“KDMV Sports Desk” Web Based System for School Sports & Athlete Management

A dissertation submitted for the Degree of Master of Information Technology

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ABSTRACT

"Sports Desk KDMV" web-based Sports and Athlete Management system has been developed to overcome the difficulties and inefficiencies caused by the current manual system. This system enables remote and robust access to all the information related to sport and athletes in the school where, students handling, sports handling, events handling, instructors handling, registering for tournaments conducted by the school, email notification regarding sports activities of the student to the parent/guarding and report handling will be carried out in an automated process. User access levels are limited and access restrictions have been added to the different type of users of the system. Any system user will be able to access the system via internet. Users will be able to access student information, practice schedules, information about sports and information on tournaments depends on the user access levels.

Existed manual systems had drawbacks such as miscommunication among parties which led to delays in the process, had unnecessary amount of paper works and paper trials, poor information flow to external parties of the school regarding sports activities(parents, instructors), unable to reach information and receive updates in timely manner and inaccurate history information on student's sports activities.

System has been implemented using php language while using other technologies such as jQuery, javascript, CSS, Ajax and MySQL where system has a flat file architecture following Agile development methodology. System requirements were gathered from system stakeholders using methods such as questioners, interviews and observations. Apache webserver has been used as the server while phpMyAdmin has been used to develop the database of the system improving agility.

The project has been completed successfully along with user satisfaction where client requirements of a web based robust and efficient system to manage student, sports, tournaments, practices and instructor information in a centralized manner while having the ability to maintain and obtain reports of current and history data, have been fulfilled.

DECLARATION

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of

Mr./Ms.

under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

Certified by:

Supervisor Name:

_____

Signature: Date:

ACKNOWLEDGEMENT

Foremost, I would like to take this opportunity to express my immense gratitude to my supervisor Mr G K S Dias for the tremendous support and advices along the period of this research. He steered me in the proper direction while allowing me to make suggestions and amendments for my research. Without the help of him I would not have been able to complete this thesis in this manner.

I would like to express my sincere gratitude to all the staff members of Kottawa Dharamapala Vidyalaya for providing me with necessary information and any other way possible. My special thanks goes to Mrs Kamani Priyadarshani, principle of Kottawa Dharamapala Maha Vidyala for allowing me to select the school to my research.

Finally, my gratitude goes to my family who has been providing me with unfailing help and constant support during my time of study and through the way until the end of my research thesis as well as throughout my studies.

This achievement would not have been conceivable without them. Thank you.

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CHAPTER 01: INTRODUCTION

1.1 Problem Identification

Today we live in a competitive and busy world therefore, managing time and schedules in daily activities plays a big role in everyone's lives. Due to lack of time management we can lose opportunities and money. Not only professional individuals or business organizations will be in benefited by time management but also students and institutes. In our schools or institutes, we have sports schedules and other related activities which require pre-scheduling and tracking but there is no proper system which allows this.

Kottawa Dharamapala Maha Vidyalaya is a school located in Kottawa which offers many sports activities to the student from grade five to thirteen. They have won many school level, provincial level achievements in various sports as well as national level. With the growth of the school over the years it has over 3500 students and it has more than 10 sports activities. Currently they have a manual document-based system to handle all the scheduling and managing records. With the increase of sports activities and the number of students, managing a manual scheduling system has become incontinent and time consuming. Therefore, with more convenient and remote system embedded with latest technology will help the staff and students with more smooth flow of information.

1.2 Motivation

Currently all the schedules of different sports practices are scheduled by athletic teachers and will be displayed in the school notice board weekly. Any changes in schedules and venues will be manually changed and will be updated accordingly where students will have to check daily and reconfirm about the practices. At present there is no proper communication to the parents nor the students when any change is made to the schedule. Information on sports tournaments and matches will have to be accessed via the sports teachers, which is troublesome to both players as well as sports instructors according to the current information flow of the manual system. This has been inconvenient in many occasions where some students were not able to apply to tournaments due to lack of communication.

To overcome this inconvenience as well as to maximize the efficiency of these procedures it was proposed to implement a fully computerized web-based system, which will be include of usability, minimizing all the paper work, reducing time wasting of students , teachers , coaches as well as parents , easy data access, history data tracking , improving data security.

1.3 Aims and Objectives

The main objective is to implement a web base solution for overall processes related to sports activities in the school which will be more efficient and effective.

Follow are the main objectives of the proposed system,

- System can be used internally in the school managing sports related activities.
- Will carry student information who participate in school sports activities though next several years.
- Will accommodate students' information, associated sports, achievements, performance, compare and contrast different players, tournaments information, practice schedules and upcoming events.
- Facilitates to schedule all the practice schedules online and improve scheduling facility.
- Users will be able to generate different reports for analytical decision-making purposes.
- System will improve information distribution by notifying practices/tournaments schedules changes and cancellations to the guardians of the students in the system.
- Implemented portal will accommodate the functionality for students to apply for tournaments related to their sports or to sign up for sports which they are interested in.
- System will streamline news and information regarding sports beyond the school with regard to new improvements on sports, new laws, new techniques and other motivational information.
- Ability to parents to view information of their child(ren)'s sports activities, such as, practice participation history, scheduled practices or tournaments, participated or upcoming tournaments or their achievements

1.4 Scope of the Project

Listed below is the scope of the project;

- Manage student and sports activities details.
    1. System will facilitate students to search information regarding sports schedules, information on tournaments before applying or registering for a sport/tournament. Will also have the facility to view the others who have registered for the particular sport/tournament.
    2. All the students should be registered to the system with the student number to register to apply/register for a tournament.
    3. Records will be maintained for the students who have already participated in tournaments with the achievements.

- Handle online registering for a sport or a tournament
    1. Upon registering for a sport/tournament student and parents will be notified via Email.
    2. Student will be able to view sport/tournament details.
    3. System will remind student and parent regarding practices via Email.
    4. System will notify student and parent regarding changes and cancellations on schedules via Email.
    5. System will store registration details.

- Facilitate all student sports records and history to be computerized.
    1. System will allow admin users to enter records of students on their participations for tournaments/practices and achievements.
    2. System will allow admin users to access data of students and compare.
    3. System will allow admin users to print detailed history on student's sport activities.

- Handle scheduling process online.
    1. System will handle all scheduling of practices and tournaments online. Upon a practice schedule, all the students who are enrolled will be notified via an email.
    2. System will automatically send an email notification upon any cancelations and changes of schedules.
    3. System will allow to printing facility and store schedule details and participant lists.

- Maintain sport instructors' details.
    1. System will store and maintain all sports instructors' details.

- Manage view of system to separate users.

    1. System will have three main login types, Admin, Student and Visitor.
    2. System will allow different access levels to separate login types.

        Example:

        Admin: Enter data and generate reports
        Student: View details and register for activities
        Visitor: Basic information on sports activities

- Facilitate to generate accurate reports for analysis purposes.
    1. Current Student List Enrolled Sport Wise
    2. Current Student Base, Sports Instructors Base
    3. Schedule Details(weekly, monthly) Sport wise
    4. Student Sport History Details – Can be compare with two students
    5. Tournaments Details(monthly)

1.5 Dissertation Outline

Dissertation is the document which contains overall information of the project in chapter wise. This dissertation contains six main chapters followed by reference and appendix.

Chapter 01: Introduction

This chapter provides a brief introduction and overview to the reader. Project introduction, scope and objectives are included in this chapter

Chapter 02: Background

This chapter discusses on the background study for the project and describes on the research done on similar systems including tools and technologies used in implementation.

Chapter 03: Analysis and Design

Requirement gathering techniques on functional and non-functional requirement gathering and requirement analysis is described in this chapter.

Methodologies, techniques and tools used to design the system is included in the Design chapter. User interface, modules and database is taken into consideration while deciding on a design for the system as well.

Chapter 04: Implementation

This chapter discusses on the implementation of the system and it describes used software and hardware, database implementation and coding modules which were used in converting specification into an executable system.

Chapter 05: User Evolution and Testing

System testing methods and tools are discussed in this chapter. Error preventing measures and error correcting methods are described as well.

Chapter 06: Conclusion

This chapter contains limitations of the project, achievements, difficulties encountered while carrying out the project and further enhancements of the project.

Reference

All the books, URL references and other referred material is including in this section with appropriate reference material.

Appendix

This includes supplementary parts and further details in related to the chapters.

CHAPTER 02: BACKGROUND

2.1 Background Identification

Today we live in a competitive and busy world therefore, managing time and schedules in daily activities plays a big role in everyone's lives. Due to lack of time management we can lose opportunities and money. Not only professional individuals or business organizations will be in benefited by time management but also students and institutes. In our schools or institutes, we have sports schedules and other related activities which require pre-scheduling and tracking but there is no proper system which allows this.

2.2 Business Background

Kottawa Dharamapala Maha Vidyalaya is a school located in Kottawa which offers many sports activities to the student from grade five to thirteen. They have won many school level, provincial level achievements in various sports as well as national level. With the growth of the school over the years it has over 3500 students and it has more than 10 sports activities. Currently, they have a manual document-based system to handle all the scheduling and managing records. With the increase of sports activities and the number of students, managing a manual scheduling system has become incontinent and time consuming. Therefore, with more convenient and remote system embedded with latest technology will help the staff and students with more smooth flow of information.

Below is the existing manual process use case diagram which clearly shows the inefficiency of the current process,

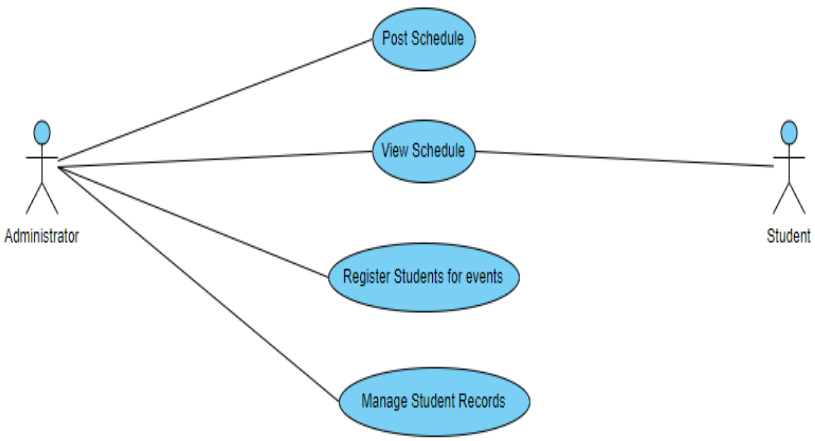

Figure 2.1 Existing Process- Use case

2.2 Reviews of Similar Systems

2.2.1 Rank One Sports

URL: https://www.rankonesport.com/content/

Rank One Sports[1] is a software which used in sports industry which has many features in connecting athlete with coaches. It provides the ability to view status of athletes to a coach at any given time. It provides a gateway to collect, store and change data on athletes for the management via forms. Any party who has authorized access to the system will be able to retrieve and view data from location where they have internet access. They provide users with historical data of the athletes as well. This provides reporting features, scheduling features as well as different levels of user accesses as well. System is controlled in a local level with multiple users.

Drawbacks of the system, which are addressed by the proposed system:

- This does not cater small and medium scale schools.
- Does not cater separate user views for parents, students, teachers and instructors.
- Does not cater enrolling students to tournaments via the software.
- Does not facilitate comparing student history.

2.2.2 Front Rush

URL: https://www.frontrush.com/web/#anchor-u34513

Compliance Solution in Front Rush[2] provides roster management, student-athlete forms, playing and practice season log verification, and complimentary admissions. They provide the access to the administrator to access and view all practice logs and get a countable measure of the athletic related activity for each team.

This will allow coaches to create and schedule their calendars and events which they participate. This will also provide an easy access to gathering data from the students via customized forms which can be updated via admins and other accessible parties. Customized report generation is also one of the main features they have. These services can be accessed via any platform which enables internet as well.

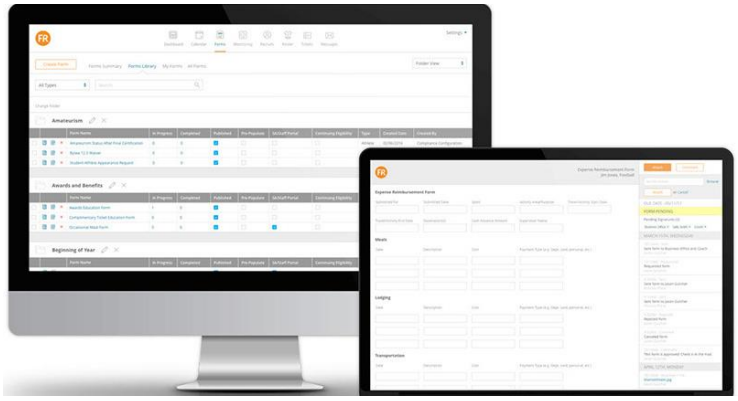

Figure 2.2 Sample Form view of Font Rush

Drawbacks of the system, which are addressed by the proposed system:

- The cost of the software makes it unreachable to most of the institutions.
- This is more focused on reports and statistics than managing schedules, therefore, lack of practice/tournament scheduling.
- Does not facilitate the parents to view their child(ren)'s information.

2.1 Implementation Tools and Technologies

Proposed system will be used by business users who are not familiar with programming. Therefore, system should be understandable and user friendly. Latest technologies and tools will be used for development. The system will be using php language as the main platform with MySQL [8] as database, Ajax for form submission and HTML for base interface of the system. Other than system will use bootstrap framework, CSS [6], [10] for styles and java scripts, jQuery will be using as front-end technologies.

CHAPTER 03: METHODOLOGY

3.1 Introduction

This chapter gives an overview of system analysis and system design. Software design phase is an iterative process in which requirements gathered in analysis are translated into a "blueprint" in building the system. Afterwards this can be elaborated into detailed functional and behavioral requirements. The output of the design phase is the system specification.

3.2 Analysis of Current System

To recognize main system functionalities, it is vital to analyze the current system methodologies. Domain analysis was carried out through certain fact gathering techniques such as interviews, observations and manually maintained logs. Currently organization does not have any type of an automated system to carry out identified functionalities of the proposed system.

According to analysis following system functionalities were identified.

- Maintain student & instructor details
- Maintain history data per student
- Maintain sports tournament details
- Maintain dashboard for students
- Maintain dashboard for parents
- Maintain practice schedules
- Generate reports based on history and current data against students

3.3 Requirement Gathering

Several kinds of techniques were engaged here to capture requirements [15],[16][from different stakeholder perspectives. The main approaches used for requirement gathering process were; interview, observation, document review and scenarios.

Both open ended and close ended interviews were conducted for prompt existing and also to identify new problems. Relevant documents and current manual system flow were studied through a sampling observation methodology. Captured facts were represented using scenarios. Use case diagrams, ER diagrams have been derived from the functional requirements gathered via above techniques. Based on the gatherings main three user roles were identified, such as, Student, Visitor and System Administration.

Functional Requirements identified:

Common Functions

- User logins based on user roles
- Manage passwords
- System logout

Student

- View practice sessions
- Request enrollment for tournaments
- View events and sports
- Manage profile

Parent(visitor)

- View practice sessions of the child
- View history of student activity
- View sports information
- View achievements of their child

Teacher(admin)

- View/add/update/delete student profile/achievement information
- View/add/update/delete sports or practice information
- View/add/update/delete instructor information
- Generate reports
- Compare student history

Apart from the functional requirements of the system non-functional requirements have been identified. Non-functional requirements generally specify the system's quality attributes or characteristics. They describe how a system should behave and what limits there are on its functionality

Non-functional requirements identified:

- Flexible interfaces with user friendly environment
- Personal who have average computer literacy should be able to gasp the system in short time period.
- The system should be accurate and consistent.
- Should handle security related risks thoroughly since the system will be a web base application.
- Backup procedures should be on place.
- Adoption for future implementations should be enabled.

3.4 Design Techniques

Design techniques are the techniques use to model the system. There are different design techniques such as Modern Structured design, Rapid Application Development, and prototyping. Object Oriented design technique was chosen out of them because of code reusable and recycling facility, design benefits and maintainable facilities with Objects and classes.

Other reasonings to the selection,

- Transparency – By using agile methodology system complexity can be reduced.
- Collaborative Effort - Clients are obligated to actively participate in the requirements definition process, thus reducing unknowns and making the overall process more efficient.
- Project size is medium.
- Customer is available throughout the project.
- Customer requirements are not stable.

Unified Modeling Language (UML) plays a significant role in Object Orient designing. UML allows programmers easy understand models of objects so that programmers can easily write software. Some of structural and behavioral UML diagrams use for design proposes systems are mentioned below.

- Use-Case diagrams with some narratives – shows what the system needs to do.
- Sequence diagrams – shows how the objects interact overtime.
- ER diagrams – shows how entities of the system interconnect.
- Class diagrams – shows the needed objects and relationships between them.

3.4.1 Propose System Design

Diagram in Figure 3.1 depicts the overall high level Use-Case of the proposed system.

Figure 3.1 High Level Use Case Diagram

Identified high level system functionalities are as follow based on the requirements gathered,

- Manage student and instructor details.
    - Student and Instructor users will be able to view retrieve and insert data to the system as per the access privileges.
    - Edit Student/Instructor basic details
    - View Student details
    - View History
    - View News Feed

- Handle online registering for a sport or a tournament
    - Users should be able to enter entries for tournaments.
    - Users should be able view sports/tournament details.
    - Student will be able to view sport/tournament details.
    - Admin users should be able to view all entered/updated details via other users.
    - System will store registration details.

- Facilitate all student sports records and history to be computerized.
    - System will allow admin users to enter records of students on their participations for tournaments/practices and achievements.
    - Admin users will have privilege of view, sort, compare or generate reports based on history data.

- Facilitate practice scheduling process online.
    - Systems users should be able to view practice schedules.
    - System should enable admin users to enter or update practice schedules.
    - System to have notification mechanism to notify any related parties of any change in practices.

- Manage view of system to separate users.
    - System will have three main login types, Admin, Student and - Visitor.
    - System will allow different access levels to separate login types.

3.4.2 ER Diagram

Diagram in Figure 3.2 depicts the overall Entity Relationship diagram of the proposed system.

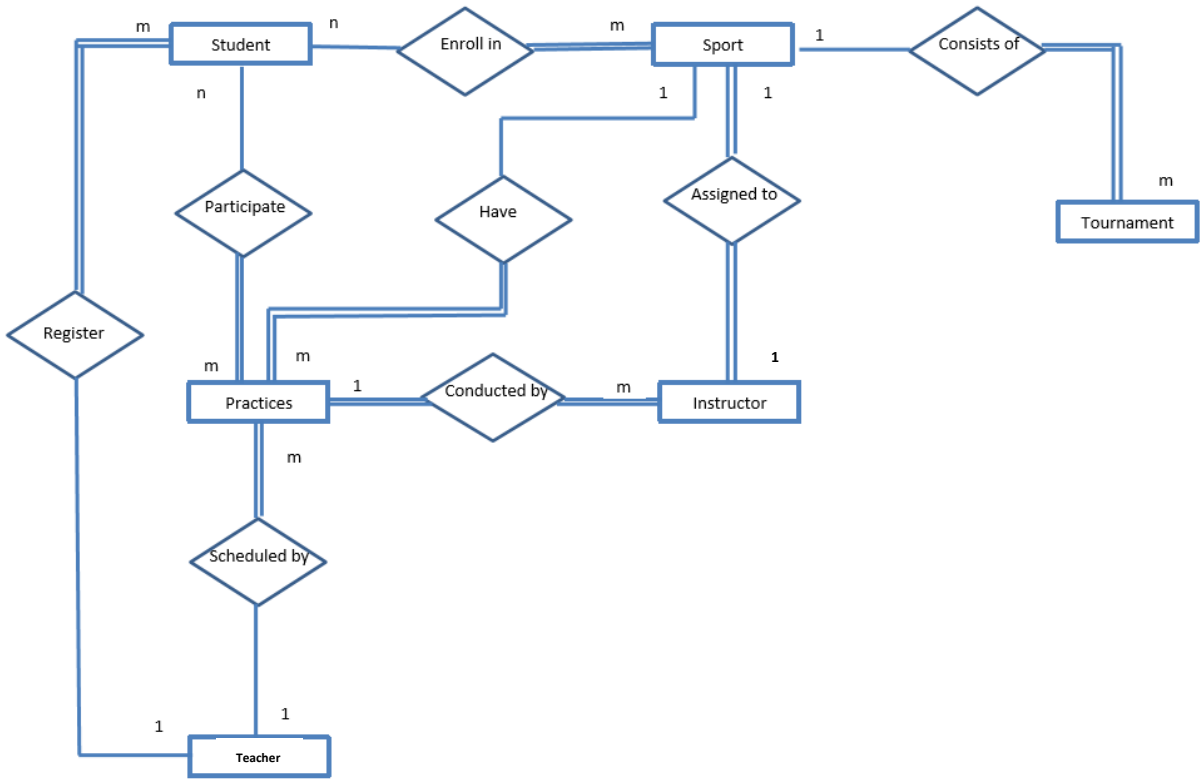

Figure 3.2 Entity Relationship Diagram

3.4.3 Sequence Diagram

Below figure 3.3 display sequence diagram for report module.

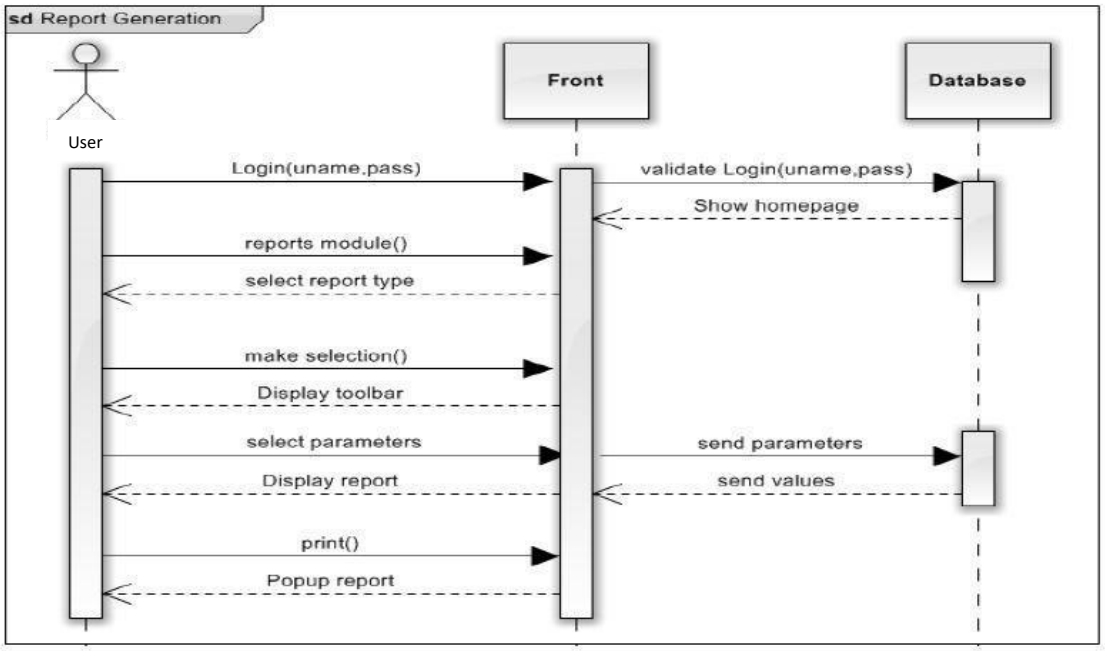

Figure 3.3 Sequence Diagram Report Module

Note: Report module will be accessible only for admin users, whom are teachers/academic staff.

3.4.4 Class Diagram

Class diagrams support to carry out conceptual and domain modeling. A conceptual model represents objects and classes from a particular system user's perspective. The following class diagram in Figure 3.4 depicts the overall classes system of the system.

