

Development of the Student Management System (SMS) for Universities in Bangladesh

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Abstract

A great number of higher educational institutions are currently operational in Bangladesh and every year more are entering the market. Higher educational institutions are big places with many people involved and countless operations take place at all times. Traditionally, operations and transactions in such places are handled by paper based forms and systems. However, as the daily increase of places and human population; managing large organizations such as universities with pen and paper are becoming quite troublesome and are leading to tremendous amount of mistakes and mismanagements. Long ago, developed countries addressed this issue and ever since they have been using computers and information technology to handle such organizations effectively. However, in countries like Bangladesh, those solutions are not yet widely implemented; and therefore handling large organizations manually is becoming next to impossible. Only few universities in Bangladesh are using computerized automated systems to manage university activities. This work attempts to find out the statistics about the automated systems uses in the higher educational institutions in Bangladesh and also proposes a methodological automated system framework called Student Management System (SMS) that can replace the less efficient traditional system. Here, we tried to accommodate everything for a student from entering the university, to graduate and then to remain in the alumni association as well as other possible functionalities for the university management to serve the students better and to execute university tasks painlessly.

Keywords: Students Management System, University Management System, Online Student Management System.

1. Introduction

According to the University Grants Commission (UGC)[1], there are now 34 public and 78 private universities in Bangladesh. Most of them are using broadband internet connectivity but still a few of them are using Student Management System.

Today's fast-paced world is becoming increasingly characterized by web based technologies. A large number of academic institutions are managing their academic activities and resources online across the globe. Students Management System is a fully web based technology where academic institutions can handle all university activities starting from enrolling students to the module that keeps together all alumni for a lifetime.

A number of academic researchers introduced and explored around the characteristics and functionalities of SMS, as well as analysis and theoretical and practical experiments have been done to reveal how SMS can be more effective for the elements of an academic institution. However, study on the impact of such system and practical implementation on the universities in Bangladesh are very few and incomplete. Here we came up with an applied approach to the given problem focusing particularly on the universities in Bangladesh.

2. What is Online Student Management System (SMS)

Student Management System (SMS) is an Integrated Application and is a data warehouse of students and courses information. This is a complete web based application that operates over the Internet/Intranet or on a LAN. Online Student Management System is an integrated computer application that automates and controls different processes and procedures involved in an academic institution such as student admissions, semester and courses managements, student certifications, other university activities as well as the system for the maintenance of the alumni information.

Four major elements of an educational institute have been integrated within SMS that are Management, Teachers, Students and the Library. Online Student Management System starts from a simple student portfolio and grows as complex as an open communication channel that facilitates the synchronization among the four elements with information and helps students management to be efficient and effective.

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SMS is Internet based and a highly versatile system with provisions for seamless incorporation of expanded modules and resultant increased functionality as the development of new modules goes on. In this research we worked on 9 basic modules in SMS that takes care of the academic and administration of information pertaining to students and university administration. Here we provide the modules that enable students to get the information online regarding their progress reports and other activities.

SMS users can view the information on any PC that is connected to the Internet. The PC can be in a computer lab on campus, in the user's home, or in another city or country.

3. Why Student Management System (SMS)?

- Empowers Universities with better efficiency, controls academic and administrative management to achieve unmatched performances with readily available information.
- Promotes university online as a powerful branding amongst public, students, educators etc.
- Gets the most accurate and updated information of the university campus anywhere any time with a single click.
- Comprehends the university management, teachers, students and parents to everyday work flow to ease the administration and grows confidence when this information is available online even beyond the campus hours.
- Better coordination and communication among students, teachers, parents and the administrators.
- User or group level access rights to the system- only those users can get the information that have proper rights to access the system.
- High degrees of data security standards that keep the sensitive and valuable information secured and protected.
- Minimum human involvements, optimal and accurate reports.
- Minimize manual works in admissions to alumni formation as well in other academic to non-academic areas.
- Is a huge time saver that facilitates instant communication among the managements, staffs and parents.
- Helps minimize repeated works and takes care of the complete workflow of an academic institution.
- Represents extensible and streamlined workflows in the administration and in the academic areas.

