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Investigating the Use of Information and Communication Technology (ICT) for Innovative Assessment in Public Secondary Schools in Nasarawa State, Nigeria

[1]Monday Damian, OGUCHE
Kogi State University, Anyigba.
babaojima1 @gmail.com. 08064179546
&
[2]Josephine Eleojo, HARUNA
Federal University, Lokoja

Abstract
The study investigated the extent to which Information and Communication Technology is used in public secondary schools in Nasarawa State for innovative assessment. Survey research was used for the study. The population for the study comprise principal and teachers of public secondary school in Nasarawa state. Proportionate sampling was used to draw 20%, the equivalent of 210 respondentsfor the study. A questionnaire titled Information and Communication Technology for Innovative Assessment Questionnaire (ICTIAQ) was used as an instrument for data collection. The questionnaire was validated by 3 experts, from the Department of Educational Foundations, Kogi State University, Anyigba. The research questions were analyzed using mean and standard deviation, while a t-test was used to test the hypotheses. The findings of the study revealed that computer is used for innovative assessment to a little extent, the internet is also used for online assessment to a little extent, etc. The study recommended provision of constant power supply, adequate security etc as measures to encourage the use of ICT for innovative assessment in secondary schools in Nasarawa State-Nigeria.

Keywords: Evaluation, Innovation, ICT, Assessment, Teachers
Word Count: 175

Introduction

The benefits of any educational endeavour can only be ascertained after a conscious assessment of the effect of implementing such an endeavour. Assessment is a process that involves the collection, processing and interpretation of results from the measurement of various aspects of educational objectives to establish the value (Oguche, 2015). Educational Assessment helps the teacher to position himself for future tasks since it involves self-evaluation. It is also part of everyday practice by students, teachers and stakeholders in education from dialogue, demonstration and observations that enhance daily learning. Educational assessment in the view of Calmin (2015) involves the use of both formal and informal tests, measurement and evaluation procedures to find out the outcome of teaching on the recipient. Educational assessments take place in institutions of learning and their outcomes are used for placement, employment and promotions.

Over the years, there have been attempts by educationists to improve the educational system all over the world through series of innovations and innovative practices (Crichton, 2015). The emergence of technology has greatly improved the business of teaching and assessment by teachers and people in the education industry (Calmin, 2015). ICT is playing a vital role in enhancing what is being taught and learnt. Secondary schools all over the world are stakeholder that may use ICT in their operations. Abubakar (2016) defined secondary schools as institutions of learning that are involved in teaching, learning and assessment. The researcher observed that assessment in Nasarawa state is characterized by irregularities, delay in releasing results, examination malpractices and poor performance by students in their respective schools. In a similar vein, Usman (2015) observed delay in result compilation of termly result, poor quality of typed question paper as some of the problems facing the secondary school in Nasarawa state due to the use of obsolete facilities. This practice can be reduced using innovative assessment. Innovation in educational assessment refers to the new idea that significantly improves classroom-based teaching, learning and assessment (OECD, 2014)

Innovation arises due to pressure to increase both the quality and quantity of education and its outcome for the benefit of society. In the view of Abubukar (2016), innovative assessment plays a formative role where learning gaps are identified and adapted appropriately. According to Hamilton (2018), innovative assessment is the type of assessment that uses improved techniques and digital tools to achieve the maximum result. It incorporates more complex scoring procedure and delivery in an innovative way using the computer and other Information and Communication (ICT) devices. Stephen and Tsav (2019) similarly noted that innovative assessment could come in the area of classroom tests, test in reading, feedback, assignment and achievement tests.

In the view of Eleno & Georgina (2015), innovative assessment effectiveness has not been properly measured in terms of perceived learning and performance improvements in developing countries. They identified this type of assessment to include competency-based assessment, e-assessment, peer assessment, computer-based test and teacher self-assessment. In the same vein, Hamilton (2018) classified innovative assessment into three, these are performance assessment (writing to Supplement Multiple Choice), Collegiate Learning Assessment (CLA); administered online, portfolio-based assessments which include the use of e-facilities that allows assessors to measure every aspect of students learning assessing a variety of teaching skills. The third one is the technology supported assessment which has made marking and compilation of essay and objective test faster. This includes Computerized Adaptive Tests (CAT) which enable the candidates to be tested based on their earlier experiences,

In addition to the above Chricton (2015) identified Computer-Based Assessment (CBA), Computer Adaptive Assessment (CAA), and Computer Adaptive Testing, as innovative assessment that can be used in secondary schools. Computer-Based Assessment (CBA) is used for simple multiple-choice format and transformative testing. Computer Adaptive Assessment is used for assessment, using the computer and the internet for online work. The use of ICT based assessment otherwise referred to as innovative

assessment can help in providing efficient feedback, measure students reasoning processes, and other complex cognitive skills and quickening the assessment process.

