Evaluation of Student Data Storage System and Development of Student Information System

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Abstract—This paper presents an analysis of the current storage of data related to students in college and an idea to centralize those data by building a web based application to access and modify them. The Registration is done every year for the new as well as the old students and theses requires a lot of resources. Paper and file based information storage is not very convenient, secure and environmentally un-healthy. Student Information System is a Simple web based interface to manage student information on all grounds. Critically important that the information stored must be up-to date and accessible ubiquitously, the Student Information System will be helpful to all those institutes that requires the storage of student information. Result Management module enhances the declaration and preparation of semester end results.

Key Words- *Student Information System, Result Management*

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I. INTRODUCTION

Student Information System is a simple web based interface for storing data related to student on any ground. The Current System followed in colleges is the paper based traditional methods which has a lot of ambiguities. The resources that the current system requires is massive and this amount is spent every year not only for the new students but also for the old students. The paper based registration requires students to manually fill up the registration papers in person and requires Dean of student affairs to verify at spot. There are five programs in the college and a total of 952 students in total.

More on, retrieval and update of these information requires students to check on several files in the administration.

The retrieval of student information is tough and the data stored in these files are not very accurate. When we talk about data, the issue of back up always raise the fears of losing it to the calamities and unintended losses. The centralized database would not only make the data available to all the stakeholders but also back up the data for unforeseen incidences.

The proposed system will also be hosting the student result system as a new module. This will allow the students to ubiquitously see their exam results as soon as the results are declared by the management. Before the result is published, several meetings at department and management levels are held to review the students result. Thus, the proposed system will incorporate features that will allow the result declaration formalities.

The system holds potential for heads and deans to get information about students at any time. Thus, Student Information system will serve as a record of students' general information and progress through the result system. This system will be particularly useful for institutes where lot of data needs to be stored.

This paper presents a prototype system that will assist the achievement of following objectives and purposes. Moreover, it will be in a way helping the environment by reducing the publication of results and making the registration process paperless.

A. OBJECTIVES

- To provide an interface for all the stakeholders to the centralized data.
- To make the information management efficient.
- To save resources by avoiding the traditional paper based registration process.
- To reduce the data retrieval easy and efficient.
- To protect the privacy of the students enhancing the result publishing process.
- To encourage parent involvement in their child's progress.

B. PURPOSE

To create a web application that will handle the task of student information management in the college. This system will also take in the work of registration and result declaration which are generally done through paper based processes.

To create a system for students to manage their modules and keep track of their progress through college days by providing them with result module.

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To create a system that will enable the heads and deans to manage and monitor the students' information stored in the databases.

II. STUDENT INFORMATION SYSTEM DESIGN

A. DATA FLOW DIAGRAM

First of all, a framework has to be drawn to understand how the current system works. This is done through gathering requirements and brainstorming, meeting the stakeholders of the system. Technically, we draw a diagram to show how the data that is collected from the students through various processes are stored and how they are managed. Graphical representation of student information is represented using the following data flow diagram. Data Flow Diagram can be used in analyzing problems.

