ADAPTING ON DEMAND EXAMINATION SYSTEM
IN NATIONAL OPEN UNIVERSITY OF NIGERIA
END OF SEMESTER EXAMINATION

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ABSTRACT

Teaching–learning process is incomplete without effective and meaningful assessment of students learning outcomes. This applies to both conventional modes of education as well as to open and distance learning modes. So far, conduct of examinations at the National Open University of Nigeria (NOUN), has been cumbersome and be-decked with 'hydra headed' problems, such as: dearth of skilled academics, finances, prompt marking of scripts and collation/processing of acceptable results leading to release of incomplete or meaningless results. Hence the need for re-engineering the examination process at the NOUN.

This paper discusses the On Demand Examination System (ODES), an Information Communication and Technology (ICT) based innovation which enables the assessment of students, as at and on their own readiness and demand. But, opined that NOUN can make better use of ODES by convenient adaptation and use of the ODES software functionalities and processes.

The ODES can be used to handle the challenging examination processes such as generating items that could be administered to students as a group at the End of Semester Examination.

The results of the examination can then be timely processedd and released following the laid down procedures already entrenched by the use of the software to overcome most of the burden experienced so far. Since, the institution, the students and even the staff are not technologically ready for On Demand Examination for now.

Keywords: meaningful assessment; acceptable result; re-engineering; examination process; technology.

BACKGROUND

Higher education in Nigeria has been under immense pressure. This is occasioned by the 21st century idea of widening access to all who seek knowledge since education is the bedrock of national development. In order to ensure access to all and guarantee individual's right to education, Nigeria has been a signatory to all the education laws, conservations and documents available. In spite of the above, Nigeria may not achieve the Education for All (EFA) goals by 2015.

Nigeria as an E9 country (one of the world's most populous developing countries) has the following statistics:

- ➢ **22.1 million out of every 42.1 million Nigerian children are in primary schools;**
- ➢ **Out of the 33.9 million Nigerians eligible for secondary education, only 10.4 million are attending;**
- ➢ **Of all the students who sat for Senior School Certificate Examinations, from 2000 to 2006, only 25 percent passed with credit in Mathematics and English;**
- ➢ **Out of the 1.5 million Nigerians seeking admission to tertiary education, only about 18.5 percent get admitted. (Jegede, 2009:7)**

Nigeria may not dream of achieving the Millennium Development Goals (MDGs) and Education for All (EFA) goals by 2015 without educating those out of school and adults who are illiterate. Nor, can Nigeria dream of catching up with the rest of the world without carrying all those who are outside the education system along. The closing of access gap comes in. This brings about the re-birth of Open University of Nigeria in 2002 to cater for those seeking access for higher education but are not accommodated by the closed gap of the conventional systems in Nigeria. However, the hallmarks of ODL success are that:

- ➢ **Large number of students who are successful in their studies can apply their learning and are acceptable as graduates; and**
- ➢ **Programmes that are sustainable beyond initial injection of funds, scalable to accommodate increasing numbers of students, can be adopted to meet changing curriculum needs, clienteles and technologies.**

Hence, the carrying capacity is elastic to carry as many students and as are willing and ready to be admitted into the system. There is a high demand of higher education because majority of the school certificate holders who are qualified for admission to higher institutions of their choice could not be admitted because of the keen competition to do so at the approved conventional schools available. Those who could not be admitted in the conventional system are left with the alternative of Open Distance Learning. This perspective is strongly supported by Olayinka (2006). Prior to 1999, there were thirty six (36) universities in Nigeria (25 Federal and 11 State owned universities) excluding other degrees awarding institutions because they are not university. It is obvious that many of the qualified candidates are being denied admission as a result of problems of space and facilities in the existing universities. This is evident from the table below showing the number of universities, number of applicants, number of admitted candidates and the left over from 1999 – 2009.

