

E-INVIGILATION: PANACEA TO EXAMINATION MALPRACTICE IN NIGERIA

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Abstract

e- Invigilation is the use of remote-controlled terminals that are linked with the main servers of any institutions. E-invigilation is very important in managing both offline and online invigilation of examinations. This is vital for eradicating examination malpractice on the part of the students. There is a disenchantingly slow evolution of ICT use in the invigilation of students in the Nigerian educational school system. The main roles of ICT in education are to provide the prospects and trends of integrating communication technology into the educational processes. Hence, one of the vital areas of incorporating ICT is in the invigilation of examination in order to bring to fore its effectiveness. In reality, an efficient and effective system of the invigilation process is essential in increasing the credibility of the entire educational assessment in Nigeria. This fundamental area constitutes an inevitable reality in modern education, especially with security of examinations in mind that attracts the law of morality. The method of data analysis incorporates both descriptive and logistic regression modeling. Therefore, Invigilation should not be played down with regard to the issues of assessment. The study proposes a model that is relevant for e-invigilation, discusses the pros and cons of e-invigilation in system of education in Nigeria and makes policy recommendations towards incorporating e-invigilation in the educational system of higher education in Nigeria.

Keywords: ICT, e-invigilation, Nigeria.

1 INTRODUCTION

Invigilation is the act of keeping watch over candidates that are taking an examination in order to prevent them from indulging in examination misconducts such as cheating. Invigilation can take two forms namely physical or remote invigilation. It can also be for different types of examination such as paper-based and computer-based examinations. Much effort in literature has been devoted to the automation of the process of remote invigilation of mostly computer-based assessments otherwise known as e-assessments. Most literature on e-invigilation is concerned with only with invigilation of computer-based examinations which usually take place in a classroom or controlled environment. In some cases, the e-invigilation exists as additions to measures put in place to ensure candidates adhere to the examination policy. For example, the work of Percival et al (2008) focused on detecting possible deviations from standard procedures by candidates by using intrusion detection type of system for computer-based tests. In addition, the work of Ko and Cheng (2008) also focused on the approach of random video-based monitoring of examination. The system combined both hardware and software components with some secure e-assessments conditions, and candidate's identity verification. All these focused on computer-based examinations and do not capture the aspect of paper-based examination in an examination hall or classroom.

In essence, the integration of ICT into education has brought significant advancement, though not without some issues to be dealt with on the flipside (Abubakar and Adebayo, 2014, p. 49). Eromosele (2008 cited in Uwadiae and Uduah, n.d, p. 5) observes that examination malpractice has long graduated from the normal '*giraffing*' at a neighbour's work, using key-points, notes and textbooks, copying on papers, desk or laps, to more advanced and sophisticated systems. Some candidates now employ the functionalities of these high technological devices to bring answers into the examination hall, especially for multiple choice questions.

Curran, Middleton and Doherty (2011, pp. 57, 58, 59, 60) highlight that the previous methods of cheating (traditionally) are speedily being replaced with miniaturised technologies, which can hold larger amounts of information. The use gadgets such as: Mobile phones, Scientific calculators (e.g. T1-84 model), MP3 players, Wireless receivers, PDA (Pocket PCs), Invisible ink pens(p.59), Wrist watches and printed label et cetera.

2 STUDY OBJECTIVES

The main objective this study is focused on the role of e-invigilation as a solution to examination malpractice in Nigeria. Other specific objectives are:

- ✚ To examine the relevance of e-invigilation in the overall assessment of students
- ✚ To assess the role of e-invigilation in the reduction of examination malpractice

3 LITERATURE REVIEW

The changing world has been facilitated by several factors; virtually every sector of human existence has experienced significant level of growth over the last two decades. One of the driving factors responsible for these changes is the Information and Communications Technology (ICT). Bladergroen, Chigona, Bytheway, Cox, Duman and Van Zly (2012, p. 107) affirm that using of Information and Communication Technology to teach and learn can "enhance curriculum delivery and concurrently improve the quality of education".

