New Technologies and the Conduct of E-Examinations: A Case Study of the National Open University of Nigeria

Mosiforeba Victoria Adegbiwa (PhD)

Department of Science Education,
University of Ilorin, Ilorin
mosillic@cllil0.co.uk

Abstract

The main focus of this paper is to investigate the importance of new technologies and the conduct of e-examinations in the National Open University of Nigeria. E-examinations are conducted and delivered with the use of electronic devices such as computers, Internet, mobile phones and so on. A researcher-designed questionnaire was the instrument employed to collect data from purposively selected twenty-five of the Information Technology (IT) services staff who participated in the 2010 e-examination of the National Open University of Nigeria. The data collected were analysed using means and standard deviations. The results showed, among other things, that e-examination as a mode of assessing students was worthwhile, more IT equipment is required in most of the examination centres, the need for basic skills in computer was also confirmed, etc. It was recommended, based on the results, that both teachers and students should be computer literate; the procurement or provision of adequate computers and other IT materials was strongly recommended.

Keywords: New Technologies, E-examination, NOUN, Nigeria

Introduction

Technology is a Latin word meaning tools, materials and a process for solving practical problems. According to Simiyu (1999), the term 'technology', as applied to the process of education, includes ways of organising events and activities to achieve educational objectives as well as the materials and equipment involved in the process. The use of technology has made every aspect of education modern,
reliable, global and efficient. The features of technology are more prominent in the conduct of e-examinations worldwide. There have been irregularities in the conduct of examination in Nigeria as a whole. Thus, institutions that are experimenting with e-examinations are truly being proactive in using a scientific approach to solving the problems experienced in the conventional examinations.

The New Technologies

Technology can be described as a product in the sense that it is the end result of the systematic application of scientific knowledge in addressing educational problems, including examination-related problems. The concept "new technology" is an indication that technology is not stagnant but keeps bringing new ideas, knowledge, inventions and skills that should be applied. This explains why the developed countries are always improving and developing new ideas. The new technologies gave birth to the current use of the e-examinations powered by the computers and other Information Technology (IT) products such as microcomputers, mainframe computers and the Internet. E-Examination is the end-to-end electronic assessment processes where IT is used for the presentation of assessment activity and the recording of responses. This includes the end-to-end assessment process from the perspective of learners, tutors, learning establishments, awarding bodies and regulators and the general public (WWW.jisc.ac.uk/assessment).

There are researches on the development and use of technology for e-examinations. For example, Schramm (2008) investigated e-learning web-based system which could present and grade questions in mathematics with infinite patience. Other researchers include Ai-Bayati & I-lussein (2008) that prepared e-examination package for hearing impaired persons (HIP), Zhenming, Liang & Guo (2003) developed a novel online examination system based on a Browser/Server framework that carries out the examination and auto-grading for objective and operating questions. Technology can further be described as a process. This includes functions connected with the software, management, organisations of human and non-human resources for the overall conduct of e-examinations.

E-Examination in Nigeria

Examinations worldwide are means of assessing or evaluating the entire teaching and learning processes, especially as they relate to the learners' performance. Originally, examinations are expected to appraise not only the performance of the learners but also the teachers' effectiveness, achievement of the stated instructional objectives, overall effectiveness of the teaching methods and the instructional materials and the final assessment of a learner's achievement, usually leading to a formal qualification or certification of a skill. However, some of these parameters
could be compromised for the electronic examinations because of their peculiarities and special operations (www.jisc.ac.uk/assessment.html).

Since e-learning is becoming more popular and accepted in the Nigeria school system, the importance of e-examinations is not negotiable and cannot be overemphasised. The e-examination is a welcome innovation because the conventional examination is plagued with several pitfalls such as examination leakages, impersonations, inadequate supervisors, demand for gratification by markers so that results can be influenced, bribe taking by supervisors or invigilators and the most devastating of these is the delay and or in many cases, non-release of examination results, especially where there are large classes or public examinations. This explains why Ayo, Akinyemi, Adebiyi & Ekong (2007) proposed a model for e-examination for the Joint Admissions and Matriculation Board (JAMB) as a way of curbing examination irregularities. Thus, the adoption of e-examinations by many institutions such as the West African Examinations Council (WAEC), National Board for Technical Education (NABTEB), National Examinations Council (NECO), National Teachers' Institute (NTI) and Teachers' Registration Council of Nigeria (TRCN) for examining their candidates is in the right direction. Also, most tertiary institutions now use e-examinations in the Unified Tertiary Matriculation Examination (Post-UTME) for screening their students.