Table: 1
Total number of Universities, Applications and admission 1999-2009

Year	Number of Universities	Number of Applications	Number Admitted	Number left Over
1999/2000	45	417773	78550	339223
2000/2001	46	467490	50277	417213
2001/2002	52	550399	60718	544321
2002/2003	53	994380	51845	942535
2003/2004	54	1046950	105157	941793
2004/2005	56	841878	122492	719386
2005/2006	75	916371	N/A	N/A
2006/2007	76	803472	123626	679846
2007/2008	94	1054053	194521	859532
2008/2009	95	1182381	N/A	N/A

Source: http://www.ume.com.ng

Note: the figures for 2007/2008 and 2008/2009 were reports given by the NUC and JAMB in the Punch, Wednesday May 21, 2008 page 7 and the Punch, Wednesday, April 15, 2009 page 6.

The table shows that the Nigerian university educational system has been going through series of reforms to expand access. Still the formal school system cannot meet the needs and expectations of the government and the individual bodies' projection for human development. Despite the need, there must be concerted effort at ensuring quality of Open and Distance Learning (ODL). The National Policy on Education (FME, 1977) reflected the idea of an Open University System for Nigeria as a separate and distinct institution with a national spread. The document stated that "maximum efforts will be made to enable those who can benefit from higher education to be given access to it. Such access may be through the universities or part-time and work-study programme". The National Policy on Education is very explicit in referring to what is now known as Open and Distance Education (ODE).

Therefore, Nigeria like most highly populated countries of the world has embraced the new global Open and Distance Learning (ODL) as an avenue for offering opportunities for education and training.

With the increasing acceptance of ODL in widening access to higher education in Nigeria, it has become increasingly necessary that Quality Assurance (QA) process is developed and maintained if the ODL provision is to be relevant and more functional and the products recognized. Any consideration of quality assurance in the context of ODL will therefore entail a detailed examination of those characteristics that can give credibility to the various programmes and the products of ODL in Nigeria.

CONCEPTUAL FRAMEWORK

With the increasing acceptance of ODL as a major channel of widening access to higher education in Nigeria, it has become increasingly necessary that the procedure for educational evaluation process should be established to maintain standard if the ODL provision is to be relevant and recognized as complementary to conventional higher education. One of the major aspects to which good attention should be paid in distance education delivery mode is educational evaluation and standards (student assessment procedures). The Quality Assurance Agency for Higher Education (2010:1) stated in Guideline 6: Student assessment precepts that a providing institution should be able to demonstrate publicly that:

> *the summative assessment procedures used for programmes studied at a distance are appropriate for the mode of study, for the circumstances in which the programmes are studied and for the nature of the assessment being undertaken; that the assessments are conducted and marked, and results promulgated, in a reliable and properly regulated manner; and that, in all respects, assessment procedures accord with the requirement to safeguard academic standards. A providing institution should monitor systematically the soundness of its assessment procedures and the practice and be ready to amend them in the light of feedback.*

So far, the conduct of examination at the National Open University of Nigeria (NOUN) has been cumbersome and challenged by dearth of skilled academics, finances, prompt marking of scripts and collation and release of meaningful results.

So many authors have cried out for improvement on the state of assessment in the university. Notably among them are Okonkwo and Ikpe (2008) who called for re-engineering of examination process in NOUN via the "On Demand Examination Initiative"; Okonkwo (2010a) called for rethinking and restructuring of the assessment in NOUN via effective deployment of technology. Earlier, Okonkwo and Okonkwo (2008) called for meaningful learner assessment in the university while Reju and Adesina (2008) were of the view that the use of technology based assessment is inevitable for the NOUN.

