

Towards a Scalable Web Assessment System for Post University Matriculation Examination in Nigeria

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ABSTRACT

Teaching and learning are constantly being migrated to several ubiquitous platforms. The World Wide Web has therefore become an indispensable tool in the administration of pedagogy. This development has led to accelerated availability of educational resources and the promotion of collaboration across different research and educational institutions. An important component of this innovative trend is the adoption of web-based technology driven assessment of students. It is becoming commonplace to see institutions across the educational strata adopt computer-based tests and assessment to admit or screen students for entrance into Nigerian institutions. We propose the use of computer-based system as a method for screening students after passing the standard written University Matriculation Examination (UME). A prototype scalable software system was developed using PHP technology, AJAX, and MySQL, as a database. Life data were gathered from the last UME and PUME, examination event to test the system. Feedbacks from the experiment showed very promising results.

Keyword: Internet, Learning, Software, Examination, E- Assessment and UME

1. INTRODUCTION

According to [1], the recent employment and eventual widespread acceptance of electronic test in examining students and various classes in Nigeria has created a significant impact in the security and result integrity of e-exams in Nigeria,. Their study featured some anomalies and developed their own to improve on the current e-exams. They further cited WAEC, NECO, JAMB as examination bodies that have embraced e-registration form and some universities that have equally adopted the e-exams for screening prospective candidates for admission. Some examples are the University of Ilorin, the Federal university of Technology, Akure and the Obafemi Awolowo University, Ife etc.

[10] as cited in the work of [1] outlined e-learning web-based system that can offer and grade mathematical questions with infinite patience. [11] presented applied genetic software of multiple kinds of e-exams to hearing impaired (HI) persons. Also cited in their work was the 3-tier model proposed by [1], [9] and concluded that the model was adopted in most institutions where the e-exam is being practiced but that the model does not take care of security on the part of handling.

According to [8], assessment is an ongoing process that involves planning, discussion, consensus building, reflection, measuring, analyzing, and improving based on the data and artifacts gathered about a learning objective. Assessment encompasses a range of activities including testing, performances, project ratings, and observations [7]. Impacting education from early childhood through graduate studies, the assessment movement is based on standards and outcomes, measuring results, and holding educational institutions accountable for students learning.

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Oversight bodies and accrediting agencies are beginning to require the establishment of learner-centered outcomes that reflect the well-rounded knowledge, competencies, and abilities preferred in today's students; the alignment of curriculum to reflect the desired progression and cognitive development of learners; the collection of data that demonstrates the satisfaction of learning objectives; and the use of assessment information to enhance decision making [6]. Assessment is not new to academics, with the roots of the current movement dating back to over two decades [8]. According to [5], assessment of student learning has been gaining and losing popularity for well over 150 years. In K-12 education, assessment first emerged in America in the 1840's, when an early pioneer of assessment, Horace Mann, used standardized written examinations to measure learning in Massachusetts [5].

The use of information technologies and e-learning strategies can provide an efficient and effective means of assessing teaching and learning effectiveness by supporting traditional, authentic, and alternative, assessment protocols [4]. According to [3], technology offers new measures for assessing learning that will yield rich sources of data and expand the ways in which educators understand both learning mastery and teaching effectiveness.

E-examination can be used to assess cognitive and practical abilities. Cognitive abilities are assessed using e-testing software; practical abilities are assessed using e-portfolios or simulation software [12]. [4] Outlined the benefits of e-examination as follows:

- low long term costs.
- instant feedback to student
- greater flexibility with respect to location and timing
- improved reliability (machine marking is much more reliable than human marking)
- greater storage efficiency – tens of thousands of answer scripts can be stored on a server compared to the physical space required for paper scripts.
- enhanced question styles which incorporate interactivity and multimedia.
- create a paperless situation

The disadvantages of e-examination systems are;

- expensive to establish
- not suitable for every type of assessment (such as extended response questions).

