

Enhancing the Management of Student's Examination Records using an Interactive Website for Tertiary Institutions in Ghana

Abukari Abdul Aziz Danaa^{a*}, Mumin Diyawu^b

^{a,b}Lecturer, Computer Science Department, Tamale Polytechnic, Tamale, Ghana

^aEmail: azizdanaa@tamalepoly.edu.gh

^bEmail: mdiyawu@tamalepoly.edu.gh

Abstract

Most tertiary institutions in Ghana still employ the manual process in students' academic records management process. Updates to records are poorly implemented which results in severe inconsistencies in students records. Generation of Reports to undertake strategic decisions usually takes a lot of time and often generated with errors. Additionally, end of semester results which is supposed to be confidential is usually posted on notice boards for students to access. Prospective students and the general public who need information regarding any aspect of the institution instead of doing so with ease, would either have to spend so much time to contact the institution and may not even be given the needed information. This research seeks to develop a very secure system which will not only provide relevant up-to-date information relating to all aspects of the institution, but also for processing students examination records and online results checking. The system will also provide an internal communication system between the system administrator and both lecturers and students.

Keywords: confidential; information; institution; results; online.

1. Introduction

The aim of this project is to develop an interactive website with results management portal where the members of the institution and the general public at large can access vital information and offer suggestions that will help improve service delivery, thus making the institution a citadel of academic excellence”.

* Corresponding author.

The proposed system would keep track of the flow of information to and from the institution, keeps details of Students, lecturers, courses as well as examinations taken by students. Accurate and timely reports can then be generated from the system with ease for decision making by management and for the consumption of the general public [4].

The system has a database support and also allows students, staff and the general public to interact with management of the institution for further clarifications. Students would also be able to check and print their results online. Provision would also be made to display the latest events and announcements associated with the Institution online.

HTML and WAMP (Windows, Apache, MySQL, PhP) technology would be used to carry out this project. [6,2]Apache, MySQL and PhP are open source software that allows access to the source code, which is free, and its use does not attract license fee.

2. Proposed work

2.1 Objectives of the proposed system

The system would;

- i. Accept data, process it and keep information on staff, students, courses, departments, examinations as well as announcements and news relating to the institution.
- ii. Provide a facility for generating adhoc reports for strategic decision making.
- iii. Provide updates regarding the institution to the general public and also allow them make enquires online.
- iv. Provide all stakeholders the ability to check results online in a very secure manner.

3. Basic theory

3.1. Web form design

Web Forms for the proposed system are based on PhP and HTML. Working with Web Forms is similar to working with Windows Forms. But the difference is that we will create Web pages with Web forms that will be accessible by a Web browser. Web Forms are Web pages that serve as the user interface for a Web application. Reference [2] A Web Form's page presents information to the user in any browser or client device and implements application logic using server-side code.

3.1.1. Components of web forms

Reference [6] In Web Forms pages, the user interface programming is divided into two parts: the visual component (design page) and the logic (code behind page). The visual element is the Web Forms page. The page consists of a file with static HTML, or PhP server controls, or both simultaneously. The Web Forms page

works as a container for the static text and the controls we want to display. The logic for the Web Forms page consists of code that we create to interact with the form. The programming logic is in a separate file from the user interface file.

4. System design

The system design phase focuses on the translation of design specifications to performance specification. The System design is divided into two main phases of development; logical and physical design.

Reference [5] During logical design phase the analyst describes inputs (sources), out puts (destinations), databases (data sores) and procedures (data flows) all in a format that meets the uses requirements. The analyst also specifies the user needs and at a level that virtually determines the information flow into and out of the system and the data resources. Here the logical design is done through data flow diagrams and database design.

Reference [7] The physical design is followed by physical design or coding. Physical design produces the working system by defining the design specifications, which tell the programmers exactly what the candidate system must do. The programmers write the necessary programs that accept input from the user, perform necessary processing on accepted data through call and produce the required report on a hard copy or display it on the screen.