They asserted that apart from enhancing the control of the overwhelming growth in student enrolments, it provides access to dispersed groups, handles some security issues as well as reducing the response time occasioning assessment

We know that educational assessment is a process of documenting, usually in measurable terms, knowledge, skills, attitudes and beliefs. Assessment can focus on the individual learner, the learning community, the institution, or the educational system as a whole. Generally, high quality assessments are considered those with a high level of reliability and validity. Reliability generally relates to the consistency of an assessment. A reliable assessment is one which consistently achieves the same results with the same (or similar) cohort of students. Various factors affect reliability – including ambiguous questions, too many options within a question paper, vague marking instructions and poorly trained markers. While a valid assessment is one which measures what it is intended to measure. Validity of an assessment is generally gauged through examination of evidence in the following categories:

- Content – Does the content of the test measure stated objectives?
- Criterion – Do scores correlate to an outside reference?
- Construct – Does the assessment correspond to other significant variables?
- Face - Does the item or theory make sense, and is it seemingly correct to the expert reader?

Thus a good assessment has validity and reliability, plus the other quality attributes for a specific context and purpose. In practice, an assessment is rarely totally valid or totally reliable. There is always a trade-off between reliability and validity. Wikipedia, Encyclopedia (2011)

WHY ADAPT ON DEMAND EXAMINATION SYSTEM
FOR NOUN END OF SEMESTER EXAMINATION

The scope of NOUN End of Semester Examination as at 2010 showed that NOUN has ninety thousand seven hundred and sixty seven (90,767) registered students and six hundred and fifty one examinable courses. The courses and the students are spread in seven (7) schools and centres in the university and dispersed in thirty nine (39) study centres in all the thirty-six (36) states of Nigeria. This implies that if the entire registered students will also register and sit for examination, the institution will be handling about one million (1,000,000) answer scripts multiplied by number of courses registered per student (Okonkwo, 2010b). The manual processing of such scripts purposes administrative nightmare.

The first sets of students were admitted in the year 2004 and they are supposed to have sat for their maximum number of semester examinations and to have graduated no matter their programme of study. But conduct of examinations for the students have remained an arduous task.

The NOUN have not been able to assesses undergraduate students the number of times due, and of the few end of semester examinations conducted, the results are not promptly scored and collated for presentation to students. Okonkwo & Ikpe observed that (2008) such results, when subsequently presented have observable lapses. The problem still persists.

Assessment is an integral part of the education process. Mandernach (2003) is of the view that it helps guide both instructors and students by providing insight on student learning and the effectiveness of institutional activities. That assessment processes, instruments and practices should be well designed need not be over emphasized. Open and distance education is technologically driven and it is currently been used to assess learning outcome.

For instance WebCT has a test construction tool which allows for the creation of Multiple Choice Questions (MCQ) and short answer and completion tests. It is an ideal learning tool; since it provides quick feedback to students about the learning materials they are using as well as preparing them for the upcoming topics (Okonkwo & Ikpe, 2008).

Another innovative system which takes advantage of Information, Communication Technology (ICT) is the On Demand Examination System (ODES), which hallmark is that students can be examined at their own readiness or demand. Other examples include the A-Tutor, which is an open source web-based Learning Content Management System (LCMS), designed with accessibility and adaptability in view and MarpleTA. In view of these myriad of problems confronting the successful conduct of examinations at the NOUN, the university felt there was the need to re-engineer the examination process at NOUN, if the institution must succeed and attain its set goals and objectives.

In 2010, the NOUN adopted and used MarpleTA software to conduct End of Semester e-Examination in two instances (Okonkwo, 2010b) and integrated Learning Management System (iLMS) developed specifically for NOUN was used for her Tutor Mark Assignments. The use of MarpleTA for e-Examination aimed at enhancing her operational efficiency still has its own challenges. The integrated Learning Management System (iLMS) developed for the university and test run on Tutor Marked Assignments has obvious challenges. Before the e-Examination era, in line with the challenges faced by the university, the university sought collaboration with the Commonwealth of Learning (COL), the National Institute of Open Schooling (NIOS), New Delhi, India to develop the On-Demand Examination System (ODES), at NOUN. This is a joint project.

