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Design of a Hybridized-Database Web-Based Transcript Processing System (HWBTP)

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Abstract: *The increase in the number of students in Nigerian universities has posed great challenges for university administration. These challenges include delayed computation and issuance of transcripts. This delay is there because most Nigeria Universities still use manual methods in generating transcripts. This process no doubt is time-wasting, more prone to errors, bureaucratic and stressful. With the enormous challenges of this manual system, in some cases, the transcript has been wrongly computed, while quite a number of students have lost brilliant job opportunities and admissions due to the unnecessary delay associated with the manual process. We observed that the major reason while most universities have not adopted most of these IT-based systems is that the departments have candid fear that if the processing of transcript is left for only the transcript officers to generate at a central point, data security may not be guaranteed. Because of this, some automated systems in other institutions still interact with the departments when requests for transcripts are made. This no doubt delays the response time to such requests. This research work is, therefore, proposing a hybridized-database web-based transcript processing system that generate transcript, verifies and approves electronically and also able to keep database at the departmental level for quick response to notification requests for verification from the transcript unit.*

Keywords: Hybridized-Database, Webpage, Webserver, Web Application, Transcript.

I. INTRODUCTION

A transcript is defined according to [1]as a certified document that shows the records of the academic work of a student at the institution of learning. It captures details of marks/grades that a student gets in the various courses taken in the institution

It can be very rigorous at times very frustrating trying to obtain a transcript from most universities in Nigeria [2]. This challenge is more when you are not personally on the ground to follow up with this request.

In any institution of learning, it is the students' transcript management system that makes it possible for the exam and records/departments to put together and analyze in an accurate and comprehensive way all the information about the students' academic record. The system provides a complete students' academic record and it is expected to be accurate, timely, consistent and reliable. For a large institution, managing and organizing student records into a cohesive and efficient system might appear like an impossible task. [3] Therefore, creating, maintaining and retrieval of information call for one of the largest investments because the information is highly important for correct students' records and examination data. Indeed the Nigerian university education system needs reformation so as to meet the needs of society.[4] There is a need for Nigerian universities to strive to remove those constraints preventing them from adequately responding to the needs of the changing society. Without a doubt, one of the major challenges for students and their various institutions of learning in Nigeria is still the issuance and collection of transcripts. On many occasions, students request transcripts from their institution and at the end, several months would pass before the transcript would be generated and sent to the organization in need of the record [5-7]. The major challenge is that most tertiary institutions in Nigeria still process transcripts manually. The manual transcript processing system is cumbersome. There is untold stress for both students and officers involved in the process particularly when plenty of transcript request forms are submitted. The system is inefficient, prone to human errors and often not secure. Despite the fact that much research has been carried out to develop and deploy IT-based systems to curb these problems, it is still disturbing to see that most universities in Nigeria still process transcripts

manually. We observed that the major reason while most universities have not adopted most of these IT-based systems is that the departments have candid fear that if the processing of transcript is left for only the transcript officers to generate at a central point, data security may not be guaranteed. The institution still want the physical authentication of this important document by the various departments and faculties. Because of this, transcript officers still physically interact with the departments and faculties when a request for a transcript is made. Another serious issue of concern is that these various departments have no database to assist in quickly responding to the request from the transcript unit. The paperwork at the departmental level no doubt delays the response time to such requests. Therefore, suppose there is a system that ensures that each department has a database, then generates transcript electronically and sends a notification to the appropriate departments for verification, and even allows the transcript approval officers to append signatures electronically then, we are good to go. Hence we are proposing a web-based hybridized-database transcript processing system that possesses these features.

II. LITERATURE REVIEW

[8] Integrating Web Services into a Web-Based College Admission Portal System. The study presents how a portal system makes use of web services in college admission to compute student transcripts.

The study employed web service technologies. The work makes possible the exchange of students' data between institutions. However, the participating institutions have to agree on the format to represent transcripts. Also, the transcript data transfer is implemented through the web and only between the involving institutions.

[9] A Real-Time intelligent knowledge-based system (IKBS) for students' results computation. The work targeted fast computation of students result and thus facilitating related record. Microsoft Excel spreadsheet program was used to build an intelligent knowledge-based system (IKBS), utilizing the programming features in the Excel spreadsheet. The work achieved a fast computation of students' results. Since the programming is hardcoded into the cells, it appears to be rather restrictive and calls for substantial expertise in programming to be able to monitor and track students' performance with cell referencing.