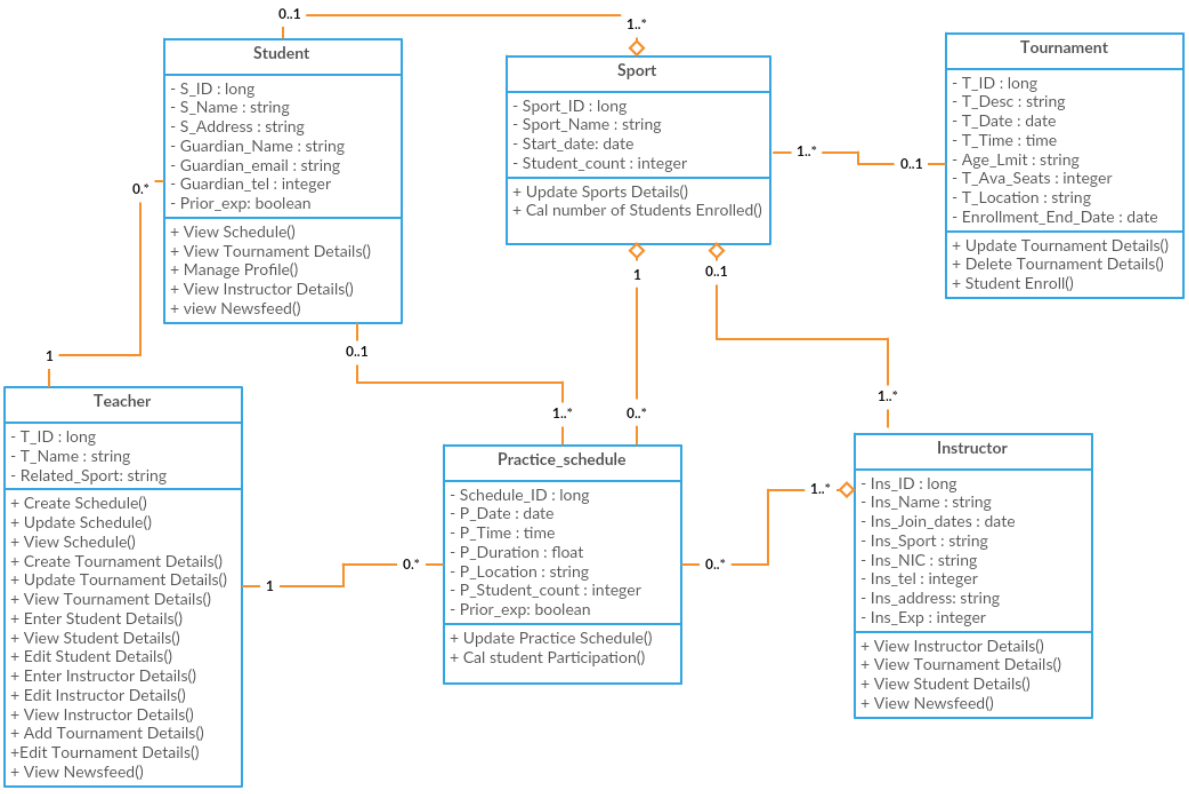

Figure 3.4 Class Diagram

3.4.5 User Interface Design

User interface is the primary and very first interaction with user and system. So it should interactive to user. User Interface (UI) Design focuses on what users expecting through system and ensuring that the interface has fundamental facilities which are easy to understand, access and use There are some properties that user interface must have,

- Avoid unnecessary elements and keep interface simple:
- Purposefully use color and texture: make direct attention toward or redirect attention away from items using color, texture, contrast.
- Use auto select options as well as let the users select options for better flexibility.
- Use common UI elements and build consistency: By using more comfortable common elements, for users and able to get things done fast.
- Use typography to create hierarchy and clarity: Different sizes, fonts, and arrangement of the text to help increase scalability, legibility and readability.

Following are the main mock up user inter interfaces designs used in the system which have been designed using an online application called Mockflow[29].

3.4.6 User Interface Design – Web Application

Below are the initial mock user interface designs of the web application.

