

THE USE OF e-ASSESSMENTS IN THE NIGERIAN HIGHER EDUCATION SYSTEM

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ABSTRACT

The rapid development of the information and communication technologies has brought about the modernization of teaching and learning across the globe. Today, teaching and learning are made easy through the use of computer technologies and/or the electronic and other multi-media elements. It is widely accepted that electronic learning naturally leads to electronic assessments or examinations. e-assessments and e-examinations are widely used all over the world in the Open and Distance Learning institutions and some conventional face to face institutions. We are thus, moving from the pen and paper assessments to a paperless e-platform and e-assessments, which are necessary constants in the Open and Distance Learning (ODL) system. e-assessments tend to eliminate the limitations and give answers to many questions emanating from the traditional assessments/examinations. Higher institutions in Nigeria are therefore advised to embrace it. The rest of the paper looks at e-assessment as a global change in assessment, benefits of e-assessment, challenges, requirements and responsibilities.

Keywords: e-Assessment, Maple T.A, benefits, challenges, requirements, responsibilities

INTRODUCTION

Electronic learning (e-learning) has increased and has continued to increase in popularity every day with both students and teachers. Its popularity can be felt in all aspects of our educational system. Computer and internet supported teaching are incorporating themselves more and more into the daily routine of the educational system, especially, in the higher institutions of learning. Different institutions adopt varieties of the e-learning mode. While some offer course materials to their students through the e-learning platform to accompany or complement in- classroom teaching, others, especially the Open and Distance Learning (ODL) institutions offer their courses through the e-learning platform. Online teaching and learning is widely used world over, including the developing countries?

According to Schulz (2009), this is a logical development in the modernization of teaching and learning which is carried out through the implementation of Information and Communication Technology (ICT), and online and multi-media elements in the adaptation of computer- supported teaching, learning and testing. e-learning naturally leads to e-assessments or e-examinations. Computer- supported assessments have been institutionalized in most of the ODL institutions and some conventional face to face institutions.

We have moved from pen and paper assessments to the e-platform and e-assessments. This implies moving from learning to assessments without walls. It means distance learning with distance assessment. This is a necessary constant in the ODL system. The use of e-assessment is aimed at resolving many questions and limitations in the traditional in the traditional assessments/examinations. The massive examination leakages and malpractices, demand for gratifications by lecturers in the form of 'sorting', bribe-taking by supervisors and invigilators of examinations among others, have become a global challenge. The challenges of the traditional pen and paper assessments include heavy work as a result of marking/grading of students' scripts, recording, organizing, and the statistical analysis and presentation of the results; higher cost, bad or poor security, poor feedback, wasting of paper resources among others. These challenges make the assessment cumbersome.

With e-assessment, it becomes easier to take examinations. According to Reju and Adesina (2009: 1),

Assessment is central to learning and teaching. What is assessed defines what is taught and how it is learnt. The process of assessment, in turn shapes institutional practices and affects a learner's view of the value of engaging in learning. Getting assessment right is essential to the wellbeing of the learners and institutions, and instrumental to the achievement of national strategies for widening participation and e-learning.

Getting assessment right implies generating assessment results which are reliable, valid, usable, credible and interpretable. It implies producing results which can be used for accurate decision making and planning. Since the e-assessment can be used in reducing or eliminating most of the problems of the traditional assessment, which have resulted to the general falling standards of education particularly among the developing nations, it means that e-assessment is a way of getting assessment right.

Nigerian Universities resorted to the conduct of post entrance or post Unified Tertiary Matriculation Examination (UTME) screening tests otherwise called "Post JAMB" examination because of lack of confidence in the conduct of the entrance examinations.

The UTME used as entrance examinations to the higher institutions in Nigeria are characterized by a lot of fraudulent acts ranging from leakage of papers, use of machineries by candidates, bribe taking by invigilators, impersonation, use of hand phones to aid malpractices and so on. If the Joint Admissions and Matriculation Board (JAMB) can adopt the e-assessment system in their examinations, most of these problems will be resolved.

Research findings (Schulz, 2009; Ayo, Akinyemi, Adebisi, and Ekong, 2007), have shown that e-assessment system has the potentials to eliminate some of the problems that are associated with the traditional methods of examination such as impersonation and other forms of examination malpractices.

The use of e-assessment can be very easy without compromising the quality and integrity of the assessment. If it is adopted on a national scale, it has the potential to fast-track the development of e-learning facilities in the country with improved access to education.

