success through academic dishonesty. Delivering educational content and assessment through digital technologies seems to be the future especially with the development and adoption of computer-based education programmes and assessment. However, traditional proctoring which often involve the use of in-person invigilators has not adequately addressed the quest for academic integrity among stakeholders. Adopting a descriptive survey design, this paper investigated the awareness and perceptions of stakeholders on the concept of digital proctoring in Rivers State. The result showed that there was a low level of awareness among stakeholders about digital proctoring, as well as negative perception towards the use of digital proctoring. The major challenge identified against digital proctoring was lack of technical know-how. On the basis of these result, appropriate recommendations were made

As far as the benefits for the whole region are concerned CPEC will play a role of catalyst to boost up the economies of the whole region especially landlocked countries by strengthening the connectivity among all countries of this region.

Key words: digital proctoring, computer-based assessment, Nigeria

INTRODUCTION

The introduction of the Computer-Based Test (CBT) by the Joint Admission and Matriculation Board (JAMB) for use in its flagship examination, the Unified Tertiary Matriculation Examination (UTME) and other examinations conducted by the assessment body in 2014 was greeted with both commendation and condemnation. While this introduction is the most widespread adoption of CBT by a national testing body in Nigeria, the use of CBT has had a fairly long history in Nigeria especially in the corporate sector where applicants are required to take personality, aptitude and intelligence test to determine their suitability for specific job roles (Adebayo & Abdulhamid, 2014). Also, the Educational Testing Service (ETS), the developer of the Test of English as a Foreign Language (TOFEL), had introduced CBT for its examinations as far back as 1998 (Guernsey, 1999). In addition, institutions such as the University of Illorin were among the pioneer tertiary institutions to adopt CBT as a mode of testing especially for the Post-Unified Tertiary Matriculation Examination (PUTME). Presently, most tertiary institutions in Nigeria, especially universities, have adopted the CBT form of examination for assessing students' aptitude, especially during the PUTME which is conducted as part of the admission requirement for their new students.

Computer-Based Test is assessments that are administered through, or with computers in either a stand-alone device, one linked to a network, or to the internet through the world-wide web (Oduntan, Ojuawo & Odunntan, 2015). Interest and adoption of CBT has been largely driven by the many positive benefits of this approach to assessment including the more efficient administration of test, better preference for students, self-selection options for students, improved writing performance, built-in accommodations of diverse students' needs, immediate feedback on performance, efficient item development and analysis, increased authenticity, and improved utilization of assessment feedback for classroom instruction (Salend, 2009). One of the best advantages of CBT as outlined by Thurlow, Lazarus, Albus and Hodgson (2010) is that it provides test developers

the opportunity to move beyond the traditional multiple choice assessment of intelligence and achievement to more innovative assessment approaches which allow students to manipulate data and engage in other creative activities.

These benefits notwithstanding, the issue of academic dishonesty and examination malpractice has remained a significant militating factor against the full implementation and widespread adoption computer-based assessment in Nigeria higher education system (Nwoke, Osuji & Ogochukwu, 2017). Although Ubulom and Wokocha (2017) advanced the need for the introduction of CBT in Nigerian education system as necessary for the elimination of impersonation, special centres and cheating, the reality on ground is a far cry from what they advocated for. Since the establishment of JAMB and in its conduct of examinations across the years, there have reports on various forms of examination malpractices including bringing unapproved materials into the examination halls, impersonation, exchange of scripts, use of technological devices, collusion with invigilators and examination officers (Nwoke et al 2017). Some of these forms of examination malpractices have been considerable eliminated or reduced to the barest minimum. However, the problem of collusion with invigilators and examination officers continues to remain a threat to the integrity of computer-based tests in Nigeria. In the report of JAMB on its 2019 examination, it was revealed that arrests were made in 23 out of the 36 states in the country due to examination malpractices, with the highest number of persons arrested in Bauchi State (Adedigba, 2019). The spokesperson for the organization said that about 200 suspects were arrested for examination malpractice in 2019 alone, with most arrest made against persons who collided with supervisors and invigilators. Furthermore, the organization reported the closure of two centers for massive examination fraud involving multiple registrations of candidates (Ikpefan, 2019).