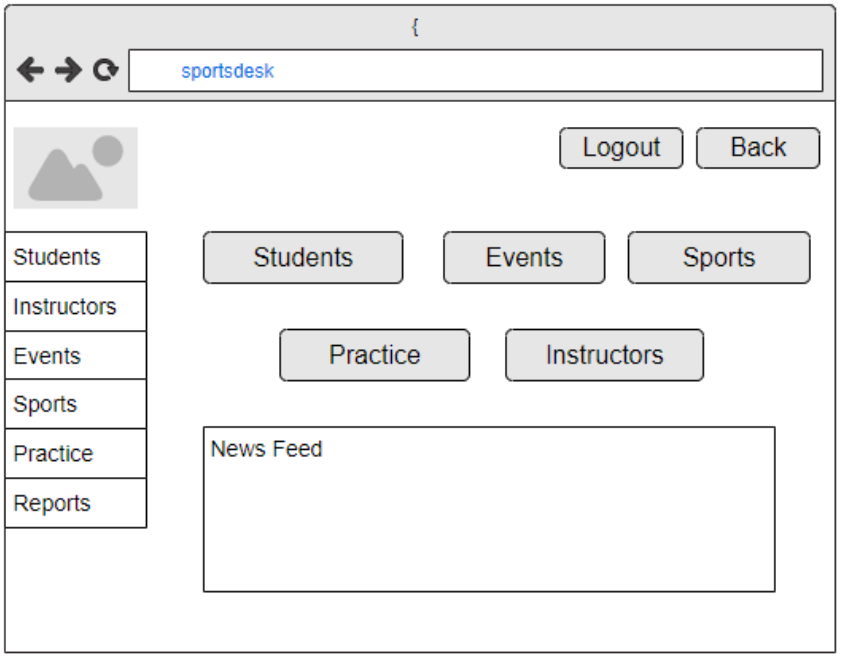

Figure 3. 5 Dashboard User Interface Design

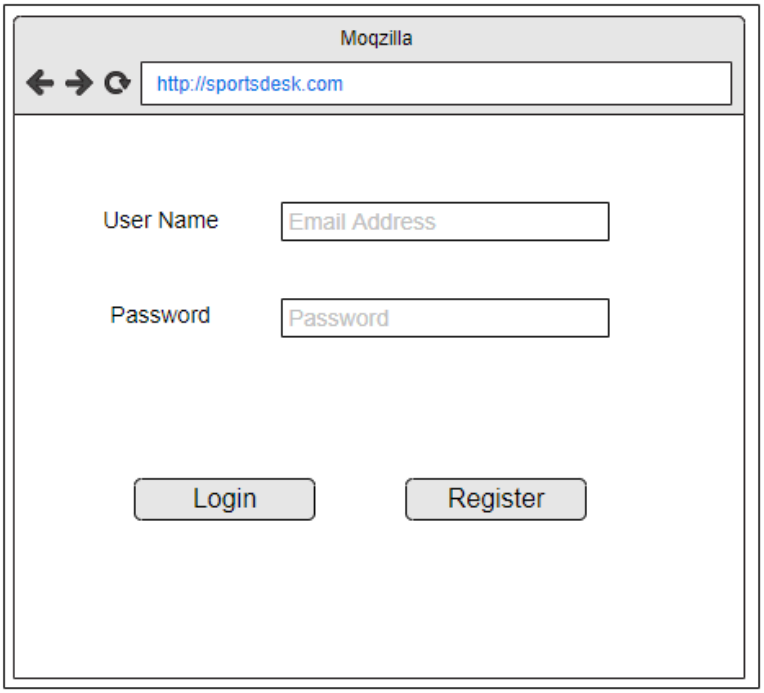

Figure 3. 6 Log In User Interface Design

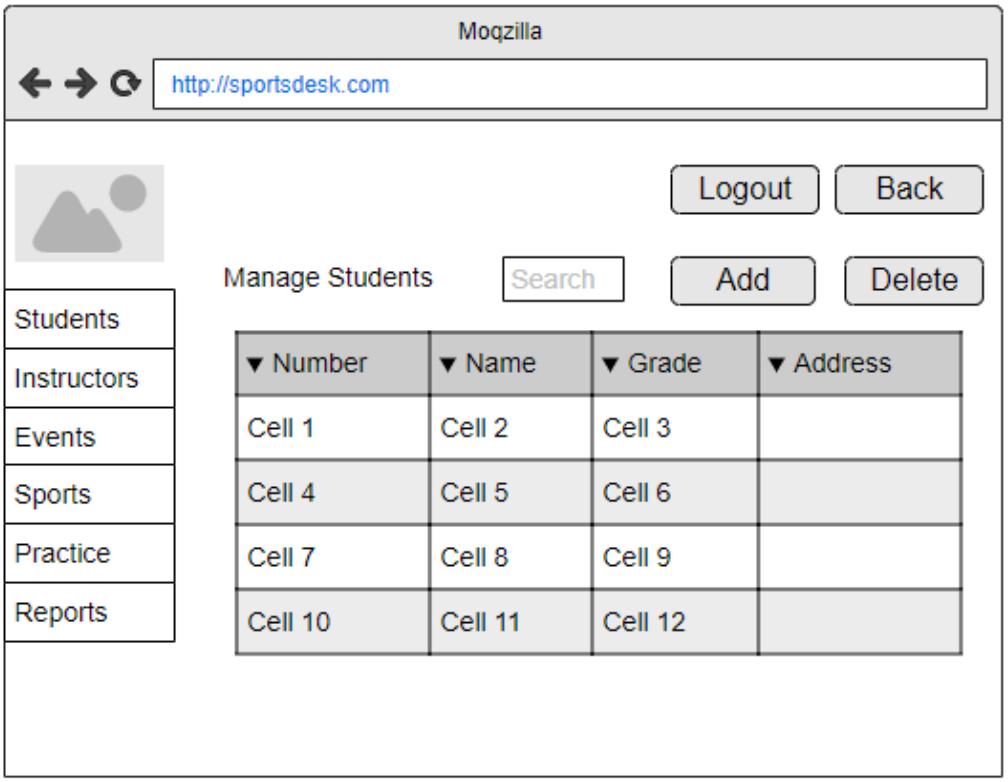

Figure 3. 7 Students List User Interface Design

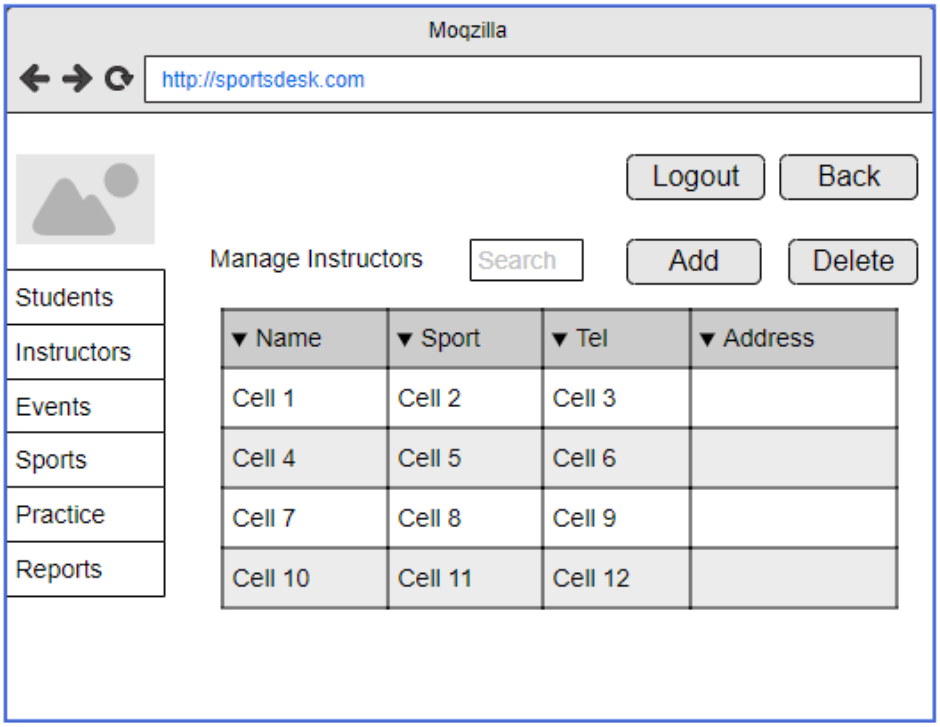

Figure 3. 8 Instructor List User Interface Design

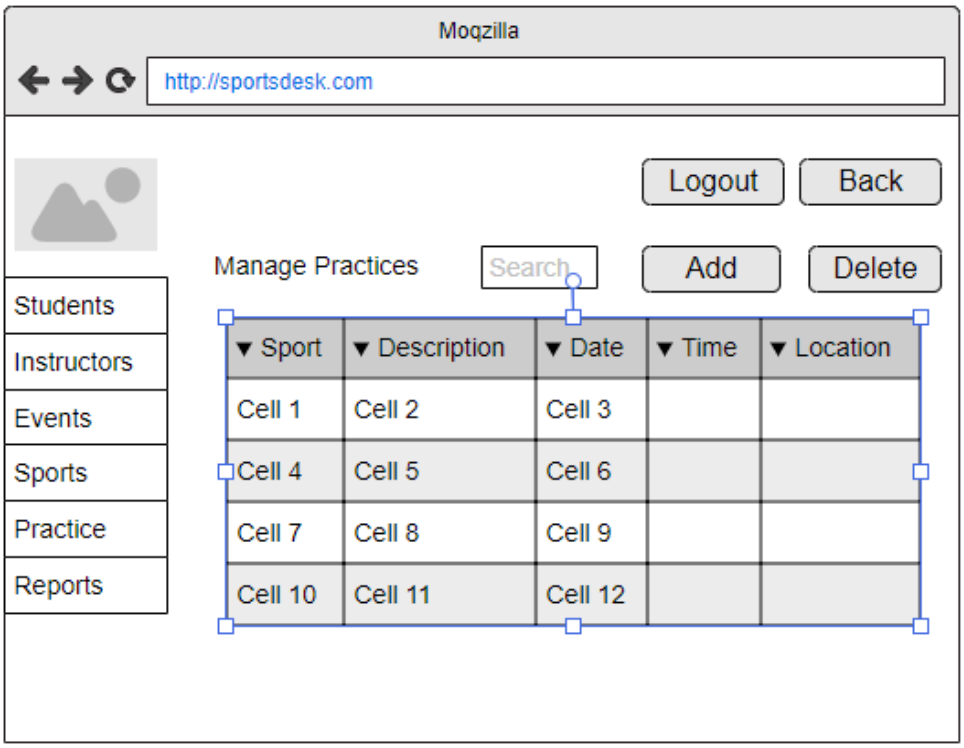

Figure 3.9 Practice List User Interface Design

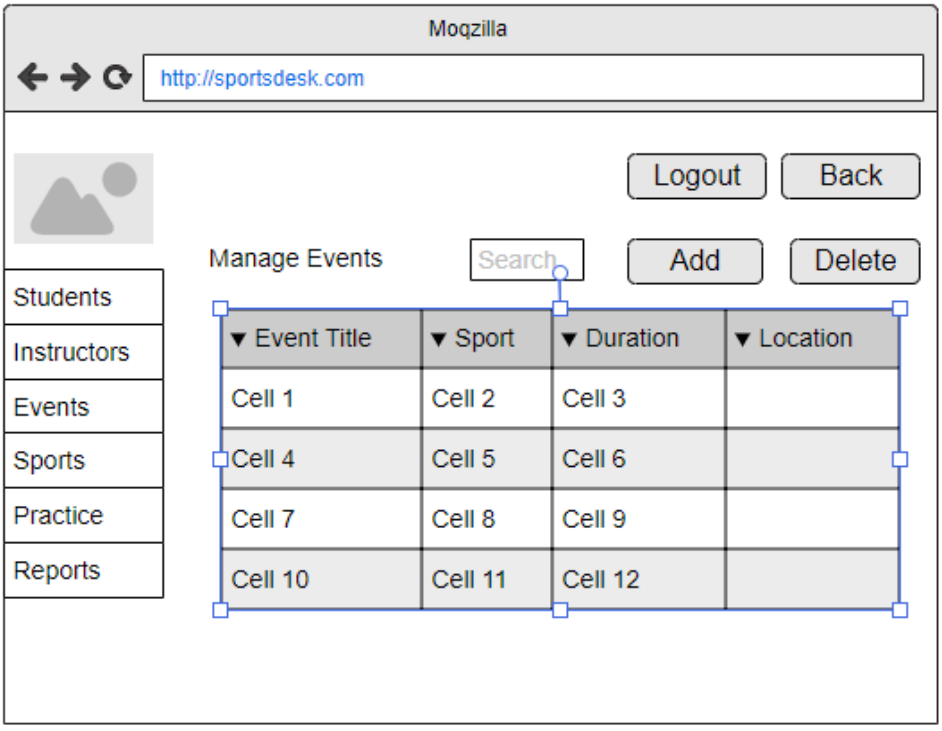

Figure 3.10 Events List User Interface Design

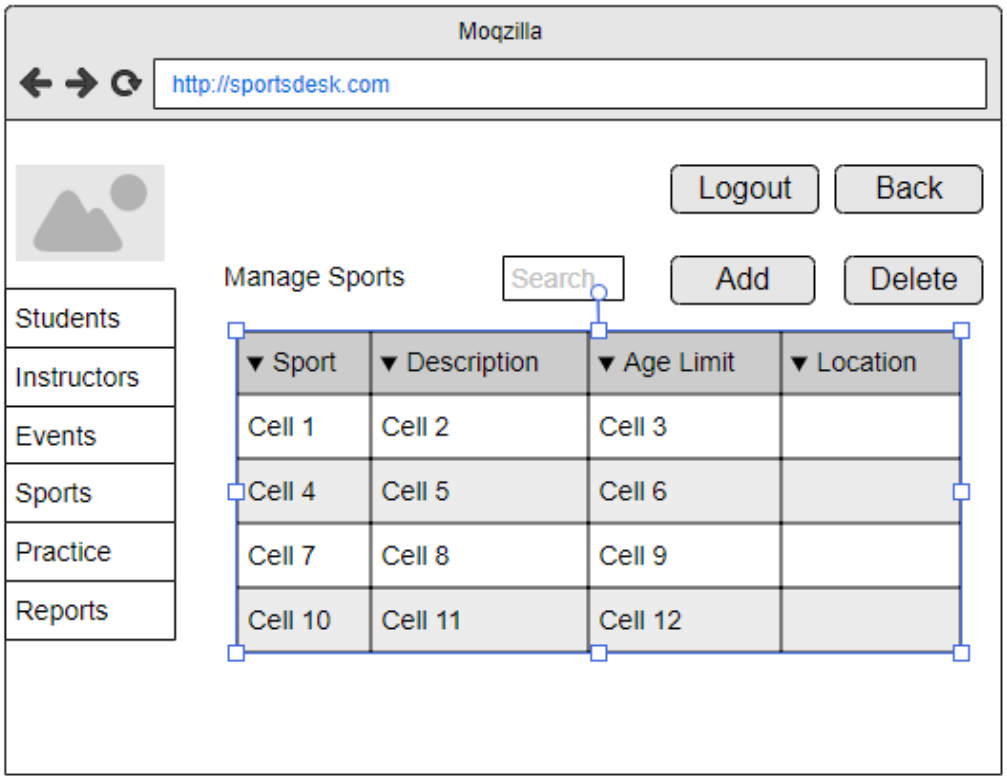

Figure 3.11 Sports List User Interface Design

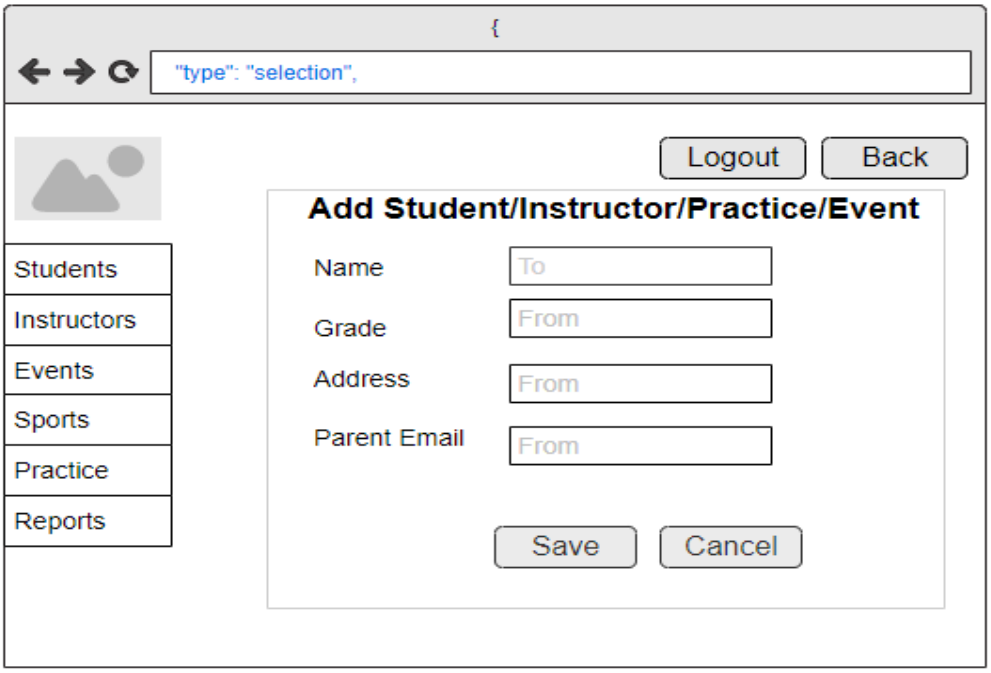

Figure 3.12 Add Record User Interface Design

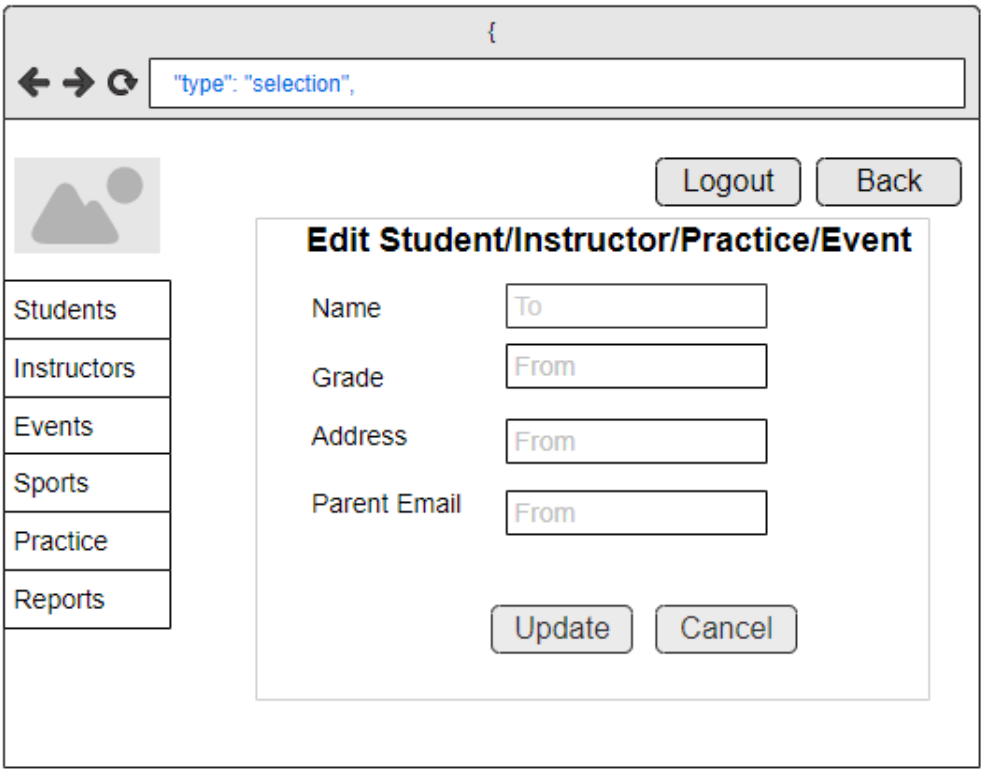

Figure 3.13 Edit Record User Interface Design

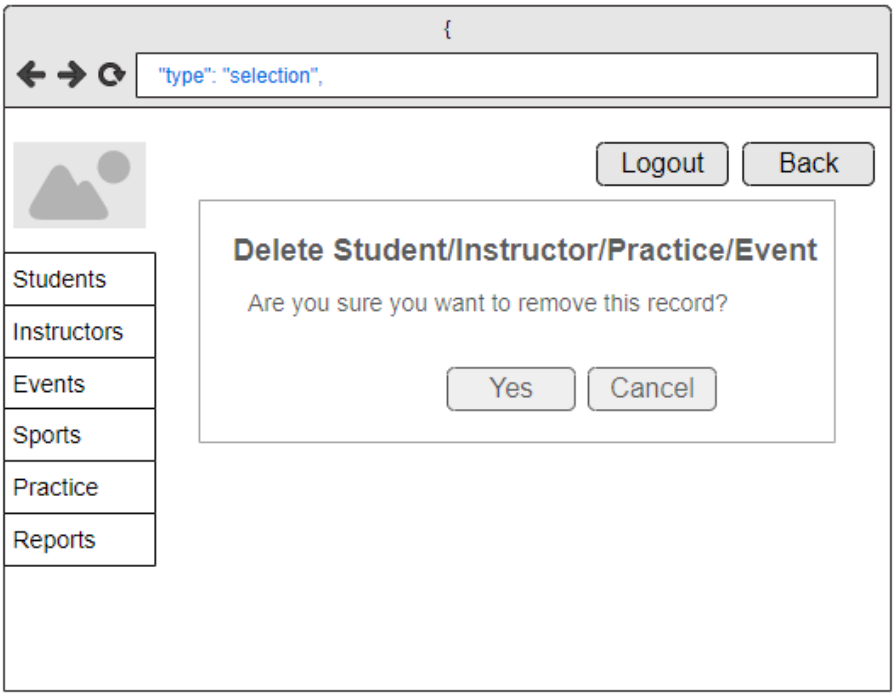

Figure 3.14 Delete Record User Interface Design

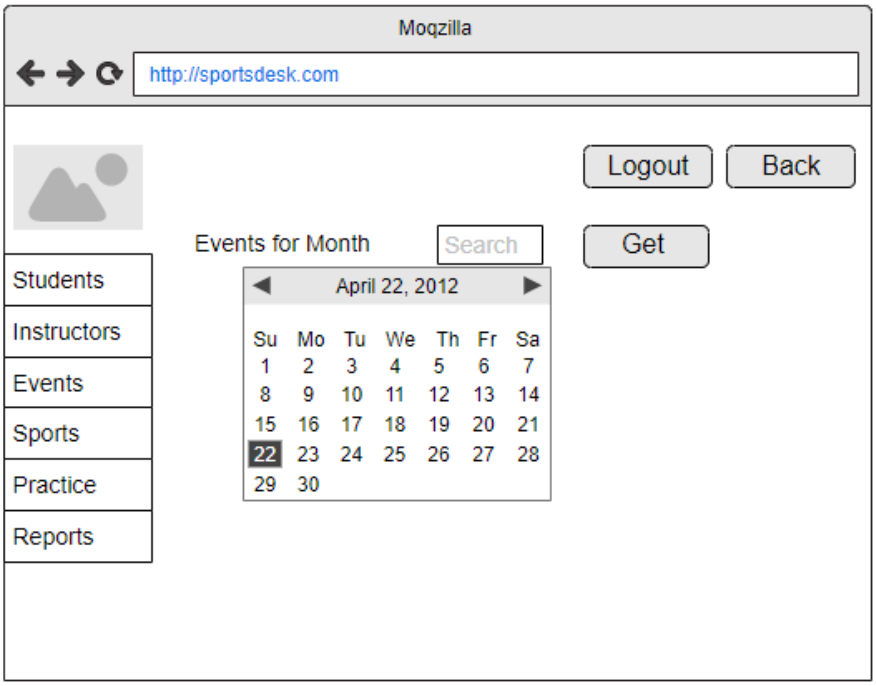

Figure 3.15 Events per Moth Report User Interface Design

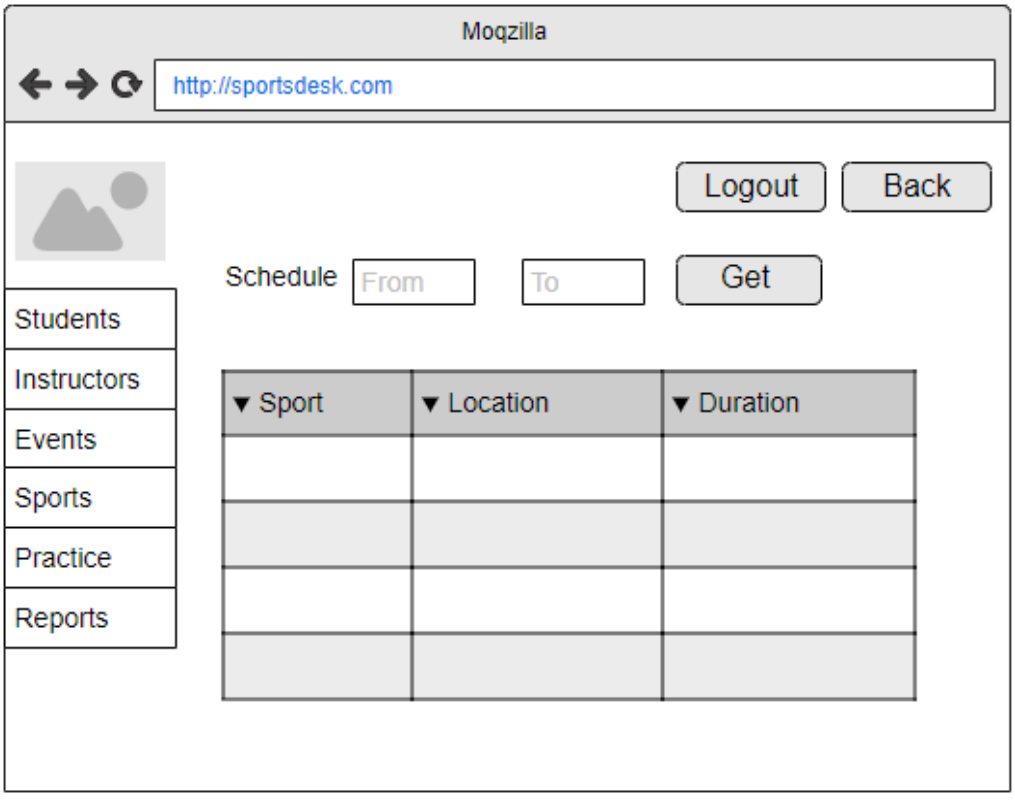

Figure 3.16 Practice Schedules Report User Interface Design

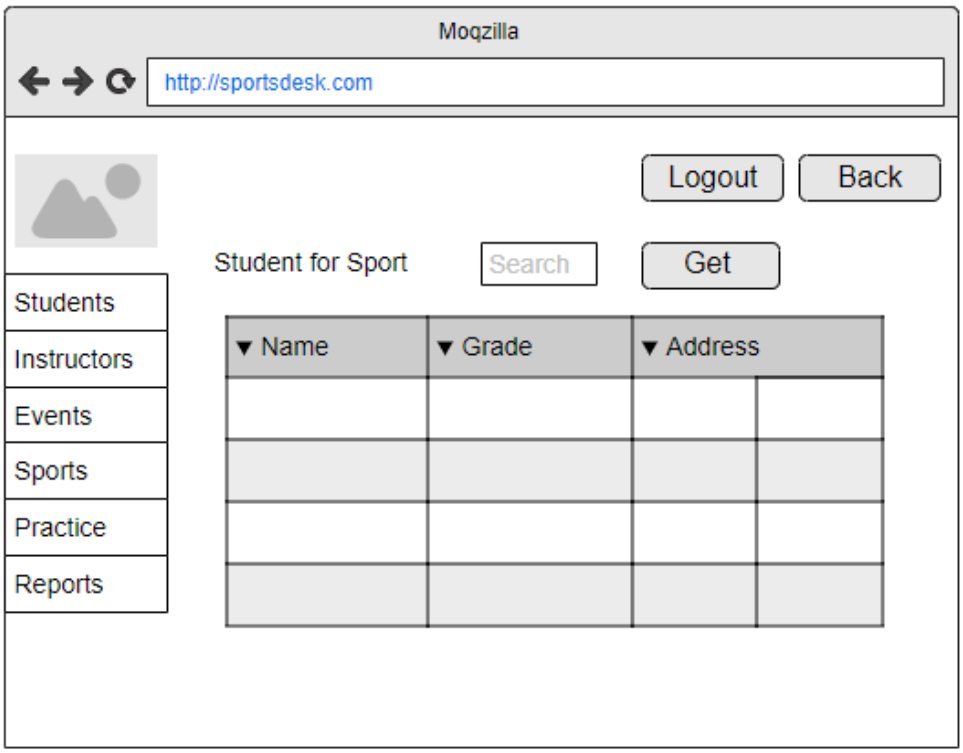

Figure 3.17 Students for Sports Report User Interface Design

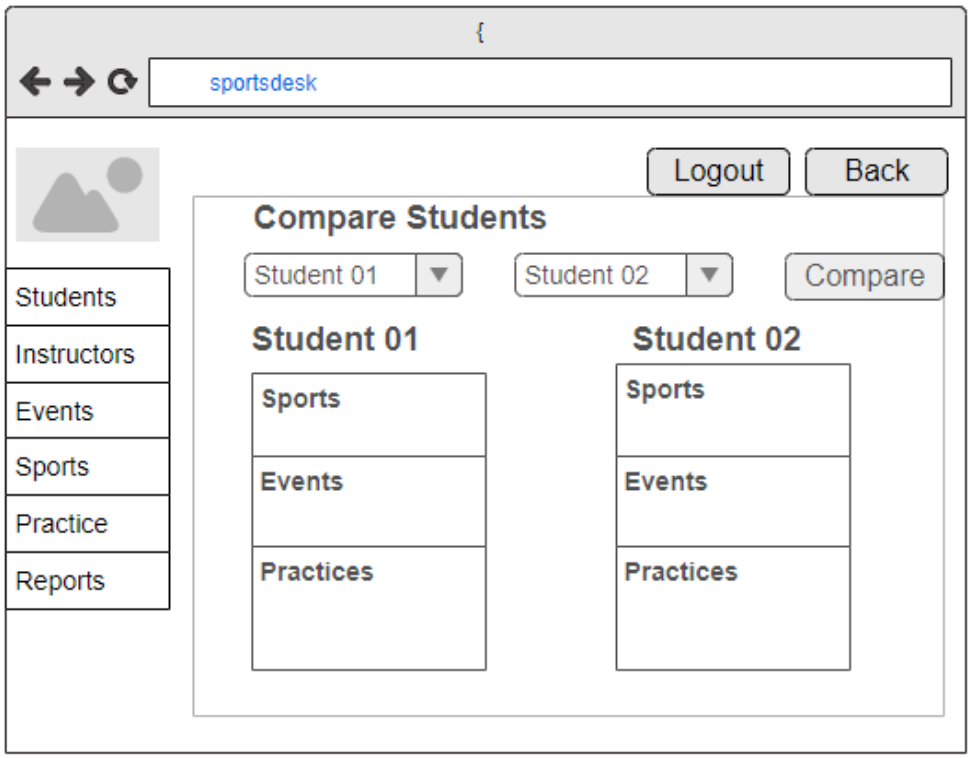

Figure 3.18 Compare User Interface Design

3.5 Implementation Environment

3.5.1 Client/Server Environment

System hosted location and client server architecture operators are considering in this environment. Server environment is used to host developed system, which can handle all the data processing activities. Server should be a Mid-upper range server with **8** GB RAM and 300 GB Storage.

Client software run in between the user and server be responsible for a user interface for user to cooperate with the server.

Hardware	Software
2.4GHz CPU or upwards	Windows 2008 (64 bit) or higher Operating System
2GB RAM	Any web browser with javascript support
At least 120GB hard disk	

Table 4. 1: Hardware and software requirements of client environment

3.5.2 Development Tools and Techniques

- NotePad++ Text Editor.
  - For scripting php[27] pages and functionalities of the project.
- XAMPP Control Panel
  - Allows to test client server services in the local machine with Apache and MySQL services.
- Apache Server
  - php will be run on this apache server which is an open source server.
- MySQL[7] server
- Adobe Photoshop CC
- PHP as the development Language

- MySQL as the database on phpMyAdmin [21],[22]
- JavaScript[19], CSS[9] and JQuery[12] for client-side activities and styling
- Ajax[11], [18],[28] for form submission functionality handling
- HTML[5] as base user interface of the system

3.6 Application Development Architecture

This system was developed in a flat architecture. Which allow flexibility to the php project along the implementation. Web pages and functionalities is written in separate text files. File structure will be as follows,

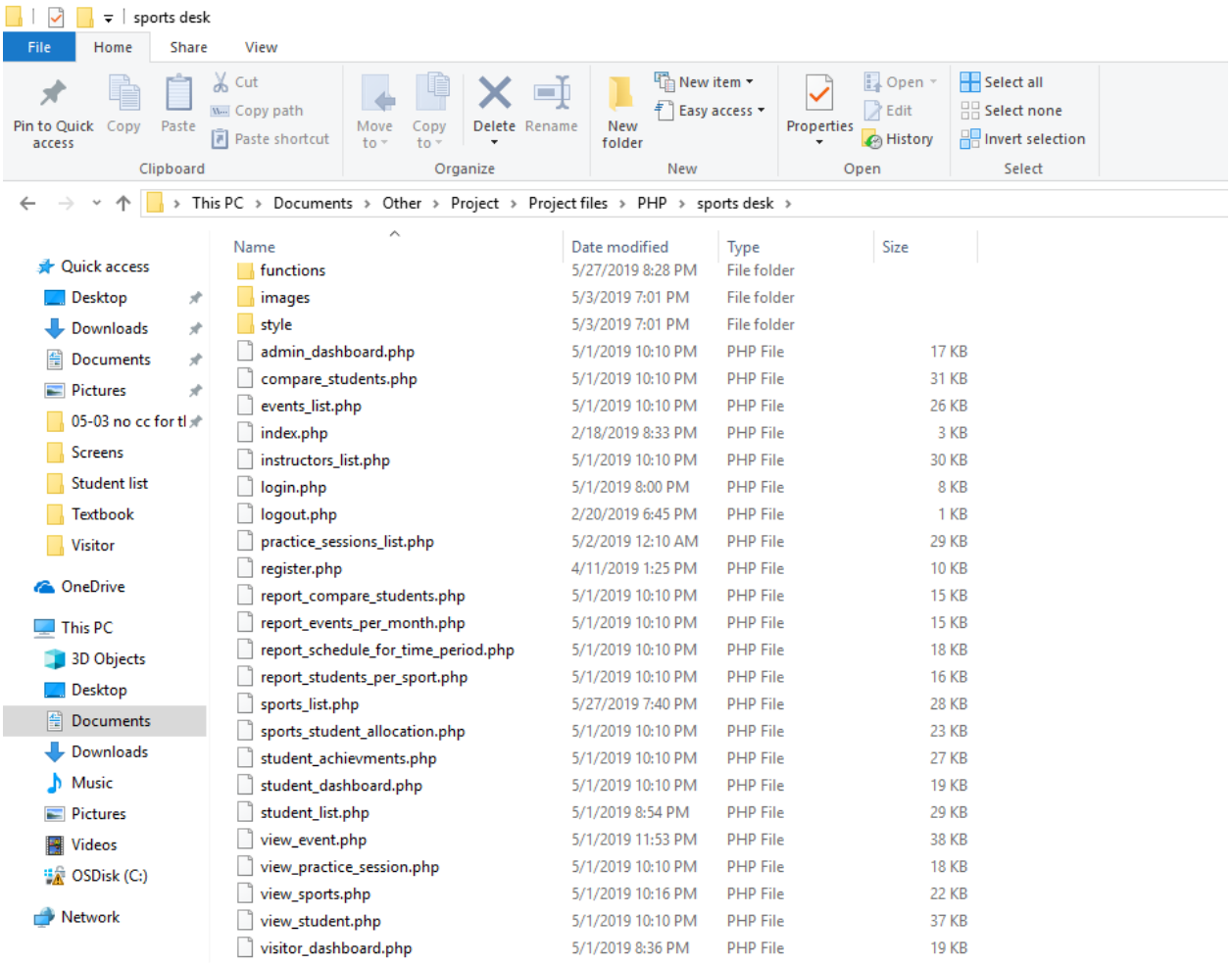

Figure 3.19 File Structure

CHAPTER 04: EVALUATION

4.1 Introduction

Software testing is a critical component of software quality assurance that represents the ultimate analysis of specification, design, and code generation of software product. The testing method [14] is basically combine with Verification and Validation. Validation refers to testing whether the system satisfies the requirements while verification refers to whether the system implements the specified functions properly. Basic goals of test evaluation is determining whether the promises about the invention by the supplier and the requirements of the customer are met on an acceptable level.

4.2 Testing Procedure

Software testing and implementation are iterative processes. Most of the time both stages work as simultaneous system components. The propose system was tested while the development was ongoing. Following iterative RUP development life cycle made it possible to test Iterative increments of the software.

Structural testing techniques were followed in this phase including “white box” testing which tests “how a program/system does something”. Functional testing techniques were used, which includes “black box” testing which tests the behavior of a system or program. These techniques were exploited in different testing levels like unit testing.

System followed object-oriented methodology, so object-oriented testing was also carried out in this phase. Individual operations associated with objects were tested initially, followed by testing individual classes and clusters of objects, and finally test the system as whole. User acceptance testing was completed in client site, participation of few staff members.

4.3 Test Plan and Test Cases

Testing begins with the implementation, code is reviewed while developing stage for testing. Test plan included all phases of testing and also used as a guide for the overall testing process. Before the system implementation, the test plan was designed. A test plan includes: test objectives, schedule and logistics, test strategies and especially test cases.

Test cases were created according to the designed test plan. That contains data, procedure, and expected result and represents which use to system or part of the system run. To reduce complexity of the testing process test cases were designed for each module independently. The following tables specify some test cases.

Below tables tabulates some test cases for test basic functions,

4.3.1 Master Data modules/ Report Module/ Login Module/ Schedule Module

Tested Component	**Master Data module** Student Registration Instructor Registration Event Details		
Description	Student/Instructor/Tournament(Event) Data Insertion		
Test Scenario Description			
No	**Test Scenario**	**Expected Output**	**Actual Output**
1	Enter all the mandatory fields in the Student Registration form and submit	User should be viewed with a success message of data insertion	"Successfully Added" message will be displayed
2	Enter all the mandatory fields in the Instructor Registration form and submit	User should be viewed with a success message of data insertion	"Successfully Added" message will be displayed
3	Enter all the mandatory fields in the Event Details Entry form and submit	User should be viewed with a success message of data insertion	"Successfully Added" message will be displayed
4	Searching for a detail of a student/instructor/event entered in the system for a Admin user	Data should be viewed once click on Search	Data will be viewed in an overlapping window
5	Searching for a detail of a student/instructor/event entered in the system for a Student	Data should be viewed once click on Search	Data will be viewed in an overlapping window
6	Updating details of a student/instructor/event entered in the system for a Admin user	Data should be updated once user enter and click on Update button	Data will be updated and "Successfully Updated" message will be displayed
7	Updating details of a student/instructor/event entered in the system for a Student	Student user login will not have edit option in Instructor/Tournament/Student details view	Edit button is not available for the Student user
8	Deletion of a student/instructor/event entered in the system as an Admin user	Data should be updated once user enter and click on Update button	Data will be updated and "Successfully Updated" message will be displayed
9	Deletion of a student/instructor/event entered in the system as a Student user	Student user login will not have Delete option in Instructor/Tournament/Student details view	Delete button is not available for the Student user
10	Mandatory data fields indication for missing data	User should be displayed with missing data fields	On Save/Update if any data are missing in the form error message is displayed "Please complete all mandatory data" and

			missing data fields will be outlined in red.
11	Database validation on insertion/update/deletion of data	Database tables should be updated as per the action	Database data will be changed as per the action
12	Invalid data type inputs for fields	Error message should indicate that entered value type is incorrect	Upon entering invalid data type for a field, one user click outside, error message will pop up saying "Invalid Data Entry. Please correct your data"

Table 4.1 Master Test Cases

Tested Component	**Report Module** Report		
Description	Report Generation		
Test Scenario Description			
No	**Test Scenario**	**Expected Output**	**Actual Output**
1	Report generation - Sport wise	User should be able to view registered students with respect to the Sport selected	User can select a Sport from the Sport drop down and select a month via the calendar and list of registered students is displayed with limited no of data
2	Report generation – Events per month the system	User should be able to view data as per the selected month	User can select the type of the users want to get via the drop down(students/instructors) and all the data related will be displayed on click of View button
3	Report generation – Schedules details	User should be able to view summery of schedules sport wise for a given period of time	User is able to, select a sport (via drop down of available sports select a time frame (month, week). Dates, Times and Instructor name is

			listed in the generated report
4	Report generation - Student in sports	User should be able to view summery view of the student in sports for sleeted	User is given the option of selecting the sport from the pre inserted sports in the system and will be able to view enrolled students.
5	Calendar date validation	Colander should have valid dates enabled	Future dates for, Student History, Student Registration, Student/Instructor all data are disabled in the calendar Future dates for Tournaments Details, Schedules are enabled in the calendar
6	Fields verification - Click on View without selecting from selection criteria available	User should be notified with the relevant input data fields	On click unselected fields which are mandatory factors for the report will be highlighted in red and will display "Please select values for the fields" error message

Table 4.2 Report Test Cases

Tested Component	**Login Module** Login Page		
Description	Login Combinations		
Test Scenario Description			
No	**Test Scenario**	**Expected Output**	**Actual Output**
1	Login - Positive	User should be able to login with a valid user name and password	Once the click on Log In, will be validated and redirected to the home page
2	Login - Negative	User should not be able to login with an invalid user name and password	Error message will be displayed as “Username or Password is invalid. Please try again"
3	Empty field validation	Error message should be displayed	Once click on Login, empty field is outlined in red

Table 4.3 Login Test Cases

Tested Component	**Practice Session Module** Practice Session		
Description	Practice Session Data Insertion/update		
Test Scenario Description			
No	**Test Scenario**	**Expected Output**	**Actual Output**
1	Enter all the mandatory fields in the Schedule form and submit	User should be viewed with a success message of data insertion	"Successfully Added" message will be displayed
2	Searching for a detail of a schedule	Data should be viewed once click on Search	Data will be viewed in an overlapping window one user select the sport
3	Enter all the mandatory fields in the Tournament Details Entry form and submit	User should be viewed with a success message of data insertion	"Successfully Added" message will be displayed

4	Updating details of a Schedule entered in the system for a Admin user	Data should be updated once user enter and click on Update button	Data will be updated and "Successfully Updated" message will be displayed and email is generated and send to the emails of participating students guardians
5	Mandatory fields indication	User should be displayed with missing data fields	On Save/Update if any data are missing in the form error message is displayed "Please complete all mandatory data" and missing data fields will be outlined in red.

Table 4.5 Report Test Cases

4.4 Acceptance Testing

The user acceptance testing was conducted in actual working environment of Kottawa Dharmapala Maha Vidyalaya. Users were selected from the employees and were asked to work with related modules in system according to their privileges. Activities were monitored while users working with the system.

To consider as a successful project the outcome needs to be accepted by the end users. Therefore, system was handover to users for test run with questionnaire to capture the customer feedbacks. Questioner was distributed to a selected sample of different users.

Results of the user feedback analysis and the questioner provided are as follow,

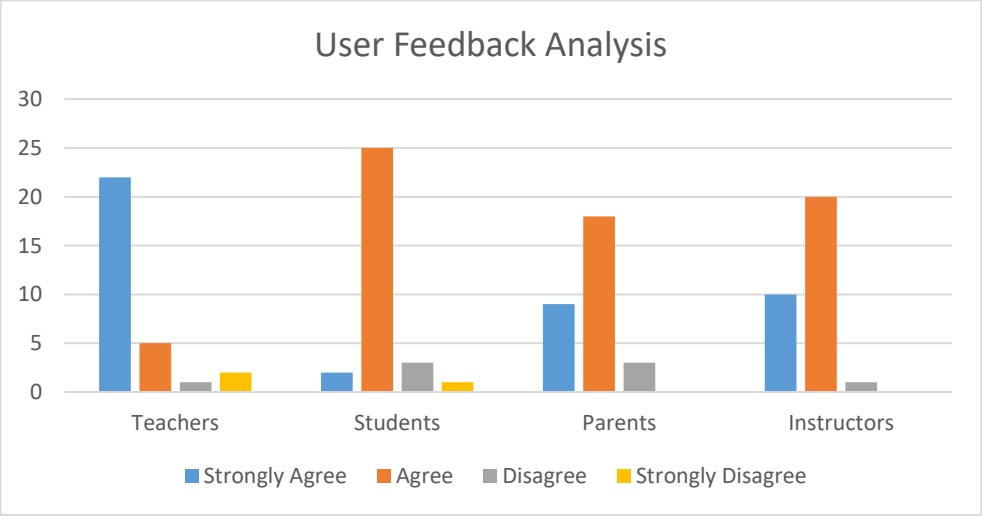

Figure 4.1 User Feedback Analysis

"Sports Desk – KDMV" Sports Management System – User Evaluation Form					
Date :		Name :		Designation :	
I appreciate your help in evaluating new software to your shop by filling short answers to below questions. Put "X" to appropriate column.					
#	Question	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Interfaces are simple and understandable				
2	System display information more familiar				
3	Easily navigate through system				
4	Functions are more reliable				
5	System provides sufficient information				
6	Degree of Information provided in Reports.				
7	Ability to maintain data, to keep it up-to date.				
8	Ease of entering/ handling form fields, and handle manipulations.				
Comments					
Thank You					

Table 4.6 User Questioner Form

4.5 Summary

After full testing cycle user and comments, system was developed successfully and according to positive user reactions shows they accepted the system. When consider user acceptance test results all the functional requirements given by the client were fulfilled and the users can carry out their tasks effectively and efficiently with new system. Few minor modifications were made to the system according to the user feedback.

Such as,

- UI color schemas used in the dashboards.
- Data input validations in form fields(ex: allowing only 4 digits for the Year field of the Sports information form).
- Adding the toggle option.
- Adding back functionality in the application rather than using the function in the browser.