E-ASSESSMENT AS A GLOBAL CHANGE IN ASSESSMENT

E-assessment simply means electronic assessment. According to Reju and Adesina (2009), e-assessment is seen as the end- to- end electronic assessment process where ICT is used for the presentation of assessment activities, and the recording of responses. It means that all aspects of assessment, from the planning, setting of the papers examinations, marking, recording and the statistical analysis are done electronically. PingSoft (2007), confirms this by pointing out that the design of the system goes through the complete process of examinations-proposition, composing papers, signing up, examining, batching, statistics and analysis. e-assessment includes the end-to-end assessment processes from the perspectives of the learners, teachers, learning establishments or institutions, awarding bodies and regulators, and the general public.

Globally, educational processes including teaching and learning have moved and have continued to move from the usual classroom face to face interaction between the teachers and the students to learning which is not restricted to the four walls of an institution. This is learning which can take place anywhere, anytime and at the comfort and pace of the learner. This type of learning which has been accepted world over in the form of Open and Distance Learning (ODL) is driven by electronic learning otherwise called e-learning. To this effect, the nature of teaching and learning is changing across all parts of the higher education sector globally. Therefore assessment practices have come under scrutiny as a result. The traditional pen and paper examinations which were held at a high esteem, have been found to have very often failed to illuminate the existence of critical thinking, effective decision-making, collaborative skills, or the ability to apply what is learnt in practical problem solving situations (Reju and Adesina, 2009).It is hoped that the use of technologies in assessment may offer opportunities to correct these deficiencies. Multi- media approach to teaching, learning and assessment is what is invoke in different parts of the world. But the application must be pedagogically and andragogically led, and appropriately selected. As far as many academic of higher institutions are concerned, the appeal for e-assessment lies in its ability to capture aspects of learning previously considered impossible to assess.

For instance, according to JISC. UK(2009), one of the examples is the Confidence-Based Marking(CBM), which has shown that objective tests in higher education-often thought to be appropriate only for low- level knowledge testing- can actually be used to assess higher order thinking in a consistently rigorous way. If we take a look at this CBM, which was developed by Professor Tony Gardner-Medwin of the University College London (UCL), it would be noted that it promotes a deeper level of learning.

It does this by challenging students to evaluate how certain they are of their answer. This is done in order to allow the students address the gaps they may discover in their knowledge. This confidence or certainty- based marking requires students to state the degree of certainty they have for each answer in an objective test and can be used with any type of right/wrong or true/false question and with existing item bank. The CBM is used to assist good study techniques and to encourage deeper reflection and understanding of the subject. It has been in use for about ten years in the medical school at the University College London.

SOME TYPES OF E-ASSESSMENT PLATFORMS

There are different types of e-learning platforms as there are also different types of e-assessment platforms which can be employed by different institutions according to their needs. Some of these e-assessment platforms which are popularly used by institutions of higher education including ODL institutions are-Maple T.A, which has been adopted and used by the National Open University of Nigeria(NOUN), Moodle, A-Tutor, T C Exam, ILMS or LCMS among others.

The Maple T A: An Overview

This is an easy -to-use web- based system for creating tests and assignments, and thereby assessing students' responses and performances automatically. It is used to support complex, free-form entry of mathematical equations and intelligent evaluation of responses. It is therefore ideal for mathematics, sciences and indeed any other courses. The Key Features Include:

- **Easy Content Creation**
 - Step- by-step question designer for easy creation of a wide variety of questions.
 - Over 14 question types and 20 sub-types available.
 - Easy- to- use editor to add formatting, images, plots and special characters to questions.
 - Ability to provide hints and feedback to students for each question.
 - Assignment editors for creating and customizing assignments and tests.
 - Different assignment types for practice, homework and proctored tests.
- **Mathematical Questions**
 - Numeric and symbolic questions;
 - Free-response questions that are graded for mathematical equivalence;
 - Open-ended questions that can have infinitely many answers;
 - Natural mathematical notation in question texts;
 - Full equation editor support.
- **Algorithmic question**
 - Randomized variables- one question template can be used to get so many.
 - Quickly generate practice problems for students.
 - Generate plots using randomized variables.
- **Automatic Grading**
 - Questions are automatically graded by the system, including the
 - Mathematical free-response questions.
 - Assignment results are automatically recorded in the grade book.
 - Results and feedback are available immediately to students.
- **Analysis of Results**
 - Grade book captures students' results for individual assignments and questions within an assignment.
 - Built in tools provide statistical analysis of results from the students' assignment and question point of view. One can get the result he wants in the form he wants it.