4. Problem in brief

Existing systems of the higher educational institutions needs to keep a number of records related to the students and enter the details of the students and their marks manually. In order to acquire a single piece of information on a department or on an individual, a person must to go desk to desk. Furthermore, for keeping students' information, the offices must meet students frequently by person. Students also want to know their information and everyday updates. The whole matter thus creates a mass gathering of students in front of the offices.

All these information are stored in paper and paper material takes up a massive amount of space on the site. Paper files are kept in the file cabinets that take up space as well. In this arrangement, data could be misplaced due to human errors or in the event of security problems, data could be lost or stolen very easily. We therefore require more handy and reliable ways to handle these tasks using automated software such as Student Management System (SMS).

5. Proposed Solution

To achieve the aims & objectives of this research, we must first identify primary objects that are involved in the system. In this scenario, these objects are: administrators, registrar, faculty, accountant & the librarian. These users should be able to login to the system with separate login credentials. Options for the new user registrations will be under administrative privileges. A database will be used to store all information throughout the system pertaining to the users, administrators, faculties, courses etc. This information can be retrieved by the users as per the user's privileges. Finally, a user should be able to search the system for certain information using search specifications.

6. Objective

The objective of this research is to create a complete university Student Management System from admission to alumni. Students, Staffs and Faculties should be able to use an easy to use information system that ensures data integrity and validations, maintains visual conformity throughout, increase efficiency and convenience and contains strong error-handling mechanisms. Objectives also include creating a paperless campus.

7. Current SMS Statistics in Bangladesh

A small number of higher educational institutions are coming forward to computerize their campus. It was very difficult to collect the actual data from universities, however, what could be revealed by phone calls and inquiries to different universities are given below in a graphical format.

SMS USES IN BANGLADESH

SMS/Total	SMS using in universities of Bangladesh	
	Private (78)	Public (34)
Using SMS	17	12

The total statistics of SMS uses at public and private universities are shown in the graph.

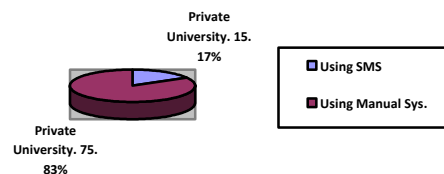


Figure 1. Computerized and manual statistics at private universities

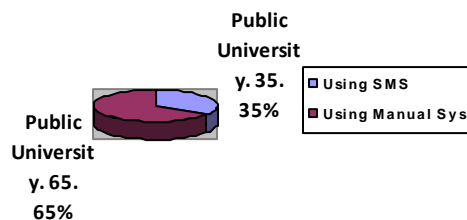


Figure 2. Computerized and manual statistics of public universities.

8. Design Constraint

8.1. SMS web and data guidelines

SMS follows all factory standards university management guidelines that are used throughout student enrollments, graduate and alumni association related procedures. There will be individual menu items and functions for specific users as well as the dashboard where the entire current status of the university will show up at a glance. By logging in with a specific user id and password a user will be able to access only the area that is designated to him/her.

The administrator will be able to assign or reassign permissions to a specific user or a group to perform certain tasks. A group admin can create or destroy users under that particular group. For any help there is an email to

contact with the administrator. Some automatic event management systems have been implemented like “forgot password” so that automatic password reset mails can be generated. All events can be logged for future investigations.

8.2. Users with limited computer knowledge

The layout and styling of the site was specifically chosen to assist users with limited computer literacy. While most university students are technologically savvy, it is easy for them to navigate this system and perform complex tasks; however, some people are still less comfortable with online resources. This fact was carefully considered during the development of this system and every step was taken to create a user friendly environment. Consistent layouts, styling and formatting were used to increase user efficiency and acceptance.

Additionally, whenever possible, graphical formats were used including graphs, charts, icons, font styling, colors, and lists. While implementing custom utilities for a designated staff member, the staff member was consulted during each phase of the development and his feedbacks were carefully considered and integrated into the system while keeping the global conformity of the overall system.