CHAPTER 05: CONCLUSION

5.1. Introduction

This chapter author explains about the objectives achieved, problems encountered and the future enhancements of the developed system. KDMV Sports Desk is a web base system which is designed to cater scheduling and internal management of sports and athletic processes in Kottawa Dharamapala Maha Vidyalaya.

Main focus of implementing the web base system is the accessibility an availability of the information to the administration as well as other users. This has overcome many drawbacks in current manual system in many aspects.

5.2. Problem Encountered

Below are the obstacles faced while carrying out the project,

1. Requirements gathered were not clear or consistent as the clients were not clear about the scope of the functionalities they require from the new proposed system. Finalizing the requirements and signing off was hard to achieve since clients were varying their expectations with regard to the lack of technical knowledge of most. Even after the requirement clarification, after the first prototype is introduced client required various user interface changes as well as functionality changes to simplify the system.

2. System development technologies were differ from the original technologies since due to lack of technical knowledge in the area of initial selected implementations. Therefore, system needed to be implemented later than the expected time line.

3. Since the technical knowledge is limit and has been outdated needed to refer tutorials, videos and various other materials to fill the knowledge gap. This consumes more time from the implementation time. Even though report and the system has been developed meeting appropriate deadlines.

5.3. Lesson Learnt

Below are the observations gained while carrying out the project,

- Author gained on hand experience on requirement gathering using various techniques such as interviews, observations and referring manuals. These have added more knowledge on how to start a project initially and to move on. As well as how to communicate effectively with the clients on gathering requirements and providing with solutions.
- Author has had the chance to implement a project with various technologies, which some had been updated and some newly introduced, such as Adobe Photoshop, Aja,

and Bootstrap. Author has gained considerable knowledge while working with these technologies.

- Author got the opportunity to have practical use of test planning, time and resource management.

5.4. Future Work

As per the feedback obtained from user acceptance testing following functionalities were identified to be implemented in the future. Which will be useful in making the system more efficient, effective and user friendly.

1. Integrating the system with government sports sites
2. Enabling SMS functionality for parents or students to receive updates on their enrolled events or practices
3. Enable chat functionality where parents can discuss instructors on students' progress
4. Develop a mobile application
5. Enable News Feed or Live casts
6. Integrate the system with private practices recommended by schools
7. Integrate Print functionality for the records

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Appendix A – Design Documentation

User Management – Use Case

Table A.1 will describe the User Management of the system

User Case ID	001
Use Case	User Management
Actor(s)	Administrator, Student, Visitor
Description	
Administrator can create users, update user details, active/inactive users Students can register and view details where visitors only can view	
Pre-conditions	
1.User credentials should be valid 2.User should have connected to the internet	
Normal Cause	
1. Enter valid relevant data 2. Click on Save button 3. User data will be added to the database and user will be created	
Alternative Causes	
1. Error validations when mandatory fields are not filled 2. Validations will be displayed if data types will not match the value field types	
Post-conditions	
1.User creation will be successful 2.Student users can register by entering other data 3.User will be able to access the system under user role assigned where functionalities will be limited as per the user role	

Table A.1 User Management – Use Case

Login – Use Case

Table A.2 will describe the Login to the system

User Case ID	002
Use Case	Login
Actor(s)	Administrator, Student, Visitor
Description	
All Validated and authorized users will be able to log into the system successfully and perform allowed functionalities	
Pre-conditions	
1.User credentials should be valid 2.User should have connected to the internet	
Normal Cause	
1. Enter username and password 2. Click on Login button 3. User will be landed in the dashboard page	
Alternative Causes	

1. Error validation for invalid user credentials
Post-conditions
1.User creation will be successful 2.Student users can register by entering other data 3.User will be able to access the system under user role assigned where functionalities will be limited as per the user role

Table A.3 Use Case Description – Login

Student Registration – Use Case

Table A.3 will describe the Student Registration to the system

User Case ID	003
Use Case	Student Registration
Actor(s)	Student
Description	
Administrator added students can register to the system	
Pre-conditions	
1.Administrator should have entered preliminary data of the student 2.User should have connected to the internet	
Normal Cause	
1. Navigate to Register 2. Select the student number and enter valid data and click on Register 3. Student record will be successfully updated	
Alternative Causes	
1. Error validations when mandatory fields are not filled 2. Validations will be displayed if data types will not match the value field types	
Post-conditions	
1.Student data will be updated successfully 2.Administrator can allow user to login to the system 3.Student can log into the system successfully under the restrictions granted	

Table A.3 Student Registration – Registration

Dashboard – Use Case

Table A.4 will describe the Dashboard of the system

User Case ID	004
Use Case	Dashboard
Actor(s)	All Users
Description	
All the users can navigate to view Instructors, Events, Practice Sessions via dashboard	
Pre-conditions	

1.User credentials should be valid 2.User should have connected to the internet
Normal Cause
1. Click on any dashboard component 2. User should be navigated to the relevant page
Alternative Causes
N/A
Post-conditions
1.Depends on user role, user can view, update or delete records in the navigated page

Table A.4 Dashboard – Use Case

Add Student/Instructor/Event/Sport/Practice Session /Achievement – Use Case

Table A.5 will describe Adding a Record to the system

User Case ID	005
Use Case	Adding a Record to the System
Actor(s)	Administrator
Description	
Administrator can add record in any module of the system	
Pre-conditions	
1.Admin user credentials should be valid 2.User should have connected to the internet	
Normal Cause	
1. Select a module, Instructor/Event/Student/Practice/Sport 2. Click on Add <component> 3. Enter all mandatory fields and click on Add button 4. User will be navigated to component main page and record will be added 5. Emails will be sent to participants of sports for practice adding	
Alternative Causes	
1. Error validations when mandatory fields are not filled 2. Validations will be displayed if data types will not match the value field types	
Post-conditions	
1.User can update data entered	

Table A.5 Add New Record – Use Case

Adding a Practice Session for the Instructor – Use Case

Table A.6 will describe Adding a Practice Session to the system

User Case ID	006
Use Case	Adding a Practice Schedule via Instructor
Actor(s)	Administrator
Description	
Administrator can add a practice session for an Instructor	
Pre-conditions	
1. Admin user credentials should be valid 2.User should have connected to the internet 3. Instructor should have been added to the system	
Normal Cause	
1. Click on View of the added Instructor 2. Click on Add Practice Session 3. User should be navigated to the Add Practice Session page 4. Enter all values and click on Add	
Alternative Causes	
N/A	
Post-conditions	
1. Once Practice Session is added user will be displayed with Practice Session page	

Table A.6 Adding Practice Session – Use Case

Register to Event – Use Case

Table A.7 will describe the Student Registration to an Event

User Case ID	007
Use Case	Student Event Registration
Actor(s)	Student
Description	
Student can request and register to an event	
Pre-conditions	
1.Student should have valid credentials 2.User should have connected to the internet 3. Events should have been posted	
Normal Cause	
1.Navigate to Events module and view an event 2.Click on Register to the event	
Alternative Causes	
N/A	
Post-conditions	

1. Students request will be able to view by the Administrator 2. Administrator will be able to view join requests in dashboard 3. Administrator be able to accept the join request and add student to the event and email will be sent to the participant

Table A.7 Register to Event – Use Case

Update Student/Instructor/Event/Sport/Practice Session /Achievement – Use Case

Table A.8 will describe Updating a Record to the system

User Case ID	008
Use Case	Updating a Record to the System
Actor(s)	Administrator
Description	
Administrator can update record in any module of the system	
Pre-conditions	
1.Admin user credentials should be valid 2.User should have connected to the internet	
Normal Cause	
1. Select a module, Instructor/Event/Student/Practice/Sport 2. Click on Edit <component> 3. Enter relevant values to update 4. User will be navigated to component main page and record will be added 5. Email will be sent to participants of sports and events on update	
Alternative Causes	
1. Error validations when mandatory fields are not filled 2. Validations will be displayed if data types will not match the value field types	
Post-conditions	
1. Updates will be reflected in the module data	

Table A.8 Update Record – Use Case

Delete Student/Instructor/Event/Sport/Practice Session /Achievement – Use Case

Table A.9 will describe Deleting a Record of the system

User Case ID	009
Use Case	Deleting a Record
Actor(s)	Administrator
Description	
Administrator can delete a record in any module of the system	
Pre-conditions	
1.Admin user credentials should be valid 2.User should have connected to the internet	
Normal Cause	

1. Select a module, Instructor/Event/Student/Practice/Sport 2. Select a record 3. Click on Delete 4. Confirm the action 5. User will be navigated to component main page and record will be deleted 6. Emails will be sent to participants of the events and sports
Alternative Causes
N/A
Post-conditions
1. Updates will be reflected in the module data

Table A.9 Delete Record – Use Case

Search Page Student/Instructor/Event/Sport/Practice Session /Achievement – Use Case

Table A.10 will describe the search component of module in the system

User Case ID	010
Use Case	Search
Actor(s)	Administrator, Student, Visitor
Description	
Any system user can search using given values	
Pre-conditions	
1. User credentials should be valid 2. User should have connected to the internet 3. Records should be added in the system	
Normal Cause	
1. Click on any module 2. Enter search value 3. Search result will be displayed	
Alternative Causes	
1. If there are no search values no data will be displayed	
Post-conditions	
1. Search results will be displayed	

Table A.10 Search – Use Case

Adding/Removing Student for a Practice Session– Use Case

Table A.11 will describe on Adding/Removing a Student for a Practice Session via the system

User Case ID	011
Use Case	Adding/Removing Student for a Practice Session via Sports
Actor(s)	Administrator
Description	
Administrator can add registered students for practice sessions of sports	
Pre-conditions	
1. User credentials should be valid 2. User should have connected to the internet 3. Sports and students should have been added in the system	
Normal Cause	
1. Click a Sport in Sport module 2. Click on Allocate Students 3. Click on Add Students 4. Add/remove student via the list of registered students 5. User will be landed in allocation page 6. Student will receive an e-mail	
Alternative Causes	
N/A	
Post-conditions	
1. Changes will be reflected in the page	

Table A.11 Adding/Removing Practice Session – Use Case

Compare Students– Use Case

Table A.12 will describe on Comparing Students

User Case ID	012
Use Case	Comparing Two Students
Actor(s)	Administrator
Description	
Administrator can add registered students for practice sessions of sports	
Pre-conditions	
1. User credentials should be valid 2. User should have connected to the internet 3. Sports, Achievements, Practices and students should have been added in the system 4. Students should have enrolled in sports/events	
Normal Cause	
1. Click a Compare Report 2. Select two students 3. Click on Compare 4. Both student details will be displayed	

Alternative Causes
1. If user select the same student, error message will be displayed
Post-conditions

Table A.12 Compare Students – Use Case

Reports– Use Case

Table A.13 will describe on Report Display of the system

User Case ID	013
Use Case	Report View
Actor(s)	Administrator
Description	
Administrator can view reports	
Pre-conditions	
1. User credentials should be valid 2. User should have connected to the internet 3. Sports, Achievements, Practices and students should have been added in the system 4. Students should have enrolled in sports/events	
Normal Cause	
1. Click a Report 2. Select search value for the report 3. Report data will be displayed	
Alternative Causes	
1. If no data is available, will display blank report	
Post-conditions	
N/A	

Table A.13 Reports Display – Use Case

Sequence Diagrams

Figure 4.2 displays the sequence diagram for student registration to the proposed system.

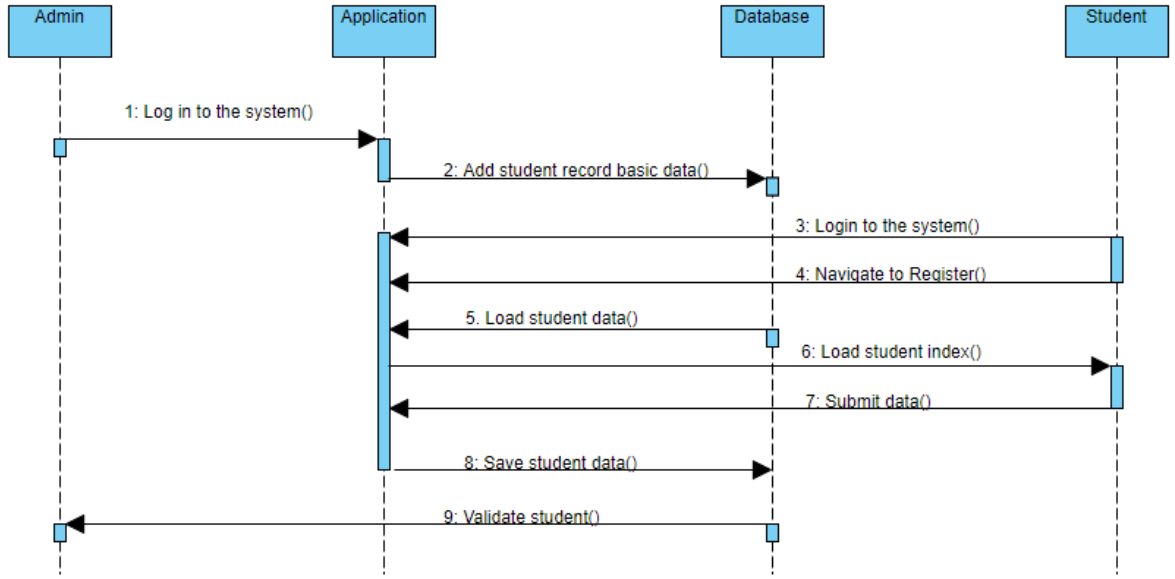

Figure A.1 Student Registration – Sequence Diagram

Figure 4.3 displays the sequence diagram for user access for data insertion and updating process to the proposed system.

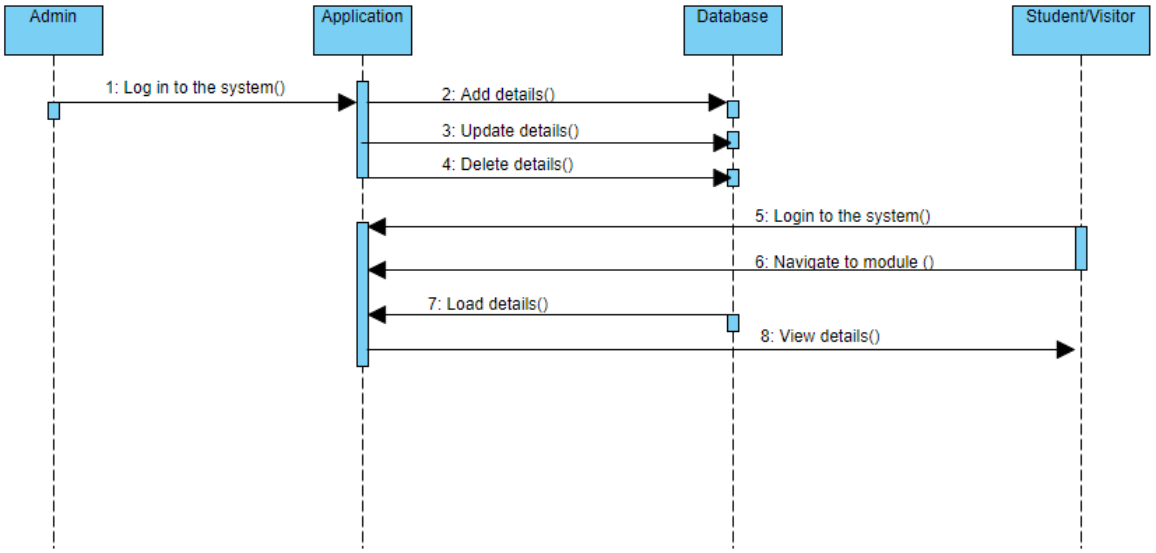

Figure A.2 Record Insertion/Updating – Sequence Diagram

Figure 4.4 displays the sequence diagram for student registration for an event (tournament) in the system.

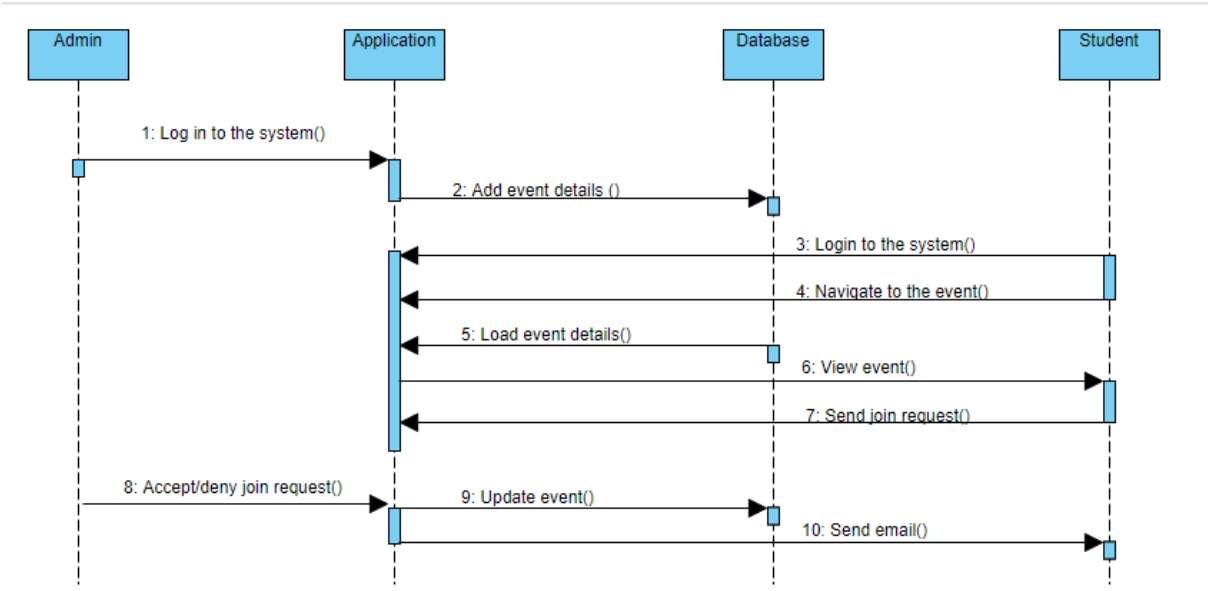

Figure A.3 Event Registration– Sequence Diagram

Figure 4.5 displays the sequence diagram for updating practice session process via the system.

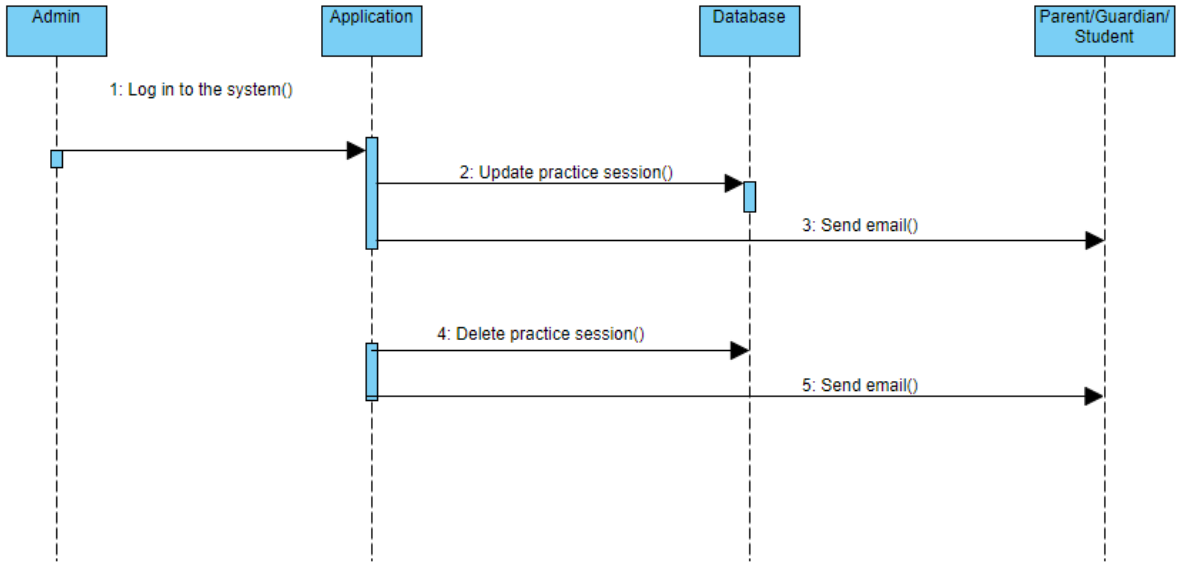

Figure A.4 Practice Session Update– Sequence Diagram

Appendix B – User Documentation

KDMV Sports desk is a web base sports and athletic management system which was developed for Kottawa Dharmapala Maha Vidyalaya and is designed to cater main three users, Teachers (administrators), Students and Visitors (parents or guardians of the students). This appendix is for the users on how to navigate and perform functionalities provided.

System contains six main components such as,

1. Student
2. Instructors
3. Sports
4. Events
5. Practices
6. Reports

For the three type of system user's module access will be as below,

1. Administrators : All modules and all functionalities
2. Students : Student, Instructors, Sports, Practices modules View access only
3. Visitors : Sports, Events, Practices modules View access only

To perform all the functionalities users should have an active internet connection during the use of the system.

Dashboard

Dashboard of the system will be the landing page of any authorized user once they login to the system. This dashboard will have quick access links to all the modules of the system. For three different users, dashboard will be displayed in three different views. Additional component is added to the Admin users in the dashboard where they can view any pending event join requests from students. Below figures B.1, B.2 and B.3 shows the dashboards for each user.