2. CURRENT SITUATION OF ASSESSMENT IN MOST INSTITUTIONS

The predominant mode of student's assessment in Nigeria is the traditional method. In this method, students are assessed using paper and pen on cognitive abilities. This method of assessment has imposed serious limitations to the effectiveness of the method. In relation to this, true student's abilities are not measured due to some factors, which are referred to as "HALO EFFECT". This is seen as un-due influence on the part of examiners. This paper therefore presents a new method of assessment using the emerging technology which in the long run minimizes the problems of the traditional method, which ranges from examination malpractice, delayed submission of results, missing results due to human error, to no results at all. Although, few universities that have embraced this technology in the conduct of Post UME as reported by candidates who applied for admission at one time in the institutions include; Federal university of technology, Akure, University of Ilorin, Ilorin, Obafemi Awolowo University, Ile Ife to mention but a few. However, this concept is a new paradigm in Ambrose Alli University, Ekpoma.

3. METHODOLOGY

The design methodology employed for this study is object-oriented techniques coupled with web development methodology. The system used 2-tier approach i.e. client /server architecture for the software developed. The client is any system on the network that uses the services of the other computer called the server. In addition the server is any system that offers services to other host on the network. In web application, the client requests for web interface through which the end users can interact with the entire application. The system logic resides on the servers and processes the request of the clients. Some of the services which the web server of the software offers include;

- Database operations.
- Generation of web pages on demand.
- Authentications and Code generations etc.
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The entire client/server interaction takes place using HTTP (Hyper – text – transfer protocol) which is one of the protocols on IP/TCP suite. The choice of programming language used was XHTML (Extensible Markup Language) and AJAX which stands for (Asynchronous Java script and XML) with PHP. Figure 1 shows the system flow diagram and Figure 2 shows the UML diagram for the software. These tools were chosen due to their suitability for the application.

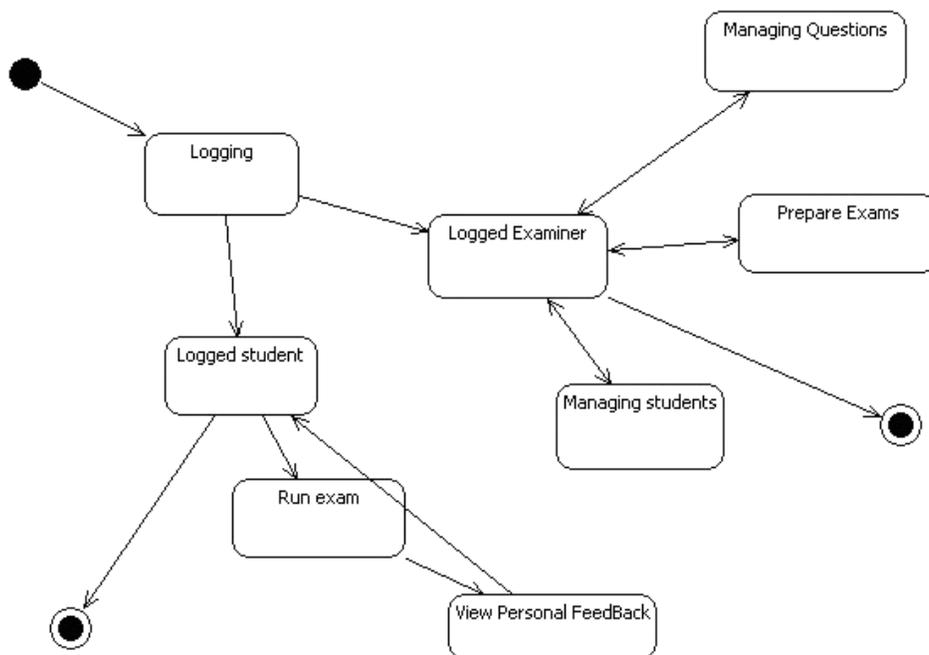


Fig 1: System flow diagram for software. Source [2].