Such anomalies which threaten the integrity of CBT examinations are cause for serious national concerns. With the recent announcement by the West African Examination Council that it shall introduce the use of CBT for candidates in its examinations (Lenbang, 2019), there is a greater urgency for ensuring that examinations taken with the aid of computers reflects the actual intellectual competencies of candidates taking such examinations. Researchers

such as Moten, Fitterer, Brazier, Leonard and Brown (2013) contends that for any meaningful learning and assessment to take place with the online learning community, candidates need to be fairly and effectively evaluated. This is further informed by the findings of King, Guyette and Piotrowski (2009) who found out that undergraduate students reported that it was easier to cheat during computer based test compared to traditional face-to-face test. A promising approach towards the reduction of examination malpractice and cheating during online test is the use of digital proctoring, which is the focus of this article.

Digital Proctoring

Digital proctoring, also called online proctoring, e-proctoring, virtual proctoring or remote proctoring, is the process of using digital tools and technology to ensure that candidates taking examinations and other forms of assessment follow the prescribed guideline and policy (Alessio, Maley, Maurer & Rubin, 2017). Proctored test refers to a mechanism to ensure the authenticity of test takers and prevent such candidates from engaging in unacceptable practices during the duration of a test (Jose, 2019). Proctoring has traditionally been conducted by individuals who are trained and qualified to authenticate candidates' identity and prevent them from indulging in any form of cheating.

Traditional face-to-face assessment has proved to be a problem for ensuring assessment integrity for a number of reasons. Firstly, providing an assessment center that is located close to test takers remains a significant challenge for most testing bodies (Suryadi & Rahmawati, 2018). Many test takers often have to travel long distances to locate their centers which are often over crowded. This has limited the nature of test item formats as speed is often a consideration for such examinations. Furthermore, it has resulted in extended test schedules and some candidates missing out of the examination. Secondly, it is often difficult to establish the capability and integrity of traditional proctors. Persons who are called upon to act as proctors in traditional face-to-face assessment often do not have available records or experience for the job, and it is often difficult to evaluate if they did the job appropriately. Finally, even in innovate assessments such as CBT, where traditional proctoring is implemented, cases are often reported of impersonation and cheating.

Students either ask some else to take the test on their behalf or use methods of cheating like referring to a textbook, using smartphones or other devices to search for answers online or taking help from a friend.

While the term online proctoring and digital proctoring has been used synonymously. Atoum, Chen, Liu, Hsu and Liu (2015) provided a distinction between both terms. According to the authors, online proctoring involves a person-watching test takers in real time, while digital proctoring involves the use of digital tools to ensure the integrity of examination and may not require a human involvement in real-time to ensure the integrity of the tests. What is being practiced in Nigeria under the current CBT operations is online proctoring. In this example, candidates come to to an on-campus or university-certified testing center and take an exam under human proctoring. New emerging technologies, such as, e.g., Kryterion and ProctorU, allow students to take tests anywhere as long as they have an Internet connection. However, they still rely on a person “watching” the exam-taking. For example, Kryterion employs a human proctor watching a test taker through a webcam from a remote location. The proctors are trained to watch and listen for any unusual behaviors of the test taker, such as unusual eye movements, or removing oneself from the field of view. They can alert the test taker or even stop the test (Atoum et al, 2015).

There are various types of digital proctoring, involving various levels of complexity. Jose (2019) provided three broad classifications of digital proctoring:

- **Live Digital Proctoring:** In this type of proctoring, a live test is monitored by a qualified person who collects real-time audio-visual information about the test takers and also monitors their screen feeds. This is often done using the computer webcam. Typically, the proctoring service provider will have people sitting in a remote location who have been trained to ensure student authentication and prevent/red flag any form of cheating. A proctor can monitor up to 30 candidates at a time, depending on the examination body. This model offers the advantage of removing the location barrier of proctoring. A major drawback of this type of proctoring is that it still requires the examination to be strictly scheduled and since human involvement is required

such as in offline proctoring, it is not very scalable, thus making it the most expensive of all types of proctoring.