- Results can be reviewed in tabular or graphical formats.
- There is weighting for different assignments or assessments.

Maple T A can automatically do the marking of the questions. Results are made available seconds after the completion of the tasks. Therefore, students' learning becomes more focused and efficient because immediate feedback is received. Again more time is gained which can be spent on other tasks. It does not compromise educational value of assignments and tests. Tests can be taken anywhere and at anytime. Results are made simple for analysis. Results are shown both numerically and graphically. We can therefore say Maple T A makes e-testing and e-assessment easy and cost effective. It is heartwarming to note that the National Open University of Nigeria, which is the only single mode open and distance learning university in Nigeria is setting the pace in the use of e-assessment in the evaluation of learners spread all over the federation. The type of e-assessment platform adopted by this university is the Maple T A, and the type of questions in use now are Multiple Choice Questions(MCQ), Fill in the Blanks(FBQ), and Key Word Questions(KWQ).It is hoped that by the time this e-assessment platform is used for more than five years, the benefits and challenges, as listed below, will be more glaring.

In a typical Moodle question bank, such categories or question types that can be created in the question database includes:- calculations, descriptions, essay, matching, embedded answers(closed),multiple choice, short answers, numerical, random short answers, true/false answers etc. The type of questions that can be created in an A-Tutor platform database can be in the following categories: Likert, Matching (graphical), matching (simple), multiple choice, Multiple answers, open- ended, ordering and true or false.

BENEFITS OF E-ASSESSMENT

The use of e-assessment in the evaluation of students' learning outcomes in the universities and other tertiary institutions has gained ground all over the world. This is because there are so many benefits derivable from the use.

According to PingSoft (2009), the system is flexible and handy to use with complete question types and excellent security strategy that make the examination online, automatic and reduce the cost. It can be used for all kinds of different scaled examinations in different courses at different levels of education. NOUN (2009:2), listed some of the benefits of e-assessment to include:

- Close alignment of assessment to the pedagogic approach used.
- On- demand delivery of tests and assignments to large number of learners.
- Opportunities for learners to personalize their learning by taking assessments on line when ready.
- Timeliness of assessments and high quality of feedback.
- Immediacy of feedback and opportunities for further learning.

In their own contribution Reju and Adesina (2009: 3), enumerated the benefits of e-assessment as follows:

- e-assessment may best be used to free staff for tasks that humans do best.
- Administrative functions performed by the computer such as scoring, recording and transferring of data, will ensure greater accuracy and objectivity than is achieved by humans.
- Anytime, anywhere assessments benefits learners for whom traditional assessment system presents difficulties due to distance, disabilities, illness or work commitments.
- On-demand summative assessments, when available, increase participation in learning by enabling learners to progress at a pace and in a way appropriate to them. (This is the reason why most of the open universities world over adopts e-assessment).
- Review of current practice suggests that technology can add value to assessment practice in a variety of ways.
- If used with skill and imagination, e-assessment defined in its broadest sense to refer to both computer- assisted and computer-based assessments- can increase the range of what is tested or assessed.
- It can provide evidence of both cognitive and skills based- achievements in ways that are durable and transferable.
- It can enhance the validity of assessment systems and encourage deeper learning.
- e-assessment, in fact, is much more than just an alternative way of doing what we already do
- A growing body of evidence indicates that well designed and well deployed assessments can foster more effective learning for a wider diversity of learners. (This is the basis which is essentially for ODL quality offering).

PingSoft (2007), also listed a number of characteristic benefits of the e-assessment system to include:

- **The expansibility:** the system has a flexible examination management which is applicable to examinations of all scales.
- **The teaching support:** the system is simple, brief and easy. The teacher can organize a practice session for some minutes with the students and with the facilities to give the students the self confidence required. (This is the practice in the National Open University of Nigeria).
- **Grade assessment papers automatically:-** Only a click at the required button, the assessment papers are automatically graded. The teacher is set free from the heavy work load of grading the papers and what more, the examination cost is reduced.
- **Overall type of test questions:** the convenience of providing a database management tool helps in the creation of items, resources shared and the modification of items, regulations, period or duration and instructions.
- **The data protection:** the system has the ability to provide perfect and considerate protection function for the assessment data.
- **The result statistics and release:** the web management system can carry out the correct result analysis, result covariance and the release of the result. As soon as the assessment is over the student can click at the required information search and get all the necessary details of his performance as fast and convenient as possible.

