Online Result Processing System for Secondary Schools

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Abstract— Result Processing is a core academic activity carried out in the secondary school setting. The development of an online result procedure for secondary schools was motivated by the need for accurate and timely result calculation for secondary schools student. With the digitized system, the schools are ensured of a centralized online storage system for management and dissemination of student result. After careful observation and analysis the existing manual process, the manual method was converted into an automated system. The manual method of result computation was modeled with an object-oriented methodology and this resulting system was implemented with a scripting language (PHP), also MySQL was employed as the database management systems for the project. This provided a robust admin interface for the various key players in this sector to actualize their duties in a convenient and responsive system. The final output of this research work produced a system that automates result processing in secondary schools, which can be used in any secondary school in Nigeria.

I. INTRODUCTION

Information processing is crucial to almost all aspects of the education system. With a reliable information system, the occasional wear and tears associated with data retrieval, management and handling are minimized. It has been observed that the occurrence of results irregularities can seriously damage public confidence in the validity and legitimacy of such results and should be dealt with promptly so as not to lose parents/public confidence [1]. Most secondary schools in Nigeria still adopt the manual system for the processing of students' results. Having analyzed the errors associated with the manual system of result computation, it becomes not just desirable but also imperative that a digitalized system be employed in the assessment of academic performance of secondary school students. The set-backs in the manual method have led to conditions where students' results are released late and most times with wrong grades and wrong class/subject ranking, as secondary school teachers find it difficult to compute rankings for students. There is also the problem of misplacement or loss of a student's result. However, some secondary schools (mostly privately owned schools) are gradually adopting a digitalized system for processing student results [2].

The current system for result computation for most secondary schools in Nigeria that has not adopted the computerized result processing system is as follows:

At the beginning of the term, Continuous Assessment (C.A) sheets are given to all subject teachers and class teachers. The CA sheets consist of column for entering

student details; the 1st CA, 2nd CA, 3rd CA and sometimes 4th CA scores, depending on schools. The CA sheets also have provision for entering the exam scores, the total score, grade and positions (rank) on each subject. As the term progresses, quizzes and tests are given to the students and the scores for each student are entered in the respective columns. After conducting the examination for the term, the scripts are marked and the scores are entered into the CA sheet afterwards. The total scores are manually computed; grades and positions are also assigned to the students based on the total score. The CA sheets are later submitted to the class teacher who enters the details for the students in their various result sheets. In some schools, these details are entered by the subject teachers.

This research focuses on building an automated information system that has the capability to ease stress and also centralized all activities in secondary school result processing.

The main contribution of this research work is:
1. Add to existing knowledge in result computation with an insight into the peculiar nature of the secondary school result system.
2. Put in place a unified database system for students so as to enable the easy computation of students' grades and ranking of students' scores.
3. Facilitate the easy retrieval of students' results and also encourage the use of the internet for students in secondary school.
4. Enhance the easy management of student data by assigning virtual roles to teachers, thus guaranteeing stress-free academic computation.

The rest of this paper is organized as follows: Section I contains the introduction and importance of the research work, Section II contains related works. Section III contains some measures of system requirements for the development of the system. Section IV contains the architecture and essential steps in the system's development. Section V explains the system methodology with a flow chart, Section VI describes the result and discussion of the research, Section VII contains the recommendation made and Section VIII concludes the research works with future directions.

II.   RELATED WORK

The Electronic Student Academic System (ESAS) by Junaida et al.: The Electronic Student Academic System (ESAS) was developed by [3] for secondary schools in Malaysia. The system was developed using Adobe Dreamweaver. It was able to capture student details, score for some pre-selected subjects, and rank the student's total score so as to determine the student's position in the class. The software was also capable of authenticating users through the login features. It suffered a setback of not being able to capture other psychomotor and behavioral traits that are used to evaluate secondary school students.