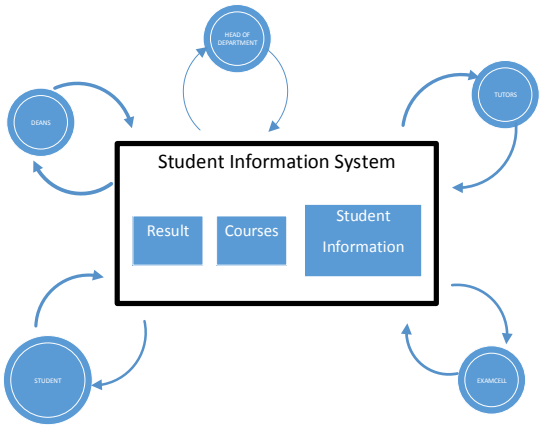

Figure 1 Data Flow Diagram

B. SYSTEM ORGANIZATION

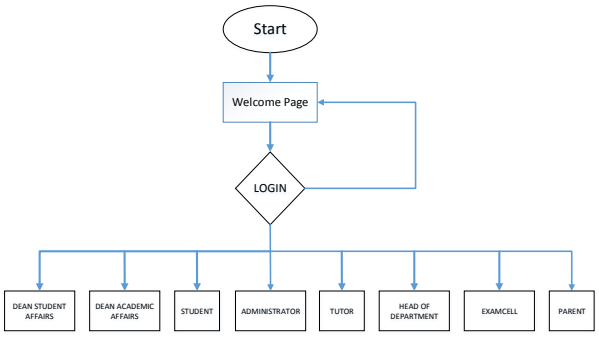

Figure 2 System Organization diagram

The proposed system will be based on roles that each stakeholder plays in the college. The rights and permission to the system will be hierarchically assigned to the users with different roles.

- Administrator

The system administrator has the permissions to assign roles to other users. A bulk upload feature will be added in addition to the aforementioned modules. Bulk upload modules will enable the system administrator to register the students and staff the student number and employment ID respectively. The administrator will be able to do all the CRUD operations. The main responsibility as mentioned earlier is to register the students and staff so that they can login using the basic credentials.

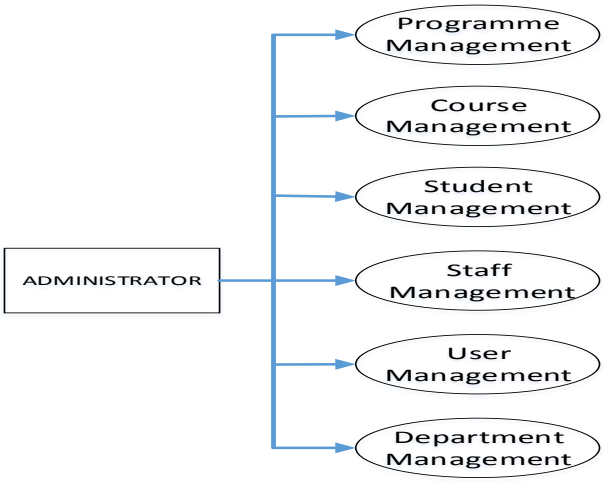

Figure 3 Administrator Module

- Dean of Academic Affairs

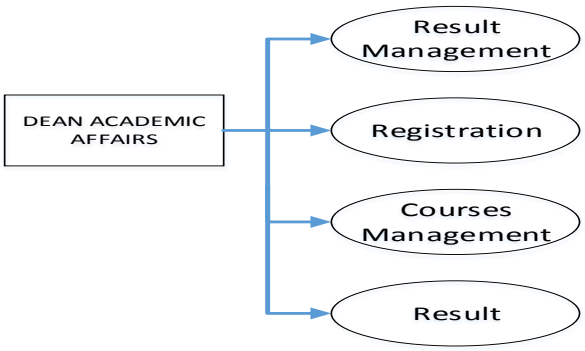

Figure 4 Dean Academic Affairs Module

The role played by the Dean of Academic Affairs in college is overseeing the course management and result management. He/she is responsible for assigning the modules to tutors and managing the result declaration and other processes related to it.

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- Dean of Student Affairs

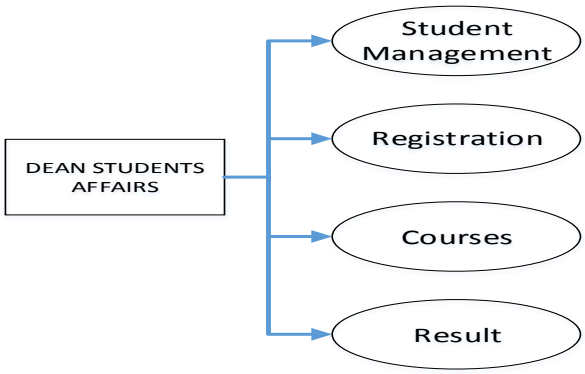

Figure 5 Dean Student Affairs Module

Dean Student Affairs oversees the registration process of new students and old students in the college every semester. More on, Dean will be dealing with the statistics of the student population and activities. The result and courses are added taking in consideration that the Dean will also be taking classes and that they will be assigned modules for which they will have to award marks to the students.