- **The equity:** using a simple method of verification of the candidates, students or examiners at the same time guarantees the safety and the equity of the assessment/ examination more effectively.
- **The security:** the facilities can be customized or have a default which can make it to cope easily with the safety recovery of examinations' data and therefore make it convenient for them to carry on continuously should there be power failure, machine breakdown or any other abnormality during the assessment process.

According to Schulz and Apostopoloulos (2009), the general requirement for e-assessment should be digitally equipped rooms for the assessments while the general goal lies in its general designs for different assessment scenarios such as standardized assessments, free text assessments among others. They summarized the benefits of e-assessments in relation to the lecturers and the students. On the part of the lecturers the benefits are as follows:

- The process demands for more assessments.
- There is cost reduction because of the reusability of assessments.
- It saves time because of the automatic validation and readability of the items.
- There is a statistical and qualitative assurance.
- There are new possibilities with multi-media elements.

On the part of the students or the learners, the benefits are as follows:

- Examination results are sooner and easily available.
- There are self- assessments whenever and wherever.
- There is quality assurance of the assessment elements.

With these numerous and overwhelming benefits derivable from the use of e-assessments in our educational institutions, most of the developing countries should not find it difficult to adopt.

CHALLENGES IN THE USE OF E-ASSESSMENT

Some of the challenges, though surmountable, which prevent the developing countries including Nigeria, from adopting full scale e-assessment system can be attributed to:

- **Low level of computer literacy:** the level of computer literacy in our country is very low. Most of the students who go into the tertiary institutions in Nigeria including the ODL institutions do not have idea of how computers work. It will therefore need both intensive and extensive manpower development in the area of computer training and usage, in order to overcome this challenge in the near future. It is heartwarming that NOUN provides computer appreciation training from time to time to different groups of people in the country for free of charge. This has motivated most of the beneficiaries to become computer literates.
- **Cost of acquiring a computer:-** the high cost of acquiring a personal computer(PC) makes it difficult for people to own, and out of the reach of most Nigerians and the students in particular. A good lap top or note book computer is not less than a hundred thousand naira (₦100,000.00).

How many students in Nigeria or any of these poor African countries can afford it? A good palm top is about eighty thousand naira (₦80,000.00). This amount does not include the internet connection facilities.

- **Epileptic power supply:-** to use the computers, there must be electricity supply. But this is not yet trustworthy in the country. The poverty level in the country makes it impossible for most Nigerians to have good quality electricity generating plant.
- **Poor technical infrastructural development:-** the universities and indeed the tertiary institutions in the country do not have the technical and infrastructural facilities to have a full- scale e-assessment processes. For instance, Hautakangas(2009) advised that e-examination rooms should be dedicated with enough computers for the purpose of assessments only. These rooms should have access controlled by personal key cards only; work station configured for accessing only the assessment system; IP- based video surveillance system recording both audio and video (4 cameras per room) and a server system which can store as much more materials from different examination rooms.
- **The Nigerian factor:-** examinations in this country are fraught with examination malpractices. Impersonation is one of them. Is it possible to avoid impersonation and the use of machineries in our public examinations?

Schulz and Apostopoloulos (2009), summarized the challenges according to the lecturers' views and the students' views. On the lecturers' views the challenges are- equipment failure, greater efforts, manipulation security, legal security and loss of quality. While on the students' part, the challenges are based on the fear of equipment failure.

RESPONSIBILITIES IN THE E-ASSESSMENT PROCESS

A change from the traditional pen and paper assessment in our educational system to the e-assessment would bring about changes in responsibilities and roles of the participant in the assessment process.

It is noted that the assessments arranged in the traditional pen and paper form can be singled out as one of the most laborious recurring tasks. According to Hautakangas (2009), a change to e-assessment could be associated with basic points of departure defined in relation to the benefits for students and staff; flexibility for students which requires a more flexible evaluation period for teachers; the experience from the use of e-platform can make it a reasonable basis for the examination system to have a low risk strategy; the work done could be used anyhow in other use of e-platform. The key areas of responsibility in the management and delivery of e-assessment are summarized by Reju and Adesina (2009: 6), as follows:

- **Senior management:** this has the responsibility for developing and supporting an e-assessment strategy for the institution.
- **Academic staff/operational management:-**these have the responsibility for the implementation of the e-assessment strategy and policies, and accountability for the e-assessment process.
- **Administration:** this has the responsibility for the operational systems and processes.