9. Background and site statistics

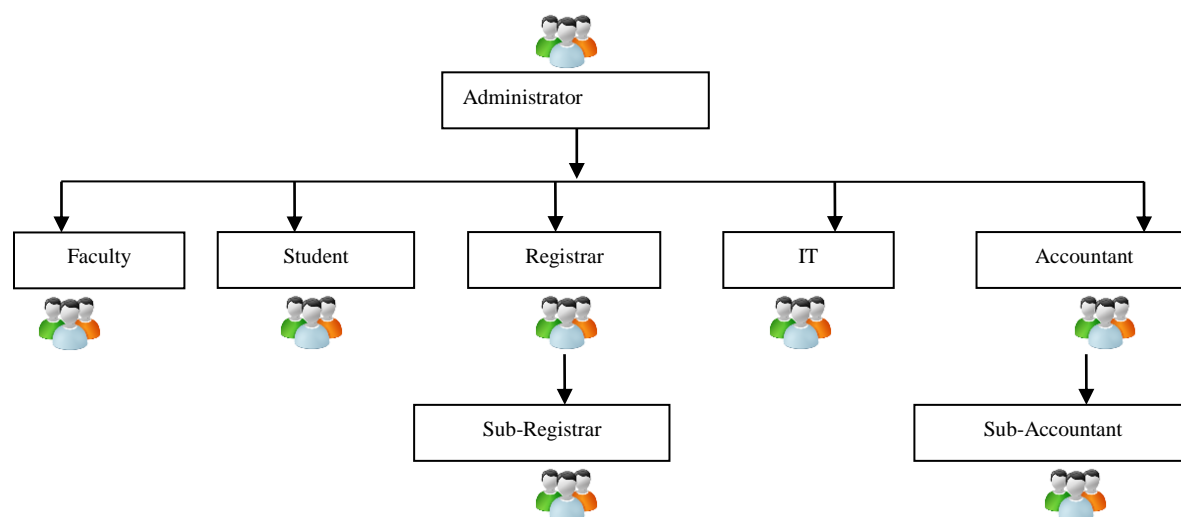
Prior to the SMS, we relied exclusively on paper records and a small collection of electronic tables for all data managements. In the beginning of SMS, there was a simple static site with limited content on general admissions requirements and other information. SMS utilizes portions of code and utilities that were found free online, but are otherwise completely original and entirely designed and developed for this research work.

10. SMS modules and functions

The Student Management System is made up of the following modules:

- Student
- Faculty
- IT
- Accounts
- Sub Accounts
- Registrar
- Sub Registrar
- Librarian
- Administrator

11. The Organogram of users



12. Activities involved with the Student Module

The student module will allow delivery of online information to the students by logging into their account and retrieve up-to-date information using a web browser.

SMS will give following functionalities and facilities to a student. Students will be able to:

- View and download course outlines, course materials, class schedules of their respective courses online.
- Get detailed course information such as credit completed, current semester courses etc.
- Fees detail from the starting of a course or courses to till an end date.
- Schedule and information on a specific class.
- View and print unofficial transcripts.
- Group messaging and Individual Messaging through course teacher and with batch-mates.
- View registration appointments.
- Change student PINs.
- Plan a schedule for a quarter.
- Register for classes.
- View and/or update address information.

13. Activities involved with the Faculty Module

A faculty will be able to do following tasks using this system:

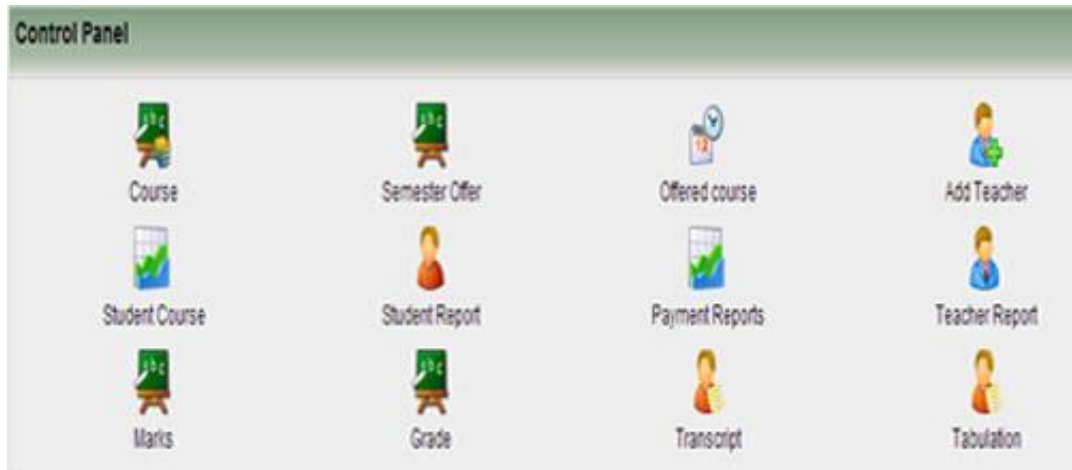
- Add and Edit course outlines and view details.
- Course contents can be added or edited.
- Files can be uploaded for a specific batch that can be organized hierarchically by creating folders and subfolders.
- Add student project and assignment specifications for individual students.
- Take online quizzes or tests upon setting the question paper.
- Group or individual messages can be posted to specified batches.
- Can copy the contents from one course to other courses.
- Rules can be set up to run and complete the course.
- Students report can be generated.
- Course schedule can be set up.
- In the report section reports can be displayed and exported to excel or pdf formats according to id, batch and course.
- Student attendance can be generated and printed.
- Finally, a forum is added to communicate with each and every student that includes batch wise messaging facilities.

