

THE PROSPECTS OF E-EXAMINATION IMPLEMENTATION IN NIGERIA

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ABSTRACT

The massive examination leakages, demand for gratification by teachers, bribe-taking by supervisors and invigilators of examinations have become a global phenomenon. This menace has resulted to general fallen standards of education and Nigeria is no exception, particularly among developing nations. Consequent upon this, all Nigerian universities have resorted to conducting post-entrance "Post-JAMB" examination/screening because of lack of confidence in the conduct of the entrance examinations. This paper proposes a model for e-Examination in Nigeria where all applicants are subjected to online entrance examination as a way of curbing the irregularities as proposed by the Joint Admissions Matriculation Board (JAMB), the body saddled with the responsibility of conducting entrance examinations into all the Nigerian universities. This model was designed and tested in Covenant University, one of the private universities in Nigeria. There were 120 questions drawn from English (30), Mathematics (30), General Science (20), Commercial Courses (20), and Religion Knowledge (20), all for one hour duration. Questionnaires were administered to the applicants at the end of the examination to assess their level of ICT literacy, ease of use of the system and the difficulties encountered. Findings revealed that the 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 system is easy to use and candidates can get use to it with time. The timing of examination can be spaced without compromising the quality and integrity of the examination. However, much is still desired if the system were to be adopted on a national scale, particularly in terms of infrastructural and manpower development. Similarly, the quest for e-Examination can fast track the development of e-Learning facilities in the country with improved access to education.

Keywords: e-Examination, ICT, online learning, e-learning, WebCT, pedagogy and Web-based examination

INTRODUCTION

The advent of web applications into the computing technology has brought about a significant revolution in our social life including the traditional system of education and examination. Many institutions are beginning to reevaluate their traditional methods and have considered providing pedagogical materials through the Internet. Several studies have been carried out on distance education which encompasses web classroom and web-based online examination (Yuan, et al, 2003; WebCT, yr; Jackson et al, 1997; and Stina et al, 2000) to mention a few. One important area of application of the web technology is in the development of web-based testing and assessment (Iyilade et al, 2005). Web-based testing and assessment systems offer greater flexibility than the traditional approach because test could be offered at different times by students and in different locations (Jay, et al 2001). More importantly, questions could be shuffled having the same structure and level but different contents.

Basically, the electronic examination (e-Examination for short) system involves the conduct of examinations through the web or the intranet and it reduces the large proportion of workload on examination, training, grading and reviewing. The set of questions often used in the e-examination system are multiple choice objective tests and quizzes that can be formally and easily evaluated online.

The rest of this paper is organized as follow; section 2 examines related works particularly on online education, section 3 states the objective of research work, section 4 presents the statements of problem, section 5 presents the research methods employed, section 6 presents the system architecture for e-examination, section 7 discusses the analysis of result, while the paper is concluded in section 8.

REVIEW OF RELATED LITERATURE

Gaytan (2007) presented a detailed historical background of online education, with regards to its current status, its potentials and limitations that could lead to the advancement of the scholarship of teaching and learning. He stressed the need for online instructors to understand the way online education has evolved over the years from previous conceptions of education and the wide array of implications and assumptions involved in the delivery of online education. He also presented some recommendations for the advancement of online education.

M'hammed et al (2007) worked on the challenges in distance learning unit. He observed that inefficient management could lead to a variety of problems in course delivery, such as delays in obtaining textbooks, problems in obtaining copyright permission, and even course delays. In an effort to facilitate, streamline and improve forms management, a system was designed to streamline the management of required forms for face-to-face, hybrid, online and televised courses. The system developed provides faculty, and distance learning administrators with an easy method to manage all forms effectively and efficiently.

The Nigerian Open University (NOU) is a typical example of e-learning platform where lectures are delivered through radio and television broadcast. However, the deployment of very small aperture terminals (VSATs) with video-conferencing was to

enhance the performance of NOU project effectively with a view to extending the facilities to the rural dwellers (Oliver, 2003). Osuji (2005) listed the elements of distance learning as print media (print and electronic), occasional face-to-face tutorials between teachers and the involvement of different role players.

Furthermore, the Nigeria National IT policy, which was formulated in the year 2000, is responsible for the monumental developments across the various sectors of the economy. The vision is to make Nigeria an IT capable country in Africa and a key player in the information society. Its primary mission is to "Use IT" for: education; creation of wealth; poverty eradication; job creation; governance; health; agriculture; etc. (Ajayi, 2005). The drive has led to major developments such as the: Mobile Internet Units (MIUs), which include busses equipped with ICT facilities such as PCs, peripheral devices and VSAT which are used to carry ICT education to rural areas; and the WIN Project, tagged "Wire Nigeria". It is intended to provide ICT infrastructure to all the nooks and crannies of the country. The project includes the provision of VSAT to the 774 local governments in the country, and the installation of the necessary infrastructures particularly, fibre optic backbone across the nation.