Furthermore, there are universities in Nigeria that are almost fully or partially implementing the e-examination for assessing their students. Examples of these include:

• National Open University of Nigeria (NOUN)
• University of Ilorin, Ilorin
• Federal University of Technology, Minna
• Covenant University, Ota (Private)
• University of Nigeria, Nsukka
• University of Lagos, Lagos

So far, it is only NOUN that is fully implementing e-examinations for assessing their students and is the only one using the Internet while the others use Intranet. However, this is understandable because NOUN is the only Open University (though there are Distance Education Programmes such as sandwich and other short-term/partially flexible education programmes) in the country (Ihebereme, 2010).

**Challenges of E-Examinations in Nigeria**

The adoption of e-examination has more radical implications and challenges than mere changing the mode of examination. It can affect the entire structure of the education and probably change its patterns of work for staff and students. Attewell (2005) identified other challenges that are applicable to this study. These include:
While e-examination may offer a reduction in the time spent in marking, it will for these reasons shift the focus of effort, which is usually very tedious, for staff to before rather than after the examination period;

Questions in item banks also need to be assessed and indexed so that each student experiences a test of equal measure to their ability, regardless of the combination of questions presented to them in a randomly generated test;

Setting up a viable physical and IT infrastructure to support e-examination to the required scale is demanding, expensive and tedious;

Instituting policies and procedures to ensure the validity, control and standards of e-examination; and

The possibility of technical failures during the e-examinations.

Apart from the foregoing, one of the biggest challenges that may exist in Nigeria with regards to the conduct of e-examination is inadequate electricity supply as well as inadequate IT tools, such as the computers and of course computer illiteracy. The issue of computer literacy still remains a significant setback to technological development on a wide scale affecting both teachers and the students. Tertiary institutions, examinations bodies and the Nigerian government need to address these problems in a very pragmatic way to ensure progress in technological advancement generally and the conduct of examinations specifically.

This study investigated the new technologies and the conduct of e-examinations using the National Open University that has fully adopted this mode of examination as a case study. The study sought to address the following research questions:

1. What are the factors influencing the conduct of e-examination in NOUN?
2. What is the students' competence level on the new technologies during the conduct of e-examinations?
3. What are the ways to improve the conduct of e-examinations?

Methodology

The National Open University of Nigeria is the only Open University in Nigeria and it has students in 42 study centres across the 36 states of the country. E-examinations started fully for the last two years in NOUN, in order to curb some challenges with regards to release of results of the conventional paper and pen examinations since its inception. The IT service staff of the university who are directly involved in the conduct of the e-examinations were purposively selected as the sample for this study. They were requested to respond to a researcher-designed questionnaire which has two parts and validated by two experts from the School of Education, NOUN. The means and standard deviations were used to analyse the data collected. The Likert ratings of strongly agree (4), Agree (3), Disagree (2) and Strongly Disagree (1) were applied to get the scores obtained.
Analysis of Research Data

The research findings from the questionnaire are presented in the following tables:

Table 1: Responses on the Importance/Conduct of E-Examinations

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The efforts expended on e-examination are not really worth it</td>
<td>1.94</td>
<td>1.18</td>
<td>Rejected</td>
</tr>
<tr>
<td>2 Knowledge of some basic computer programmes, (e.g. Microsoft word, Ms word, Corel Draw) should be a prerequisite for writing e-examinations</td>
<td>2.68</td>
<td>1.21</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>3 E-examination should not be used at all because it requires IT tools</td>
<td>1.18</td>
<td>1.01</td>
<td>Rejected</td>
</tr>
<tr>
<td>4 E-examination has improved the standards of examinations in NOUN</td>
<td>2.62</td>
<td>1.11</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>5 More students fail e-examination than the conventional examinations</td>
<td>2.51</td>
<td>1.18</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>6 Supervision during E-examination is too complex/cumbersome for me</td>
<td>1.08</td>
<td>1.06</td>
<td>Rejected</td>
</tr>
<tr>
<td>7 E-examination is capable of testing the performance of students</td>
<td>3.28</td>
<td>1.07</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>8 E-examination centres are not too conducive (e.g. no air conditioner, limited computers)</td>
<td>2.76</td>
<td>1.14</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>9 Invigilators at the e-examination centres are not competent in computer usage</td>
<td>2.58</td>
<td>1.02</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>10 Students at the e-examination centres are not competent in computer</td>
<td>1.94</td>
<td>1.13</td>
<td>Rejected</td>
</tr>
<tr>
<td>11 E-examination cannot replace the conventional way of writing examinations</td>
<td>1.01</td>
<td>1.83</td>
<td>Rejected</td>
</tr>
<tr>
<td>12 Inadequate electricity supply is a major challenge in the conduct of e-examination in most of the examination centres</td>
<td>3.51</td>
<td>1.10</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>13 It is easy for students to cheat through e-examination than the conventional examinations</td>
<td>1.18</td>
<td>1.14</td>
<td>Rejected</td>
</tr>
<tr>
<td>14 E-examination saves time</td>
<td>3.51</td>
<td>1.64</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>15 Students should be given orientation on the conduct of writing e-examination</td>
<td>2.89</td>
<td>1.05</td>
<td>Not Rejected</td>
</tr>
</tbody>
</table>

Acceptance Level = 2.50; Rejection Level= Below 2.50
The responses in table 1 revealed that the decision on the statement that the efforts expended on e-examination are not really worth it was rejected (Mean=1.94 and SD=1.18). Most of the respondents agreed that knowledge of some basic computer programmes, such as Microsoft word, Corel Draw, should be a prerequisite for writing e-examinations. The statement was not rejected (Mean=2.68 and SD=1.21). The decision on the item that e-examinations should not be used at all because it requires IT tools that are not readily available in the Nigerian Universities was rejected (Mean=1.18; SD=1.01). The respondents did not reject the statement that the conduct of e-examinations has improved the standard of examinations as a whole in NOUN (Mean=2.62; SD=1.11). The respondents did not reject the statement that more students failed e-examinations than the conventional examinations (Mean=2.51; SD=1.18). They rejected the notion that supervision during e-examination is too complex/cumbersome for them, probably because they are IT staff.

Furthermore, the respondents did not reject the item which stated that e-examination was capable of testing the performance of students (Mean=1.28; SD=1.07). The respondents did not reject the idea that examination centres were not too conducive for e-examinations (Mean=2.76; SD=1.4). They also did not reject that officers at the e-examination centres were not very competent in assisting the students during the conduct of e-examinations (Mean=2.58; SD=1.02). The respondents rejected the notion that students at the e-examination centres are not competent in computer usage (Mean=1.94; SD=1.3). They also rejected the statement that e-examinations cannot replace the conventional paper and pen way of writing examinations (Mean=1.01; SD=1.83). They, however, agreed that inadequate electricity supply was a major challenge for the conduct of e-examinations in most of the centres (Mean=3.51; SD=1.0). The respondents rejected the statement that it is easy for students to cheat in e-examinations than the conventional examinations (Mean=1.8; SD=1.4). Most of the respondents agreed that e-examinations save time (Mean=3.5; SD=1.64). Lastly, the respondents also did not reject the statement that students should be given orientation on the conduct of writing e-examinations.
### Table 2: Responses on Students' Computer Skills during the Conduct of E-Examinations

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to open the computer system</td>
<td>3.38</td>
<td>0.08</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>2</td>
<td>Accessing their portals</td>
<td>4.18</td>
<td>0.91</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>3</td>
<td>Entering names/matriculation numbers</td>
<td>3.34</td>
<td>1.91</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>4</td>
<td>Rectifying errors encountered during the exams</td>
<td>1.09</td>
<td>1.21</td>
<td>Rejected</td>
</tr>
<tr>
<td>5</td>
<td>Ability to identify the operational computer keys</td>
<td>3.21</td>
<td>1.69</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>6</td>
<td>Ability to save their documents after the exams</td>
<td>2.01</td>
<td>1.94</td>
<td>Not Rejected</td>
</tr>
<tr>
<td>7</td>
<td>Ability to log off the computer after the exams</td>
<td>3.11</td>
<td>1.02</td>
<td>Not Rejected</td>
</tr>
</tbody>
</table>