The existence, emergence and integration of ICTs have had significant impact on the world educational landscape. Hardman (2005), and Louw, Muller and Tredoux (2008) also affirm that ICT is considered to have power to improve teaching and learning, particularly in developing countries where most schools are battling with issues such as lack of resources and under qualified teachers (Koo 2008 cited in Bladergroen, 2012, p. 109).

4 ICT ADAPTATION AND INTEGRATION

Considering the immense benefits ICT provides education, there are several factors capable of hampering the growth and potentials of such a promising synergy. Drent and Meelissen (2008 in Bladergroen et. al, 2012, p. 107) opine that the presence of learnt ICT skills is required for the successful integration of ICT into the learning process. Toro and Joshi (2013, p. 22) from research findings advocate that infrastructural improvements would aid ICT to better improve the outcome of our educational system.

Oye, Salleh and Iahad (2011, p. 22) observe that the provision of more funds and support from the Government would better drive the effectiveness ICT could give to the class room experience in terms of learning and training. According to Chigona, Chigona, Kausa and Kayongo (2010) "recent works suggest that the problem may not necessarily lie with the technical skills, but rather the combination of ICT skills, content management skills" and better infrastructure.

In the present cases of ICT integration into educational circles, there has been hampered progress by technological (infrastructural, skill, competence), pedagogical (teaching styles, training, approach) and social factors (Olaore, 2014, p. 154). The pedagogical and technological challenges can be well attended to through continuous training (and retraining) and funding respectively; however, social factors stemming from the negative impacts of ICT on learning such as examination malpractice must draw its solutions from a different source (Oyelekan, 2008, p. 13).

5 NEED FOR EDUCATIONAL TECHNOLOGIES AND INSTITUTIONAL CHANGE

Aduwa-Ogrebaen and Iyamu (2005, p. 104), citing Thierer (2000), submit thus:

There is no doubt that that modern life is dominated by technology. There is universal recognition of the need to use Information and Communication Technology (ICT) in education as we enter the era of Globalisation. Already, Nigeria is on the wrong side of the International digital-divide, as it has not made significant efforts at integrating ICT into education.

6 EXAMINATION MALPRACTICE

Examination malpractice is the act of violating examination rules and regulations by a candidate, candidates or their agents before, during or after an examination in order to have undue advantage. Such activities give candidates an unfair advantage and reduce the reliability of the grades and scores obtained by candidates if not caught or sanctioned (Uwadiae and Uduah, n.d, 2).

Some activities captured under the term 'examination malpractice' are:

- a. Bringing in of foreign materials into the examination hall (Curran, Middleton and Doherty, 2011, p. 56).
- b. Irregular activities inside or outside the examination hall e.g. sending information by agents or touts to candidates inside the Examination halls.
- c. Foreknowledge of examination questions.
- d. Mass cheating: with the involvement of School Authorities, candidates and Examination Officials.
- e. Insult/ Assault of supervisors/ Inspectors by Candidates.
- f. Miscellaneous cases: having two types of hand-writing on a Candidate's scrip, use of unsigned scripts, etc (Uwadiae and Uduah, n.d, p. 3; Curran, Middleton and Doherty, 2011, pp. 56-59).

Some of the ICT measures currently taken to negate this menace of malpractice include:

1. Pre-print of Objective Answer sheets bearing candidate's examination particulars and subject/ paper which must be used specifically.
2. E-registration was introduced in 2005 to checkmate incidences of Impersonation through electronically captured photographs.
3. Issuance of forge-proof certificates with high grade security features like watermarks, holograms, and copy proof marks- making forged results easily detectible.
4. E-confirmation and verification of results.
5. Photo embossment on certificates amongst other (Uwadiae and Uduah, n.d, p. 4).

7 INTRODUCING E-INVIGILATION

The integration of ICT into education has brought significant advancement, though not without some issues to be dealt with on the flipside (Abubakar and Adebayo, 2014, p. 49). Eromosele (2008 cited in Uwadiae and Uduah, n.d, p. 5) observes that examination malpractice has long graduated from the normal 'giraffing' at a neighbour's work, using key-points, notes and textbooks, copying on papers, desk or laps, to more advanced and sophisticated systems. Some candidates now employ the functionalities of these high technological devices to bring answers into the examination hall, especially for multiple choice questions.