- **Recorded Proctoring:** This approach does not involve real-time monitoring of candidates. Rather, the audio-video and screen share feeds of the test candidates are recorded during the test. At a later time, a representative or qualified individual plays back the recording and observes for any suspicious activity which are then recorded and reported for necessary actions to be taken. Advantages of this model are that it reduces scheduling and location constraints, but it has the major drawback of human involvement. The fact that humans are involved in the process of the proctoring might result in slow feedback, thus making it difficult to scale and still expensive in terms of technological resources and man hours required.
- **Advanced Automated Proctoring:** Automated proctoring is the most advanced form of proctoring. Here again, the audio-video and screen share feeds of the test candidates are recorded during the test. It ensures candidate focuses on test screen during the test; there is enough light in the room and checks for suspicious objects in video and background voice activity to red flag the test. It also uses face recognition to do student authentication. Advantages are that it eliminates both schedule and location constraints. It also does not require humans to do the review, and hence it is scalable and is more cost effective.

The increasing adoption of computer-based testing and assessment has increased the use of digital proctoring. However, the observation of this researcher has shown that proctoring even in computer-based examinations is hinged upon the traditional approach. Furthermore, a search of the literature indicated that no study has been conducted within Rivers State where the awareness and perception of stakeholders were investigated on the issue of digital proctoring. It is against this background that the present study is being undertaken to empirically ascertain the awareness and perception of educational stakeholders in Rivers State towards digital proctoring.

Aim and Objectives of the Study

The aim of this study was to investigate the awareness and perception of stakeholders towards digital proctoring in Rivers State. Specifically, the objectives of this study were:

1. To ascertain the awareness of educational stakeholders regarding the use of digital proctoring in Rivers State.
2. To ascertain the perception of educational stakeholders towards the use of digital proctoring in Rivers State.
3. To investigate the challenges militating against the effective usage of digital proctoring in Rivers State.

Research Questions

The following research questions were developed to provide direction for the current study:

1. What is the awareness level of educational stakeholders regarding the use of digital proctoring in Rivers State?
2. What is the perception of educational stakeholders towards the use of digital proctoring in Rivers State?
3. What are the challenges militating against the effective usage of digital proctoring in Rivers State?

Methodology

The study adopted the descriptive survey design using a sample of 819 educational stakeholders in Rivers State. The descriptive survey design was adopted for the study because the researcher was only interested in describing the awareness and perception of stakeholders towards the use of digital proctoring in Rivers State. The purposive sampling technique was used for the study because the researcher was only interested in using sample units that had served as invigilators and supervisors for public examinations. The instrument for data collection was a 15-item questionnaire titled “***Awareness and Perception of Digital Proctoring***” The instrument was designed by the researcher using a modified four-point Likert scale of Strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD). The instrument was validated by test experts at Ignatius Ajuru University of Education and the University of Port Harcourt before administration was done. Using Cronbach Alpha method, a reliability coefficient of 0.91 was obtained which showed that the instrument possessed suitable level of reliability. Data

analysis was done using percentage, mean and standard deviations. The results obtained are presented in tables below:

Result Presentation

Table 1: Analysis of Respondents Demographic Data

Respondents'	Information	Frequency	Percentage
Gender	Male	385	47
	Female	434	53
	Total	819	100
Respondents'	Information	Frequency	Percentage
School Ownership	Public	619	76
	Private	200	24
	Total	819	100
Respondents'	Information	Frequency	Percentage
Location	Urban	523	64
	Rural	296	36
	Total	819	100
Respondents'	Information	Frequency	Percentage
Years of Experience	1-5	105	13
	6-10	306	37
	Above 10	408	50
	Total	819	100
Respondents'	Information	Frequency	Percentage
Educational Qualification	NCE	128	16
	Bachelor	513	63
	Post Graduate	178	21
	Total	819	100