Result Processing System(RPS) for Secondary School in Nasarawa by Ezenma et al.: The Result Processing System(RPS) designed by [4] provided an automated result processing system for secondary schools in Nasarawa using HTML and PHP language scripts. The system was able to create subjects and assign them to various classes. It was also able to accept continuous assessment scores and exam scores for students and compute their individual totals. Its biggest loophole was that it could only be handled by one admin.

Course Registration and Result Processing System by Amah M.C: The Course Registration and Result Processing System was designed by [5], for use by the Computer Science department of the University of Nigeria, Nsukka. The system was developed using HTML, PHP, and CSS. The designed system was capable of receiving the students' bio data and gives the students the ability to pick their courses for the semester, after which the admin (lectures) downloads the courses that were registered by the various users (students) in an excel format and enters the exam and continues assessment scores for the students. The system was robust enough to meet the results needs of any department in a university, but it cannot be used for secondary school result processing because it does not allow for the computation of individual student positions.

Web Based College Information Management System by Rasika Chandrasekaran et al.: The web-based CIMS as proposed by [6], was built to guarantee an easy interface for faculties and academic institutions to manage students' data. The framework was built for all kinds of students, which included faulty details and academic reports. The system has the capability to track students' exam details, including internal and external marks, within the faculty. It also provided an avenue for academic administrators to handle academic records of students, update and even delete records with a few clicks. The system could be controlled remotely and, with its authentication system, ensure that the abuse of students' information is reduced to the barest minimum.

Android Based College Management System by D.S. Pujare et al.: The Android Based CMS by [7] was proposed with five modules, which included the students, faculty, finance department, librarian, and software admin. The system allows students to access college-related information such as available books, notes, and assignments and also has provision for students to give feedback. For each of the modules, the students will need to register and verify their email address before they can access the module. The application hoped to save time and also provide a reliable system for school authorities with a very attractive and responsive user-interface.

III.   METHODOLOGY

The object-oriented modeling methodology was used for the design of the Online Result Processing System for Secondary Schools. The simplification of the software design process justifies the choice of the research methodology, as it presents each module as an object and provides an efficient way of communicating with these objects. It also creates a representation of real-world entities where the objects are described by their attributes, behaviors, and relationships within the system [8]. With this model, the computer calculates the results of those conditions that match the oriented model and produces an output in a format that is either machine or human-readable form, depending on the implementation.

Database Design
A database consists of a collection of entities with related information [9]. In the designed online result processing system, the various related entities are: user's login; bio-data; subjects; classes; results; terms; and sessions. The student bio-data table shows the student's profile, the subject table contains all subjects that are offered in the school. The result table is a combination of the student's bio-data and the subject offered CA tests, exam scores, total score, and grade. The users table contains the necessary profile information that the various users (i.e., admins and teachers) would have in order to access the software. A linkage of the various tables in the database is shown below.
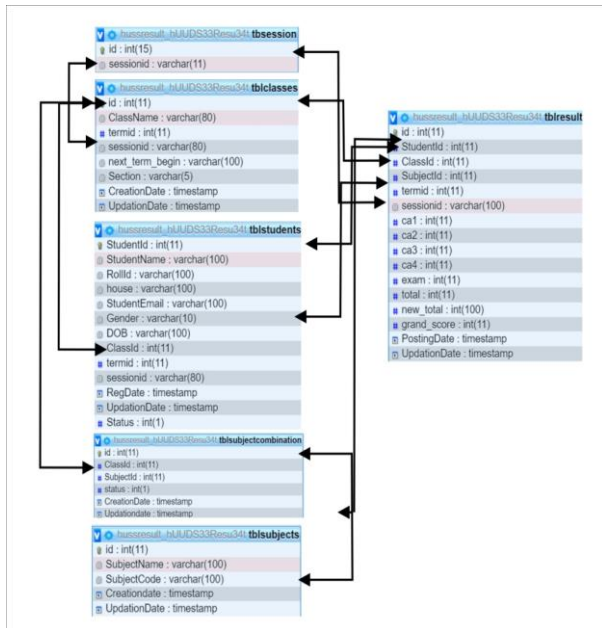
Fig.1: Linkage of database tables