4.1. Entity Relationship Diagram (ERD)

Reference [3] An entity is an object that exists and is distinguishable from all other objects by a specific set of attributes. An attribute or a set of it may identify an entity. These attributes may either be primary or foreign keys. The primary key uniquely identifies a record, while the foreign key is an attribute in a relation and may be primary key to another relation. A relation is an association among several entities.

The following entities were realized during the process; lecturer, subject, department, student, examination, exam, results, enrolled,

These entities and their relationship were observed and represented as below;

4.2. Data Flow Diagram (DFD)

Reference [1] Analyst can use several tools to assist in the analysis, including data flow diagrams (DFDs) and special software packages, such as Excelerator, a computer aided software engineering (CASE) tool that, among other things, automates the data through a system-where it originates and where it goes.

Being graphical, DFD help the user (Analyst) to check the accuracy of the data flow before being converted to computer procedures.

DFDs identifies the major data flow within the system boundaries, processes (procedures and software) and the

storage areas for data, they does not provide information about whether a process is performed by a manual procedure or a computer program, nor do they provide control information.

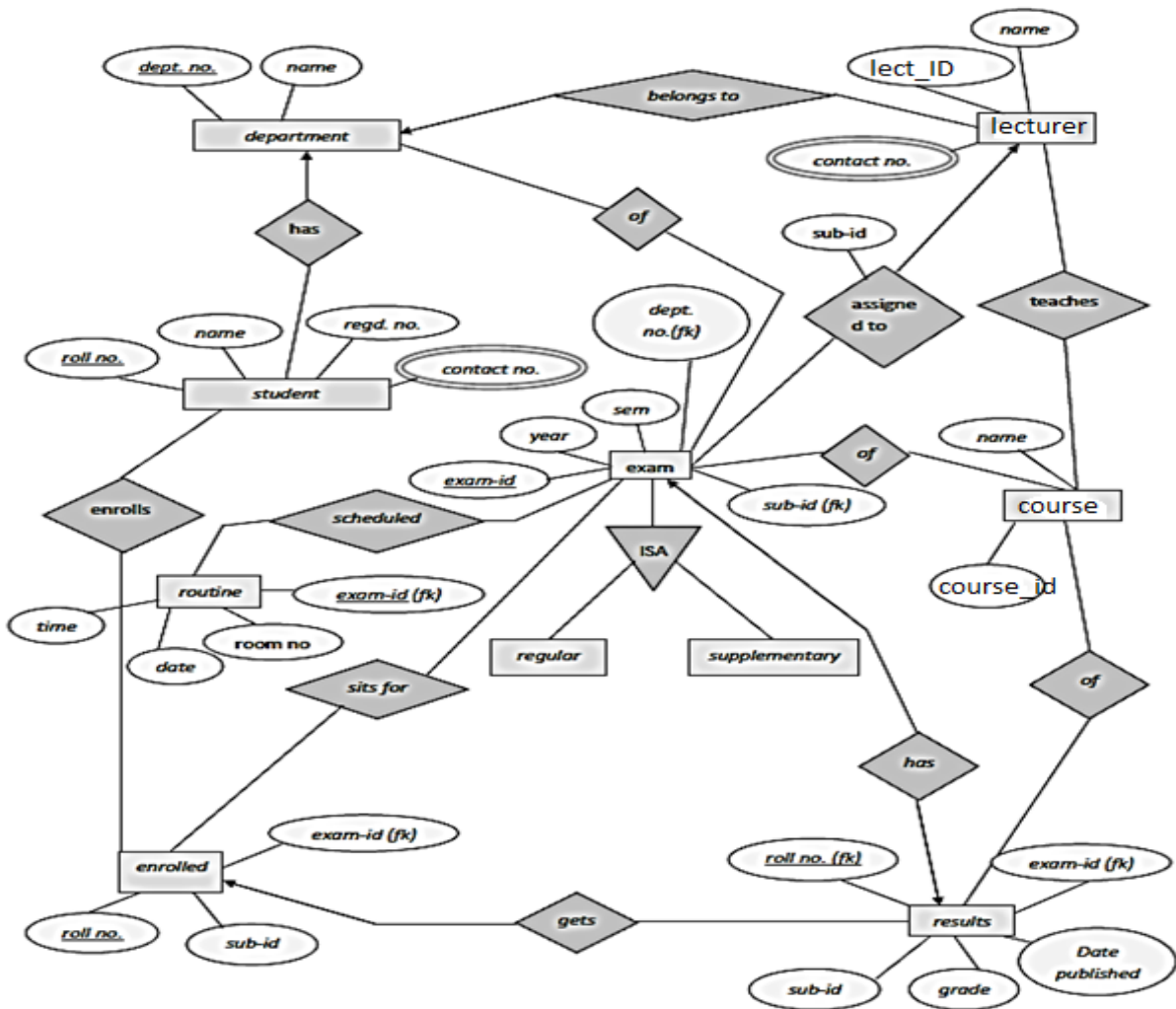


Figure 1: Entity Relationship Diagram of the proposed system

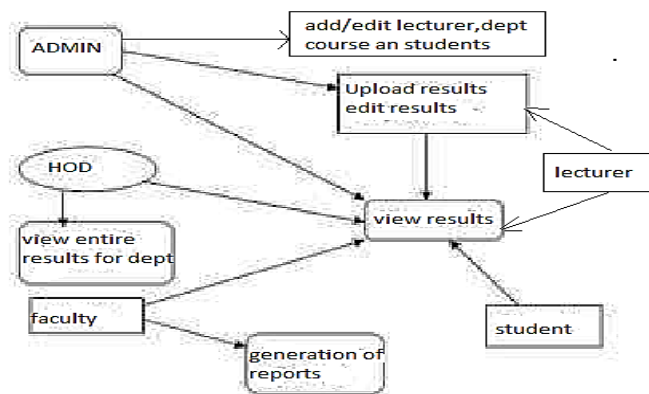


Figure 2: Data Flow diagram for the proposed system

4.3. Application Implementation

Reference [8] To overcome the problems that are obtained in the existing process of managing students results, the system is implemented so that all that stakeholders need will be done automatically when students raw grades are fed into the system. These results can then be accessed online by students when they are released.

Ideally, the new system replaces the existing system after running alongside it for a trial period of one year. During this time, the output of the new system will be compared with the old system and any discrepancies will immediately be investigated and corrected. Also, staff will gain experience of operating the new system.

Personnel would be trained on their own premises, where specialist takes them through computer literacy and software management. Alternatively, they can be enrolled in a good computer school for a short period of two to three weeks.

5. Coding

5.1. Features of the programming language used

Reference [9] PHP is a general-purpose scripting language originally designed for web development to produce dynamic web pages. For this purpose, PHP code is embedded into the HTML source document and interpreted by a web server with a PHP processor module, which generates the web page document. It also has evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP can be deployed on most web servers and as a standalone interpreter, on almost every operating system and platform free of charge. A competitor to Microsoft's Active Server Pages (ASP) server-side script engine and similar languages, PHP is installed on more than 20 million websites and 1 million web servers.