This paper discusses the On Demand Examination System (ODES), an Information Communication and Technology (ICT) based innovation (Prasad and Xavier, 2006a), which enables the assessment of students, as at and on their own readiness and demand. The interest on ODES in this case is on the daptation and use of software functionalities and systematic processes in the end of semester examination in NOUN. The NOUN can make better use of ODES by convenient adaptation and use of the ODES software and processes to generate items that could be administered to students as a group at the End of Semester Examination.

The results of the examination shall also be timely processed and released to overcome most of the burden experienced so far using the mechanism developed in the systm. Since, the institution, the students and even the staff are not technologically ready for On Demand Examination for now.

THE ON-DEMAND EXAMINATION SYSTEM (ODES)

The On-Demand Examination System (ODES) is a highly flexible examination system, where assessment takes place when the individual learners consider themselves to be ready to take it. According to Prasad and Xavier (2006a), "not only that ODES is time independent but it also allows the learners to improve their performance till they are satisfied with the mastery level set by them individually". Thus, ODES adds another dimension of openness in the Open Schooling System where examination is self paced and degree of performance is learner controlled, they had further reiterated. In agreeing with this, Peters (2007) averred that "the NOUN seeks to introduce this innovative venture of ODES in Nigeria as part of the universities flexible approach to learning". But the institution, the staff and even the students are not ready for it now.

HOW ODES FUNCTIONS

An overview of the technicalities involved in the operation of ODES involves the following:

- Planning and building up a functional question bank. The question bank is designed to fulfil certain pre-determined purposes like enriching the instructional aspects and to judge the students learning outcomes. It offers a utility service with inbuilt feedback mechanism for improvement of questions. The generation of items for the question bank is based on test blue prints and question paper design.
- Capacity building and training in the following areas:
  - Technical training for the question databank administrators;
  - Training of Course Coordinators and Programme Leaders on item development procedures for the 'blue prints' for courses to be examined (that is, the academics involved in items development processes);
  - Training of all academic staff on continuous basis on generation of items;
  - Training of examination officers and staff of the study centres on use of the technology software for assessment;
  - Training of academic staff on development of test items using item codifications for the 'test blue print';
  - Development of rich question bank with many items in each cell of the blue print for computerization and use in students assessment;
  - Training of ICT personnel for technical support and back up for the deployment of technology in the Study Centres/Examination venues; and
  - Training of data entry operators for inputting the questions into question bank as they are developed, validated and moderated.
- The operational processes of technology will entail consideration and effective implementation of the relevant factors in the deployment of technology in NOUN assessment. The factors are:
  - Question paper design and blue print;
  - Number of items in a question paper;
  - Total number of items in the question bank;
  - Item codification; and
  - Item sheet. (Okonkwo; 2010a:8)

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- ➤ **Formal registration of students for assessment lays the foundation for subsequent administrative processes. This is a high-volume activity requiring a high degree of accuracy. The student registration master data base is to be used to prepare:**
  - • **Attendance register;**
  - • **Packaging and distribution lists for question papers;**
  - • **The data base for entry of students scores;**
  - • **Printing file for result listing.**

The registration process assigns an examination number to each candidate. That is, an identity number made up of: "Study Centre code/Programme code/Student unique number entry code".

- ➤ **This provides a unique identifier for each student for the examination period;**
- ➤ **The unique identifier also makes it possible to link results files to the candidates; their programmes and their Study Centres;**
- ➤ **The registration system may include security measure like:**
  - • **Candidates photographs with their registration forms; one photograph stays with the original form and one is attached to the examination admit card to be checked by the examination hall supervisor.**
  - • **This helps to counter impersonation as a means of malpractice.**