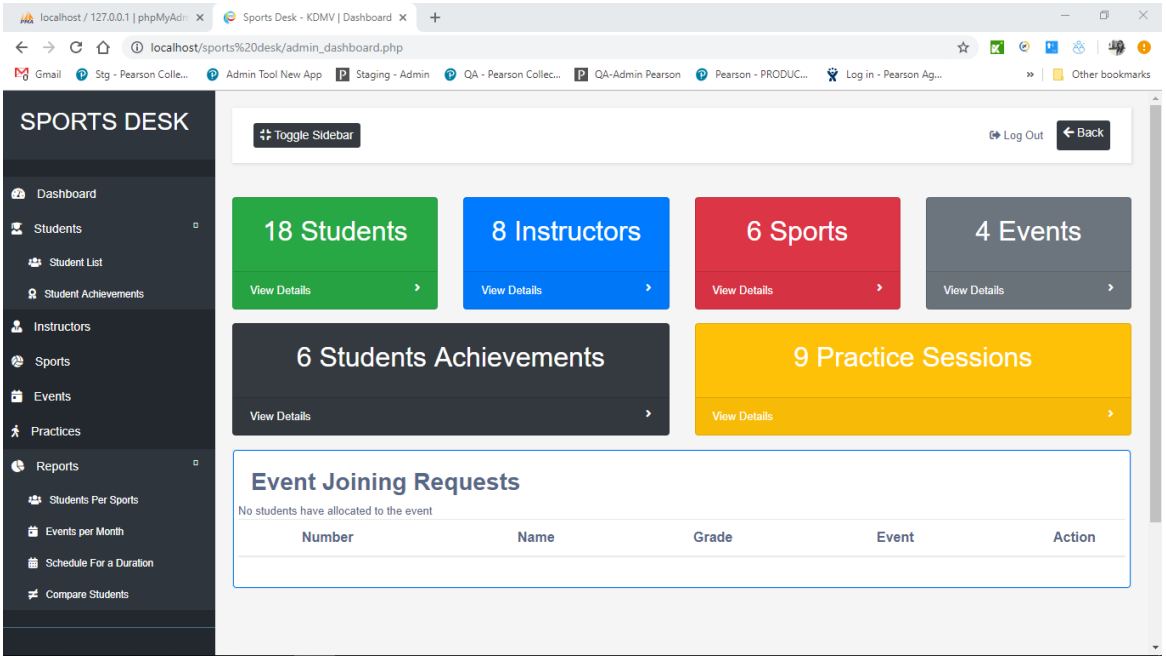

Figure B.1 Dashboard – Administrator

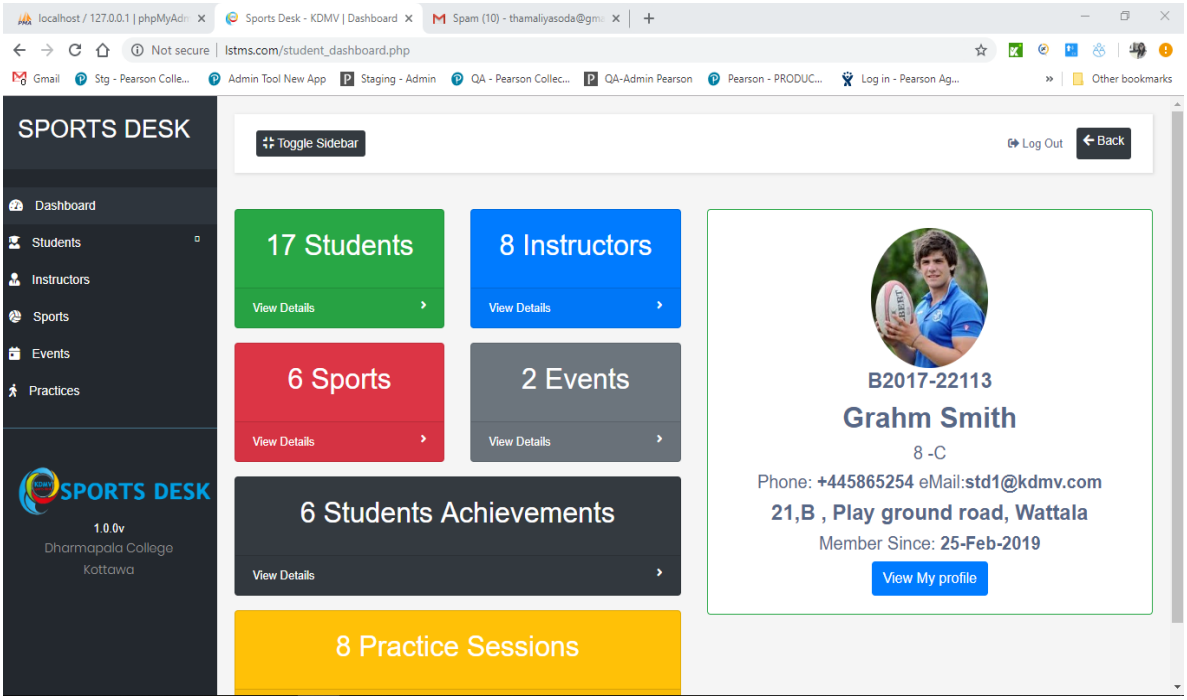

Figure B.2 Dashboard – Student

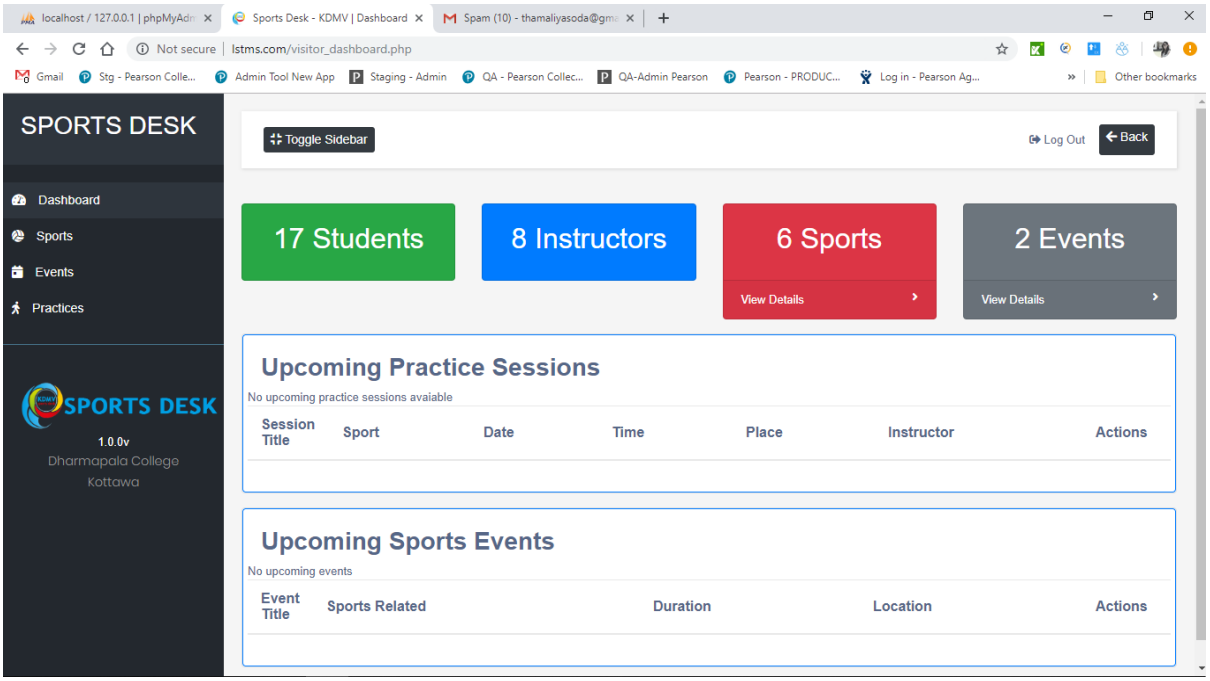

Figure B.3 Dashboard – Visitor

Add Student

Figure B.23 shows adding a Student Details to the system. This will only be visible and accessible for admin users of the system. These will be preliminary data of the student where student will be adding their data during the registration to the system. It is shown in the figure B.24.

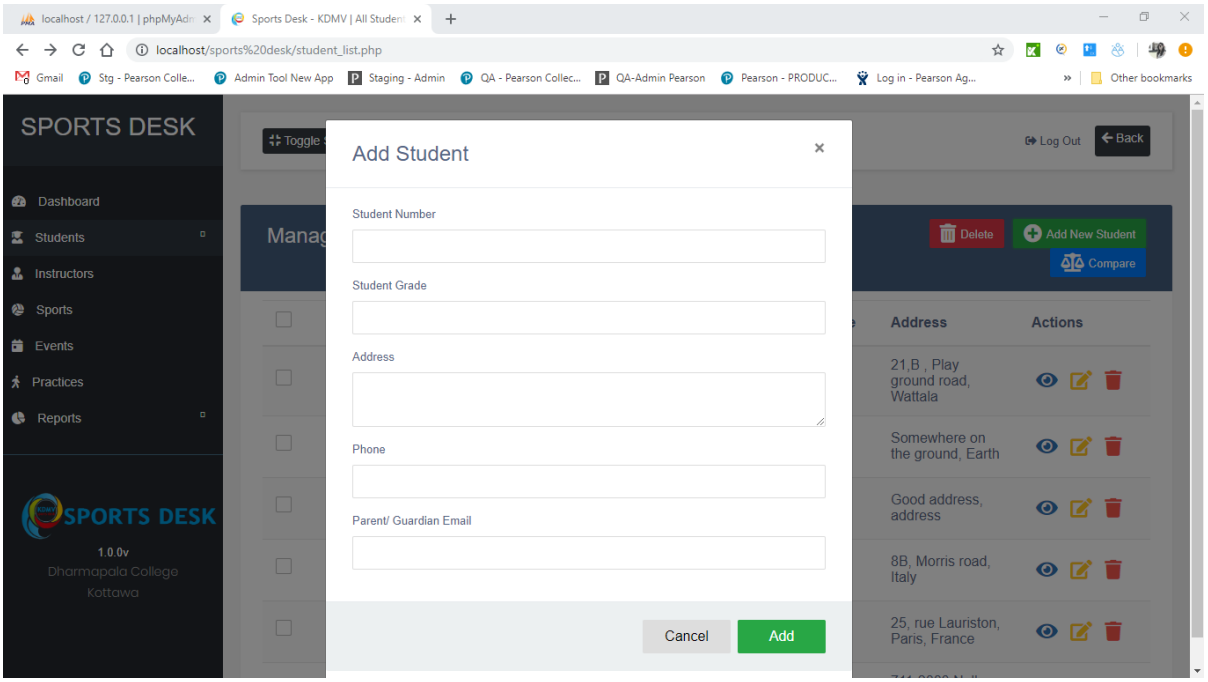

Figure B.4 Add Student

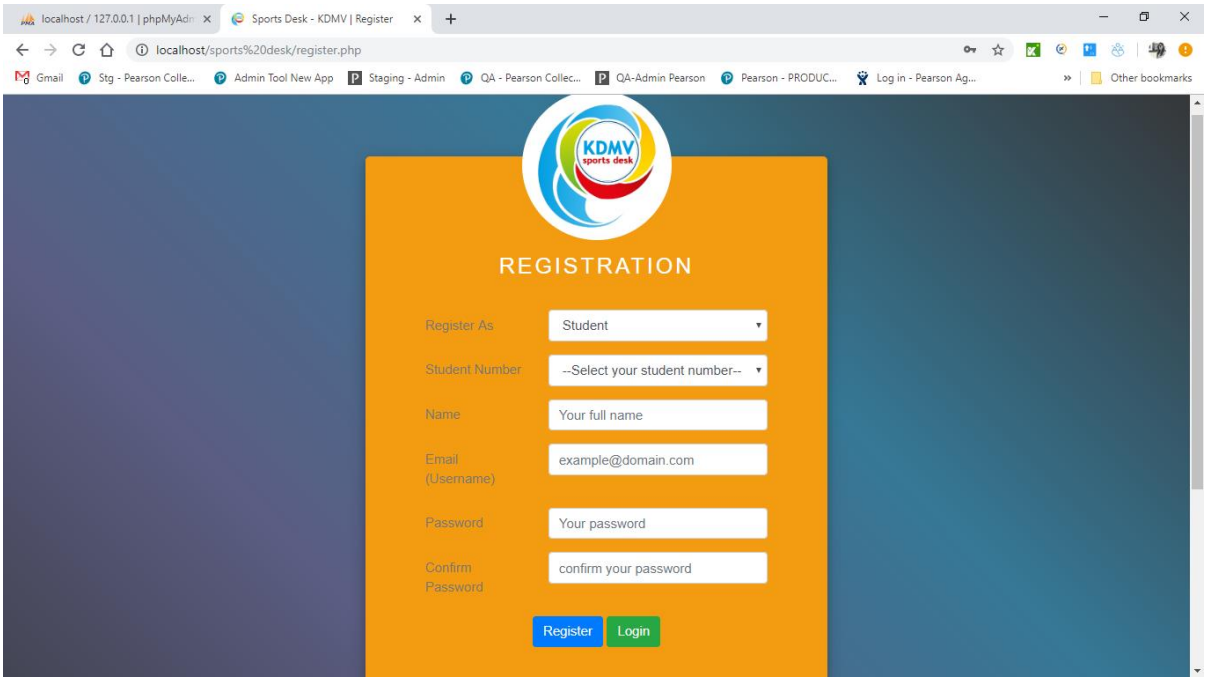

Figure B.5 Student Registration

Login

Figure B.25 and B.26 shows the initial page and the login page of the system. This will be common for all three type of users. Where user can enter valid credentials and login to the system.

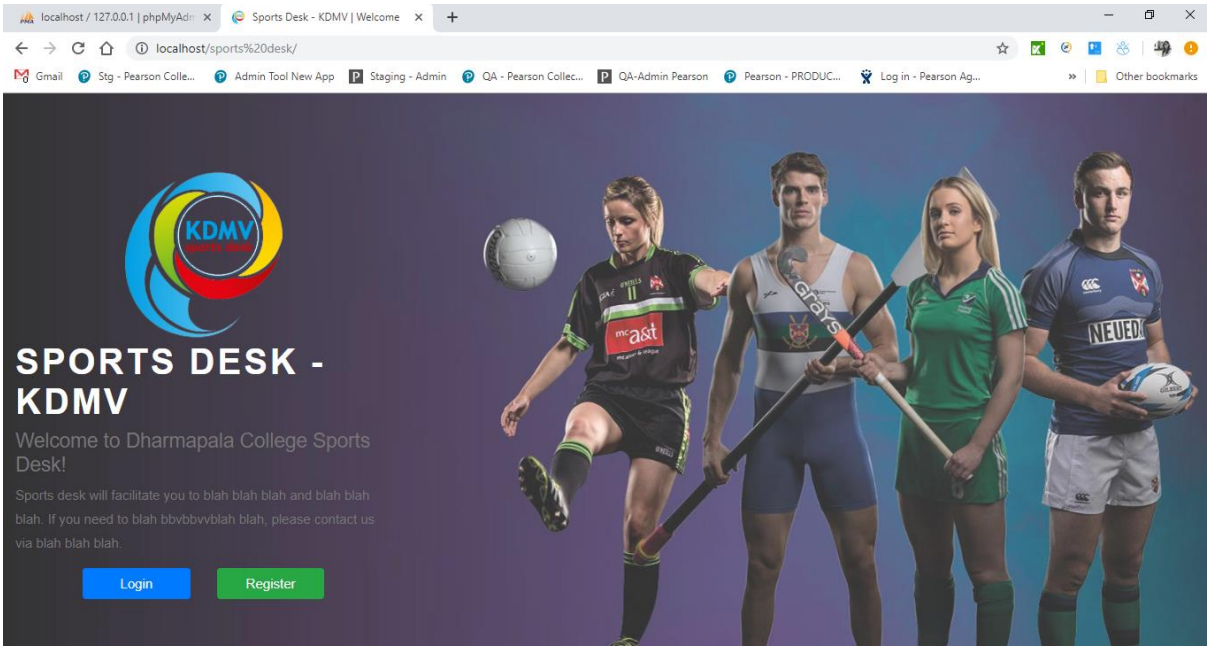

Figure B.6 Main Page

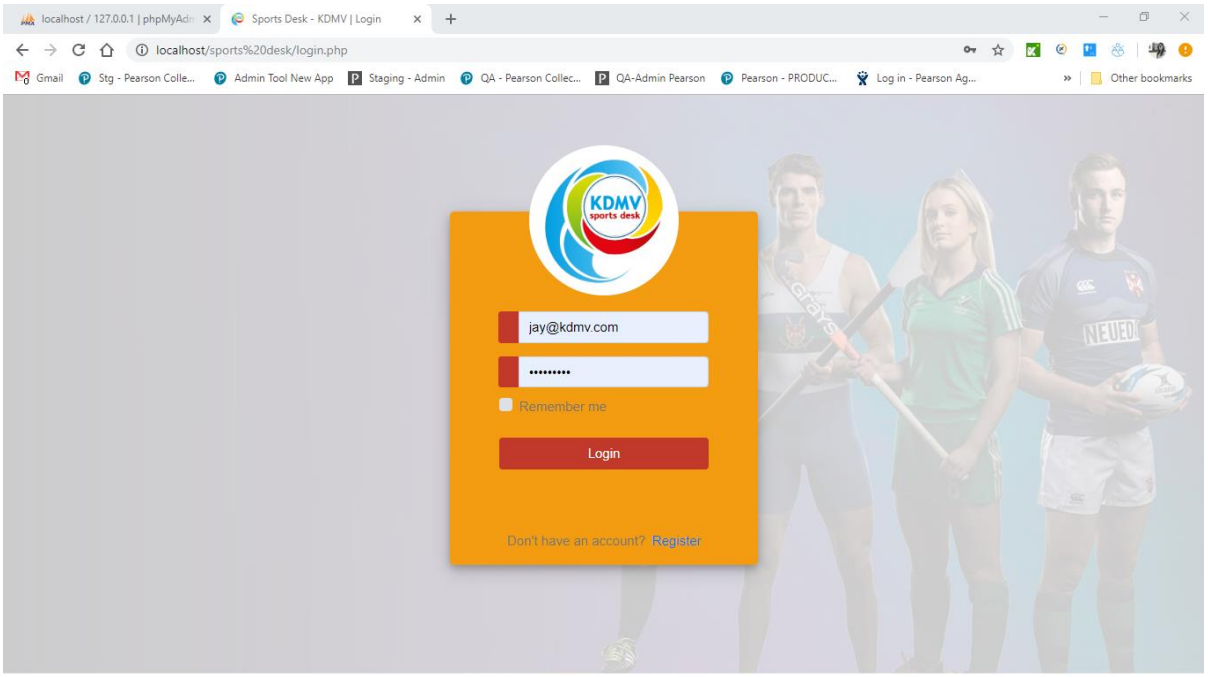

Figure B.7 Login Page

Manage Students

Figure B.4 and B.5 show the Student List page of the system. This will have two separate views for Administrator and Student, where Visitor will not have access. Student will only have View right of the records in the system.

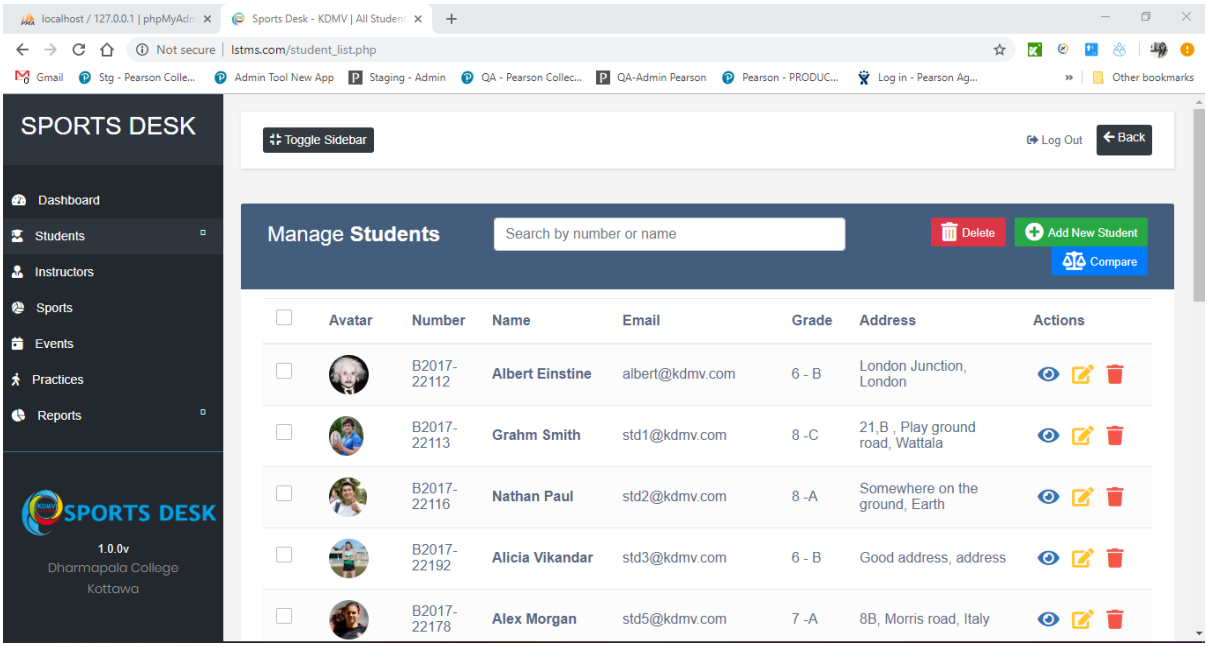

Figure B.8 Manage Students – Administrator

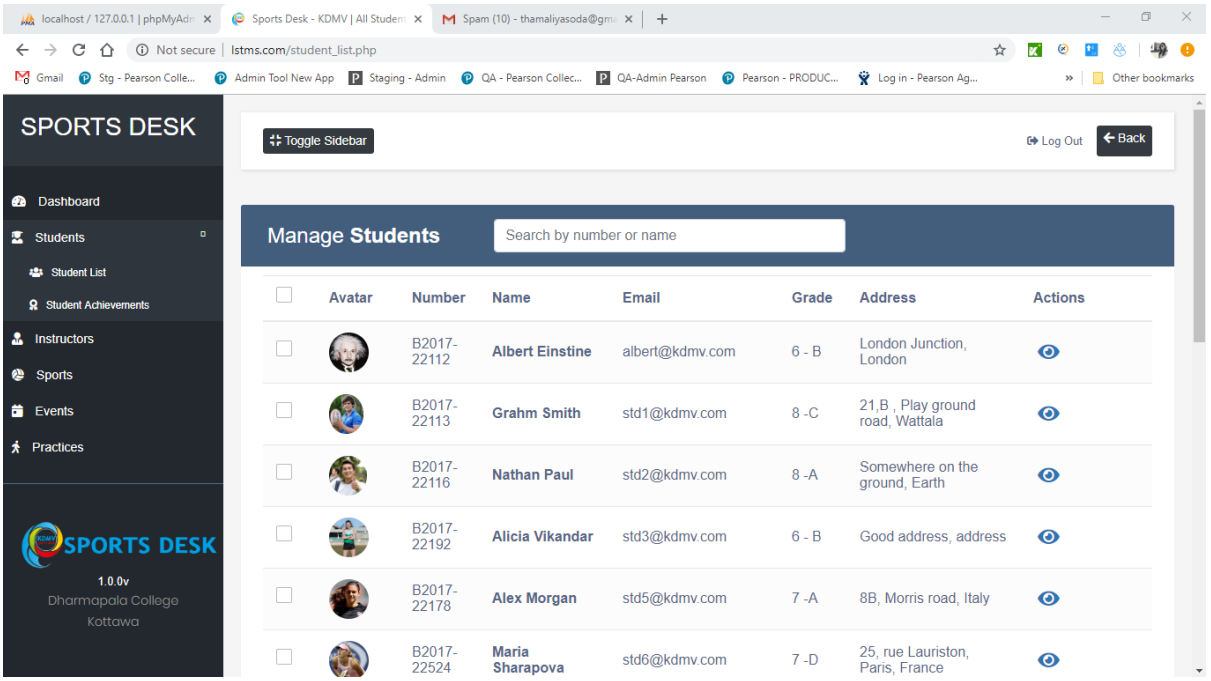

Figure B.9 Manage Students – Student

Edit or Delete Student

Figure B.9 and B.10 show how administrator user can update or delete student data. Only administrator will have rights to perform these functionalities. These functionalities are available in Manage Students page relevant for each record.

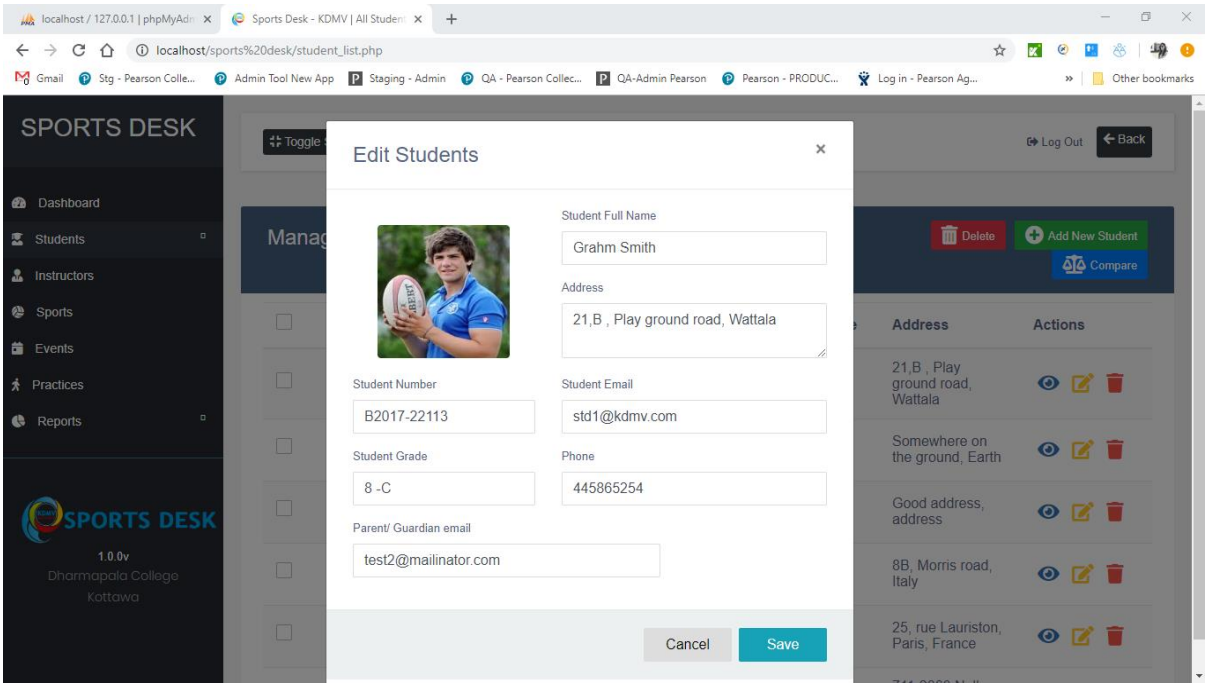

Figure B.10 Manage Students – Edit Student

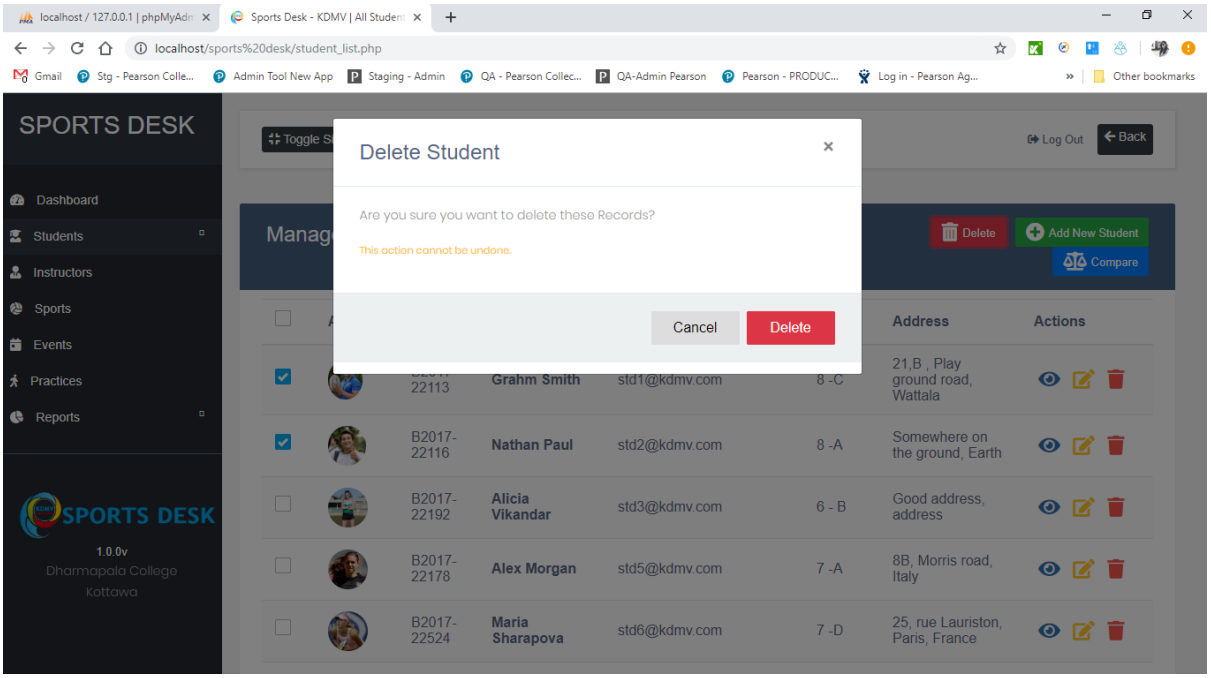

Figure B.11 Manage Students – Delete Student

Compare Students

Figure B.11 will display on how administrator user can view and compare two students in the system. Only administrator will have rights to perform these functionalities. These functionalities are available in Manage Students and once user select two users and click on Compare, both students' data will be displayed alongside.