Sample codes

Login Page

```
<?php
//Start session
session_start();
//Connect to mysql server
include('connect.php');
//Function to sanitize values received from the form. Prevents SQL injection
function clean($str) {
    $str = @trim($str);
    if(get_magic_quotes_gpc()) {
        $str = stripslashes($str);
    }
}
```

```
        return mysql_real_escape_string($str);
    }
    //Sanitize the POST values
    $login = clean($_POST['id']);
    $password = clean($_POST['password']);
$result = mysql_query("SELECT * FROM user WHERE idnumber='$login' AND password='$password'");
    while($row = mysql_fetch_array($result))
    {
        $position = $row['position'];
    }
    if ($position=='admin')
    {
        //Create query
        $qry="SELECT * FROM admin WHERE idnum='$login' AND password='$password'";
        $result=mysql_query($qry);
        //while($row = mysql_fetch_array($result))
        // {
        // $level=$row['position'];
        // }
        //Check whether the query was successful or not
        if($result) {
            if(mysql_num_rows($result) > 0) {
                //Login Successful
                session_regenerate_id();
                $member = mysql_fetch_assoc($result);
                $_SESSION['SESS_MEMBER_ID'] = $member['id'];
                session_write_close();
                //if ($level="admin"){
                header("location: admin/profile.php");
                exit();
            }else {
                //Login failed
                header("location: index.php");
                exit();
            }
        }else {
            die("Query failed");
        }
    }
}
```

```
        if ($position=='student')
        {
            //Create query
            $qry="SELECT * FROM student WHERE idnumber='$login' AND password='$password'";
            $result=mysql_query($qry);
            //while($row = mysql_fetch_array($result))
            // {
            // $level=$row['position'];
            // }
            //Check whether the query was successful or not
            if($result) {
                if(mysql_num_rows($result) > 0) {
                    //Login Successful
                    session_regenerate_id();
                    $member = mysql_fetch_assoc($result);
                    $_SESSION['SESS_MEMBER_ID'] = $member['id'];
                    $_SESSION['SESS_FIRST_NAME'] = $member['course'];
                    session_write_close();
                    //if ($level="admin"){
                    header("location: student/profile.php");
                    exit();
                }else {
                    //Login failed
                    header("location: index.php");
                    exit();
                }
            }else {
                die("Query failed");
            }
            }
            if ($position=='teacher')
            {
                //Create query
                $qry="SELECT * FROM teacher WHERE idnumber='$login' AND password='$password'";
                $result=mysql_query($qry);
                //while($row = mysql_fetch_array($result))
                // {
                // $level=$row['position'];
                // }
```

```
//Check whether the query was successful or not
    if($result) {
        if(mysql_num_rows($result) > 0) {
            //Login Successful
            session_regenerate_id();
            $member = mysql_fetch_assoc($result);
            $_SESSION['SESS_MEMBER_ID'] = $member['id'];
            $_SESSION['SESS_FIRST_NAME'] = $member['idnumber'];
            session_write_close();
            //if ($level="admin"){
            header("location: teacher/profile.php");
                exit();
            }else {
                //Login failed
                header("location: index.php");
                exit();
            }
            }else {
                die("Query failed");
            }
        }
    }
?>
```

Student's main page

```
<?php
require_once('../auth.php');
?>
<html>
<head>
<title>Silay Institute</title>
<link rel="stylesheet" href="../css/main.css" type="text/css" media="screen" />
<!--sa poip up-->
<link href="src/facebox.css" media="screen" rel="stylesheet" type="text/css" />
<script src="lib/jquery.js" type="text/javascript"></script>
<script src="src/facebox.js" type="text/javascript"></script>
<script type="text/javascript">
jQuery(document).ready(function($) {
    $('a[rel*=facebox]').facebox({
        loadingImage : 'src/loading.gif',
        closeImage : 'src/closetlabel.png'
```



```

    })
    })
</script>
<link rel="stylesheet" href="febe/style.css" type="text/css" media="screen" charset="utf-8">
</head>
<body>
    <div id="main">
        <div id="header"><font size="6"><b>STUDENT'S PAGE</b></font></div>
        <div class="menu">
            <ul>
                <li><a href="profile.php">Profile</a></li>
                <li><a href="viewrecord.php">View Record</a></li>
                <li><a href="notification.php">Notification</a></li>
                <li><a href="prospectus.php">Prospectus</a></li>
                <li><a href="..loginform.php">Logout</a></li>
            </ul>
            <br style="clear: left">
        </div>
        <div id="content">
            <table cellpadding="1" cellspacing="1" id="resultTable">
                <tr>
                    <th style="border-left: 1px solid #C1DAD7">Name</th>
                    <th>ID Number</th>
                    <th>programme</th>
                    <th>Year Level</th>
                    <th>Birthday</th>
                    <th>Status</th>
                    <th>Gender</th>
                    <th>Action</th>
                </tr>
                <?php
                    include('../connect.php');
                    $id=$_SESSION['SESS_MEMBER_ID'];
                    $result = mysql_query("SELECT * FROM student WHERE id='$id'");
                    while($row = mysql_fetch_array($result))
                    {
                        echo '<tr>';
echo '<td style="border-left: 1px solid #C1DAD7">'. $row['fname']. ' '. $row['mname']. ' '. $row['lname']. '</td>';
                    }