Note: for recommendation.....A way forward, as advocated by Uwadiae (n.d) the Registrar/ Chief Executive Officer of West African Examinations Council (WAEC) is captured in the publication: *Impact of Information and Communication Technology on Examination Malpractice at the West African Senior Secondary Certificate Examination in Nigeria*, is the approval and provision of relevant equipments and software (p.7).

Curran, Middleton and Doherty (2011, pp. 57,58,59,60) highlight that the previous methods of cheating (traditionally) are speedily being replaced with miniaturised technologies, which can hold larger amounts of information. The use of gadgets such as: Mobile phones, Scientific calculators (e.g. TI-84 model), MP3 players, Wireless receivers, PDA (Pocket PCs), Invisible ink pens (p.59), Wrist watches and printed labels etc.

8 E-INVIGILATION APPROACHES TO PREVENTING CHEATING

With the continuous repetition of the malpractice menace, adequate measures ought to be taken to curtail the continuous repetition and effects of Malpractices in Nigerian Higher Educational Institutions.

There are a number of different technological approaches, which could be summed up under the broad-term: '**Electronic Invigilation**', adaptable to cushion the growing effects of examination malpractice.

- Jammers (Signal Jamming Devices): according to Curran, Middleton and Doherty (2011, p. 60), Jammers are intended to prevent radio equipment from receiving and transmitting signals relevant to their functions. Such Jammers can be programmed to be strong enough to block mobile phone signals without interfering with the functionalities of other electronically-powered equipments in the examination halls, such as electronic doors and boards, CCTV camera, etc.
- Reference is made to the "Faraday Cage", which requires that metal is built into the walls of the examination hall to block electro-magnetic waves. This would hamper free flow of mobile networks, signals and deactivate the possibilities of text messaging for as long as the examination lasts (Curran et. al., 2011, p. 60).
- Detection devices could be provided and purchased for as low as 100 pounds, which has the capacity to detect the presence and use of mobile phones, PDAs and other network adapted devices and micro-chips within a limited range. This could be held by the invigilator while he/she walks around the hall (Curran et. al., 2011, p. 60).
- The use of CCTV Camera for surveillance and the recording of examination offence could be adopted also. The mere presence of CCTV cameras alone is capable of scaring potential malpractice candidates, since they are well aware of being watched, with the possibilities of recorded clips being filed as evidence of malpractice endeavours (Curran et. al., 2011, p. 61).
- Also, airport metal detectors are capable of discouraging candidates who try to sneak in microphones and earpieces. When candidate with such devices walk through the metal detector, it produces a beep as a sign of the presence of metal devices (Curran et. al., 2011, p. 61).
- The Virtual Invigilator System is a device designed to secure the electronic communications of an assessment environment. It is designed to assist in proctoring an examination hall (Percival, Percival and Martian, 2008, p. 3). The system helps by monitoring all networks for traffic from the computers in the class room, recording it and at the same time identifying in real-time any activity that is suspected to be violating the rules set up for the examination and alert the invigilator (Percival et. al, 2008, p. 5).

Therefore, in order to avoid pre-programmed calculators being used, educational management organisations should provide approved calculators, which would be given to candidates for the examinations and returned afterwards.

9 PROPOSED MODEL

The term electronic invigilation or e-invigilation is used to describe the act of invigilating an examination without physically being present but rather through the use of modern technology and devices. This paper proposes an approach to e-invigilation that aims at ensuring proper monitoring and supervision of candidates without the usual presence of invigilators in the examination hall. In this approach, candidates are required to enroll in order to confirm that they qualify to participate in the examination via a biometric device interfaced with a client application. The biometric detail captured is compared with the template already stored for the candidate in respect of the examination. The biometric means of enrollment and authentication guarantees that the actual candidate sits for examination and eliminates incidences of impersonation. It also serves as a proof that the candidate attended the examination. The biometric details may be captured at the end of the examination or as the candidate finishes his or her work. This will make it possible to ascertain when a candidate came in and when he or she left the examination hall.