[10] Developed Personal Record Software. The aim is to reduce the time spent in calculating GPA and generating transcripts. The users' view was designed with Microsoft (MS) Visual Basic® (VB) 6.0, while MYSQL was used to create the database tables. The work is able to compute students GPA without error. This application, though tested and found to be working as expected, cannot generate an accurate transcript.

[11] E-Transcript Web Services System Supporting Dynamic Conversion Between XML and EDI. The work shows an electronic transcript web services framework that supports XML and EDI e-transcripts, and also web services and transmission mechanisms of the FTP. The work utilized open source projects to implement the proposed framework based on web services architecture and workflow management mechanism. It adopted the workflow management mechanism and guarantees a secure electronic exchange of transcripts between institutions though it emphasizes document conversion and reuse of web services.

[12] The Design and Implementation of Student Academic Record Management System. Solving problems encountered in admitting students and course registration in tertiary academic institutions. This work shows software for student registration and course management database with Microsoft access 2003. The system is simple to implement yet could not generate students' transcripts.

[13] Web-Based Virtual Transcript Processing and Transfer for Nigerian Universities. The study focuses on a web-based portal for results and transcript generating. It employed a Structured System Analysis and Design Methodology.The author developed a system that computerized both results and transcript problems in a web format. However, if the system is hosted, poor internet connectivity and the high cost of the service will be a challenge. Then, if it is going to be Ethernet, recovery from system crash will be difficult since the backup database is absent at the departmental level

[14] Architecture for Centralized Transcript Request System in Nigeria. The work shows appropriate system architecture for transcript generating. A System Analysis approach was employed to survey the existing system approaches to transcript processing. The study suggested a suitable and systematic architectural model for executing a centralized transcript request system in Nigeria. However, it is limited to the architectural design aspect of the proposed system.

[15] Design and Implementation of a Mobile-based Transcript-Request-Processing System. (MBTS) The paper presents a mobile-based transcript portal for sending students' transcripts. The study adopted Structured System Analysis and Design Methodology. (SSADM) It facilitates the request and generating of a transcript and presents a system that is platform-dependent. It runs only on the Android operating system.

[16] Transcript Request Processing System: A Multi-Tenant Framework. The work presents a framework forconsolidating the transcript system using the concept of multi-tenancy. It presented a multitenant framework as a viable solution in achieving a timeless, efficient, and cost-effective Transcript Processing System. The work proposed implementation through the concept of Pluggable Databases (PDBs). The PDBs are portable collections of schemas, schema objects, and non-schema objects that there as a son-CDB. CDB stands for Container Database. The framework proposed a system that will be cost-effective although the multi-tenant database requires relatively complex implementation

[17] Development of Centralized Transcript Processing System. The paper presents a web-based architectural framework suitable for implementing a centralized transcript processing system in Nigerian tertiary institutions. The study adopted Structured System Analysis and Design Methodology. (SSADM)Students are able to apply for their transcripts online. And the system is also able to generate transcripts electronically ensuring accuracy in the transcript generating. However, it is noticed that the system is not fully automated as there is a need for transcript officers to physically interact with the students' departments after their requests for transcript. The system's efficiency will be negatively affected as time will be involved in requesting and getting information from the department.

III. SYSTEM ARCHITECTURE

The system architecture of the proposed hybridized-database web-based transcript processing system is shown in figure 3.1 below.