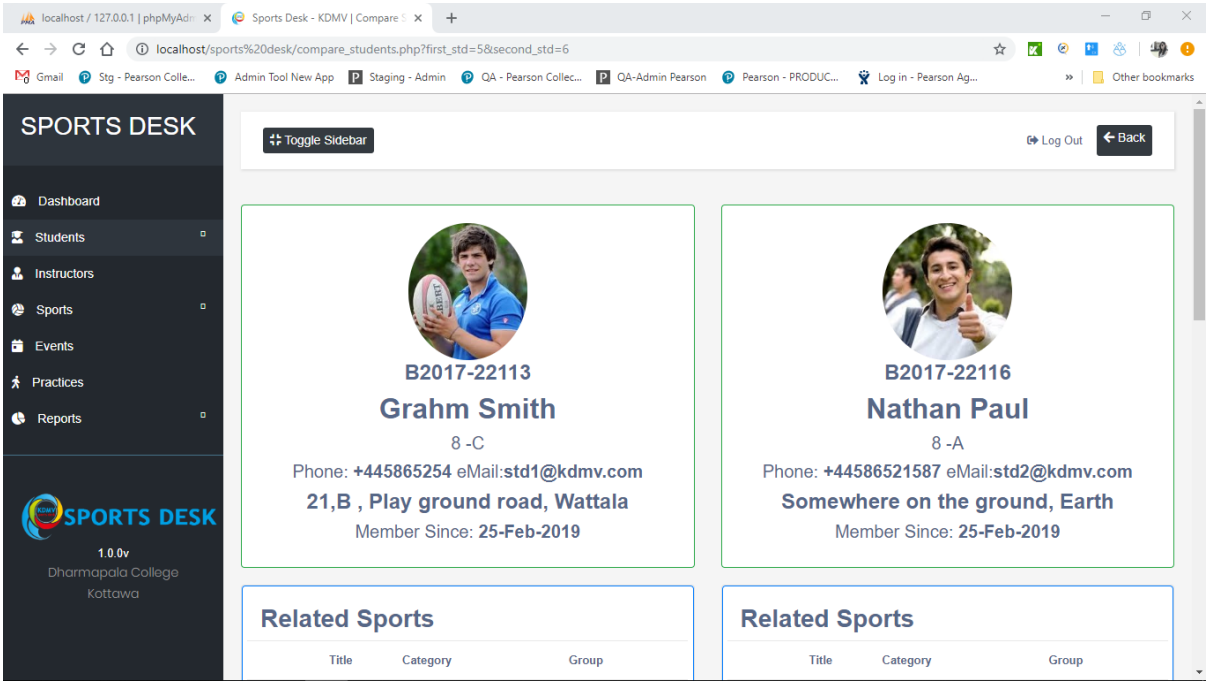

Figure B.12 Manage Students – Compare Students

Manage Instructors

Figure B.12 and B.13 show the Instructor List page of the system. This will have two separate views for Administrator and Student, where Visitor will not have access. Student will only have View right of the records in the system. Once user clicks on Views he can view selected instructor details. And click on edit will enable user to edit entered value and update. Deletion icon will allow user to delete the selected record from the system.

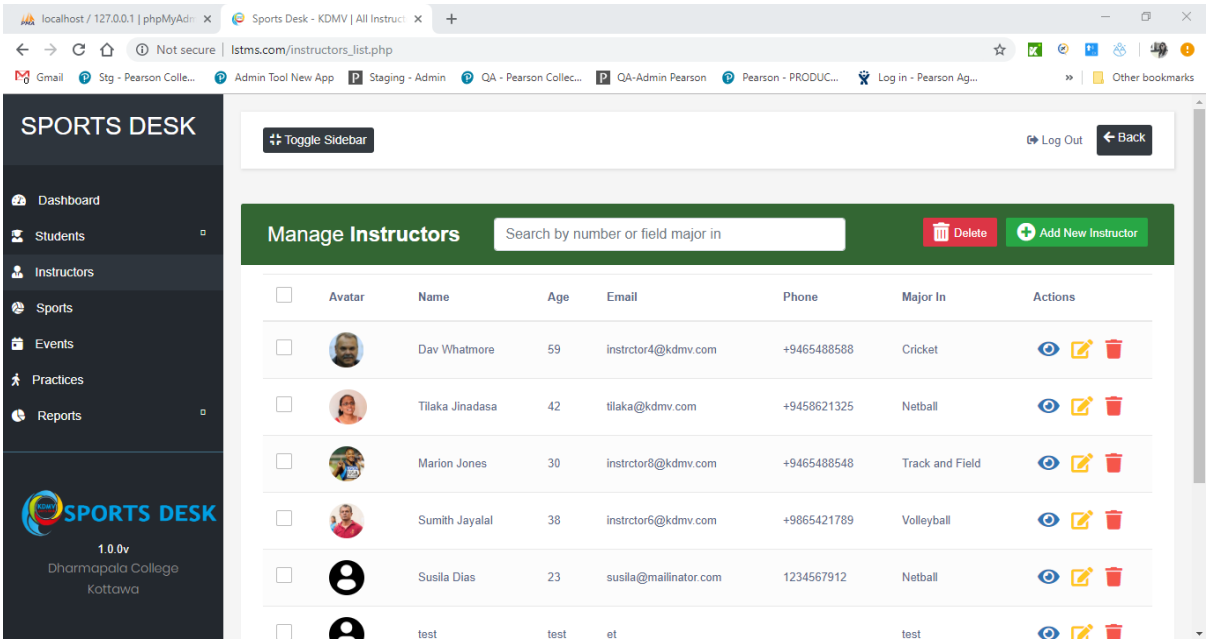

Figure B.13 Manage Instructors – Administrator

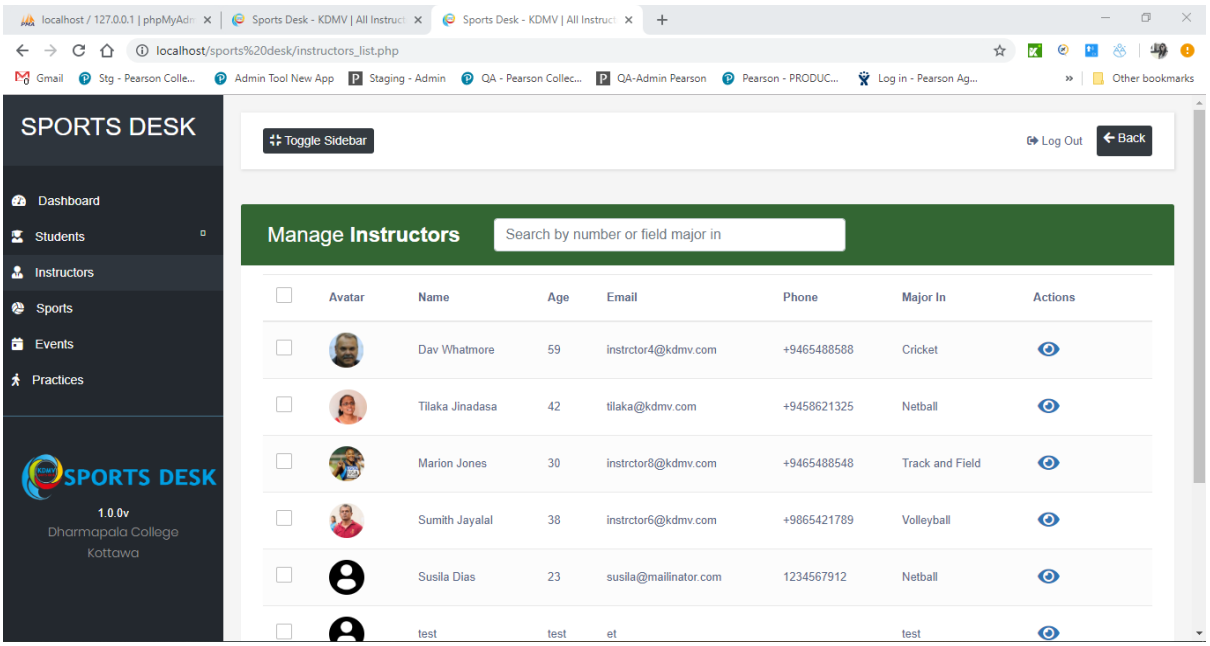

Figure B.14 Manage Instructors – Student

Manage Sports

Figure B.14 and B.15 show the Sports List page of the system. This will have two separate views for Administrator and Student/Visitor. Student and visitor will only have View right of the records in the system.

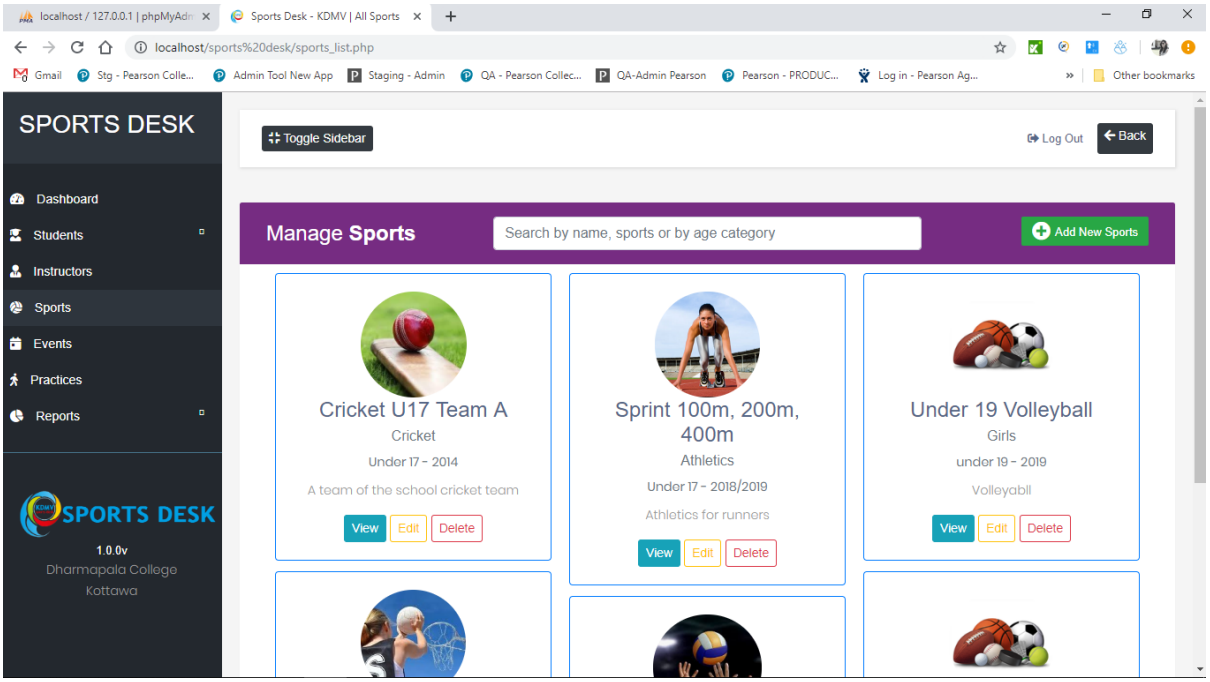

Figure B.15 Manage Sports – Administrator

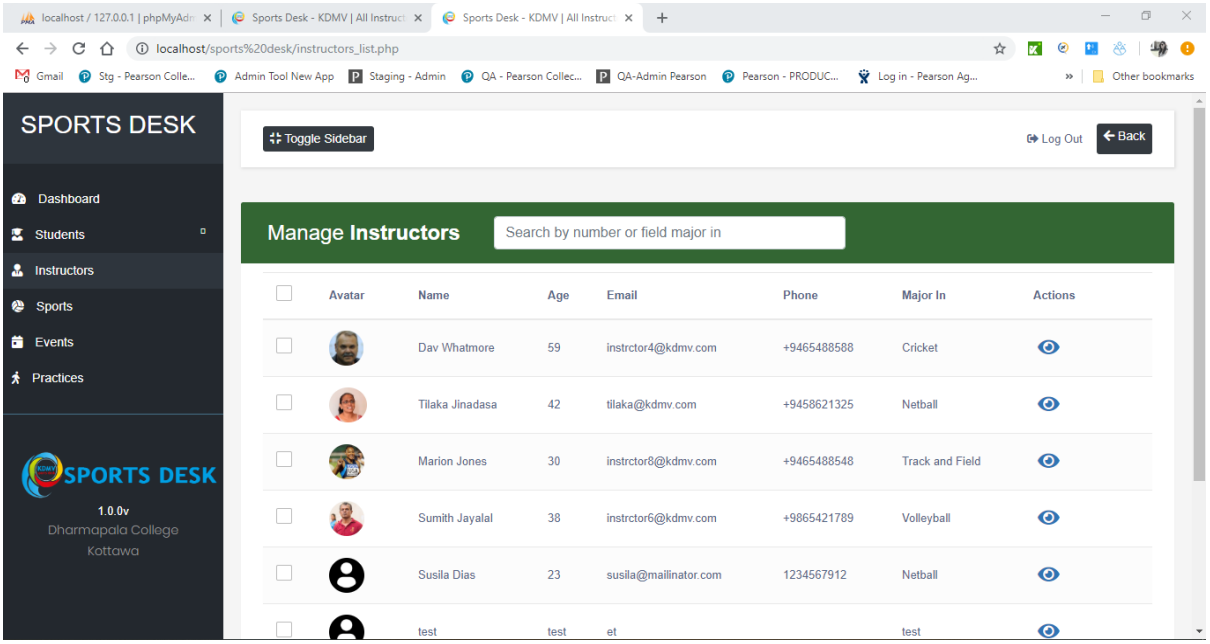

Figure B.16 Manage Sports – Student and Visitor

Add, Edit or View Sport

Figure B.16, B.17 and B.18 show the Add, Edit or View of sport in the system. Admin user only will have the rights to add, edit or delete where visitor and sport only will have access to view records. User can navigate to these forms using Manage Sports page.

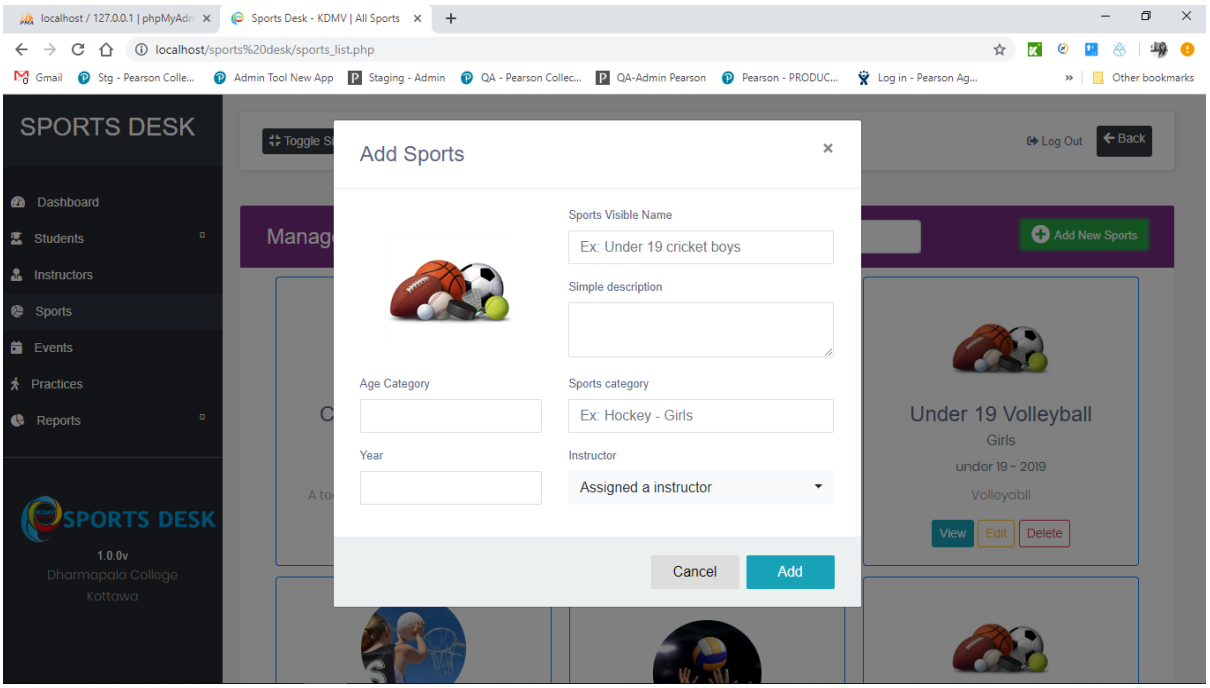

Figure B.17 Manage Sports – Add Sports

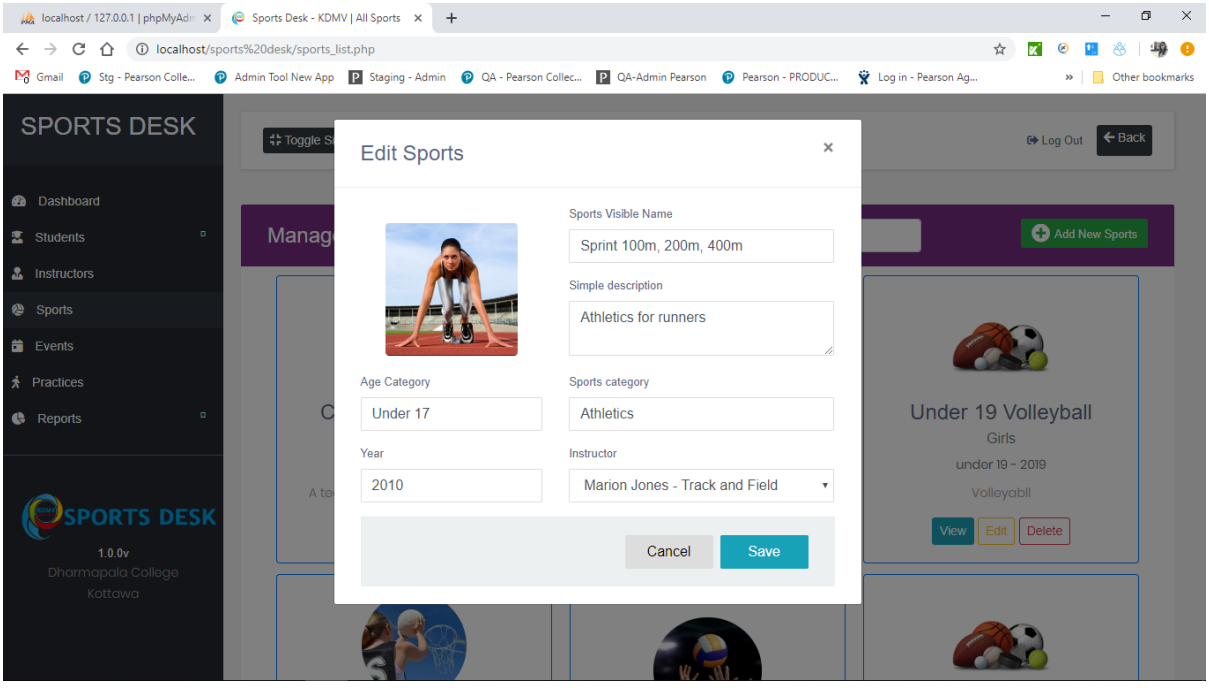

Figure B.18 Manage Sports – Edit Sports

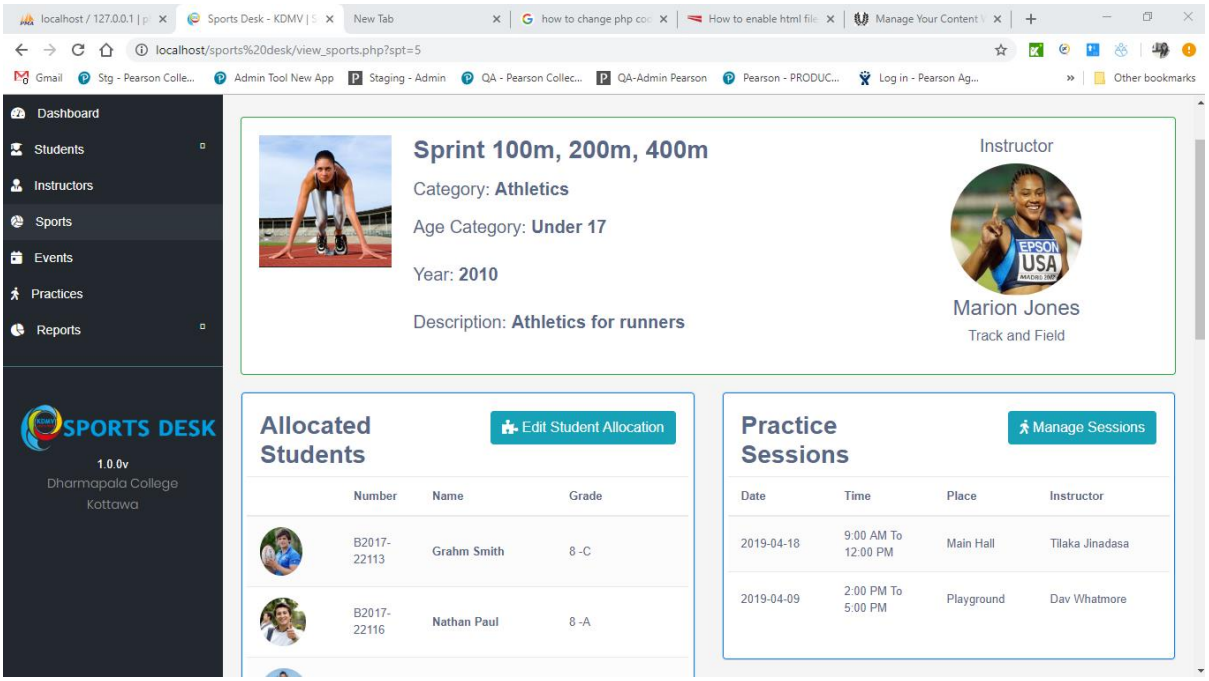

Figure B.19 Manage Sports – View Sports

Allocate Students

Figure B.19, B.20 and B21 will feature the page where user can allocate or remove students for a sport. Admin user only will have the rights to add or remove students for a sport.