The e- invigilation system can be said to comprise of two parts namely the biometric capture and authentication module and the network of closed-circuit televisions (CCTVs) positioned all-round the examination venue to capture activities during the examination. A room for viewing and recording of all activities during every examination is also proposed. In case of any suspicious behavior of any candidate in the course of the examination, the recorded video could be replayed to ascertain what really happened. Figure 1 below presents the architecture of the proposed e-invigilation system.

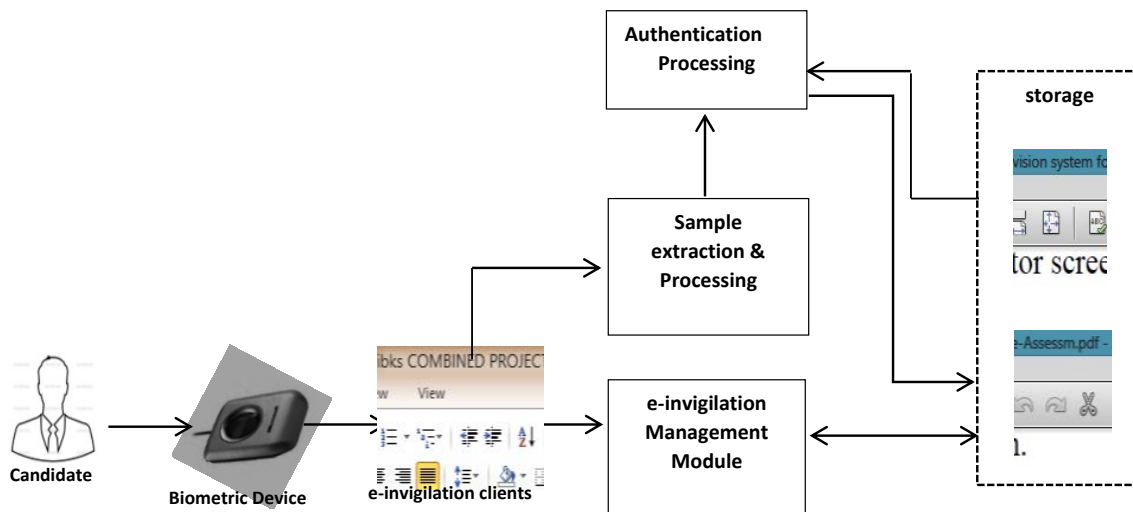


Figure 1: Architecture of Authentication Module of e-Invigilation System

The architecture above covers only the aspect of candidate authentication to ascertain the right candidate enters for the examination. A biometric-based authentication is proposed as this has a number of benefits among which is elimination of impersonation. The biometric capture also serves the purpose of attendance for the examination which could be printed via the e-invigilation manager module for all students.

10 METHODOLOGY

The data for this study is solely from primary source generated from personal survey and questionnaire administration. The design of research instrument consists of two broad sections. The first section seeks to obtain information concerning the demographic attributes of the respondents. The second section deals with the vital information which comprises of structured items of the questionnaire that addresses the core essence for execution of current research. These issues were considered under the two subsections that focus on impact of electronic device in curbing examination malpractice and the significant factors that influence students' involvement in the act. Multi-choice questionnaires with close ended questions were administered to the participants to elicit the necessary responses required in the study analysis. The study population involves some two randomly selected private universities in Ota Local Government Area comprising of majorly undergraduate students from various colleges and departments. A total of two hundred and fifty (250) questionnaires were randomly administered to respondents with a response rate of 86 percent obtained from the retrieved questionnaires analyzed for the study. The method of data analysis utilized descriptive approach of frequency table and percentage analysis. The study further employed chi-x² normal distribution technique in data analysis and validation of the study hypotheses.

11 TEST OF INSTRUMENT RELIABILITY

Table 1 Reliability Statistics

Cronbach's Alpha	N of Items
.759	21

As shown in table 1 below, the study employed Cronbach's Alpha coefficient in testing for the reliability of the research instrument. The result of the test (0.759) suggests a reliable estimate of the level of internal consistence of the information contained in the responses gathered from the questionnaire.