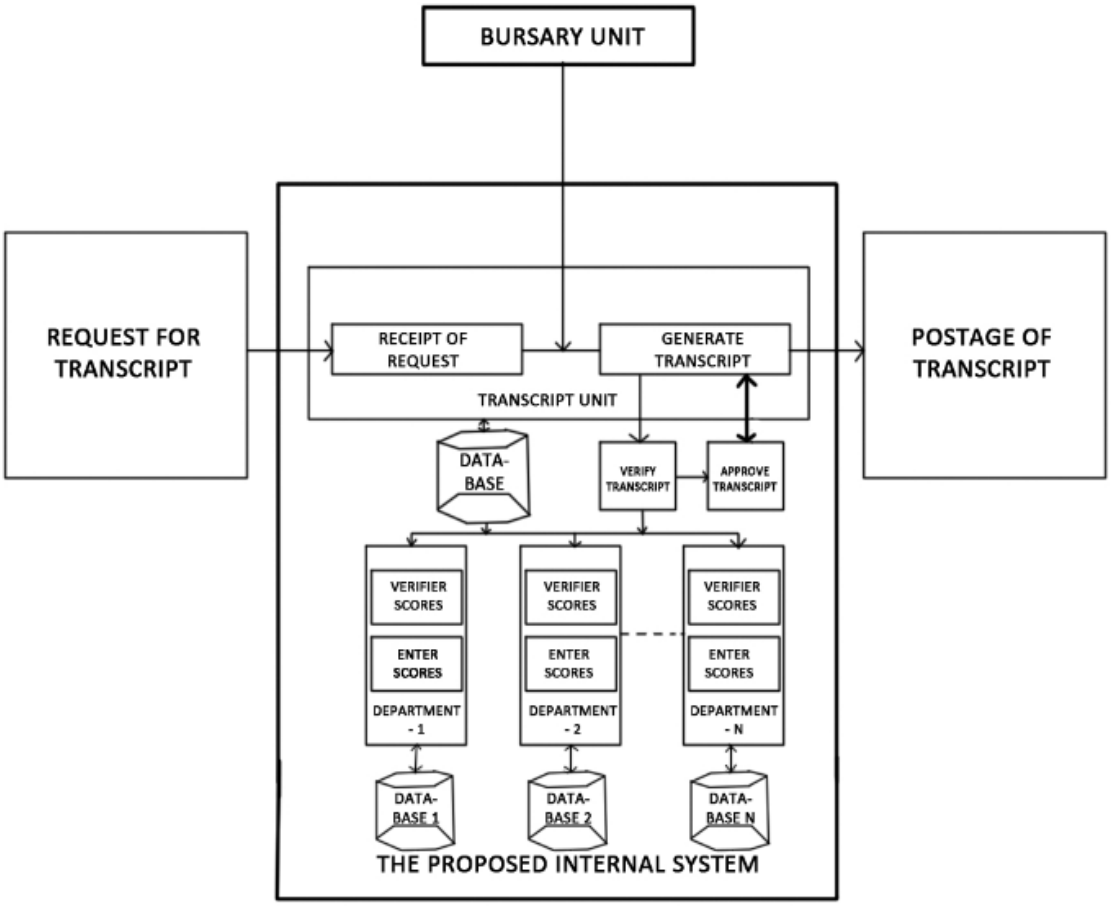

Fig 3.1: The proposed hybridized-database transcript generating system Architecture

3.1 Request for Transcript: Here requests for transcripts are made either as students come physically to make requests or they make use of the institution's online portal for that purpose for the institutions that have such. During this process, students are directed to make payment through the method approved by the institution. And they are asked to submit their necessary data like matriculation numbers.

3.2 Bursary Unit: This handles all the finances in connection with the transcript.

3.3 Transcript Unit: This unit receives requests for transcript. It ensures that the individual making the request has made the necessary payment as it liaises with the bursary unit for that confirmation. It uses the student information to generate the transcript and the

system sends a notification to the appropriate department that will verify.

Please note that in this proposed system, the staff in the transcript unit will not have to physically move to the various departments and faculties to monitor this transcript verification and approval process as they often do in the existing system reviewed and most institutions in Nigeria. Everything happens online. It is also the transcript unit that prints and sends the approved transcript to the institution in need of the document.

3.4 Transcript Verification Unit: this unit is at the department level. The officer in charge at the department gets the notification from the system that a transcript has been generated. He verifies the information on the generated transcript against that at the department database. He sends feedback to the transcript unit if there is variation so that harmonization can take place or simply click a button to verify thereby changing the transcript status from 'transcript not verified' to 'transcript verified.'

It is significant to note here that this proposed Hybridized-database transcript processing system is going to eliminate all the paperwork usually associated with this process in most institutions. This no doubt will enhance the efficiency of the system.

3.5 Transcript Approval Unit: this unit is at the faculty level. The individual designated to approve transcript gets the notification that a transcript has been generated and verified. He simply clicks on the button to change its status from 'transcript verified' to 'transcript Approved.' This button click also appends his signature electronically.

3.6 Department: Here various Department does all it takes to set-up the system. Some of the activities happening here are to enter the students' information, registering the courses and entering the scores. These various departments also upload all this information to the central database for transcript generation while retaining the information in their database for any future verification process.