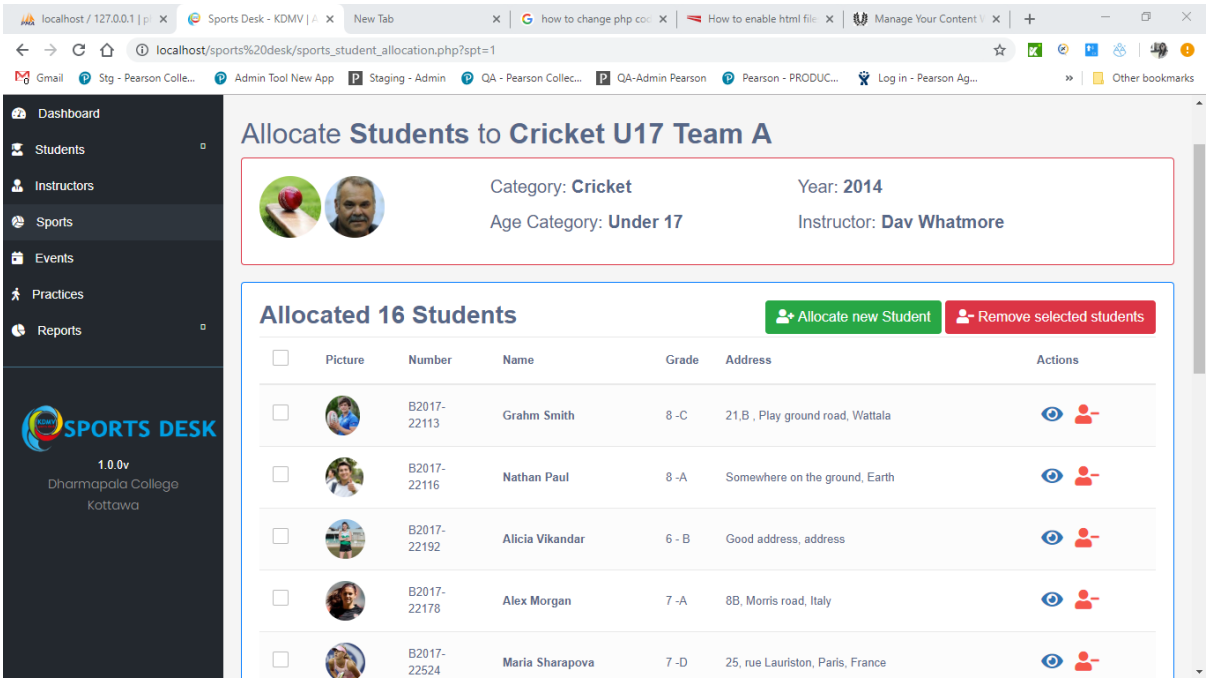

Figure B.20 Allocate Students

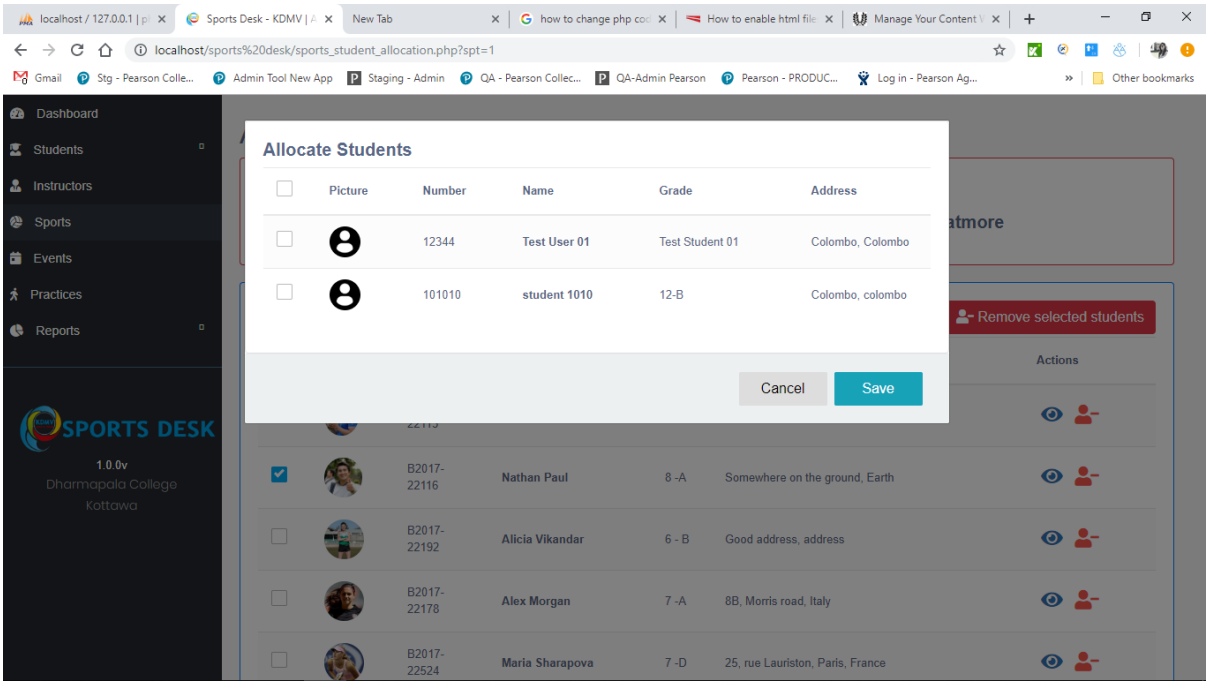

Figure B.21 Allocate New Student

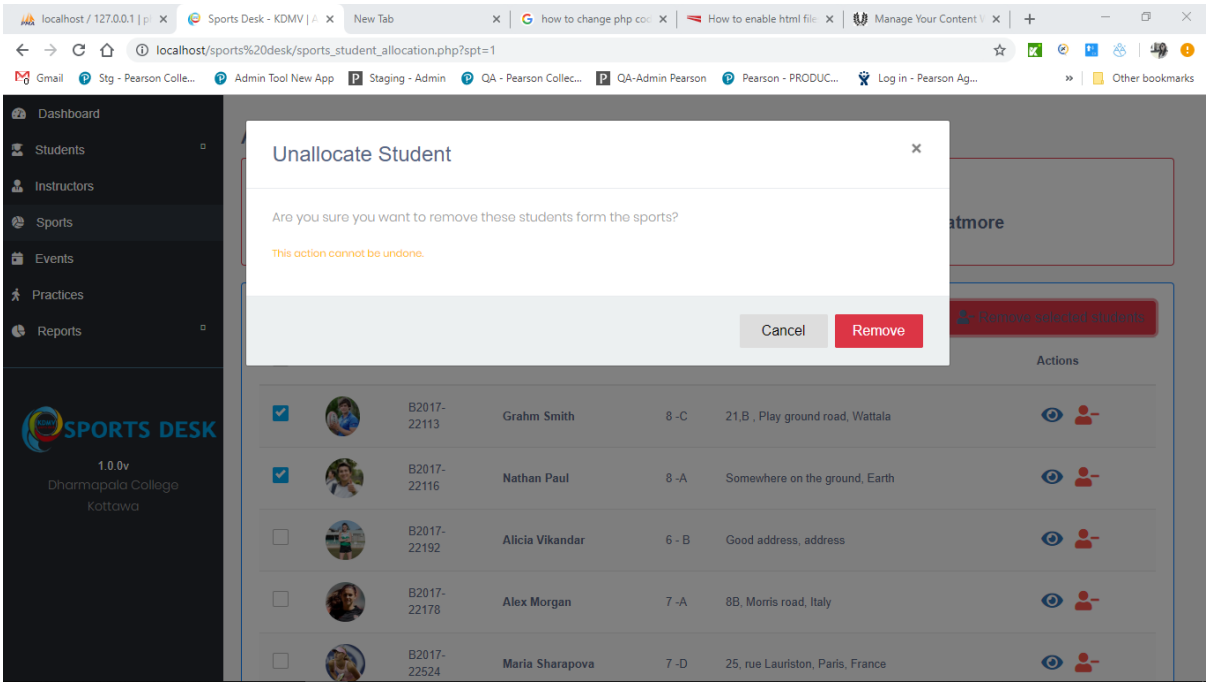

Figure B.22 Remove Student

Manage Events

Figure B.22 and B.23 show the Events List page of the system. This will have two separate views for Administrator and Student/Visitor. Student and visitor will only have View right of the records in the system.

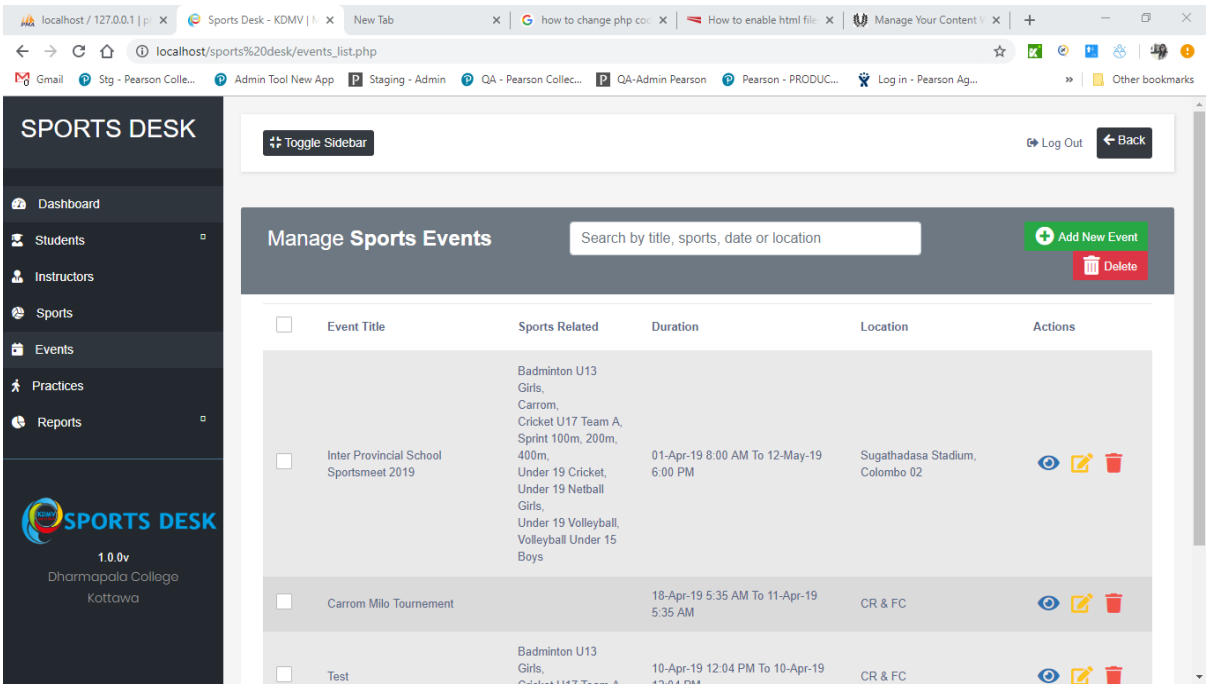

Figure B.23 Manage Events – Administrator

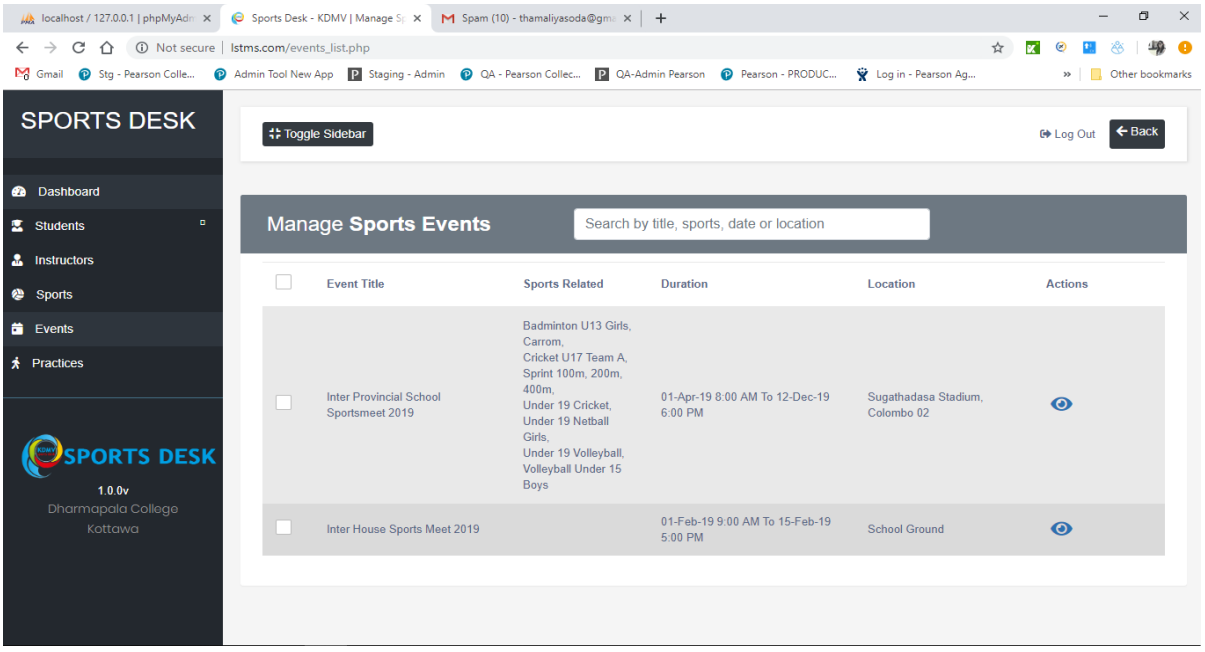

Figure B.24 Manage Events – Student and Visitor

View Event

Figure B.24, B.25, B.26 shows the View Events page of the system. This will have three separate views for Administrator, Student and Visitor. Visitor users will only obtain view access where student users will have Join Event functionality as well. Student will be able to join to the particular event by that functionality.

Administrators will have another view where they can accept join requests made by the students, include instructors for the event and add achievement for the event.

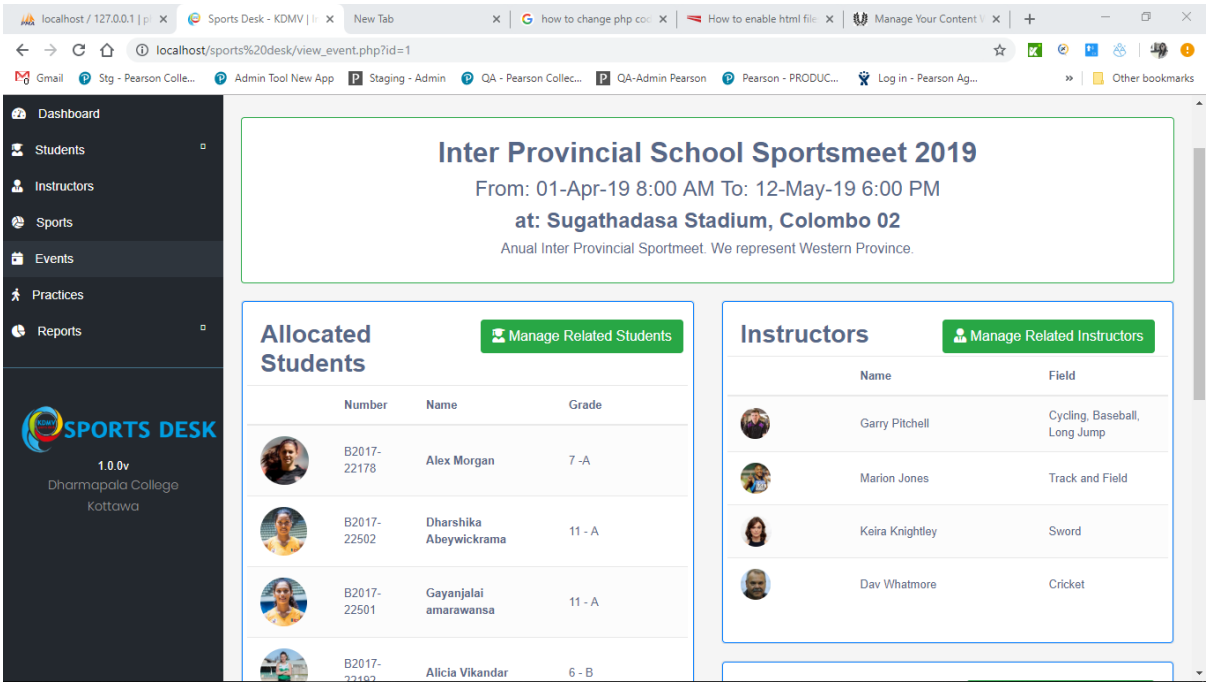

Figure B.25 View Event – Administrator

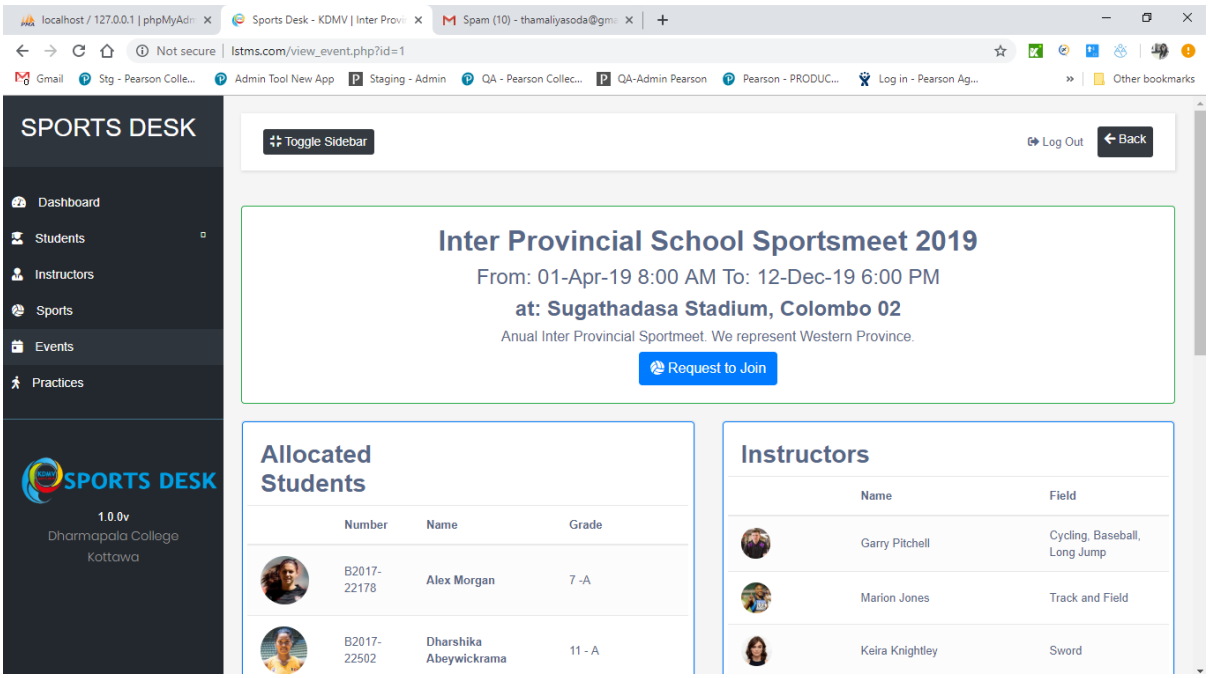

Figure B.26 View Event – Student

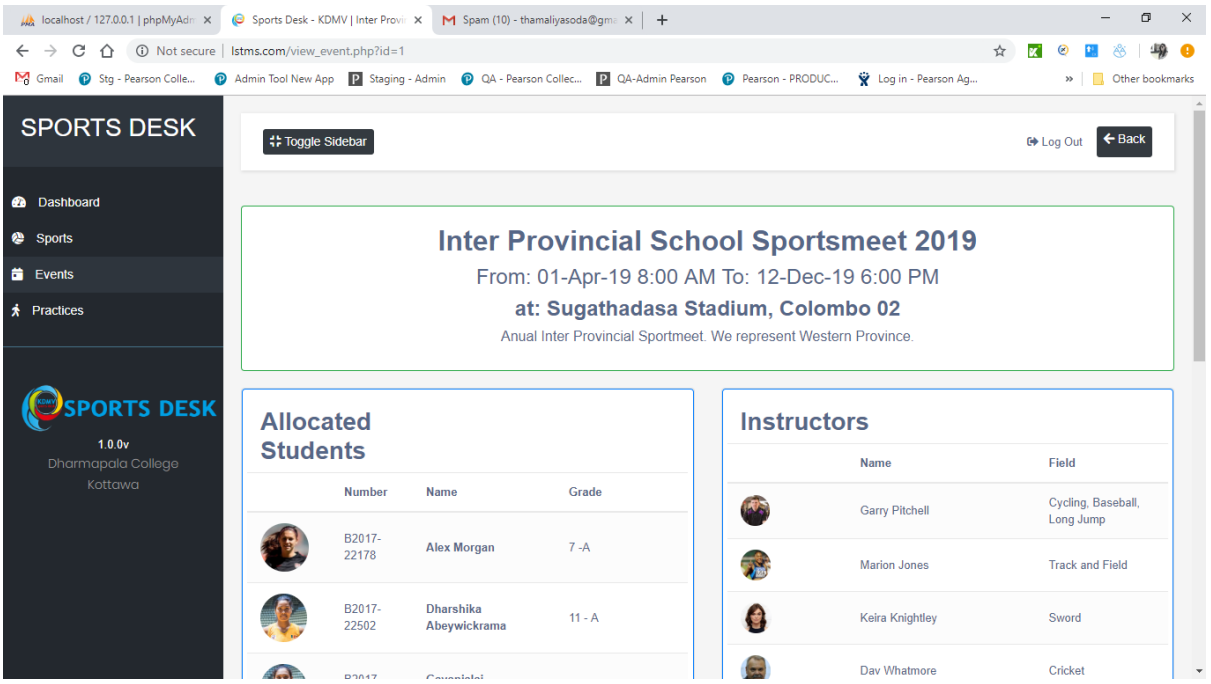

Figure B.27 View Event – Visitor

Manage Allocated Students, Instructors, Sports and Achievements for an Event

Figure B.27, B.28, B.29 and B.30 show the pages where admin user can accept event join requests by students and allocate instructors, sports and achievements to the created event. These functionalities will only be available for admin users. If any changes are done email notifications will be sent to students who are associated with the system.