STATEMENTS OF THE PROBLEM

The present problems associated with the conduct of JAMB examination are inadequate examination halls or classrooms to check and control candidates during examination; impersonation in the examination hall; leakages of examination questions; mercenaries hired by registered students to write the exam for them; bribing examination officials - supervisors and invigilators; desperation of parents to buy live questions for their wards; conspiracy and collaboration of security agents and officials of public examination to compromise the integrity of the examination.

OBJECTIVES OF THE RESEARCH

The objectives of this research are:

- To develop a system of examination model that is devoid of irregularities and generally fair to all applicants
- To explore the possibility of conducting a national e-Examination;
- To investigate the level of ICT literacy of applicants.

RESEARCH METHODS

Two research methods were employed. First, an e-Examination system was designed and implemented. The application was developed with the use of HTML, PHP and MYSQL database for dynamism and tested on an Apache web server, hosted on the University intranet. The second method was a research survey carried out among the applicants. A set of questionnaire was designed and administered to applicants seeking admission into Covenant University as a case study. The questionnaires were administered immediately after the examination to the students to assess the adequacy of the system and questions and their level of ICT literacy.

The collected data was analyzed based on descriptive statistics using statistical package for social sciences. The population for this survey is 1,500 drawn candidates from all over the country and a sample size of 200, which is based on the number of available PCs in the computing laboratory where the examination took place.

A total of 1351 questionnaire were returned which represent 90% of them.

Consequently, the examination was space over a period of 25 days based on the number of systems and the convenience of the students who traveled far and near to write the examination on the University intranet.

ARCHITECTURE OF E-EXAMINATION SYSTEM

The e-Examination system is a 3-tier architecture comprising the presentation tier, the business/logic tier and the database tier. The presentation tier offers an interface to the user, the business/logic tier serves as the middleware that is responsible for processing the user's requests, while the database tier serves as the repository of a pool of one thousand two hundred (1,200) questions.

300 in mathematic, 300 in English language, 200 in general science, 200 in commerce, and 200 in religion knowledge. From these set of questions, 120 questions: 30 questions each in Mathematics and English; and 20 questions each in General Science, Commerce, and Religion Knowledge are selected and stored in a separate file from where they are randomly generated for a particular examination such that no two students has the same question occurring in the same sequence.

However, the same set of questions is offered by the students but in different order. The system is made up of two main modules that contain some basic components such as data storage, data call, user identity, certification, and data security.

- **Identification Module: This module authenticates the students' ID, user name, and password. After the authentication, the student is allowed to proceed to the examination process. No candidate can write the examination twice as authentication is based on the candidate's form number and a generated pin number.**
- **Examination Module: After verifying the candidate's identity, this module comes into effect. The module is responsible for generating questions, display questions, track candidates' answers and display result.**

The figure below depicts the general procedure of the e- Examination system. As applicants logon to take the examination, the applicants enter their particulars for identification, which is authenticated by the system to ascertain the candidates' eligibility. Any candidate that is not eligible is automatically disallowed from taken the examination.

The moment a candidate's eligibility is verified, questions are generated from the database and displayed for such applicant and the examination continues until the applicant finishes not later than the stipulated time for the examination. At the end of the examination, the student submits his/her work and the system automatically computes the result and displays it for the student who thereafter prints the result and quits the examination hall.