For effective test administration and control however, the structure suggested by Okonkwo (2010a) shall be deployed in the assessment process as foundation in examination processing system in NOUN. The structure is presented in figure 1 below.Registration of candidates – Foundation for deployment of technology in assessment
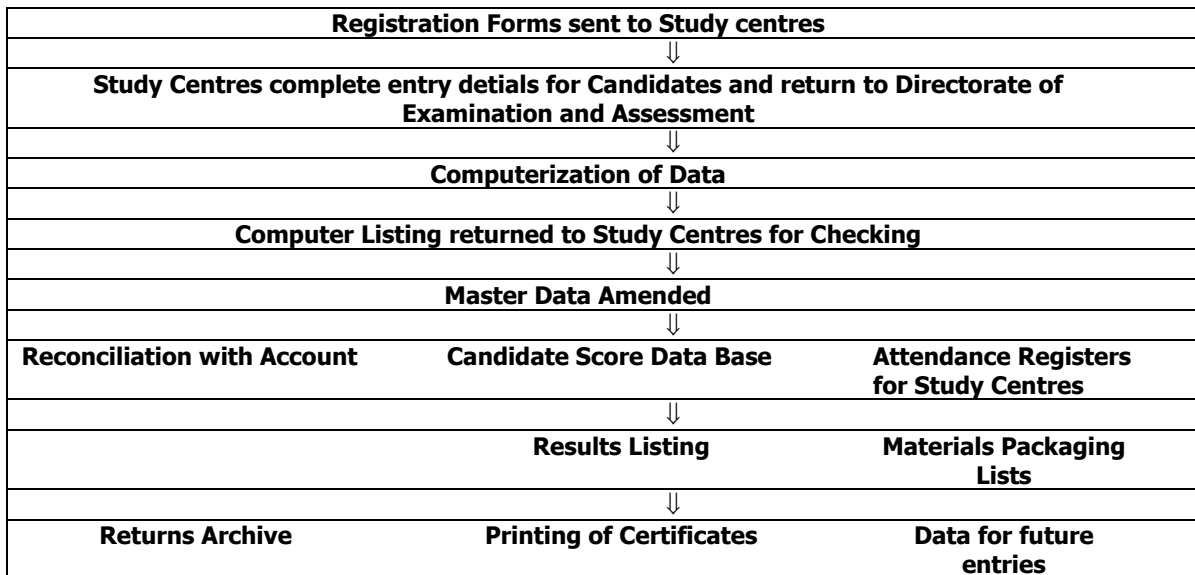
Registration Forms sent to Study centres		
⇓		
Study Centres complete entry detials for Candidates and return to Directorate of Examination and Assessment		
⇓		
Computerization of Data		
⇓		
Computer Listing returned to Study Centres for Checking		
⇓		
Master Data Amended		
⇓		
Reconciliation with Account	Candidate Score Data Base	Attendance Registers for Study Centres
	⇓	
	Results Listing	Materials Packaging Lists
	⇓	
Returns Archive	Printing of Certificates	Data for future entries

Figure: 1
Structure for Effective Registration of Candidates for Examination Source: Adapted from the World Bank Group (2001)

Under the System of ODE, a unique question-cum-answer booklet having defined number of items is generated randomly by the computer on the day of the examination out of the already developed question bank on the basis of question paper design and the blue print of the subject.

The number of items in the question bank is crucial in determining the number of unique sets of question paper. The question-cum-answer booklet is unique at every generation instance. Nevertheless, for NOUN to use ODES in her End of Semester Examination successfully and meaningfully, the functionalities shall be adapted and modified to suit NOUN peculiar needs and circumstances.

ADVANTAGES OF ADAPTING ODES FOR NOUN EXAMINATION

There are observable advantages that can be ascribed to a successfully adaptation of ODES for NOUN End of Semester Examination. Amongst them are:

➢ Every question paper generated is different from any other question paper generated at any given instance but have comparable difficulty levels;
➢ It allows for diverse range of question types which is better in testing candidates' competencies;
➢ The computer selects test items from a pool of questions in such a manner that candidates taking the same examination may not be answering identical questions but their defficulty levels shall be comparable;
➢ It helps to enhance management and control of assessment and collation of results unlike in the manual processing approach that takes several months for processing results, leading to prompt publishing/release of assessment results.
➢ It has the potential to reduce examination malpractices as examinees are duly authenticated before sitting for examination; and
➢ Proper registration exercise enhances proper collation and release of meaningful results on schedule.