- **Technical support:** this is responsible for the technology-whether it is provided in-house or through a third party.
- **Learner support:** this has the responsibility for maximizing the potential for success through the e-assessment process.

Definitely, with the implementation of the e-assessment system, a number of existing roles will be changed. Some of these roles may include invigilation, internal and external verifications, examination administration, recording and statistical analysis. It means therefore that specific responsibilities will vary according to different institutions.

REQUIREMENTS OF E-ASSESSMENT OR ONLINE ASSESSMENT SYSTEM

An e-assessment system requires a detailed step- by- step approach for effective implementation. A comprehensive outline of such requirements is compiled below.

Delivery system requirements

- There must be a requirement for a server.
- The system runs on the Web or browser.
- Candidates will require any browser on any operating system.

Creating Databanks And Tests With The E-Assessment System

- Questions can be categorized according to topics, types, etc.
- Provisions for the difficulty levels of items are made.
- A test can be compiled with questions from different topics.
- A code number or serial number is provided for each question according to the topic or sub- topic.
- The code or serial number can be used to search for and select questions.
- Questions can be converted to the databank from existing databanks.
- Questions can also be converted from word processing files.
- Tests can be created on a random basis per students.
- Specific questions can be flagged to be included or excluded in a test.
- The on- line assessment system is suitable for surveys.
- The e-assessment system can automatically add the marks allocated in each question to determine the total marks for the test.
- A printed paper and a memorandum can be compiled.
- Different papers (shuffle code) and memoranda can also be compiled.
- Question papers and memoranda can be exported to text or document files.

Control Mechanisms In The Test

- A time limit can be set for the test.
- The sequence of questions can be randomized.
- The system allows jumping to specific questions based on the previous answer.
- The distracters or options per question can be randomized.
- The e-assessment system limits the number of times a student can write a test.
- Students can navigate within a test, either backwards or forwards. This can be set. Navigation tools or buttons can be selected for a test. These buttons can be switched on or off per question or per test. For instance, there should be backward button or forward button.

- Students can be forced to go through all the questions at least once before exiting the test.
- Students can also be allowed to exit the test on/ before completing all the questions.
- After exiting a test, students can be allowed to continue the test from the last question they answered.
- A specific date for a test to be active can be set.

E-Assessment System Feedback

- Feedback on test results can be set on or off.
- Feedback per question can be set on or off.
- Customized feedback per questions or test can be set.
- The event of feedback can be set, for instance, after all the questions, after each question, after a section or sub- topic, not at all, etc.
- The assessment system should indicate what the students answered as well as the correct answer.
- Extra time can be set for students to work through the feedback after test completion.
- Score per question can be displayed in the feedback.

Other Essential Requirements Of The E-Assessment System

- Graphics can be included as part of a question.
- Sound can also be included as part of the question.
- Video can also be included as part of the question.
- Animations can be included as part of the question.
- Scoring per option should be possible.
- Negative marking should be possible in all the question types.
- Preview of a question is available while setting up questions.

Programme Requirements

- Text can be formatted easily, eg. Bold, italics, underline, etc
- Text can be formatted easily within a question, eg. Bold, italics, underline, etc.
- Templates can be used to set the format of a test.
- Style sheets can be used.
- Graphics and videos can be moved around the screen.
- Provision for zoom facilities can be made for graphics and videos.
- If a number of options are involved, they can be presented in a column.
- The e-assessment system can handle or insert the Greek alphabets, subscripts and superscripts.
- The system can handle or insert special characters such as arrows, etc.
- A student's preview should be available while setting up a test.
- Completed papers of individuals can be exported to text or document format.
- The question numbers can be displayed.
- The number of questions answered can be displayed.
- Remaining time can be displayed.
- Can a student switch on or off? This can be set.