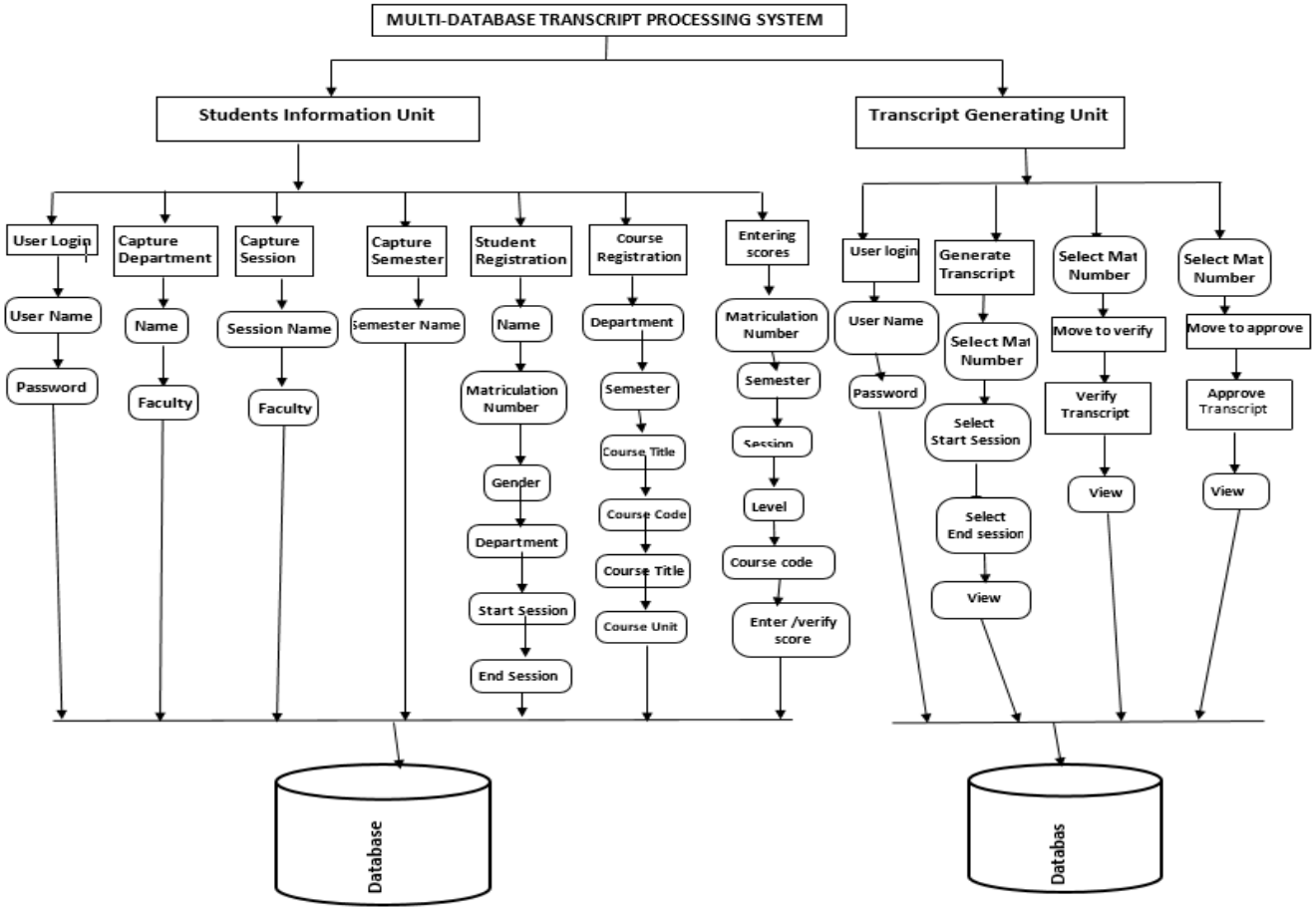

Fig 3.2: The processing unit of the Hybridized-database transcript processing system

Figure 3.2 depicts the processes of the proposed system. The dual nature of the system: the Students Information Unit and The Transcript Generating Unit give rise to its name 'Hybridized-database transcript processing system.' Under the Students Information Unit, activities like student registration, curriculum set up, course registration and exam scores entries are carried out and information is saved in the database while been uploaded to the central database for use by

the Transcript Generating Unit. This unit generates, verifies approves the transcript.

IV. CONCLUSION

This paperwork has briefly presented an architecture for a Hybridized-Database Web-Based Transcript Processing System (HWBTP). If the tertiary institutions in Nigeria adopt this design and implement it, it is going to reduce their recurrent expenditure. Because the automated system will definitely require fewer human hands compared to the manual system. It is going to save money for the students too and they will heap a sigh of relief away from the usual stress of going several times to track the process of transcript generation. They will not have to travel down to make the request and track this process because the document will be processed sooner than expected.

The system is also going to guarantee the security of data and its integrity if during implementation various users' access to the database is limited by their access levels and a secure database server like MYSQL is involved.

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