As noted earlier, the advent of technology has revolutionized the way assessment is carried out in schools and colleges. ICT is a technology that uses electronic means to create, process, store, and disseminate information to those who might need it (Oguche, 2015). These ICT devices include computer hardware, software, internet, telephone, multi-media, Compact Disk (CD), Compact Disk Read Only Memory (CDROM), digital camera, modem, video – conferencing, teleconferencing etc. Innovation in Educational assessment using the above devices and others not mentioned here will positively affect educational assessment Similarly, Stephen & Tsav (2017) note that gadgets like webcam intelligent video guideline, computer-assisted instruction (CAI) when used are extremely viable in instruction and assessment. Electronic mail and computers are ICT facilities that are used for assessment (Ihechu & Ugwuoji 2017). The e-mail is used to acknowledge assessment and online questions and answers. It is, also widely used by academicians all over the world to enhance creativity and innovative assessment. In addition, the computer is an electronic machine which accepts data, process data and bring out the processed data as information accurately. The computer helps teachers to record and store students data, scores, print exam questions and store examination records. The use of the computer by institutions for learning and classroom instructions has improved the way teachers teach and the ways learners learn. According to Marina (2016), communication using ICT tool in institutions can be accomplished using e-mail, websites, conference calls and other ICT devices, she listed Computed Assisted Assessment (CAA), and Computer-Based Testing (CBT)as the types of the assessment tool to be used in Schools and Colleges.

Similarly, Irwin (2011) developed the e-snowball system using Microsoft Word to give instant feedback to students. The use of e-snowball for feedback can quicken the innovative process. In the view of Oguche (2017), social networks, Blogs, Skype, witty, com,

google, classroom red pen, ever note and paper rater etc. are some ICT tools that can be used for learning and assessment in schools. The task of the educational assessors and secondary school teachers is to harness these innovations for effective assessment.

Secondary school is an intermediary level of education that prepares the student for tertiary education and the world of work. The Federal Republic of Nigeria (FRN, 2014) National Policy on Education, states that Secondary Education is established with the objectives of promotingcultural values and prepare students for a useful living. Innovative assessment, if properly used in secondary schools, can bring about the attainment of the stated objectives. In the view of Abubakar (2016), ICT can be used to improve teachers' and students' performances similarly, studies by Apagu & Wakili (2015) revealed that in Yobe state, ICT is used to improve students and teachers output in the classroom, however, they observed that it has not been fully utilized for technical works because of inadequate power supply and low connectivityFakeye (2010) found out that most schools in Ibadan do not have computers and are not yet prepared to use ICT in their operations. In the view of Oguche (2014) teachers in secondary schools arenot ICT compliant, so they cannot use it for effective teaching, learning and innovations. To worsen the situation, most secondary schools have no access to the web, In addition, Oguche (2017) identified the major challenges to the utilization of ICT as constant power failure, low internet connectivity, high cost and securities of ICT facilities. These factors are major challenges to the uses of ICT for instruction.

This study will investigate whether secondary schools in Nasarawa state have changed from paper and pencil assessment to the use of ICT for assessment. Specifically, the study will find out the extent Computer Adaptive Assessment is used for innovative assessment, verify the extent the internet is used in the management of students' assessment. The study will also investigate the challenges ICT users encounter in the bid to improve innovative assessment in Secondary Schools in Nasarawa State.

The discourse on the use of ICT is hinged on the Diffusion of Innovation Theory (DIT) and Technology Acceptance Model.

The diffusion of innovation theory was propounded by a French sociologist in 1908. Roger (1995) version of the theory states that diffusion is a process of using new ideas, communication, and the time it takes to transfer this innovation to members or group in a social system. This theory is relevant to the present study, the use of ICT for innovative assessment is an innovation that has come to replace the paper and pencil assessment. It requires time to learn, various members of the social system have to be convinced of the usability or otherwise of the facilities (communication) before its adoption. How far have secondary school teachers and principals in Nasarawa State being communicated about this innovation? Are they putting it into use? If yes, to what extent? This study will answer the above questions and other questions that might be raised in the course of this investigation.

The Task Technology Fit Theory was propounded by Goodhue & Thompson (1995). It states that the use of technology is more likely to have a positive impact on individual performance and should be used if the capability of the technology matches the task that the user must perform. The theory is relevant to this work. Innovative assessment has a positive impact on the assessment of students in secondary school since it quickens the assessment process, reduces stress and malpractices associated with assessment. The task of improving assessment is a must for secondary school operators. The use of ICT to accomplish this task is, therefore, a must to secondary school teachers. The study will find out if secondary school teacher carries out the task.

