Service Oriented Model for Implementing Computer Based Examination(CBE) Software

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Most examination conducted in the world today; use the CBE in carrying out the exercise. In Nigeria, some universities have started adopting this system of examination in most of their general courses. CBE is the system of examination that is conducted and administered through the use of computer and its related tools. In using this method for conducting examination in Nigeria universities, alots of problems like examination malpractices, cheating in examination hall by accessing other student's answers, capturing images of questions to other students, etc has widely be experienced within the examination centers. Similarly, providing questions and answers to students before the examination commence by some technical staff that does not care about the value of the examination system is also a serious problem facing the potential of this method of conducting examination. A critical examination of this system, shows that all the aforementioned problems are product of the architecture used to design the CBE software. Hence, there is need for a better architecture and system in the light of the challenges of malpractices still facing the currently used system. In this paper, service oriented models suitable for the full implementation of such improved system were designed and discussed. Therefore, the full adoption of these models will result to a better system/software for conducting examination in Nigeria Universities.

Index Terms— Computer Based Examination, Universities, Architecture, Service Oriented, Software

1 INTRODUCTION

One of the basic building blocks for every sector of economy is information and communication technology (ICT). Mastering the skills and potential behind this technology is very important and needed in all sectors that need rapid growth in the operation like the education sector. ICT adds values to learning methods in higher institution. ICT relies heavily on collections of different tools and mechanism which are used for capturing and processing data within a particular context. ICT includes hardware, software, information, communication devices and computer network to mention but a few which help for easy processes of data. [1] noted that ICT is an umbrella term that includes communication device or application, encompassing radio, television, cellular phones, satellite system and so on, as well as various services and applications associated with them. Hence, these facilities can support various aspects of education and improving its standard. Applying these facilities in conducting test, examination and allocating scores and grades is called Computer Based Test (CBT). It is a process of conducting test and collating test electronically. Many developed nations use CBT for several admissions. It helps to eliminate distance which is a barrier in paper-based test.

Prior to this era of CBT, paper-based test(PBT) is always use by many educational bodies. This goes along with several challenges; these include examination malpractices, inaccuracy in marking, delay in marking, delay in releasing result etc. These have resulted to the poor growth experience in Nigerian Educational System. Similarly, this method (paper-based test) has made some students and teachers not to be serious in the process of learning and teaching. Some students believe that they can pass all examination through providing money or other favour to their

teacher (lecturers) who will do the marking of their examination. The extent to which paper based test has contributed to the decay of Nigeria Educational Standard cannot be over emphasized. [2] noted that the paper based test otherwise called the traditional method of conducting examination is characterized by different form of examination malpractices such as bringing in unauthorized materials, writing on currency notes, identity card, spying of other candidates in examination, substitution of answer sheet and change of examination or grades. Thus, there is need to change the process or method of conducting basic examination in Nigeria Universities. Applying CBT in conduct of most examinations in Universities will help to curb these challenges. [3] noted that CBT is important because it can measure different skills or set of knowledge in order to provide new and better information about individual abilities and that colleges and universities receive CBT results more quickly than those from PBT and can make admission decision more quickly. Also, student with no computer experience can take CBT since the system is always design to be self-instructional.

Meanwhile, CBT exist in two forms, Linear and Adaptive. The linear is a full length examination where the system selects different question for a student without considering their level of performance. This kind of test is scored as paper based test. While an adaptive test is one which the system selects questions based on student's level of performance. Meanwhile, in using CBT in Nigeria Universities, any of the form of CBT can be considered by looking at the target students.

In Nigeria, CBT has been applied and found successful in the conduct of most of the examinations like UTME. Infact, it has been found to be highly successful in conducting UTME in Nigeria. Similarly, most screening for jobs in Nigeria use CBT. If this is successful in these fields of education, it is important to apply it in conducting examination in Nigeria Universities. It can be applied in the conduct of General Courses in Universities like the GSTs, ENTs and other courses from 100 level to 200 level as the case may be. CBT enable educator and trainers to author, schedule, deliver and report on test and examination at a particular point in time. Hence, this paper has presented a general service oriented model that every university in Nigeria can adopt in developing and deploying CBT system for the conduct of examinations in their universities.