- Head of Department

Department Heads manages the students in their departments and courses that are offered to them. Statistics about the students and courses as well as the staff within the department can be managed.

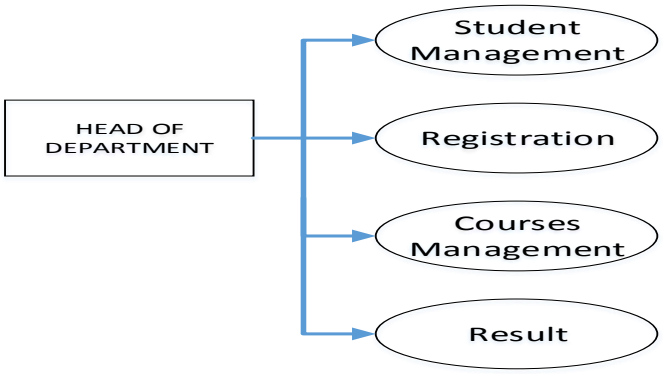

Figure 6 Head of Department Module

- Tutor

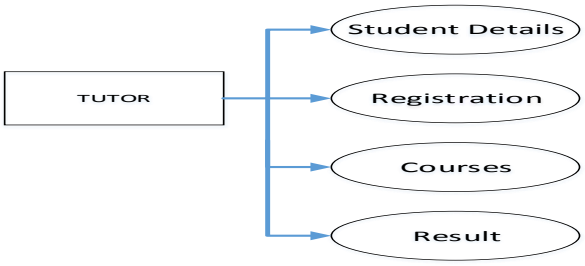

Figure 7 Tutor module

The tutor has to register after logging in. He will be able view the details of all the courses that he handles. He will also be able to view the details of the students enrolled in modules assigned to him. He can also update the marks and performance of the students for the result.

- Student

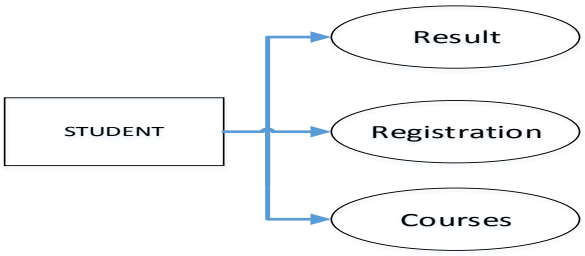

Figure 8 Student module

Student will have to register after signing in and the system will create a default profile that can be viewed by the tutors, deans and head of department. In addition, the modules that are meant for that semester will be automatically subscribed. Different types of students are repeaters, students with repeat modules and in-service students. He will be able to view the details of the modules subscribed to him and the result for all the semesters that he has attended.

- Exam cell

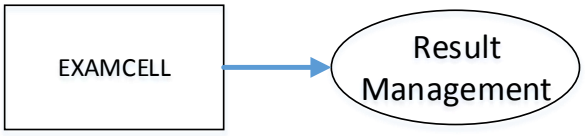

Figure 9 Exam cell

The Exam cell will be able to view the marks submitted by the tutors and forward them to the Dean of Academic Affairs for further result processing. Also, Exam cell can forward the marks back to the tutors for review.

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- Parent

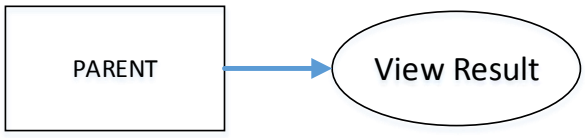

Figure 10 Parent Module

Using their children's student number and citizenship ID number, parents will be able to view the results of their children.

C. REQUIREMENTS GATHERING AND ANALYSIS

For the development of the Student Information System, requirements were gathered using basic techniques such as

- Interviewing the deans, students and head of departments.
- Brainstorming
- Series of meetings with the student body.
- Collection of forms and processes of the manual system.

Analyzing the requirements, the Student Information System requires the following features.

- Each role requires different permissions and rights.
- Each user can update information relating to their own.
- Consideration that each user has their own account and identity [1].