From the analysis shown in the table above, the result revealed that 385 (47%) were male, while 434 (53%) were female. Regarding school ownership, the result revealed that 619 (76%) were from public schools, while 200 (24%) were teachers in private school. The analysis also revealed that 523 (64%) were located in urban areas, while 296 (36%) were located in rural areas. Regarding years of teaching experience, 105 (13%) had 1-5 years of experience, with 306 (37%) reporting 6-10 years of experience, while 408 (50%) had above 10 years of experience. Finally, the educational qualification analysis of respondents showed that 128 (16%) had NCE qualification, with 513 (63%) reporting that there had bachelors' degree, while 178 (21%) had post-graduate qualification.

Research Question One: What is the awareness level of educational stakeholders regarding the use of digital proctoring in Rivers State?

Table 2: Awareness level about digital proctoring

	Awareness about Digital Proctoring	Teacher (n = 819)		Criterion \bar{X}	Decision
		\bar{X}	SD		
1	I have heard of digital proctoring	1.48	0.99	2.50	Disagreed
2	Digital proctoring must require the service of a person present	1.76	0.73		Disagreed
3	Digital proctoring enables students to pass appropriately	2.99	1.04		Agreed
4	Digital proctoring is a common practice in Nigeria	1.89	1.07		Disagreed
5	JAMB has started using digital proctoring	1.23	0.96		Disagreed
	Grand Mean	1.87	0.95		Disagreed

From the result displayed in Table 2, it is shown that for item 1 (I have heard of digital proctoring) had a mean rating of 1.48 (SD = 0.99), item 2 (Digital proctoring must require the service of a person present) had a mean rating of 1.76 (SD = 0.73), with item 3 (Digital proctoring enables students to pass appropriately) reporting a mean value of 2.99 (SD = 1.04). Furthermore, the result showed that item 4 (Digital proctoring is a common practice in Nigeria) had a mean rating of 1.89 (SD = 1.07), while item 5 (JAMB has started using digital proctoring) yielded a mean rating of 1.23 (SD = 0.96). On the basis of the mean ratings reported, it is shown that respondents disagreed to all the items with the exception of item 2. Furthermore, the result showed that a grand mean value of 1.87 (SD = 0.95) was obtained which implies that there is a low level of awareness regarding digital proctoring among educational stakeholders in Rivers State.

Research Question Two: What is the perception of educational stakeholders towards the use of digital proctoring in Rivers State?

Table 3: Perception towards the use of digital proctoring?

	Perception towards Digital Proctoring	Teacher (n = 819)	Criterion \bar{X}		Decision
			\bar{X}	SD	
6	Digital proctoring is more efficient than human invigilators	1.72	0.78		Disagreed
7	Digital proctoring can led to loss of income for invigilators	1.91	0.91		Disagreed
8	Digital proctoring is easy to implement	2.11	0.85	2.50	Disagreed
9	Digital proctoring can work effectively in a place like Nigeria	2.03	0.72		Disagreed
10	I support the use of digital proctoring in school and examinations	1.94	0.93		Disagreed
	Grand Mean	1.94	0.83		Disagreed

According to Table 3, it is shown that item 6 (Digital proctoring is more efficient than human invigilators) reported a mean value of 1.72 (SD = 0.78), item 7 (Digital proctoring can led to loss of income for invigilators) had a mean value 1.91 (SD = 0.91), item 8 (Digital proctoring is easy to implement) yielded a mean value of 2.11 (SD = 0.85), with item 9 (Digital proctoring can work effectively in a place like Nigeria) giving a mean rating of 2.03 (SD = 0.72) and item 10 (I support the use of digital proctoring in school and examinations having a mean value of 1.94 (SD = 0.93). Observation of these mean values showed that the items had mean values lesser than 2.50 which was the criterion mean. This therefore showed that the items were not accepted. From the grand mean value of 1.94 (SD = 0.83), it is therefore shown that the stakeholders had negative perception towards the usage of digital proctoring towards digital proctoring in Rivers State.

Research Questions Three: What are the challenges militating against the effective usage of digital proctoring in Rivers State?