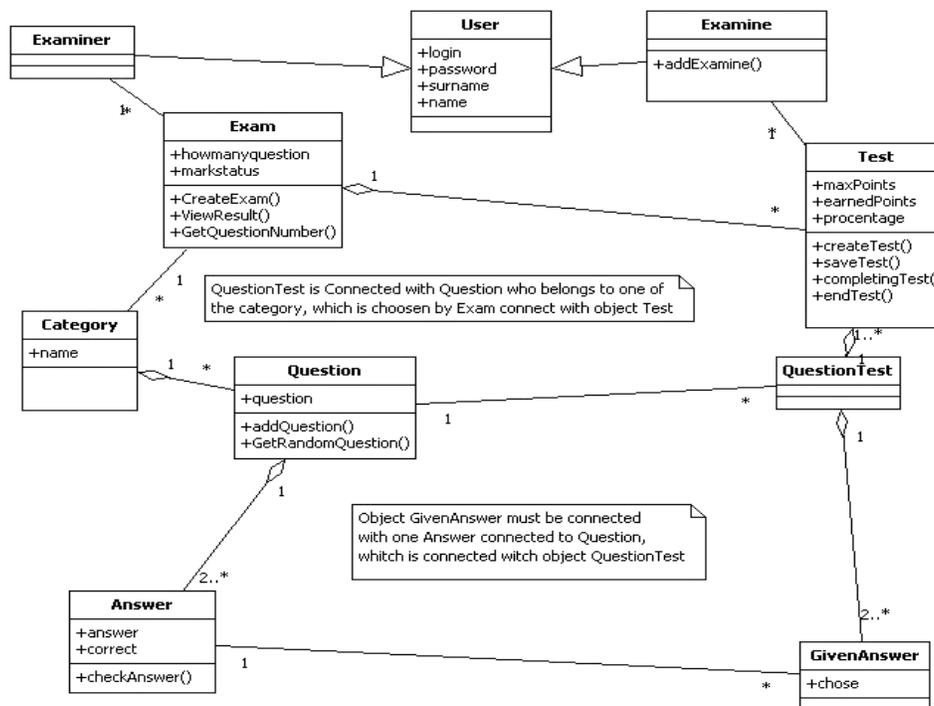


Fig 2: UML Diagram for the Implementation of the Software; Source [2].

3.1. Database Design Structure

Tables 1 and 2 present part of the database design used. The structures are relational

Table 1: Login screen for student eligible to write the entrance examination (PUME). Source [2]

Column name	Data type	Width	Constraint
Username	varchar	30	Primary Key
Password	varchar	30	
Subject category	varchar	100	

Table 2: Choice of subjects' students are eligible to writ. Source [2]

Column name	Data type	Width	Constraint
Subject_id	varchar	3	Primary Key
Subject	varchar	70	
Subject_category	varchar	100	

3.1.1. MySQL

This was used due to its cross-platform capabilities, it runs on any operating system, it is an open source software, free and to a large extent secured.

3.2. Minimum Client Hardware Requirements

Here, the software can only be used on any computer system that meets the following minimum hardware requirements.

- Minimum of Pentium IV or IBM compatible system
- 500 Mhz processor speed or higher
- Minimum of 256 MB memory capacity
- Stand alone and Intranet network.

3.3. Minimum Client Software Requirements

For the effective running of the system, the following tools may be required:

- Minimum of Windows XP as the operating system (OS).
- UNIX based operating system can also be used as the operating system on which the expert system runs. The UNIX based operating system include LINUX RED HAT 5.0, Solaris 10.0 and MAC OS 9.0 due to a cross platform database used.
- Java Virtual machine (JVM).
- support any web browser. Internet explorer 5.0, Mozilla fire fox 3.0, opera 9.0 etc.

4 . SYSTEM SIMULATION AND RESULTS

The software developed was simulated with the help of apache server as a local host which aided the testing with input data that serve as assessment for the set of students. The shot screens of the interface are as presented in the figures below

Home page: This page allows user identification of student through the use of user account and password as shown in figure 3.



Figure 3: shot screen interface for candidate identity verifier, [2] . pp 69-71.

The interface in Fig. 4 permits students to chose the faculty in which the course(s) they apply fit in.



Figure 4: shot screen interface for choice of faculty,[2]. pp 69-71.

Figure 5 presents instruction to students in which they are to agree with the terms.

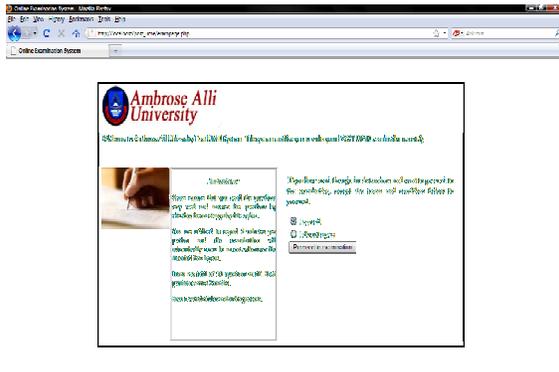


Figure 5: shot screen interface for terms of agreement from candidates [2]. pp 69-71.