The model presented in this paper for CBT is not concentrated on a particular course in the University and is not specially developed for any university. That is to say any university in Nigeria can adopt this model in the deployment of CBT system for conducting their examinations.

RELATED WORKS

Computer Based Test (CBT) is the use of electronic and ICT in conducting examination and awarding scores and grade instantly. It uses ICT facilities or tools like computers, software, hardware, network tools in conducting examination. Meanwhile, CBT will help to eliminate the challenges facing the PBT in Nigeria Universities. [4] noted that CBT is a very vital component of the educational process because one of the challenges facing educational institutions today is

the conduct of examination that is free from malpractice before, during and after the examination. [5] stated that the evolution of web system has brought about significant changes in our social life including the traditional system of conducting examination. [6] carried out a detail review of the literatures regarding advantages and disadvantages of electronic assessment for different types of test for different types of students in different educational environment. [7] developed a novel online examination system based on a Browser/Server framework which carries out automatic grading for objective question in computer related topic such as programming. This system was applied to distance evaluation of basic operating skill of students offering computer science in different universities.

[8] noted that the adoption of e-examination by many institutions in Nigeria is as a result of several pitfalls such as examination leakages, impersonation, inadequate supervision, demand for gratification by maker so that result can be influenced, bribe taking by supervisors and the most devastating of this is the delay and in most cases non-release of examination results especially where there is large public examination. In their research, they developed a computer based testing system. [9] reviewed on the use of computer based testing method for the conduct of examination in University of Ilorin. The study was centered on a specific university. [10] carried out a study on computer based versus paper based examination and show them different challenges and advantages. The study did not provide a general model to adopting CBT in universities.

In [11] CBT system for university academic enterprise examination was developed. Similarly, [1] designed a secured computer based examination system and this was implemented and its success shows that, this kind of system can also be implemented in Nigeria Universities. In [12], online examination system was implemented with firewall security. This shows that it is possible to secure online system from attack through the use of firewall. This gives security a stand to this kind of system when implemented.

[13] developed an online website for tutoring and conducting examination for economic courses. [14] designed a multistage adaptive test system for conducting uniform examination. [15] developed an architecture for multidimensional computer adaptive test with educational purposes. All these researches show that CBT has a strong base that is existing in other sector but the educational sector feel little of its potentials because developers are looking for best model to adopt if it is to be implemented for most of the course in our educational sectors (mainly higher institutions of learning).

METHODOLOGY

In this paper, the design science approach was used to conduct the research for the CBT and how best it can be implemented for Nigerian Universities. The model was presented using UML and Entity-Relationship diagram. They were particular used as the UML diagrams to show how best to implementing CBT and the road maps to implement this system in Nigeria universities that will be free from examination malpractices.

PROPOSED MODEL

The proposed model is expressed in system

diagram and entity-relationship(E-R) diagram taking congnisance of all the needed services. The system architecture is as shown in figure 1, while the E-R diagram is as shown in figure 2. When these models are implemented, the style of administering the examination will be different from what is currently running in most CBT centre. The models have admin module, lecturer module and student module.

The admin model helps to control the activity of the lecturer and student, the lecturer module is used to provide questions to the student module while the student module is used by the student to write or access examination questions and display of results.