```

```
?>
</table>
</div>
<div id="footer"></div>
</div>
</body>
</html>
}
```

Connection string

```
<?php
/* Database config */
$db_host = 'localhost';
$db_user = 'root';
$db_pass = "";
$db_database = results;
/* End config */

$link = mysql_connect($db_host,$db_user,$db_pass) or die('Unable to establish a DB connection');
mysql_select_db($db_database,$link);
mysql_query("SET names UTF8");
?>
```

User authentication form

A user provides a username and a pin to login into the system. Depending on the category of user; Administrator, lecturer or student, the appropriate user rights and privileges are given.

The usernames for students is usually their Matric numbers uniquely assigned them.

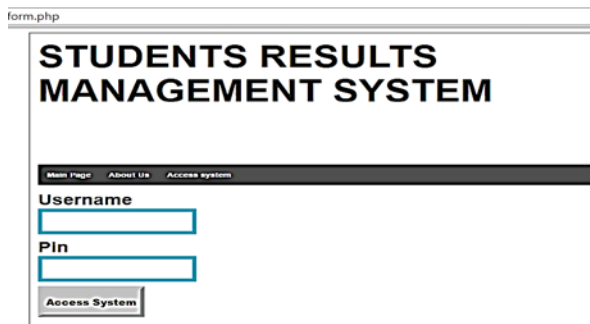


Figure 3: Login Form

Administrator's Page

An Administrator can login to manipulate details on lectures, students, Departments and courses. Alerts can automatically be sent to all lecturers or students portals by the System Administrator on critical issues. For security reasons, He/she assigns courses to individual lectures that can only be accessed by them. The administrator also monitors all that is done by individual lecturers to ensure the smooth running of the system.

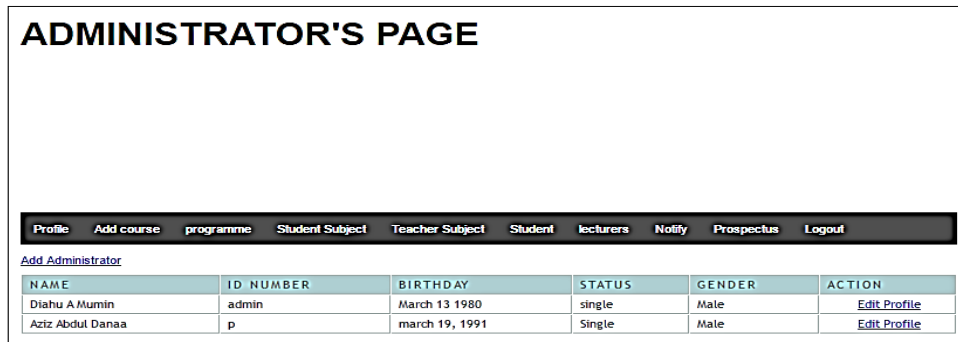


Figure 4: Administrator's page

Students page

Students login to view and print their results details, view notifications from the Systems Administrator and may also edit some of his/her basic details. The figure below depicts that.

Details of all courses students are taking at any point in time is also available to each students through the portal. Figure ... below depicts that.