D. FUNCTIONAL REQUIREMENTS

Student information management system aims to improve the efficiency of college information management, and the main function is managing and maintaining information [2]. All the aforementioned entities are functional requirements to the system.

Deans will be managing the modules that are assigned to them. The Administrator will have the responsibility of uploading the basic information about users for them to be able to sign in and further enter other information. Students can only enter their information and view and subscribe courses.

The permissions and rights to manage and alter the information in the system are hierarchically distributed with system administrator at the top.

E. NON-FUNCTIONAL REQUIREMENTS

- Safety Requirements
  To avoid unforeseen acts, taking the backup of database periodically is a requirement. The System may crash due to viruses and operating system failure [1].
- Performance Requirements
  The proposed system that we will develop will be used as the chief performance system for helping the organization in management the whole database of the student studying in the organization. Therefore, it is accepted that the record would perform functionally all the requirements that are individual [3].
- Security Requirements
  The information stored in the databases can be view by all the stakeholders based on the permission and rights(role) they have in the system. The privacy of the student is protected by allowing only the student himself and his parent to be able to view the result.

III. DEVELOPMENT METHODOLOGY

A. METHODOLOGY

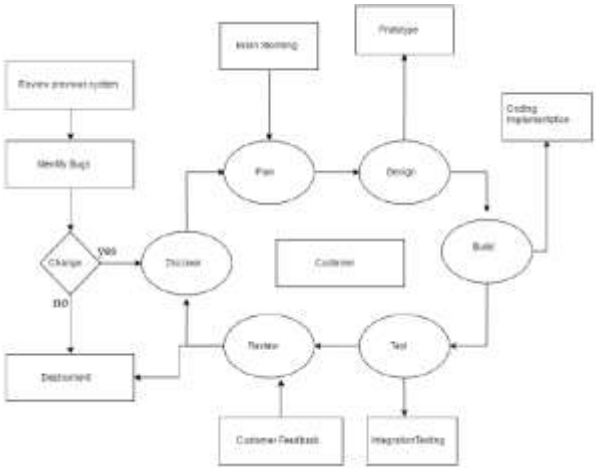

Figure 11 Development methodology

Agile is a software development methodology to build a software incrementally using short iterations so that the development is aligned with the changing business needs. There is no direct long-term of requirement. In every review the demo of prototype is shown to the reviewer. After the review comments and feedback are taken to incorporate in working software. The software under goes series of reviews.

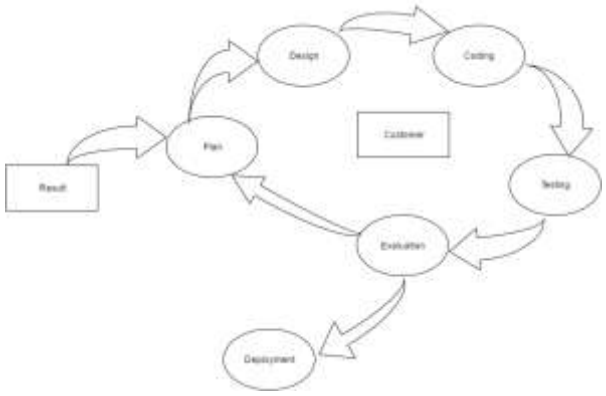

Figure 12 Result Module Development methodology

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B. TECHNOLOGIES USED

The system is built using Laravel Framework. Laravel is easy to learn and understand as well as provides agility and efficiency in development. For front end, bootstrap was used and plugins were used when erver there was need. Plugins and bootstrap packages makes the development easy and rapid.

Laravel is undisputedly the king of PHP frameworks and spans the widths and depths of large scale web application development. Laravel ecosystem has quickly grown huge with supportive community and boasts tons of free tutorials and learning resources to get you started within no time [4].

Laravel is built to be simple, easy to learn and supports rapid application development. You get rich set of features to bring any large scale project to life within days. Laravel comes with its own templating engine named “Blade”. The best thing about Blade is that it allows you to write plain PHP in the templates which essentially means that Blade brings no performance overheads to your application [4].