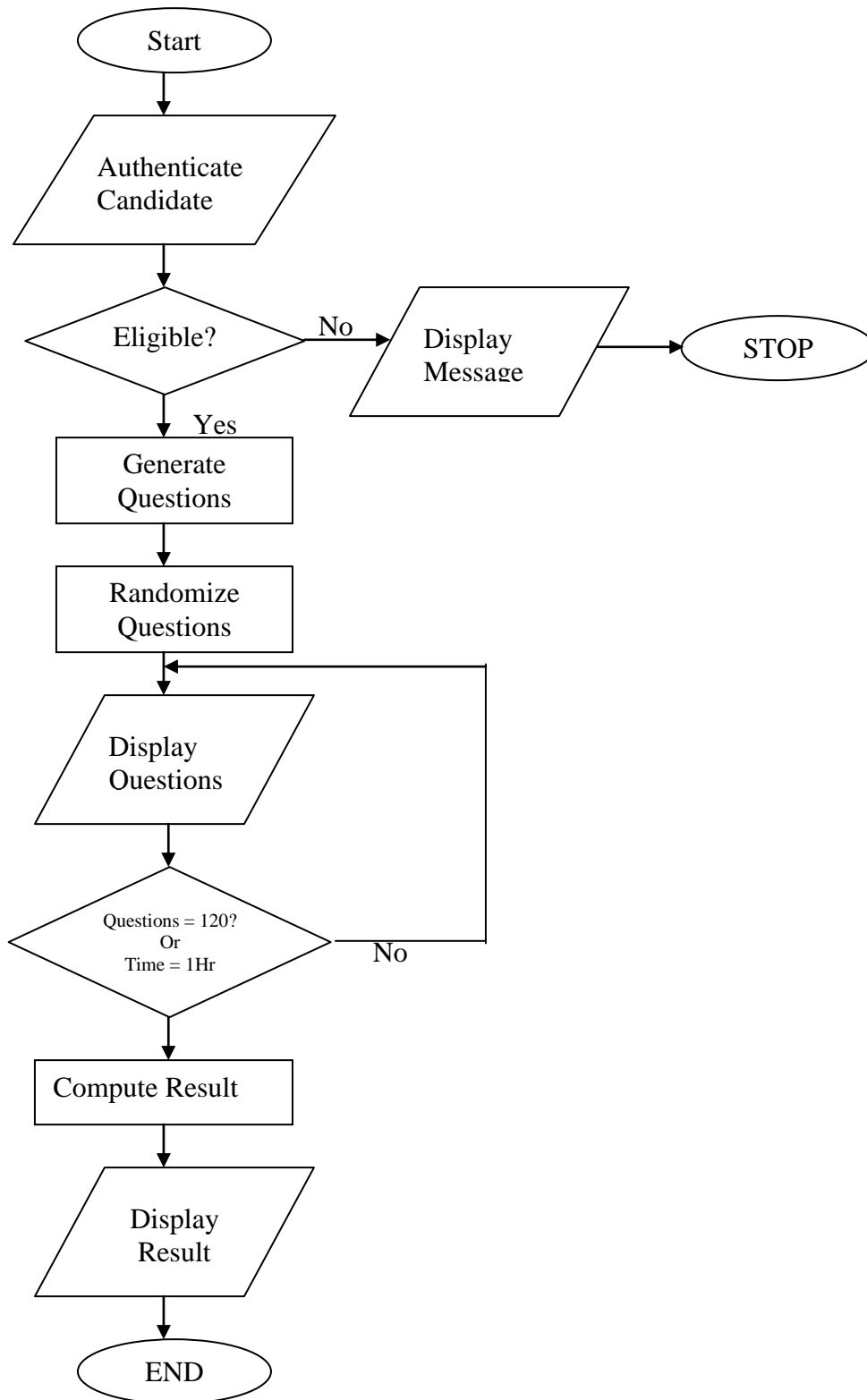


Figure: 1
A flowchart for the e-Examination System

ANALYSES OF RESULTS

Biodata of Applicants

Table: 1
Biodata of Respondents

Gender			
		Frequency	Percent
Valid	Male	748	55.4
	female	603	44.6
	Total	1351	100.0
Age			
		Frequency	Percent
Valid	below 15	58	4.3
	16-17	719	53.2
	18-19	383	28.3
	above 19	191	14.1
	Total	1351	100.0
Secondary Education			
		Frequency	Percent
Valid	before 2002	47	3.5
	2003-2004	152	11.3
	2005-2006	630	46.6
	2007	499	36.9
	Total	1328	98.3
Missing	System	23	1.7
Total		1351	100.0

There were 55.4% male applicants and 44.6% female applicants. The minimum age for admission into Nigerian Universities is 16 years. Of all the applicants, only 4.3% were under-aged, and the others are duly qualified. Concerning the year of completion of Secondary Education, a total of 829 of them, representing 62.4% had completed that level of education some years before the current year. Only 499 (36.9%) of the applicants completed their Secondary Education in the current year.

This submission goes to corroborate the fact that access to Education at all levels in Nigeria is a major problem. There is only access for 150 thousand applicants yearly out of over 1 million them.

Level of Computer Literacy

Table: 2
Level of Literacy of Applicants

Computer Literacy		Frequency	Percent
Valid	yes	1099	81.3
	No	252	18.7
Total		1351	100.0

81.3% of the applicants are computer literate, while the remaining 18.7% were guided through the examination. There were some officials dedicated to those applicants who are not computer literate to help them scroll through questions and assist to click the suggested answers by the applicants. The officials had no business interfering in the examination but just to offer assistance to the applicant in the area of computer usage. This therefore implies that most secondary school graduates seeking for admission into Nigerian Universities, and in particular, Covenant University are computer literate. This means that the diffusion of IT in schools is gaining ground in Nigeria which further makes the teaching and using of IT related materials easy to administer in the University.