14. Activities involved with the Grades and Transcripts Module

- The Grades and Records Module provides with the functionalities for entering end-of-quarter grading and transcript generation and maintenance. With this module, you can create transcript records including letter grades and other grade formats.
- Choose a template from several grade roster formats.
- Enter grades using SMS grade entry forms and using the Instructor Briefcase.
- Print and access transcripts.
- Record information regarding degrees, certificates, completions and comments.
- View transactions that occurred on a student's courses, transcripts, degrees etc.
- View a student's course requirements.
- Merge and modify records for students with transcript related problems.

15. Activities involved with Registrar Module

- Course can be added, edited and deleted for a particular program.
- Reports can be generated for a particular course on a specific semester, year or program.
- Can check for offered courses by filtering by year, semester, degree, department, batch and section.



- Faculty information can be added, updated or removed.
- Display reports on courses taken by filtering by id, batch and faculty.
- Student's detail information can be edited, printed and deleted by filters.
- Payment reports can be generated by various parameters such as id, batch, course, ledger and daily report can be generated for a specific date.
- Marks Statement can be displayed and printed on a specific batch, program etc.
- Final grade sheet can be displayed and printed for every student.

16. Activities involved with Sub Registrar Module

The SMS Sub Registrar module provides the functionalities associated with a student's enrollment in classes. It also provides the data necessary to support grades and student enrollment records. Following tasks can be performed:

- Add, edit and delete student records.
- Add and edit faculty course information.
- Add and edit a semester courses.
- Offer courses for a new semester.
- Approve courses to start a semester.
- Promote students to the next semester.
- Various reports generation by student id, course, batch as well as department wise and faculty wise.
- Students can drop, retake and reassign the batch.
- Add, delete and modify new degree information.
- Get the reports for the passed out students.

17. Activities involved with Accounts Module

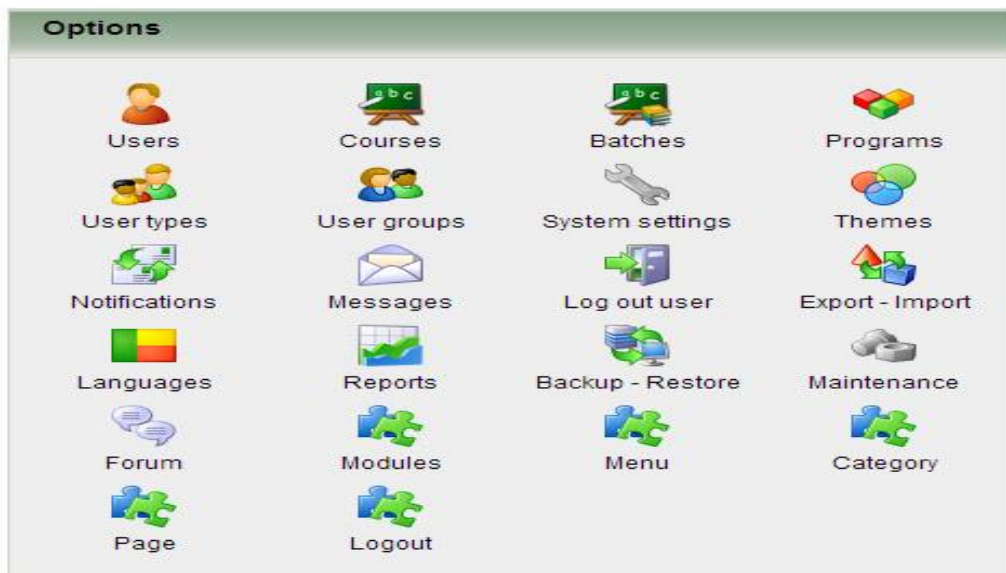
- Accountant will be able to setup and edit the rates for the admission fees, registration fees, per credit hour fees for a specific program.
- Discount with percentage can be assigned on a student payment.
- Sub users can be created under the accounts section for handling large number of entry.
- Sales of admission forms can be stored and monitored.
- Student payment reports can be generated for specified student using id and batch.
- Finally, student payment reports can be generated according to batch, course and by filtering by a specific date.