Use Case Design
Figure 2 is a user case diagram that represents a summary of activities of the online result processing system for secondary schools.
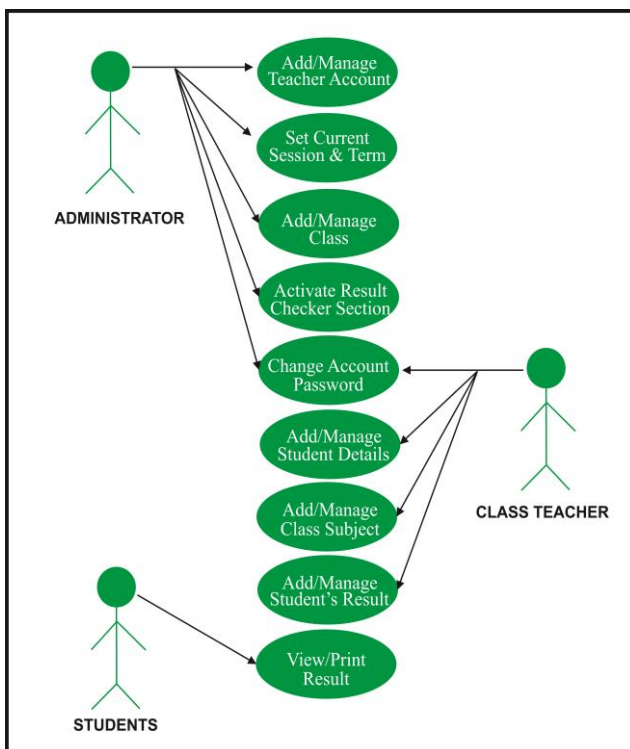

Fig.2: Use Case Design

ARCHITECTURE OF SYSTEMS
Figure 3 illustrates the 3-tier architecture used in the system's design. The three-tier architecture includes:

- The interface is presented to the user at this software level, known as the Presentation Tier. HTML was used in its creation.

- The Middle Tier: Between the UI and the database, this level acts as a bridge. It selects data that the user enters through the interface and either adds it to the database or compares it to data that is already there.

- The third tier of the software architecture is the data tier. The database is what makes it possible to insert, save, and retrieve any kind of data.
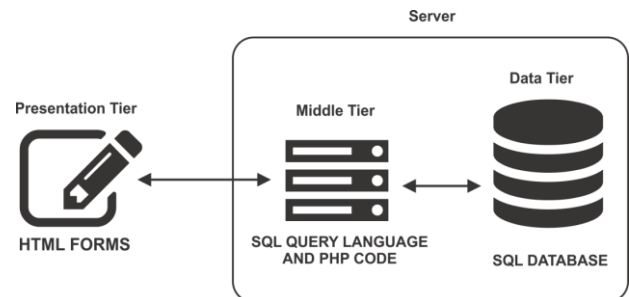
Fig.3: Diagram of the System Architecture

IV.   RESULTS AND DISCUSSION

DEVELOPMENT ENVIRONMENT
The development environment used in this project is PHP (with embedded HTML mock-ups) and a MySQL database. PHP facilitates the development of a web-based program and the creation of web-pages. The XAMP server was also used to create a local server environment within the PC which enables PHP code to run and allows communication between the MySQL database and PHP code. The system was tested at every stage of its development in order to detect and remove errors. During the development, parallel testing was conducted to check the correspondence between the manual output report and the automated report. Though the presentation format of the automated report varies slightly, there is uniform information between the manual system and the automated system.

IMPLEMENTATION ARCHITECTURE
Figure 4 shows a diagrammatic representation of all the components involved in the software and their linkages. In the project, only three categories of users are guaranteed access to the software, and the roles of the users are outlined in the diagram below.