Table 4: Challenges of digital proctoring in Rivers State

	Challenges militating against the use of digital proctoring	Teacher (n = 819)		Criterion \bar{X}	Decision
		\bar{X}	SD		
11	Lack of technical equipment	3.10	0.97		Agreed
12	Large number of examinees	3.06	0.99		Agreed
13	Negative attitude of examinees	2.96	1.05		Agreed
14	Lack of skills on the part of students	2.94	1.07		Agreed
15	Unstable and irregular power supply in school	3.17	1.01	2.50	Agreed
	Grand Mean	3.05	1.02		Agreed

According to the result shown in Table 4, it is revealed that item 11 (Lack of technical equipment) with a mean rating of 3.10 (SD = 0.97), item 12 (Large number of examinees) had a mean value of 3.06 (SD = 0.99), item 13 (Negative attitude of examinees) had a mean value 2.96 (SD = 1.05), with item 14 (Lack of skills on the part of students) reporting a mean value of 2.94 (SD = 1.07), while item 15 (Unstable and irregular power supply in school) yielded a mean of 3.17 (SD = 1.01). From the reported mean ratings of the various items, it is shown that they had mean values greater than 2.50. From these mean ratings and the obtained grand mean (3.05), it therefore shows that these challenges are significant in militating against the effective utilization of digital proctoring in Rivers State.

Discussion

According to the result obtained from the analysis of the data, it is shown that there is a low level of awareness among educational stakeholders regarding digital proctoring. This result might have been obtained because most of the stakeholders are used conducting examinations were digital proctoring were not used. Furthermore, the result might be attributed to the concern that digital proctoring has not taken a great hold due the relatively recent introduction of computer-based test in the Nigerian educational sector. The result of this study is similar to that obtained by Sivakumar (2017) who found that there is a low level of awareness among student-teachers on the use of computers in educational assessment in India. Similarly, the

result from James (2016) study showed that many students has a low level of awareness about online proctored examination.

The second result from the study showed that teachers had a negative perception towards the use of digital proctoring in education. The findings might have been obtained because of the general belief that education can effectively be executed by teachers and other humans. Furthermore, it could also be attributed that digital proctoring will make some of the stakeholders redundant as their services may no longer be needed. This might have resulted in the negative perception of stakeholders towards the use of digital proctoring. Furthermore, because these stakeholders are often given allowance by examination bodies and sometimes collide with candidates after collecting money, there is the likelihood that they might have negative perception towards the use of digital proctoring. The result of this study is similar to the result obtained by Tuparova, Goranova, Voinohovska, Asenova, Tuparov, and Gyudzhenov (2015) who found out that teachers in Bulgaria have negative attitude towards the use of e-assessment.

The final result of the study showed that the major challenges militating against the effective administration of digital proctoring were lack of technological equipment, large number of students, negative attitude of examinees and unstable electricity supply in schools. As seen from this finding, the absence of skills and lack of technological infrastructure were identified as key obstacles that might prevent effective deployment of digital proctoring for examinations in Rivers State. The result of this study is similar to that obtained by Ohiwerei, Azih, and Okoli (2013) who reported that negative attitude of students, lack of internet facilities and lack of equipment were the most significant factors militating against the effective usage of ICT for educational assessment in Business Education in Nigerian universities.

Recommendations

From the result obtained and the discussion presented, the following recommendations were made

1. There should be a pilot programme for the implementation of digital proctoring in schools similar to the manner in which the Joint Admission and Matriculation Board (JAMB)

- introduced the use of computer-based test in students' assessment.
2. Students should be allowed to take digitally proctored examinations as they progress through their academic journey. This is meant to provide them with the familiarity and comfort they need to perform in digitally proctored examinations.
 3. Teachers should be given regular trainings on the effective usage of Information and Communication Technologies so that when digital proctoring is fully implemented, they can adjust adequately.
 4. There should be ample provision of technological resources in schools, including steady electricity and efficient internet connectivity to facilitate the deployment and success of digital proctoring.

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