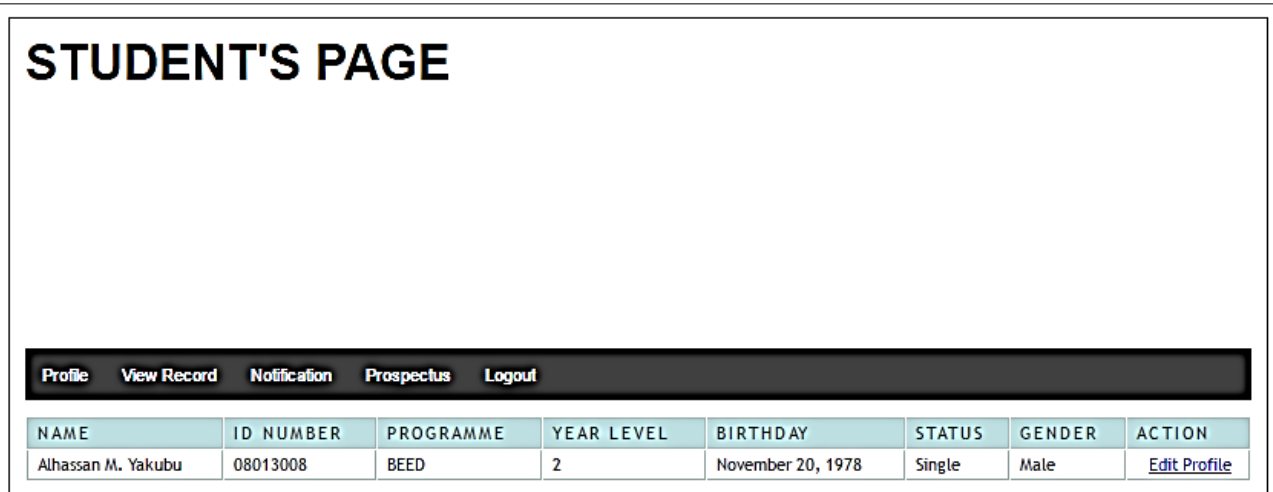


Figure 5: Students page

Lecturer's Form

A lecturer may login to submit or edit grades for students, view notifications sent from the Systems

Administrator, or change His/her own profile details. The snapshot in figure below depicts that;

LECTURER'S PAGE

Profile
Submit Grade
Notification
Percentage
Edit Grades
Logout

NAME	ID NUMBER	WORK	BIRTHDAY	STATUS	GENDER	ACTION
Ismael A Shiraj	00-1111	Full Time	March 13, 1986	Single	Male	Edit Profile

Figure 6: Transaction form

Results Entry Page

A lecturer logs in and uses the results entry page to submit results of students. He selects the semester and the year and then enters the marks. The snapshot below depicts that;

RESULTS ENTRY PAGE

Profile
Submit Grade
Notification
Edit Grades
Logout

Select Year:

Select semester:

ID #	NAME	QUIZES	ASSIGNMENT	MID SEMESTER	END SEMESTER
09-0002	July Ann Alingasa	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 7: Results entry form

6. Conclusion

The system has been developed and tested vigorously to ensure that it does not contain bugs. Other important factors considered were security, robustness and efficiency when the system is under pressure. Also provision is

provided for future enhancements. Reference [10] In summary, Various institutions use various types of techniques for maintaining examinations records, but by using this proposed system that have been developed will greatly simplify the process that have to be done whenever the results are released for semester examinations and will also will greatly simplify and speed up the result analysis process to take critical decisions.

7. Recommendations

Based on the conclusion above and from the highlighted significance of the proposed online based students result management system, the following are recommended;

- i. Reference [5] Institutions should make conscious efforts to invest on ICT by computerizing all the departments that coordinate students' results in order to ensure easy flow of information among them.
- ii. Additionally, staff of the user departments as well as students should adequately be trained to ensure smooth implementation of the new system.
- iii. Reference [6] After a smooth deployment of the system, high security measures must be ensured put in place to protect it, especially if it is going to be linked to an existing network network within the Institution.

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