Fig.4: Implementing Architecture

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SOFTWARE TESTING

The system was also subjected to a performance test on different web browsers, and it was found that the system performed better on the Microsoft Edge browser and Google Chrome browser. The query language was tested to find out its ability to generate different kinds of reports. It was found that the input data structure in the database design must correspond to the user's input. E.g., by entering an Admission number that is already in existence in the database in the student detail table, the system would not generate an appropriate report since two students have the same unique ID (Admission No.). Again, the character length specified in the design table must be used in the character data entry. By adjusting the parameters until the desired rendering was obtained, the cascading style sheet was put to the test. The more visible and appropriate the parameter's viewpoint, the higher its value.

The Admin Dashboard: This module gives an overview of the system in terms of the number of teachers, students, and declared results.
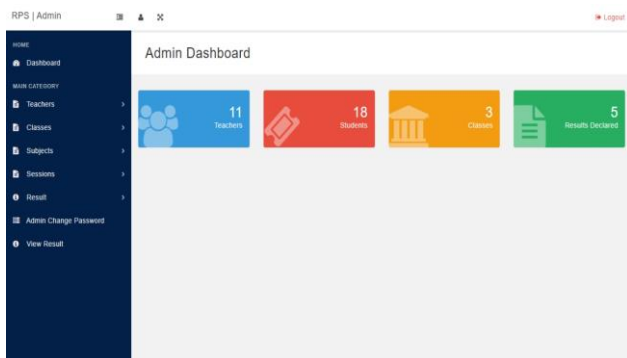
Fig.5: Admin Dashboard

The Input Design: The input design shows the template for the user's input. Through the input form, data is submitted into the system.

Fig.6. Input Form for entering Student Result

Output Design: The output design is the expected results the end-user (students) expects to get when he views his result online. The major activity carried out by the student is to view his/her result

Figure 7: Printout of a Student Result

FURTHER DISCUSSION

The Online Result Process System for Secondary Schools is an enhanced automated software built to eradicate the major problems inherent in the manual method of processing results in most secondary schools. The development of this system arose because of the difficulty encountered by teachers and school administrators with the manual method of result computation in secondary schools. Therefore, the new system targets to arrest this situation by building features in the software that can not only produce a better system but also enable the student to get their results at a good time.

Secondly, studying the manual method of result processing exposed the laborious nature of the system; it is time-consuming and less effective. The new system that has been developed has the capability to extract students' results from the system while they are in the comfort of their home. This will not only enable the students to access themselves and improve their performance, but will also help the school administrators to have a "result bank" where all the student results are kept and can be easily retrieved for future reference.

V. CONCLUSION AND FUTURE SCOPE

In conclusion, this project presents a software application that is capable of storing and processing students' results with high speed and accuracy and presenting the output in a certain required format. Its qualities include enabling error-free student registrations; a reduction in the cost and time spent on computing student subject and class grades; assigning form masters to each class to allow for easy results; and enabling the website administrator to view each class result on a single page for better management of results. Due to the application's usage of a relational database management system, it is user-friendly, relatively secure, and enforces data integrity.

The findings of this study exposed some salient issues in the secondary school results processing that would require further automation. It is hoped that these issues will advance and promote further research in schools and colleges. The recommendations derived from this study are:

1. The inclusion of a scratch card or pin for the student before the result can be viewed. This will enable the school administrator to generate income from the system and thus add to the school's annual income and also make funds available for the maintenance of the system.

2. A component should be built into the result page to enable the school principal to endorse the result electronically, by including the school stamp or by adding a watermark to the result sheet. This is to increase the reliability of the data in the result and will enable easy detection of any alteration of the result.

3. The system could also be reprogrammed to include an SMS notification of the result. Thus, the system will be able to send a short SMS message of the student's result to the parent's phone through an SMS gateway.

4. A further study on predicting student academic performance based on available results in the "result bank" can also be considered in the future.

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