Interaction with the e-Examination

Table: 3
The Experience of applicants with the System

Ease of use of the System		Frequency	Percent
Valid	Yes	1023	75.7
	No	327	24.2
	Total	1350	99.9
Missing	System	1	.1
Total		1351	100.0

The total number 1023 (75.7%) of respondents who participated in the e-Examination conducted in Covenant University took electronic examination for the first time and as such found the examination easy, a few found it a little challenging but adjusted with time. 327 (24.2%) of the applicants had not been involved in any form of electronic examination before, and found it difficult. This implies that e-Examination is a new innovation in Nigeria Schools or Higher Institution of learning.

Overall assessment of the system

Table: 3
The Experience of applicants with the System

Assessment of e-examination		Frequency	Percent
Valid	Yes	1043	77.2
	No	305	22.6
	Total	1348	99.8
Missing	System	3	.2
Total		1351	100.0

1043 respondents recommended e-examination for conducting entrance examination into the Nigerian Universities based on the fact that it was easy to use, administer and most especially the fact that the result of the exam can be viewed almost immediately after the exams. This enables the students to know about their performances and their grades immediately after the examination.

CONCLUSION

The developed system would solve the associated problems with the traditional methods. With e-Examination, it is possible to space the period of examination without compromising quality and integrity of the examination. The system has the potentials to reduce drastically examination malpractice as applicants are duly authenticated online, real-time before taking the examination and the result released immediately after the examination.

However, for the system to be adopted on a large scale, efforts should be intensified to ascertain its disadvantaged on accounts of IT illiteracy, by taking ICT training to the nooks and crannies of country. Consequently, more investment is required in the areas of infrastructural and human development.

E-examination has the advantage of being easy to administer, ability to offer applicants instant results, easy verification, devoid of paper work and long time involved in marking examination scripts which in most cases are prone to errors and misplacement of some scripts due to the large volume of scripts that has to be marked and accessed.

If e-examination is introduced into other institutions it will go a long way to control and check examination malpractices and all fraudulent acts associated with the manual process of writing examination. The popularity of this system has the possibility of popularizing e-Learning and online education.

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REFERENCES

Ajayi G.O (2005): E-Government in Nigeria's e-Strategy, Paper presented at 5th Annual African Computing and Telecommunications Submit, Abuja, Nigeria.

Gaytan J. (2007) Vision Shaping the Future of Online Education: Understanding Its Historical Evolution, Implications, and Assumptions. Access date: June 15th, 2007. www.westga.edu/~distance/ojdla/summer102/gatyan102.htm

Iyilade, J. S. and Odekunle, W. O. (2005) A Web-Based Student Testing and Assessment System. Proceedings of the International Conference on Application of ICT to Teaching, Research, and Administration, AICTTRA, vol. 1 pp. 16 – 24.

Jackson, D, and Usher, M (1997) Grading Student Programs using ASSYST. In Proceedings of the 28th SIGCSE. Technical Symposium, 1997 pp 335–339.

M'hammed Abdous and Wu He (2007) Streamlining Forms Management Process in a Distance Learning Unit. Access date: June 15th, 2007 www.westga.edu/~distance/ojdla/summer102/gatyan102.htm

Nancy, K., Scott, M, and Hinton, H. S. (2001) The Design of A Web-Based Computer Proficiency Examination. 31st ASEE/IEEE Frontiers in Education Conference. F2C-3 – F2C-7

Oliver Osuagwu (2003): Nigeria's Open University: Expanding Educational Opportunities to Hinterlands through VSAT based Internet Technology, Conference Proceedings of NCS, vol 14, pp. 233-234.

Osuji S. N (2005): The Mass Media in Distance Education in Nigeria in the 21st Century, Turkish Online Journal of Distance Education (TOJDE), vol 6, no 2. Article 5.

Stina, B., Michael, T., Stephen, G., and Roberto, T. (2000) PILOT: An Interactive Tool for Learning and Grading, SIGCSEB; SIGCSCE Bulletin, 2000.

WebCT, "Web Courses Tolls" <http://www.WebCT.com>

Yuan, Z. Zhang, L, and Zhan, G. (2003) A Novel Web-Based Examination System for Computer Science Education. 33rd ASEE/IEEE Frontiers in Education Conference. S3F-7 – S3F-10.