18. Activities involved with the Library Module

- Adding new books to the library database by category wise as well as by providing other details like title, author etc.
- Display the report for the issued books.
- Issue book to a student by entering students details.
- Return books from students.
- Library report by students.
- Report on book availability.
- Summary report of issued and available books.

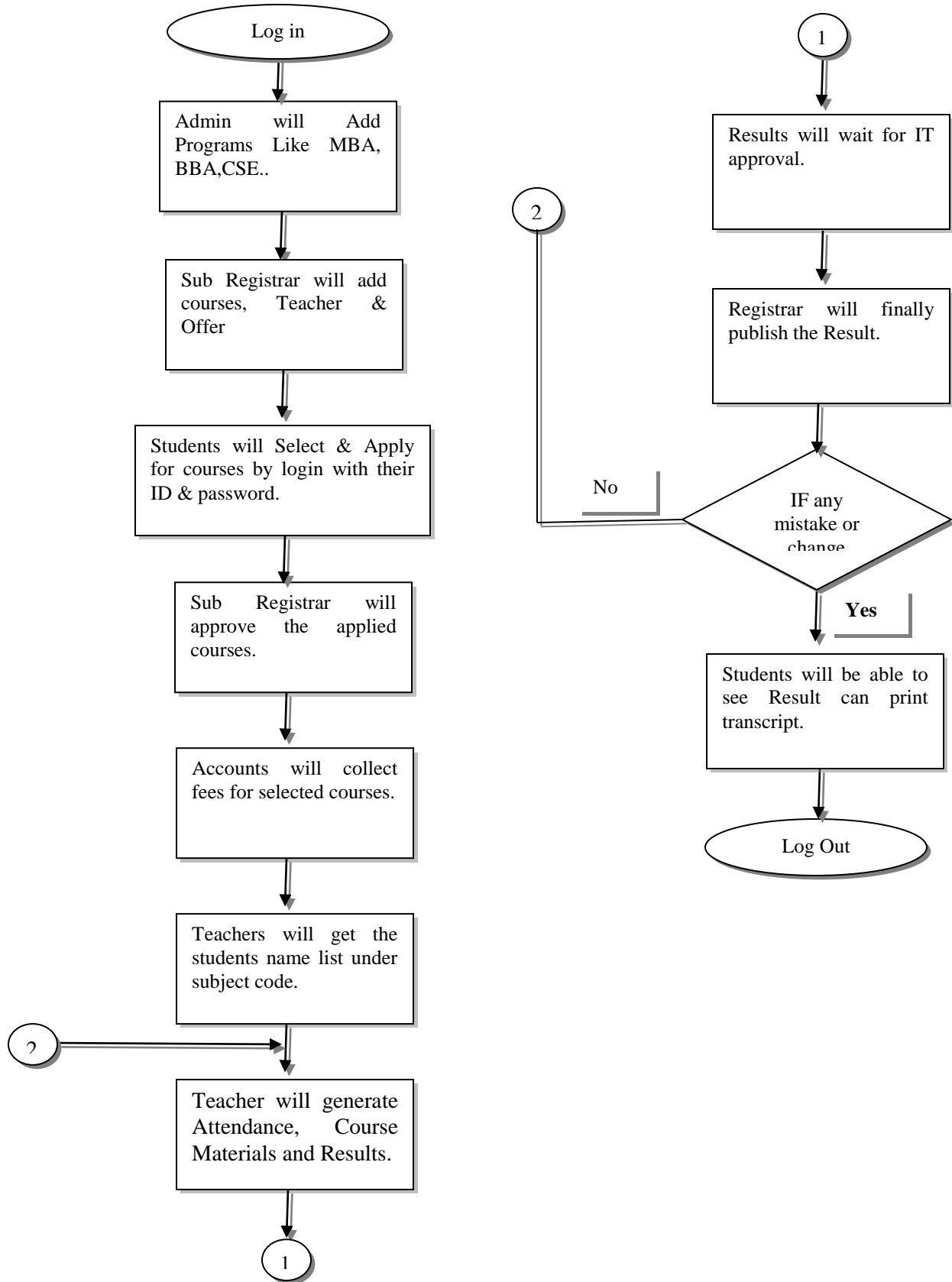
19. How the Admin User Interface behaves