There has been public outcry and expression of worries over the prevailing deteriorating standard of secondary education in Nasarawa State and the output turned out every year. This may be attributable to the quality of assessment carried out in these schools. This in turn has brought about a delay in the preparation of results, improper feedback of students performances to parent and guardian and improper placement of students. The State Ministry of Education through various agencies have tried to solve

these problems by introducing the Basic Examination in junior secondary school, Transition Examination in senior secondary school, supply of computers to schools across the state and creation of examination unit to be manned by the Director of Examination (DE). These seem to have yielded few results. The continuous effort made by the state government and the fact that the problem persists necessitates the present study. Put in question form are a secondary school in Nasarawa State using ICT for innovation assessment?

Research Questions

The following research questions guided the study.

1. To what extent is the computer-adaptive assessment used in assessing students learning outcome in secondary schools in Nasarawa State?
2. To what extent is the internet used for students assessment records in secondary schools in Nasarawa State?
3. What are the challenges to the uses of ICT for innovative assessment in secondary schools in Nasarawa State?

Methodology

The design used for this work is a descriptive survey. Teachers and principals of secondary schools in Nasarawa State constitute the population for the study.The sample consists of 210 respondents (20% of the total population) drawn using proportionate sampling. The questionnaire was used to collect data for this work. The questionnaire was validated by three experts in the relevant field of Educational Foundations in Kogi State University, Anyigba; they checked the questionnaire and confirmed the accuracy, adequacy and relevance to the study. Copies of the questionnaires were administered by hand and collected by hand using research assistants. Mean and standard deviation was used to answer the research questions, while t-test of independent sample was used to test the hypothesis at 0.05 significant levels.

Results

Research Question One: To what extent is the computer-adaptive assessment used for innovative assessment in secondary schools?

Data in respect of research question one are analyzed and the findings reported in table one.

Table 1: Mean scores of principals and teachers of public secondary school in Nasarawa State on the extent of computer-adaptive assessment is used for assessment in secondary schools.

S/No	Items statement	N_1 = principals = $\overline{X}_1$	SD	DEC	N_2 teachers = $\overline{X}_2$	SD	DEC
1.	Students attendance to classroom are monitored using Computer Adaptive Assessment (CAA)	1.81	0.91	LE	2.12	0.90	LE
2.	Learners performances are assessed in a given test with the use of C.A.A.	2.10	1.05	LE	1.64	0.73	LE
3.	In our school paper and pencil work dominates.	3.50	0.98	VGE	3.05	1.28	GE
4.	Computer adaptive assessment is used to diagnose learner's learning needs.	2.41	1.05	LE	1.41	0.71	VLE
5.	Students work progress is monitored with the aid of C.A.A	2.10	1.06	LE	2.18	1.08	LE
6.	Feedback on assignment is provided with the aid of C.A.A	1.80	0.96	LE	1.79	0.62	LE
7.	Computer adaptive testing is used to summarize result compiled.	2.3	1.10	LE	1.43	0.70	VLE
8.	Problems related to calculation, experimentation and exploration are solved with the use of C.A.A.	1.70	1.20	LE	1.64	0.54	LE

Table 1 presents the mean scores of respondents on the extent to which computer-adaptive assessment is used for assessment in public secondary schools in Nasarawa State. Items 1,2,3,5,6,7,8 showed that both respondents used computer-adaptive assessment to a little extent for assessment in public secondary schools. Item 3 showed that the paper and pencil test is still in use to a great extent.

Research Question Two: To what extent is the internet used for students assessment in secondary schools in Nasarawa State?

Data in respect of research question two are analyzed and the findings reported in table two.

Table 2: Mean score of respondents on the extent the internet is used for innovative assessment.