IV. STUDENT INFORMATION SYSTEM [RESULT]

A. LOGIN

The application starts with the login page. It is the basic throttle for authorized to sign in for the system. The application does not support self-registration because all users will be registered by the system administrator.

Figure 13 login page

Figure 14 Parent Portal login

B. REGISTRATION FORMS

Figure 15 Staff Registration form

Figure 16 Student Registration form

C. PROFILES

Figure 17 Staff Profile

Figure 18 Student Profile

D. OTHER FORMS

Figure 19 Course Addition form

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Similar to the above form, many more forms are prepared for CRUD functionality based on roles of each user. There are department, user, course, program and result forms for creation and update.

Figure 20 Bulk upload form

The bulk upload feature is added to ease the administrators work load. This will enable him to upload all the students and staffs' login credentials through a csv file

Figure 21 Exam creation form

The Dean of Academic will use this form to create an instance of semester end exams. Once created, the tutors will be able to enter the marks of the students which will generate the students result view.

Figure 22 Mark entry form

This form is available to all the tutor and it will list all the students enrolled in the module assigned to him sorted class wise. He can enter the marks obtained by the student and edit the entered marks. The entered marks will be or can be viewed by the Dean of Academic Affairs and Exam Cell.

E. OTHER VIEWS

Figure 23 profile view of student

The students profile can be viewed by all the staffs, deans and head of departments.

Figure 24 Result

The result view will be available to the students can be viewed only by the parent and the student. Numerous views are generated like the pages to view all staff, students, courses, users, programs and departments.
All functionalities collected during the requirement have been developed.

F. DASHBOARDS

The dashboard for users differ according to the role assigned to them.

Figure 25 admin dashboard

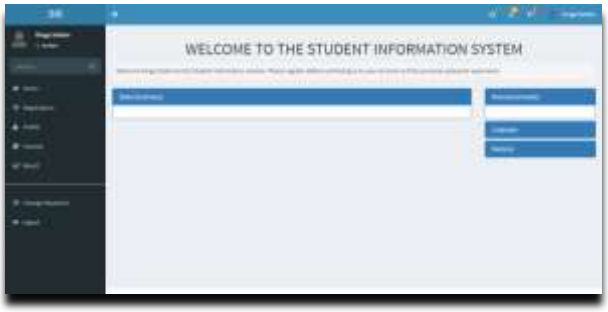

Figure 26 Student Dashboard

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Figure 27 Staff Dashboard

Figure 28 Dean Student Affairs Dashboard

V. TESTING

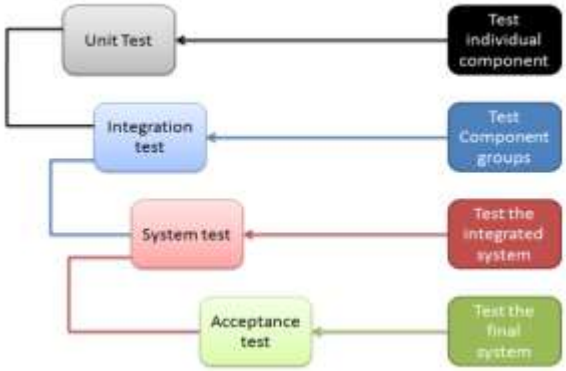

Figure 29 Testing

A. UNIT TESTING

In unit testing the components/units are tested separately if they work as designed. This is done while developing the specific component [5].

B. INTEGRATION TESTING

In integration testing, the components that are built separately are integrated and tested how the application functions [5].

C. SYSTEM TESTING AND ACCEPTENCE TESTING

System Testing and Acceptance Testing is done after all the components are integrated and the software is ready to deploy [5].

VI. CONCLUSION

The synopsis, this paper provides an idea of reducing paper works in colleges and managing the information efficiently. It also assists the development of the proposed system, methodologies and purposes.

This system can enable the ubiquity of information to all stakeholders with accuracy and efficiency. Centralizing the data in a database would decrease the redundancy and since the registration can be done online, the requirement of man power and resources is decreased. The management of results and information is also eased by the development of this system so, this system is essential for colleges and schools.

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