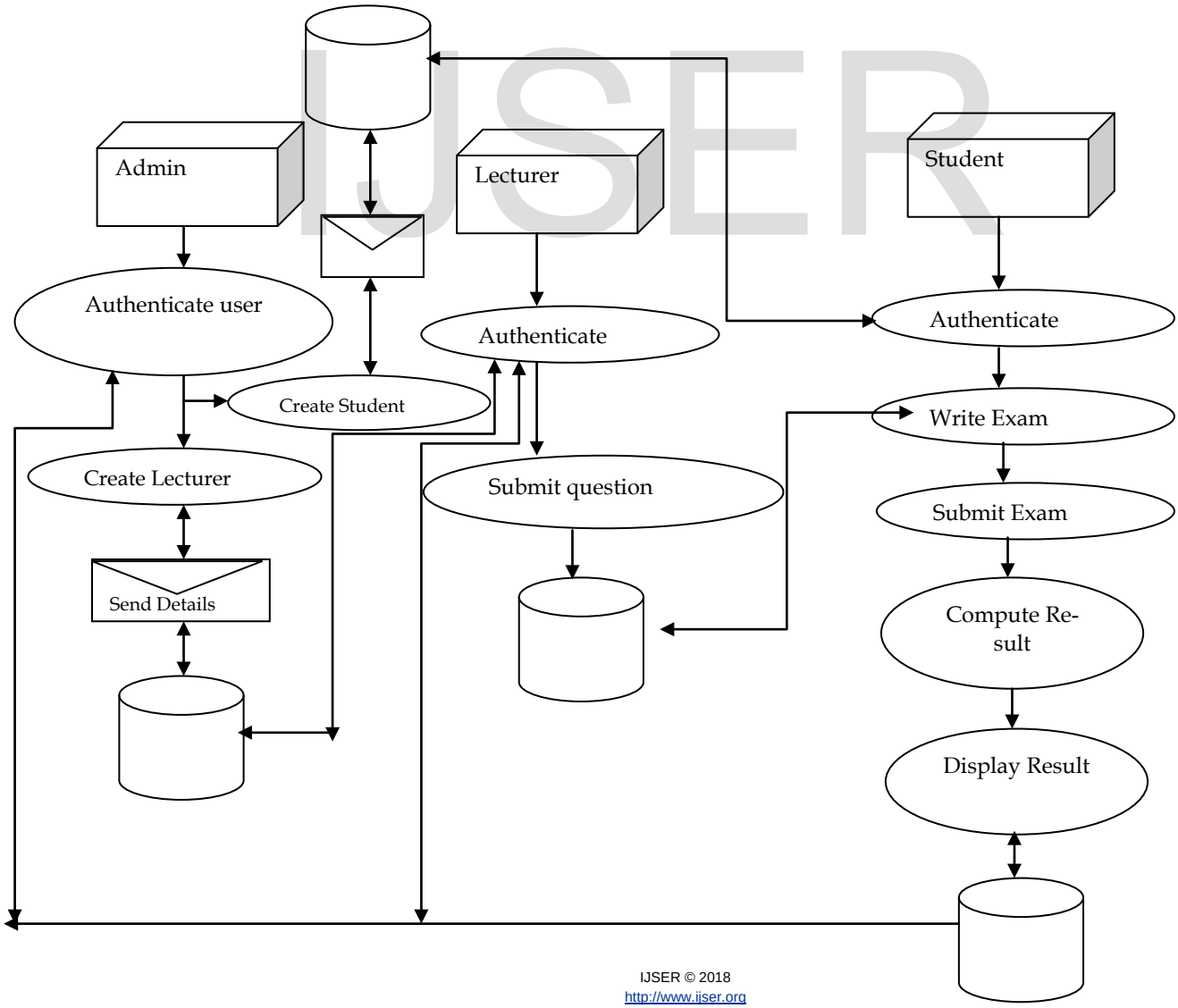

Fig 1: Service oriented CBE Model

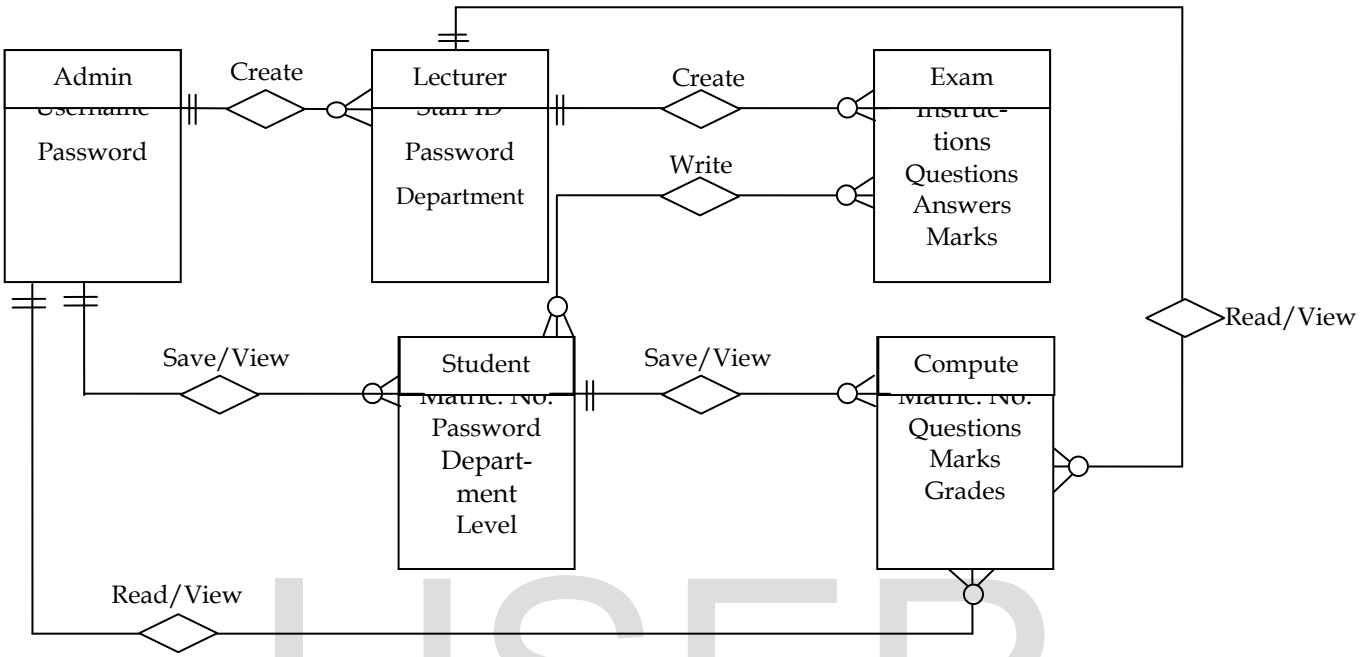

Fig 2: Service Oriented CBE E-R Diagram

DISCUSSION

Using these kinds of models in CBT systems implementation, the system will not display the entire questions for a particular subject for all the students at the same time. However, it will adopt a random question display, a question at a time slice and allocation and monitoring of time for a particular question given to a particular student. With this kind of system implementation techniques/logic, students will not be able to copy answers to questions from each other, because a number 5 question for a particular student can be number 20 question for another student and each question is allocated a particular time to be answered by the student else the system will display another question. The essence of this kind of implementation techniques is to checkmate examination malpractices and also improve the conduct of CBT. Similarly, the upload of question and answer can only be done by the lecturer of that course. Following the design of this model shows that the technical staff do not have the privilege to upload any question or have access to the question before the examination.

CONCLUSION

The use of ICT has affect virtually all aspect of human life including the conduct of examination. Hence there is need to see its full potentials being delivered in conducting examination in higher institutions of learning. This is actually the need for a service oriented system in conducting these examinations. Implementing a service oriented system for CBT has a lot of advantages (like elimination of examination malpractices) over the currently used system. Hence, such models have been designed and presented in this paper. The model gives a road map in achieving a better software for conducting examinations in Nigeria Universities by eliminating the afore mentioned problems facing the currently used software.

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