Fig 6 presents a multiple choice questions from which the candidates are expected to make their choice.



Figure 6: shot screen interface for candidate questions, [2]. pp 69-71.



Figure 7: shot screen interface for scores summary for the examination, [2]. pp 69-71.

5. DISCUSSION OF RESULTS

The type of e-examination presented was already in use in Federal university of Akure, University of Ilorin and few others that we may not know. The idea is quiet new in Ambrose Alli University,(AAU), Ekpoma.

The last examination conducted in (AAU) Ekpoma, used multiple choice questions manually prepared and marked, the results was released after some weeks. Although, for the e-examination to be achieved; a lot of Information Technology facilities have to be in place such as equipped networked computer system laboratory, adequate and competent support staff. The issues raised in [1] concerning the security will in a way be taken care of, since the e-examination used real time for its execution, the time required or left may not permit cheating because it will scroll up the moment it is timed out and the questions for one student may be different from the other. Also the issue of impersonation that was raised can be taken care of by putting passport size photographs on the transcript of every student once result is ready. All these efforts are geared towards effective and efficient result integrity.

6. CONCLUSION

In this paper, we presented a software that can be used as a platform for conducting Post University Matriculation Examination, (PUME). The system is capable of discouraging all forms of examination malpractices since the software uses real time process.

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REFERENCES

- [1] A. Olawale and M.A. Shafi'i (2010) E- Exams System for Nigerian Universities with Emphasis on Security and Result Integrity, The Seventh International Conference on elearning for knowledge- Based Society, Thailand.
- [2] F. E. EZOMO (2011) Design and Simulation of "PUMELASSTEM" Post UME Electronic Assessment System, Undergraduate Project Submitted to the Department of Computer Science, Ambrose Alli University, Ekpoma. Unpublished.
- [3] F. Vendlinski Stevens D (2002) "Assessment and evaluation: the principles"-Hamburg. .
- [4] P. Bennett. (2002) Flexible Learning Readers. Research investigation on online Assessment as an integral Part of Flexible online Delivery.
- [5] C. Stecher (2002) Self and Peer Assessment of Student Teamwork Designing, implementing and evaluating SPARK, a confidential, web based system' in Flexible Learning for a Flexible Society, Proceeding of ASET-
- [6] R. Clarke and D. Stevens (2000) forthcoming in Online Learning Research Readings, NCVET, Adelaide. Cockcroft (1982) How should UK higher education make best use of new technology? Paper presented at ALT-C. Glasgow, United Kingdom.
- [7] R. Earl, Clayton, B., Hyde, P., Harcher, R. and Hungar, S. (2003) unpublished Creative, Quality Online
- [8] S. Vergis (2005) Assessment of critical thinking. In K. Martell and Calderon, Assessment of student learning in business schools: Best practices each step of the way (Vol. 1, No. 1, pp. 130-155).
- [9] C. K.. Ayo, I.O. Akinyemi, A .A Adebisi., U.O. Ekong (2007), "The Prospects Of E-Examination Implementation In Nigeria", Department of Computer and Information Sciences, Covenant University, Ota, NIGERIA. Turkish Online Journal of Distance Education-TOJDE October 2007. ISSN 1302-6488 Volume: 8 Number: 4 Article 10, page 125-135.
- [10] T. Schramm (2008) "E-Assessments and E-exams for Geomatics Studies" Department of Geomatics Halen City University Hamburg Hebebrand Strabe 1,22297,Hamburg Germany. <http://www.hru. Hamburg .de>.
- [11] M.A. Al-Bayati, K.Q. Hussein (2008) "Genetic Software of E-Exam Package for Hearing Impaired Persons (Mathematics as a Case Study)", 2nd Conference on Planning and Development of Education and Scientific Research in the Arab States.
- [12] G. Yu (2004) An assessment planning primer: Getting started at your own institution. Presentation Made at the 13th Annual Northeast Regional Teaching Workshop.