S/No	Items statement	$\overline{X_1}$	S.D	Dec	$\overline{X_2}$	S.D	Dec
1.	Students continuous assessment is sent to the net for Safety	2.34	1.50	LE	2.12	0.90	LE
2.	Students network with experts for research on classroom Assignment	2.13	1.90	LE	1.64	1.73	LE
3.	Students acknowledge results on the net.	1.89	.062	LE	1.34	1.36	LE
4.	The internet is used for online test.	2.02	1.03	LE	1.43	0.70	LE
5.	Students search the net for past questions.	1.41	0.56	LE	2.12	0.90	LE
6.	The net is used to track data about students sitting for examinations.	1.80	0.96	LE	1.64	0.73	LE
7.	Teachers participate in marking without meeting in a central place.	2.40	1.02	LE	2.05	1.02	LE
8.	Students get immediate feedback on performances.	2.30	1.01	LE	1.43	0.70	LE
9.	Students' independent learning is monitored on the net.	2.17	0.99	LE	2.18	1.08	LE
10.	Manual method of recording scores is still in use.	3.80	0.91	GE	3.25	0.89	GE

Table 2 revealed the opinion of respondents on the extent the internet is used for innovative assessment. The table revealed that item 9–17 are used to a little extent, while item 18 is still in use to a great extent for innovative assessment in public secondary schools in Nasarawa state

Research Question Three: What are teachers/principals challenges in the use of ICT for the innovative assessment?

Data in respect of research question three are analyzed on table three below.

S/No	Items statement	$\overline{X_1}$	S.D	$\overline{Dec}$	X_2	S.D	Dec
(19)	Our school is faced the problem of internet connectivity.	3.23	0.09	A	3.70	0.69	A
(20)	ICT facilities for innovative assessment are not available in our school.	2.01	0.80	D	2.10	0.71	D
(21)	Inadequate supply of electricity hinder the use of ICT facilities in our school.	2.82	1.15	A	3.10	0.89	A
(22)	Most teachers and principals are resistant to innovations.	1.75	0.79	D	1.70	0.68	D
(23)	Security of ICT facility is a problem in our school.	3.19	0.98	A	3.06	0.69	A
(24)	Constant change in ICT policy hinders the use of ICT.	2.03	0.90	D	2.11	0.89	D
(25)	Most ICT facilities in our school are obsoleteS so we can't use them.	2.01	2.10	D	2.09	0.86	D
(26)	Our staff are not ICT complaint.	1.87	0.04	D	1.67	0.09	D

Table 3 indicates the responses of teachers and principals of secondary schools in Nasarawa State on the challenges to the use of ICT for innovative assessment. The table shows that both the principals and teachers agreed on items 19, 21, and 23 that most public schools in Nasarawa State are faced with the problem of internet connectivity, irregular power supply and insecurity of ICT facilities. The table also indicates that the principals and teachers disagree on items 20, 22, 24, & 25 indicating that ICT facilities are

available, principals and teachers are not resistant to change, constant change in ICT policy does not pose any challenge, ICT facilities are not obsolete and staff are ICT compliant.

Discussion of Findings

As indicated by the study, Computer Adaptive Assessment (CAA) is used in public secondary schools in Nasarawa State to a little extent to monitor student's attendance, diagnose learner's learning needs, feedback on assignment and compilation of results etc. The findings also revealed that paper and pencil work is still in use to a great extent in public secondary schools in Nasarawa State for assessment. This is an agreement with Ihechu & Ugwuoji (2017) that computer is not widely used in developed countries for assessment despite its acceptance.

The opinions of principals and teachers of public secondary schools in Nasarawa State also revealed that the internet is used for student continuous assessment, networking, acknowledgement of results, searching for past questions etc to a little extent. The findings also revealed that the manual method of keeping assessment records is still in use to a great extent. This finding agrees with the findings of Abdulsalaam (2012) that most students in secondary school have no access to the web so they find it difficult to do online work. However contrary to his findings on students and teachers preparedness to use ICT, most teachers are prepared more than ever to use ICT in their operations considering the numerous benefit of ICT to teaching/learning and assessment.

In addition to the above, the findings further revealed that most respondents agreed that the major challenges to the use of ICT for innovative assessment are constant power failure, low connectivity, and security of ICT facilities supplied to schools and Colleges. This finding is in the agreement of Oguche (2017) who identified constant power failure, low connectivity and lack of security as challenges facing the use of ICT. These challenges have affected the use of ICT for innovative assessment. The findings also revealed that some of the challenges reported by researchers such

as resistance to innovation, availability of ICT facilities have been overcomed in Nasarawa state Nigeria.

Conclusion

It can be concluded that computer-aided assessment is used to a little extent for innovative assessment, the internet is also used to a little extent for innovative assessment in public secondary schools in Nasarawa state. The major challenges to the use of ICT for innovative assessment are constant power failure, security of ICT facilities and poor internet connectivity in most public secondary schools in Nasarawa state.

Recommendations

1) The government of Nasarawa state should enforce the use of ICT facilities for innovative assessment
2) The community in which the school is located and the school authority should partner to provide adequate security for ICT facilities provided for public schools.
3) The Federal government, state government and service providers should work hand in hand to extend their services to rural areas where the schools are located

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