ANTICIPATED CHALLENGES

➢ More investment is needed in the area of infrastructure and human development especially in the area of ICT infrastructure, ICT skill development and training and in item writing;
➢ The question bank needs to be large enough to prevent high levels of repetition;
➢ Computer crashes occur – regardless of the computer system in use. There is need for contingency plan in case of other technical faults in the middle of the examination period that may affect smooth conduct of examination and assessment processes; and
➢ Other resources required – sufficient numbers of computers, room for installing them, appropriate software and adequate technology expertise are necessary for effcetive adaptation.

IMPLICATIONS OF ADAPTING ODES FOR NOUN END OF SESMESTER EXAMINATION

The National Open University of Nigeria, the staff and students are presently not IT empowered enough to adequately imbibe the ODES. But, NOUN can adapt the software for End of Semester Examination in the following ways:

- ➢ Development and generation of test items using specified formats in the test blue print. This will ensure that the items for the examination are developed to cover the course content and are at the appropriate difficulty levels.
- ➢ The system will be used to ensure that unique question cum answer booklet having defined number of items is generated randomly by the computer on the day of the examination out of the already developed question bank on the basis of question paper design and the blue print of the subject. But, rather than making the question and answer booklet unique for each student, the question paper and answer booklet should be made unique for each study centre and for each given day of examination. Since, although every question paper generated is different, but they have comparative difficulty levels. At present, NOUN has 44 Study Centres spread in the six geographical zones of Nigeria. Rather than carry the question papers around, the IT infrastructure and its software would be installed in all the study centres and the questions would be send online on agreed date before the due date for examination. This would control cost and examination malpractices because the system generates different questions at every given command. The beauty of it is that all the items in a given question paper weigh the same with any other generated question paper from the same question bank at any other instance. This is possible because the software is already designed to achieve this purpose.
- ➢ It is also envisaged for NOUN should adopt sustainable assessment and evaluation strategies for open and distance learning already discussed by Okonkwo (2010c). This will help in ensuring that the educational evaluation and standards at NOUN attain desirable and acceptable quality.

Already Reju and Adesina (2008) are of the view that the use of technology based assessment is inevitable for the NOUN. They asserted that apart from enhancing the control of the overwhelming growth in student enrollments, it provides access to dispersed groups, handles some security issues and reduces the response time occasioning assessment. While Okonkwo (2010a) called for rethinking and restructuring of NOUN assessment system via effective deployed of technology occasioned by the numerous challenges associated with NOUN assessment. The university is overdue to produce graduates with meaningful results, empowered with lifelong, sustainable and defendable employments.

ODE System as a technology based assessment strategy has the following implications for assessment at NOUN:

- ➢ The use of ODES by NOUN will reduce significantly, the problems associated with the traditional method.
- ➢ It will allow for the spacing of examination period, without necessarily compromising the quality and integrity of the process
- ➢ The system can curtail examination malpractices since examinees are usually authenticated before beening allowed to sit for examinations.
- ➢ The number of students that may be examined at any point in time may be large but manegeable, scoring and processing of acceptable examination results would be possible in record time. This is because the students would have been formerly registered for assessment and their records will be ready and easy to use.

CONCLUSION

This paper views assessment of students learning outcome as an integral component of any teaching/learning process. Most systems in the universe have their peculiar problems; the NOUN has its peculiar problems with the administration of examination in the institution. There are some technologically based assessment systems available these days that could help manage theses problems. They include Web-CT, the A-Tutor, the ODES and the MarpleTA. However, the authors of this paper are of the view that ODES software and processes can effectively be used in NOUN for End of Semester Examination.

This is because it can easily be tailored to serve NOUN needs and as such is capable of overcoming most of the assessment challenges experience in NOUN assessment. If properly deployed at National Open University of Nigeria, ODES will no doubt assist towards ameliorating challenges associated with the assessment of student learning outcome in the institution.

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