Table 2 revealed that students were able to perform most of the skills required for the conduct of e-examinations with the exception of item 4 which is the only one rejected (M=1.09 and SD=1.21). The other items have means of between 2.01 to 4.18 which indicated that most of the students have the required skills for the conduct of e-examinations.

### What are the ways to improve the conduct of e-examinations?

Respondents suggested ways, based on their experiences on how to improve the conduct of e-examinations beyond their own institutions. The summary is presented below:

1) Examination centres- Most of the respondents (80%) suggested that the examination centres should be equipped with adequate computers and other IT tools for a smooth conduct of e-examinations;

2) IT tools/skills- About 60% of the respondents suggested that the students should be more exposed to basic computer skills. They also suggested that there should be computer laboratories in all the centres/schools and the inclusion of computer education in the school curriculum;
3) Lecturers- 40% suggested that the lecturers should be trained in the preparation, scripting, uploading and monitoring of e-examination questions;  
4) Power supply-20% of the respondents suggested that there should be adequate supply of electricity and that this should be complemented with a standby generator;  
5) Funds- 20% also advocated the release of more funds for the exercise to be more successful; and  
6) Invigilators/supervisors- 10% suggested that invigilators or supervisors need to be trained to handle some basic IT problems so that they can assist students during the conduct of e-examinations.

Discussion of Findings

The findings of this study revealed that efforts expended on e-examinations were worth it. Though, it may be too early to conclude on the superiority of e-examinations over the conventional examinations in Nigeria in particular, this study sets the stage and awareness for technological approach to solving examination problems in education. It may also encourage NOUN and other institutions that are yet to fully adopt the e-examination for assessing their students to do so because it is also confirmed that the conduct of e-examinations saves time, especially when the university has enough questions in its item/question banks and enough learning materials. This corroborates the assertion of Attewell (2005) that adopting e-assessment has more radical implications than just changing the mode of assessment. The findings further showed that the respondents accepted that e-examinations improved the standard of examinations and that more students failed e-examinations than the conventional examinations. This is against the expectations of some that e-examinations are easy to pass and that students can also easily cheat. It is also true because students need to read every detail in order to pass their examinations. The new technologies have made it impossible for students to cheat because each student is served with his own questions which may be different from the student sitting next to him. It was also revealed that necessary IT equipments and tools, the environment and computers were inadequate and many of the tools not installed or non-functional for the conduct of e-examinations so far. The study confirmed the inadequacy of electricity at the examination centres and thus requiring installation of standby generators until when the electricity supply in Nigeria improves.

Conclusion

This study examined the new technologies and the conduct of e-examinations using the National Open University of Nigeria as a case study. It discussed the new technologies as a way in which we are exposed to constant development in
the educational system. Technology is not stagnant, which is the reason why we keep having new ideas, skills, inventions, innovations, etc. One of the innovations of the new technologies is the mode of assessing students through e-examinations. There are challenges against the full implementation of e-examination in the Nigeria educational system, such as inadequate electricity, inadequate questions in the item bank, computer illiteracy and lack of IT infrastructures. Further studies are desirable on a larger scale for generalisation on the new technologies and the conduct of e-examinations.

**Recommendations**

The following recommendations were proffered based on the results of this study:

- Lecturers should be sensitised about their changing roles in the conduct of e-examinations. They should be trained and assisted to adapt to the new technologies through workshops, seminars, conferences, etc;
- Students should be assisted through induction or special coaching to acquire basic skills in computer that will help them during the conduct of e-examinations;
- The provision/procurement of adequate computers is strongly recommended if e-examinations are to meet global standards; and
- More universities and other examinations bodies should adopt the e-examination mode of assessing their students. The problems of delayed or non-release of examinations results will be over.

**References**