Other Features Of The E-Assessment System

- **Students can access tests they have completed.**
- **Both essay type questions and memoranda or instructions can be saved in a databank.**
- **A paper- based test paper can be generated from the databanks.**
- **A test can be saved in text format.**

Stability And Speed Of The On-Line Assessment System

- **The e-assessment or on- line assessment system is stable while setting up tests.**
- **It is stable while students complete a test (even with large number of students).**
- **Answers can be saved in real time(if there is power failure, the answers must be saved up to that point).**
- **The speed of delivery of test from the server to work station is acceptable.**
- **The speed of presenting each question per work station is acceptable.**
- **The speed of presenting videos and graphics per work station is acceptable.**

Security

- **Only registered students should be able to access a test.**
- **The test can be made available on specific dates.**
- **The test can be made available on specific times.**
- **The number of times students can access tests can be set.**
- **The log in time per student is available.**
- **The log off time per student is available.**
- **The system can limit logins to a specific subnet.**
- **Text files with students' details such as names, matriculation numbers or identity numbers can be used to give students access to tests.**

Reporting

- **Results on students' performance can be obtained as follows**
 - **Students' numbers, names and marks in Excel, Word and Text formats.**
 - **Results per topic per students.**
 - **Average of group**
 - **Average time used by the students.**
 - **Date and time of test taken.**
 - **Time taken for each individual student to complete the test.**
- **Full report per question is available and includes:**
 - **The difficulty value of a question.**
 - **Discrimination index.**
 - **Standard deviation.**
 - **Graphical representation of results.**
 - **Number of times a distracter has been selected.**
- **Answers can be saved in real time (if there is power failure, the answers must be saved up to that point)**
- **Papers can be remarked after editing a test, (eg. If a question is deleted)**
- **Results should be presented according to the original question.**
- **Report of each individuals' answers should be made available**

Support and Training

- Technical support for the e-assessment should be available per institution.
- Extensive training should be available to both the students and staff to enable them use the e-assessment to its full capacity.
- There should be a quick response time in the event of technical problems.
- There should also be a service level agreement.

Evaluation Of The On-Line Assessment System

- An institution can have the complete e-assessment system on their net work for a trial period.
- An institution can have permission to use the e-assessment system in a "live" test situation for a specified period of time.
- All role players including telematic departments, lecturers, ICT staff, etc can be involved in evaluating the on- line assessment system.
- The e-assessment system can be evaluated by various people.

CONCLUSION

One of the changes brought about by globalization is the change in educational processes. The traditional face to face interaction is gradually giving way to individualized learning which can take place anywhere, anytime and at the comfort and pace of the learner. This is driven and supported by e-learning, which brings about e-assessments. These in turn bring about global integration and standardization in the educational processes.

In this paper we have seen the benefits and some types of e-assessment platforms. Some emphasis has been given to the maple T A, because of its easy use. The e-assessment system eliminates the logistical headaches and malpractices associated with the traditional mass placement, pen and paper examinations. It is therefore very important that the government should do every thing possible to popularize the e-assessment system in the country. It can do this by equipping the higher institutions with computers and internet facilities. Again, it should subsidize the cost of acquiring computers by the students. This will help the students own personal computers. Importation and training of experts in computer engineering, maintenance and spare Parts should be liberalized.

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REFERENCES

Ayo, C. K., Akinyemi, I. O, Adebisi, A. A. and Ekong, U. O. (2007). The Prospects of e-Examination Implementation in Nigeria: Administration and Management. *Turkish On-line Journal of Distance Education*, Vol.3, No. 6 p. 47.

Hautakangas, S. (2009). *Electronic Examination Service: Experiences from the Design and Use of the Examination Rooms.* Tampere, University of Tampere.

Jisc, U, K. (2009). **On-line Examination System Requirements. Umfundi Assessment System.** Cited in **NOUN (2009).** *NOUN E Examination Implementation Plan.* Lagos. National Open University of Nigeria.

NOUN (2009). *NOUN E-Examination Implementation Plan.* Lagos. National Open University of Nigeria. Nov. 5.

PingSoft (2007). Hyper Author e-Examination System.
<http://www.pingsoft.net/english/product/haes.asp>. Retrieved 12/10/2009

Reju, S.A and Adesina, A. (2009), Fundamentals of On-line Examinations. Paper presented at a training workshop for academic staff on on- line examination System in National Open University of Nigeria, at the Model Study Centre Computer Laboratory, Lagos. 5 to 9 November.

Schulze, A. (2009), FU E-Examinations—Digital Teaching and Testing Space. Berlin. Centre for Digital Systems: e-examinations. Freie Universitat.

Schulze, A. and Apostopoloulos, N. (2009), *e-Assessments with Students' Notebooks: FU e-Examinations.* Berlin. Freie Universitat.