From table 2 it is observed that many of the participants 115(53.5%) were within the ages of 18-25 years. The study further shows that majority 135(62.8%) were female. The single 203(94.4%)

constitute the higher percentage of the respondents. The study samples is mainly on undergraduates 212(98.6%) who are full time 201(93.5%) students of the selected tertiary institutions.

Table 2: Demographic Distribution of respondents

Variables	Category	Frequency	Percentage
Age	Below 18 years	91	42.3
	Between 18-25 years	115	53.5
	26-35 years	7	3.3
	35 years and above	2	.9
	Total	215	100.0
Gender	Male	80	37.2
	Female	135	62.8
	Total	215	100.0
Marital status	Single	203	94.4
	Married	12	5.6
	Total	215	100.0
Education	Undergraduates	212	98.6
	Postgraduates	3	1.4
	Total	215	100.0
Mode of Study	Full time	201	93.5
	Part time	12	5.6
	Others	2	.9
	Total	215	100.0

Source; Survey Report, 2015

The result in table 3 shows that from 49(22.8%) of the respondents have been involved in exam malpractice from a total sample size of 215(100%) in the field survey.

Table 3 Level of exam malpractice

	Yes		No	
	FQ	%	FQ	%
I have been involved in examination malpractice before	49	22.8	166	77.2

The analysis of the result from table 4 below indicates that 89(41.4) of the total participants believe that e-device is useful in controlling exam malpractice. Majority 76 (35.3%) of the respondents agree that with electronic device the level of exam malpractice will significantly reduce in tertiary institutions. The result of the survey further reveals that 89(41.4%) of the entire participants agree that electronic invigilation will easily expose students better than human invigilators. 111(51.6%) supported the opinion that with electronic device there will be enough evidence to judge students caught in examination malpractice. Also 69(32.1%) strongly believe that Students caught through e-invigilation could readily plead guilty with evidence from electronic device.

Table 4 e-invigilation and examination malpractice

	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	FQ	%	FQ	%	FQ	%	FQ	%	FQ	%
1. Electronic device is useful in controlling exam malpractice	50	23.3	89	41.4	42	19.5	23	10.7	11	5.1
2. With electronic device the level of exam malpractice will significantly reduce in tertiary institutions	66	30.7	76	35.3	21	9.8	38	17.7	14	6.5
3. Electronic invigilation will easily expose students better than human invigilators	67	31.2	89	41.4	19	8.8	31	14.4	9	4.2
4. With electronic device there will be enough evidence to judge students caught in examination malpractice	67	31.2	111	51.6	23	10.7	12	5.6	2	.9
5. Students caught could readily plead guilty with evidence from electronic device	69	32.1	21	9.8	21	9.8	24	11.2	12	5.6

Source; Survey Report, 2015

12 TEST OF HYPOTHESES

12.1 Hypothesis I

H₀: E-invigilation has no significant impact in control of examination malpractice in Nigeria.

H₁: E-invigilation has in significant impact in control of examination malpractice in Nigeria.

Table 5 Test Statistics

	Electronic device is useful in controlling exam malpractice	With electronic device the level of exam malpractice will significantly reduce in tertiary institutions	Electronic invigilation will easily expose students better than human invigilators.	With electronic device there will be enough evidence to judge students caught in examination malpractice	Students caught could readily plead guilty with evidence from electronic device
Chi-Square	83.488 ^a	69.023 ^a	106.233 ^a	191.674 ^a	106.930 ^a
df	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000

The chi-square test conducted in table 6 below shows estimated result of 83.488, 69.023, 106.233, 191.674 and 106.930 with degree of freedom of 4 all significant at 1 percent level. The above results from the study carried out therefore suggest that Electronic device is useful in controlling examination malpractice. With electronic device the level of examination malpractice will significantly reduce in Nigerian tertiary institutions. It further confirms that electronic invigilation will easily expose students better than human invigilators and with electronic device there will be enough evidence to judge students caught in examination malpractice while Students caught could readily plead guilty with evidence from electronic device. Given the result of the test this study proceeds to reject the null hypothesis that e-invigilation has no significant impact in control of examination malpractice in Nigeria

leading to the acceptance of the hypothesis that e-invigilation has in significant impact in control of examination malpractice in Nigeria.