The interface allows the users to input login username and password that must be authenticated before access is granted. In case of wrong input of username or password, the application produces an error message prompting the user to input correct username and/or password. After the user input the correct username and password, the program informs the user that he/she has successfully logged in.



After the admin user logs in successfully the above options will be displayed under user module. Here, all types of user can be created like student, faculty, registrar, sub-registrar, account, sub-account, IT and more.

20. How the proposed system works?



21. System Requirements

Since a database was used to store confidential information in this system, this system is not recommended to be hosted on a commercial server out of the premises. The recommended server is a Brand Raid Server that hosted locally. A raid server is able to restore all data's in case of hardware catastrophe. A power backup system must be used with the server that provides at least 3 hours backup to the CPU and to the router and accessories that are connected to the server. A dedicated internet connection with at least one Static IP is required. Depending on the data traffic, a high bandwidth internet connection will be required. A tape drive is required to backup data in a hardware failure.

A remote backup system is recommended to synchronize information on every new action to avoid the risk factors.

22. Design Guideline

22.1. *Design Languages*

HTML, hypertext markup language, was used for all basic layout and placement of objects. CSS, cascading style sheets, was utilized for styling and design flourishes to ensure global conformity and ease of design alterations on a global scale. PHP programming language was utilized for all real time content development and data organization. Finally, SQL, structured query language, is employed for all data management, retrieval and storage.

22.2. *Layout*

It was desired to keep the navigation and layout of the SMS as simple as possible while still retaining the ability to list all relevant pages. Future scalability was also considered during the selection of a navigation system. Subordinate menu items are placed under appropriate categories. Every effort was made to ensure each item occurred only once in the menu. Buttons for changing the layout was given so that users can change the layout to his or her choice.

22.3. *Database*

To make the system accessible from everywhere, MySQL database was used, which is considered to be the best fit with the PHP programming language. A large number of tables are used. Sometimes different types of join are used to get data from multiple tables. Permission is also assigned for different users so that different types user can perform different tasks.

23. Future Work

Future work on the SMS will include integrating a Mobile SMS subsystem where the students will be able to get the latest updates to their cell phones. A forum and a chat facility will be added so that students can participate on live chat. A payment gateway may be added in the admission module to facilitate the student's payment processes. Furthermore, amobile application of the system can be made available for download.

24. RESULTS AND DISCUSSIONS

In order to evaluate the modules implemented in the system, visits to different university campus maybe arranged. The purpose of the visits is to discover different systems how they are implemented in different places.

Implementation of the system requires training of several persons involved with the system and testing of the system across the network.

25. CONCLUSION

The SMS is only a humble venture to satisfy the needs of educational institutions. Several user friendly interface and many resourceful options have been adopted. Hopefully, this system shall prove to be a powerful package to satisfy the requirements of an educational institution.

SMS is expected to increase the efficiency of the university management, decrease time required to access and deliver student records, decrease data duplication, increase data integrity, increase user access and convenience,

decrease time spent on non-value added tasks and increase the ability of the staffs to better serve the students. The objective of SMS is to provide full information and resources to the students online that are required to be updated regularly as the study goes on.

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