Table 6 Principal Component Analysis

	Initial	Extraction
Lack of necessary facilities for teaching/learning	1.000	.629
Non-coverage of prescribed course outlines due to their extensiveness	1.000	.614
General nonchalant attitude of teachers towards teaching.	1.000	.638
Industrial actions by teachers.	1.000	.729
Mass promotion of students in internal examinations.	1.000	.489
Faulty or lack of proper administration of examinations.	1.000	.349
Imposition of field of study on candidates by parents.	1.000	.321
Poverty and greed on the part of the teachers who constitute the bulk of invigilators and examiners.	1.000	.604
Constant increase in examination fees, among others.	1.000	.732
Type of school.	1.000	.738

Table 6 below shows that type of school (0.738), constant increase in examination fees (0.732), industrial actions by teachers' actions by teachers (0.729), general nonchalant attitude of teachers towards teaching (0.638), lack of necessary facilities for teaching/learning (0.629), Non-coverage of prescribed course outlines due to their extensiveness (0.614), poverty and greed on the part of the teachers who constitute the bulk of invigilators and examiners constitute the significant factors that encourage examination malpractice in Nigeria tertiary institutions. However type of school and cost of examination fees among other factors appears to be the most significant factor that influences examination malpractice from the field survey carried out in this study.

12.2 Hypothesis II

H₀: There exists no significant control mechanism for examination malpractice in tertiary institutions in Nigeria.

H₁: There exists significant control mechanism for examination malpractice in tertiary institutions in Nigeria.

Table 7 Control of examination malpractice

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a Mass promotion of students in internal exams	-.365	.165	4.897	1	.027	.694
Constant	2.559	.644	15.776	1	.000	12.927

Table 8 Control of examination malpractice

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a Electronic invigilation will easily expose students better than human invigilators	.334	.136	6.048	1	.014	1.397
Constant	-.015	.515	.001	1	.976	.985

The result of the responses generated from the present study in table 7 suggests that mass production of students in internal examinations do not positively control the level of student involvement in examination malpractice with the beta coefficient (-0.365) with the level of significance at 5 percent. This further suggests that mass promotion do not offer could not be considered a determinant solution

in the control for exam malpractice in tertiary institutions. However, the deployment of electronic device (0.334) as observed in table 8 reveals a significant positive impact on control for examination malpractice at 0.05 probability level. It further confirms the assertion that e-invigilation will readily expose culprits more than human invigilators. Therefore the hypothesis that there exists a significant control mechanism for examination malpractice in tertiary institutions in Nigeria which implies that the null hypothesis that there exists no significant control mechanism for examination malpractice in tertiary institutions in Nigeria is cannot be validated for the present study.

13 RECOMMENDATIONS

The present study examined the importance of e-invigilation as a solution to the long existed occurrences of examination malpractice with specific focus on students in randomly selected tertiary institutions in Nigeria. Evidence from the survey study suggests that

- ✚ Mass promotion of students in higher institution should not be considered as an alternative option for curbing examination malpractice
- ✚ Evidence from the study indicates that the type of school, cost of examination fees and lack of basic facilities for effective teaching and learning constitutes factors that could influence students' involvement in examination malpractice. Therefore, efforts should be made by various tertiary institutions to provide environment that is conducive for learning at a relatively affordable tuition fees.
- ✚ Sufficient time should be accorded for teaching and preparation for examinations to ensure an extensive coverage of course outlines and student readiness for the examination.
- ✚ Nonchalant attitudes and industrial actions that could significantly hinder the motivation and level of seriousness of the students should be avoided by the teachers as much as possible.
- ✚ Teachers and examination invigilators should be contented with their due earnings and not allow greediness and corruption that will lead to compromise of examination standards.
- ✚ Tertiary institutions in Nigeria should explore the option of e-invigilation mechanism as an alternative solution to eliminate the weaknesses associated with human or manual invigilation in the quest for effective control of examination malpractice.

14 CONCLUSION

Given the persistent occurrence of examination malpractice in Nigerian education system that appears to erode the value and recognition accorded to Nigerian degree and certificates obtained in tertiary institutions. It becomes necessary for such a study like this to assess the relevance of e-invigilation as a better alternative to the traditional system of invigilating examination normally conducted by human invigilators. In this study significant factors that influence students indulging in examination malpractice have been examined. The study proceeds further to examine whether there is existence of a significant impact of e-invigilation on examination malpractice control. It thus concludes e-invigilation could serve as a significant control mechanism in curbing the incidences of examination malpractice especially in higher institutions in Nigeria. The goal to curb academic malpractice must also be passed into law to provide an academic-legal framework capable of being used in prosecuting individuals who indulge in such practices. The supports of educational management bodies are needed to reduce malpractice to the barest minimum.

REFERENCES

- [1] Abubakar, A.S., and Adebayo, F.O. (2014).Using Computer-Based Test Method for the Conduct of Examination in Nigeria: Prospects, Challenges and Strategies. *Mediterranean Journal of Social Sciences, MCSER, Rome- Italy*: 5(2).
- [2] Aduwa-Ogrebaen, S. E. and Iyamu, O.S. (2005) Using Information and Communication Technology in Secondary Schools in Nigeria: Problems and prospects: *Educational Technology and Society*, 8 (1), 104-112.

- [3] Bladergroen, M., Chigona, W., Bytheway, A., Cos, S., Dumas, C., and Van Zyl, I. (2012). Educators Discourse on ICT Education: A critical analysis. *International Journal of Education and Development Using Information and Communication Technology*, 8 (2), 107-119.
- [4] Chigona, A., Chigona, W., Kausa, M. & Kayongo, P. (2010) An Empirical Survey on Domestication of ICT in Schools in Disadvantaged Communities in South Africa. *International Journal of Education and Development Using ICT*, 6 (2).
- [5] Curran, K., Middleton, G., and Doherty, C. (2011). Cheating in Exams with Technology. *International Journal of Cyber ethics in Education*, 1 (2).
- [6] Hardman, J. (2005) An exploratory case study of computer use in a primary school mathematics classroom: New technology, new pedagogy? *Perspectives in Education*, 23 (4), 99-111.
- [7] Ko, C. C. and Cheng, C. D. (2008). "Flexible and secure computer-based assessment using a single zip disk," *Comput. Educ.*, Vol. 50, No. 3, pp. 915–926, April.
- [8] Macfadyen L. P. (2004). A Handbook of Best Practices in the Integration of Learning Technologies into Higher Education: Illustrated with Case studies from Innovative Institutions in Canada and around the World. *The MAPLE centre: University of British Colombia*. Retrieved on October 6th 2015 from <http://www.maple.ubc.ca>.
- [9] Louw, J., Muller, J. & Tredoux, C. (2008) Time-on-task, technology and mathematics achievement. *Evaluation and Program Planning*, 31 (1), 41-50.
- [10] Olaore, I. B. (2014). Impacts (Positive and Negative) of ICT on Education in Nigeria. *Developing Country Studies*, 4 (23).
- [11] Oye, N.D., Salleh, M., and Iahad, N.A. (2011). Challenges of e-learning in Nigerian University Education based on the experience of developing countries. *International Journal of managing Information Technology*, 3 (2).
- [12] Oyelekan, O. S. (2008). An Overview of the Status of Information and Communication Technology (ICT) in the Nigerian Educational System. *African Symposium*, 8 (2).
- [13] Percival, N., Percival, J., and Martian, C., (2008). The Virtual Invigilator: a Network-based Security System for technological-enhanced Assessments. *A Paper delivered at the Proceedings of the World Congress on Engineering and Computer Science*, WCEC October 22-24, 2008, San-Francisco, USA.
- [14] Toro, U., and Joshi, M. (2012). ICT in Higher Education: Review of Literature for the Period 2004-2011. *International Journal of Innovation Management and Technology*, 3 (1), 20-23.
- [15] Uwadiae, I., and Uduh, C.A., (*n.d) Impact of Information and Communication Technology on Examination Malpractice at the West African Senior Secondary Certificate Examinations in Nigeria. *West African Examination Council Publications References*.