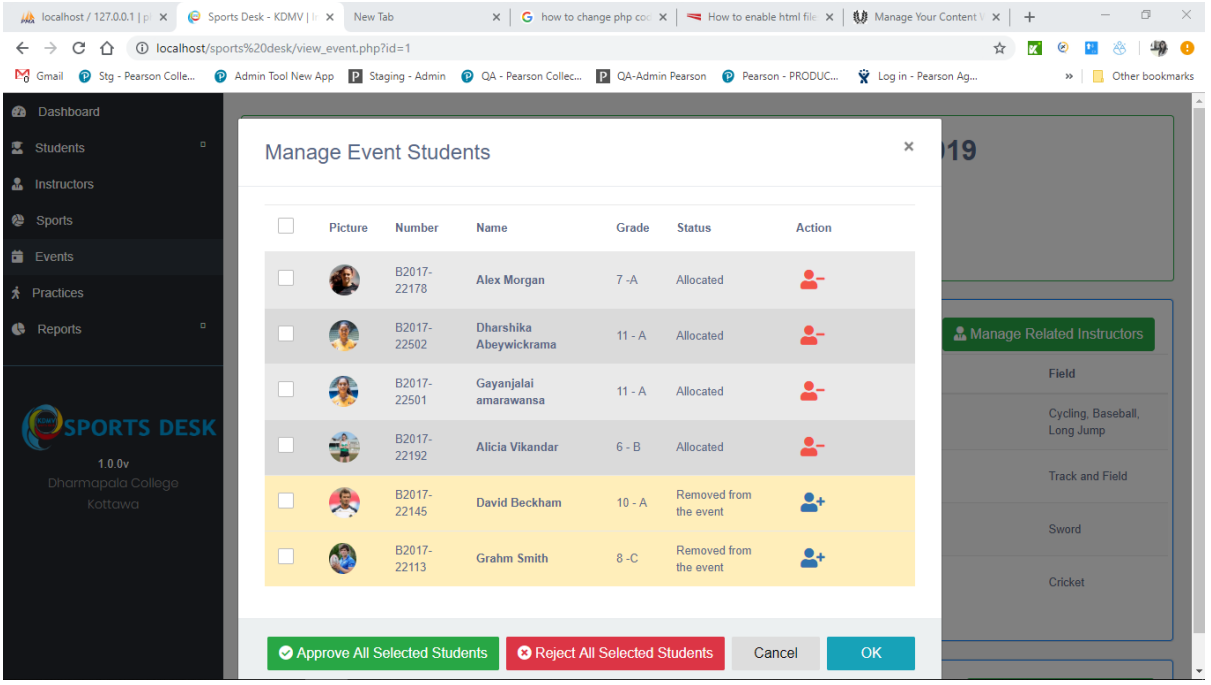

Figure B.28 Manage Event – Add or Remove Students

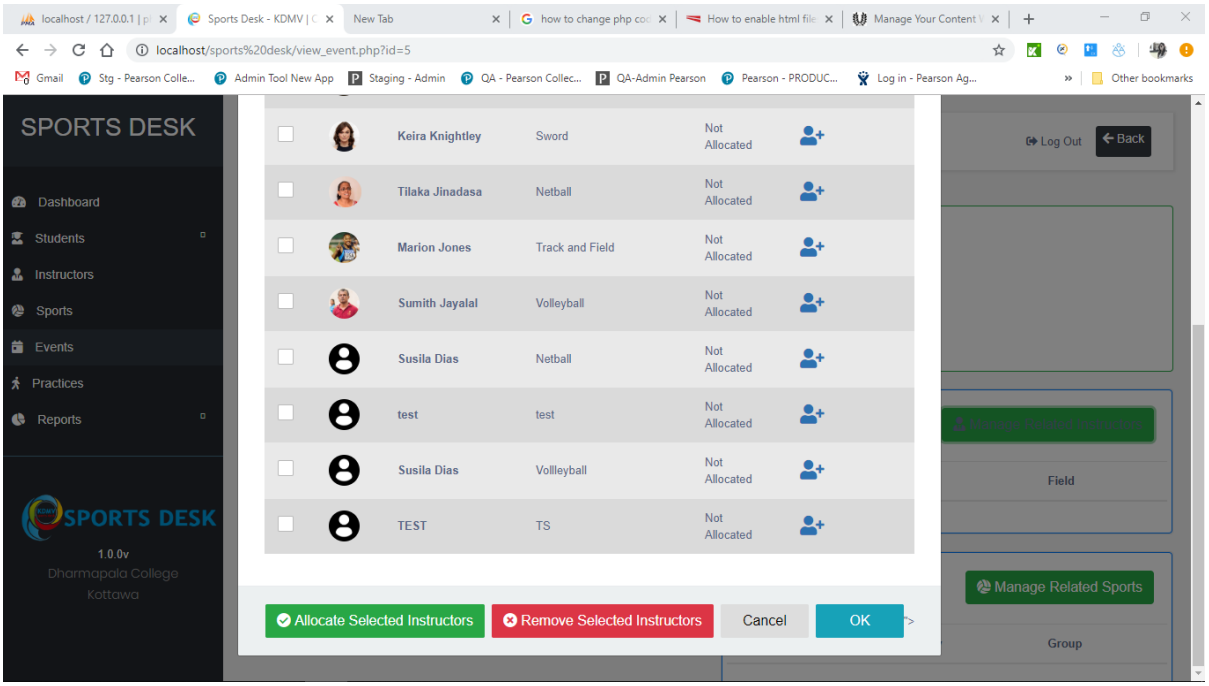

Figure B.29 Manage Event – Add or Remove Instructors

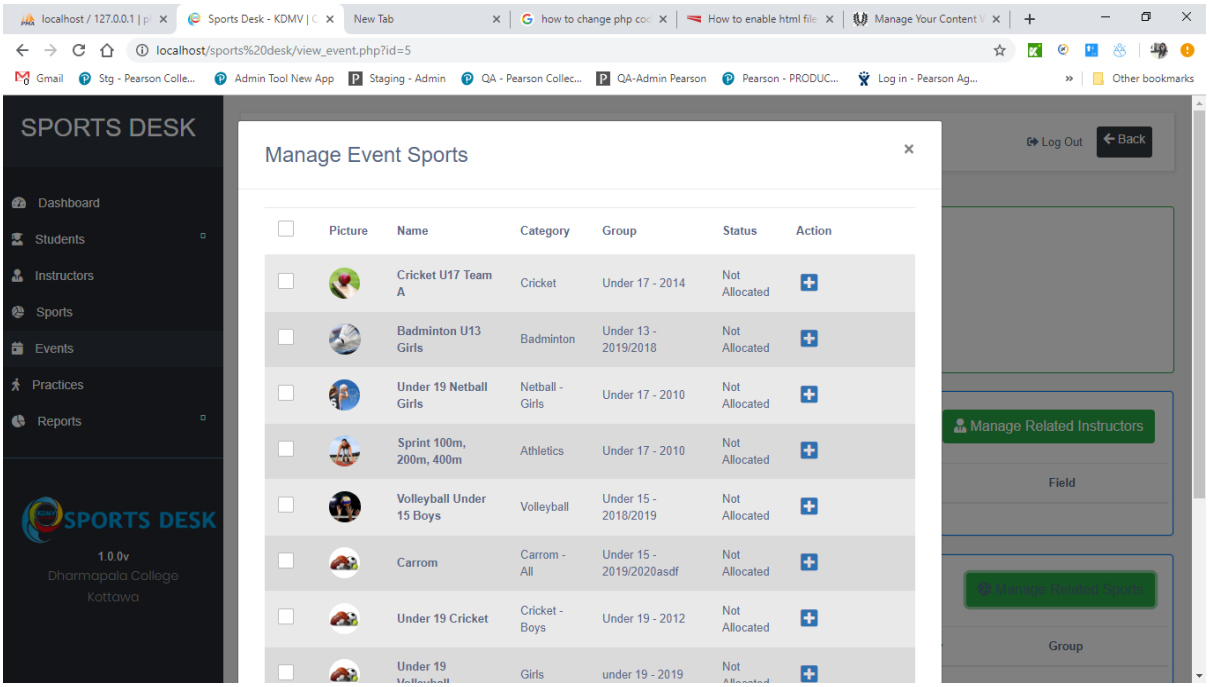

Figure B.30 Manage Event – Add or Remove Sport

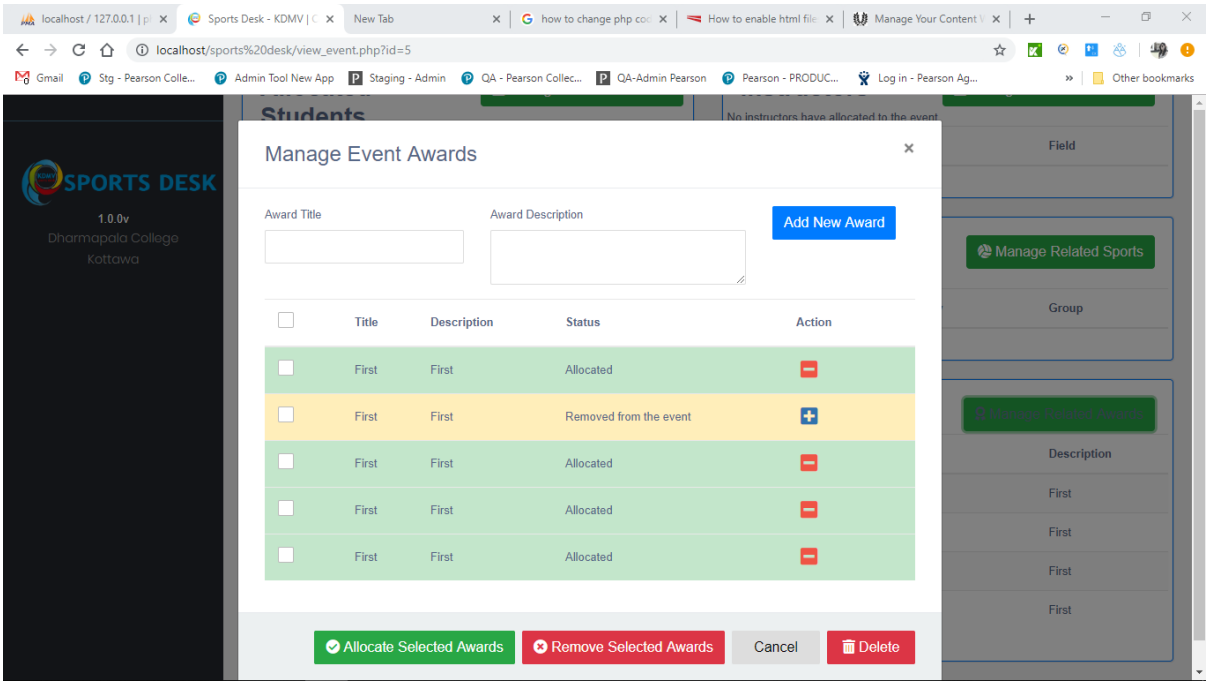

Figure B.31 Manage Event – Add or Remove Achievements

Manage Practices

Figure B.31 and B.32 show the Practice List page of the system. This will have two separate views for Administrator and Student/Visitor. Student and visitor will only have View right of the records in the system.

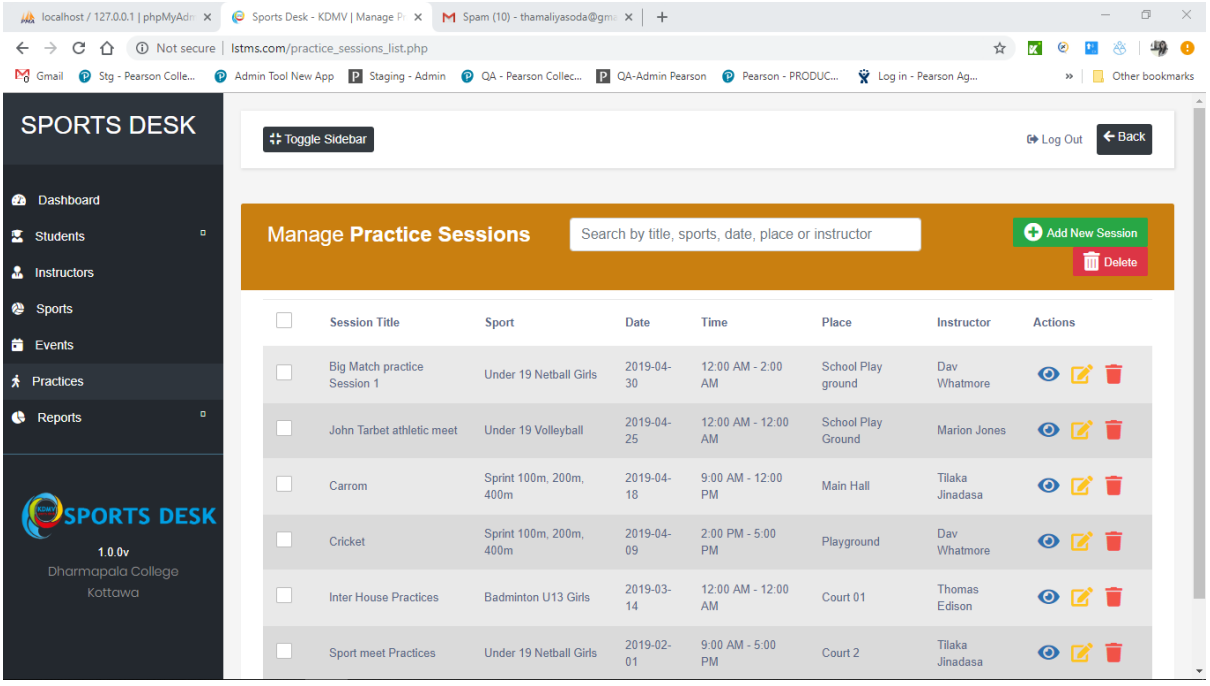

Figure B.32 Manage Practice Sessions – Administrator

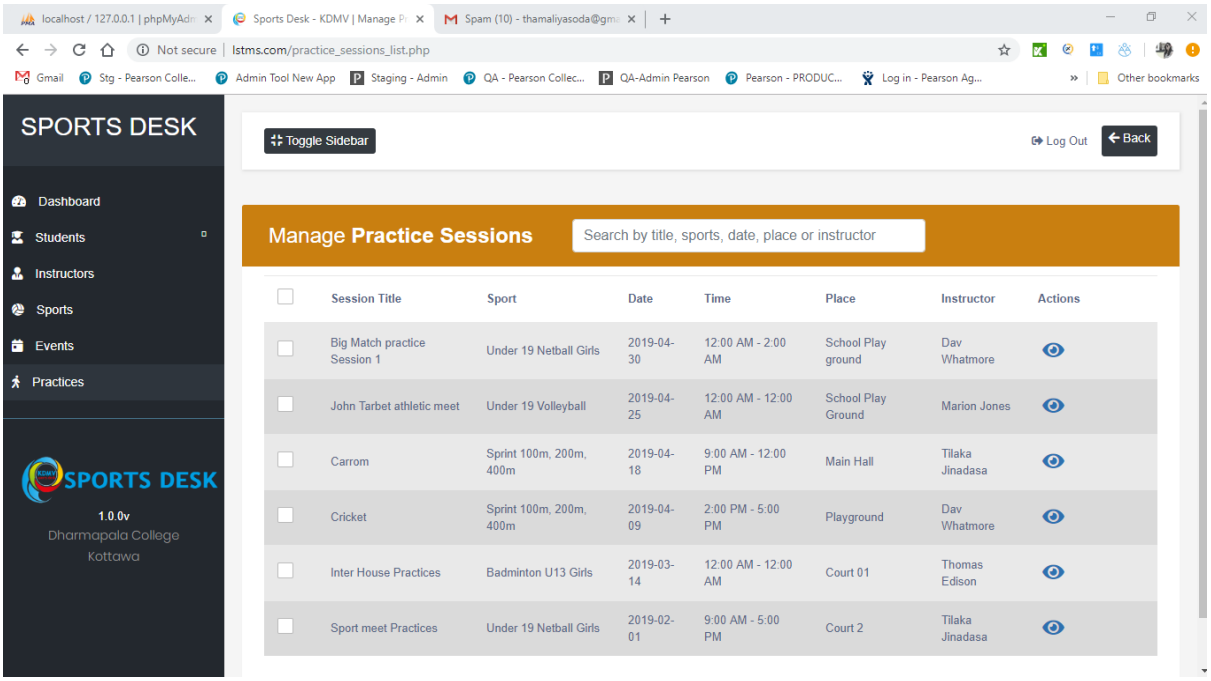

Figure B.33 Manage Practice Sessions – Student and Visitor

View, Update or Delete Practice Sessions

Figure B.33 to B.36 will figure the pages where user can view added practice session, edit data of a practice session or delete a session. Student and visitor will only have View right of the records in the system. Once user clicks on Views he can view selected practice session. And click on edit will enable user to edit entered value and update. Deletion icon will allow user to delete the selected record from the system. Admin user will have all the access rights for all the functionalities.

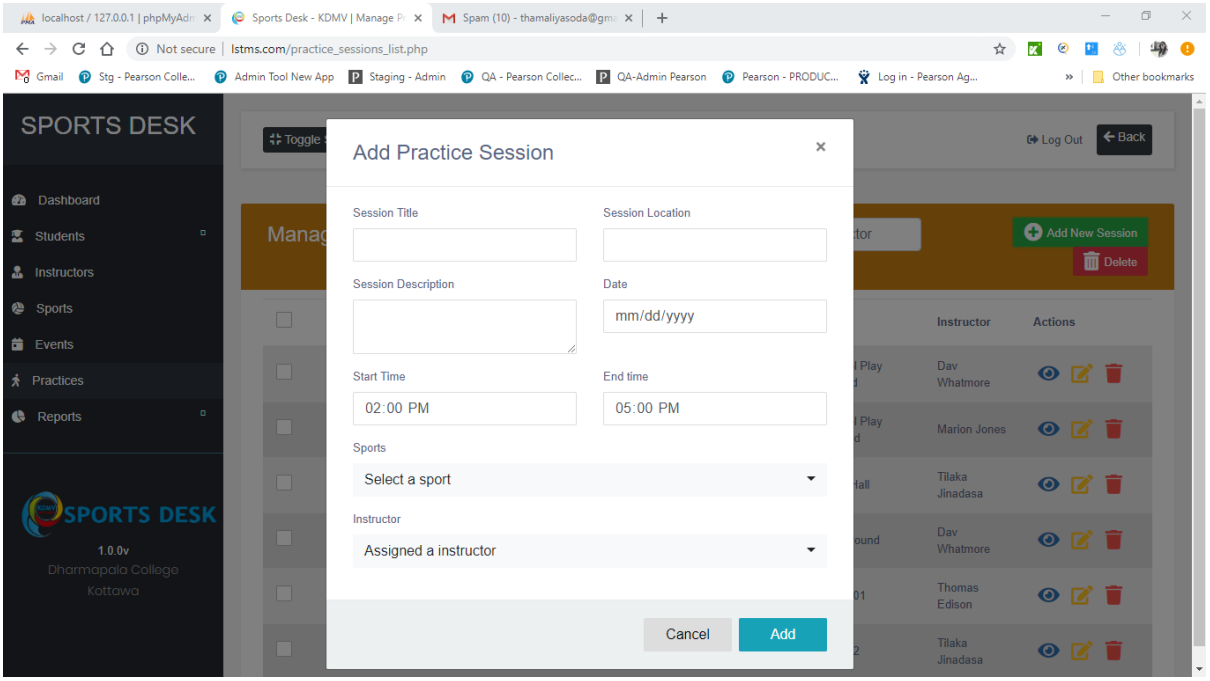

Figure B.34 Add Practice Session

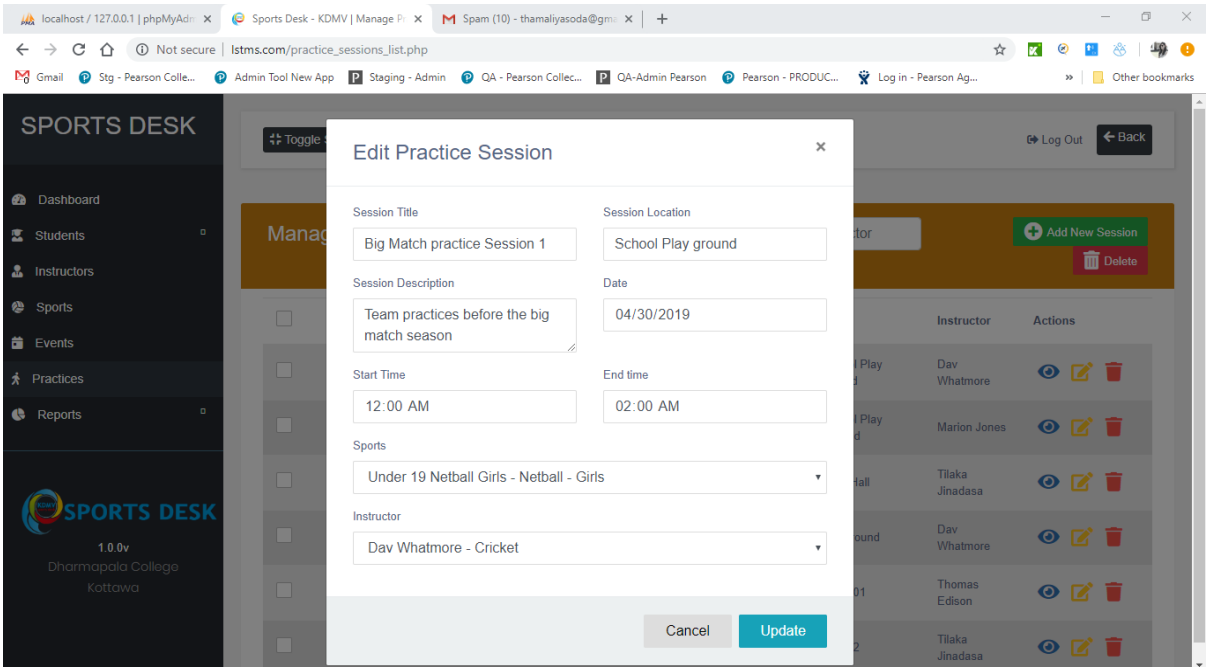

Figure B.35 Update Practice Session

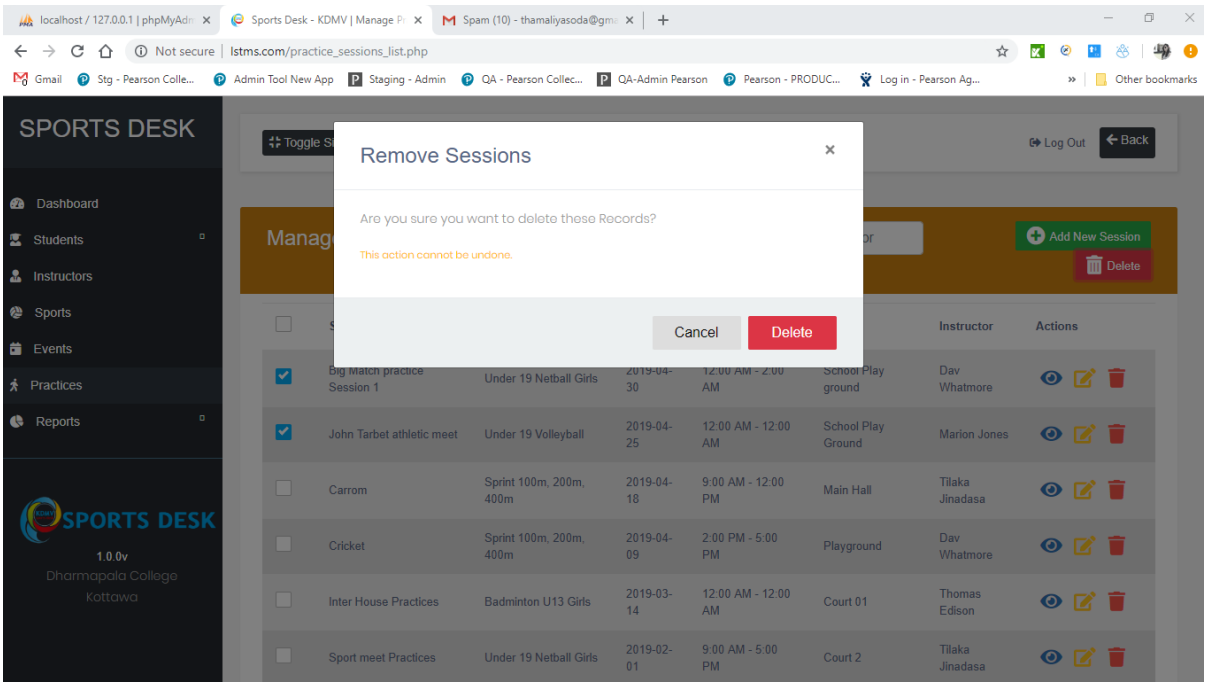

Figure B.36 Delete Practice Session

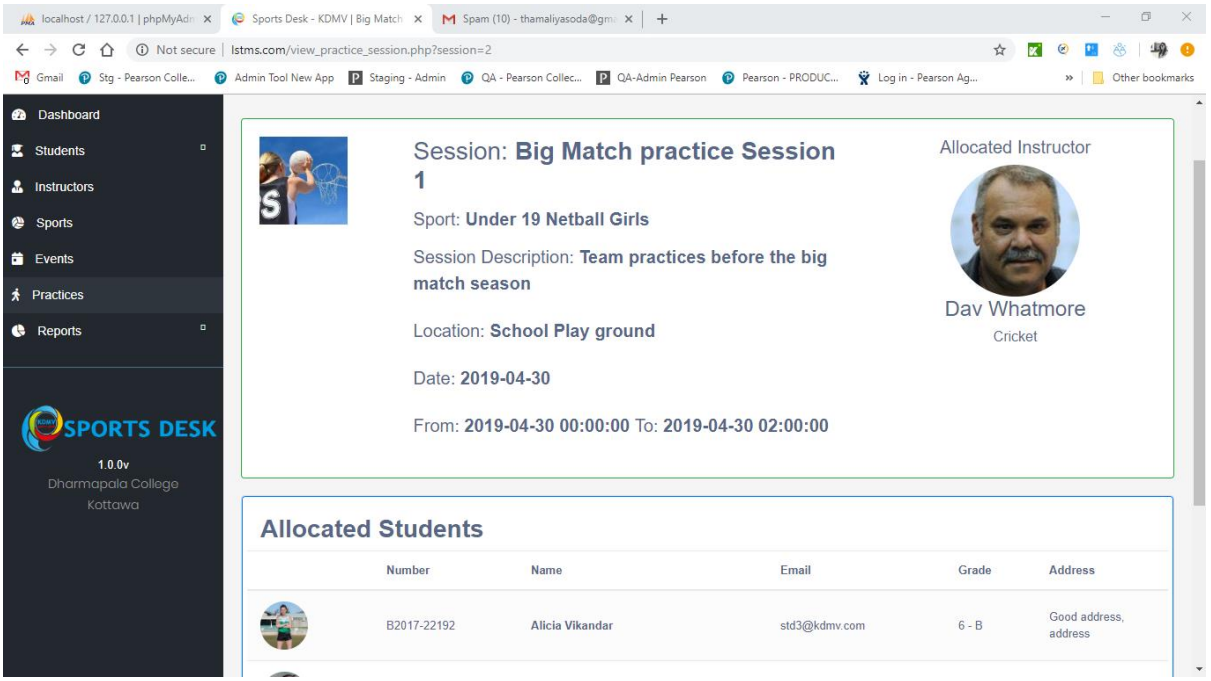

Figure B.37 View Practice Session

Manage Achievements

Figure B.36 and B.37 show the Achievement List page of the system. This will have two separate views for Administrator and Student, where Visitor will not have access. Student will only have View right of the records in the system.

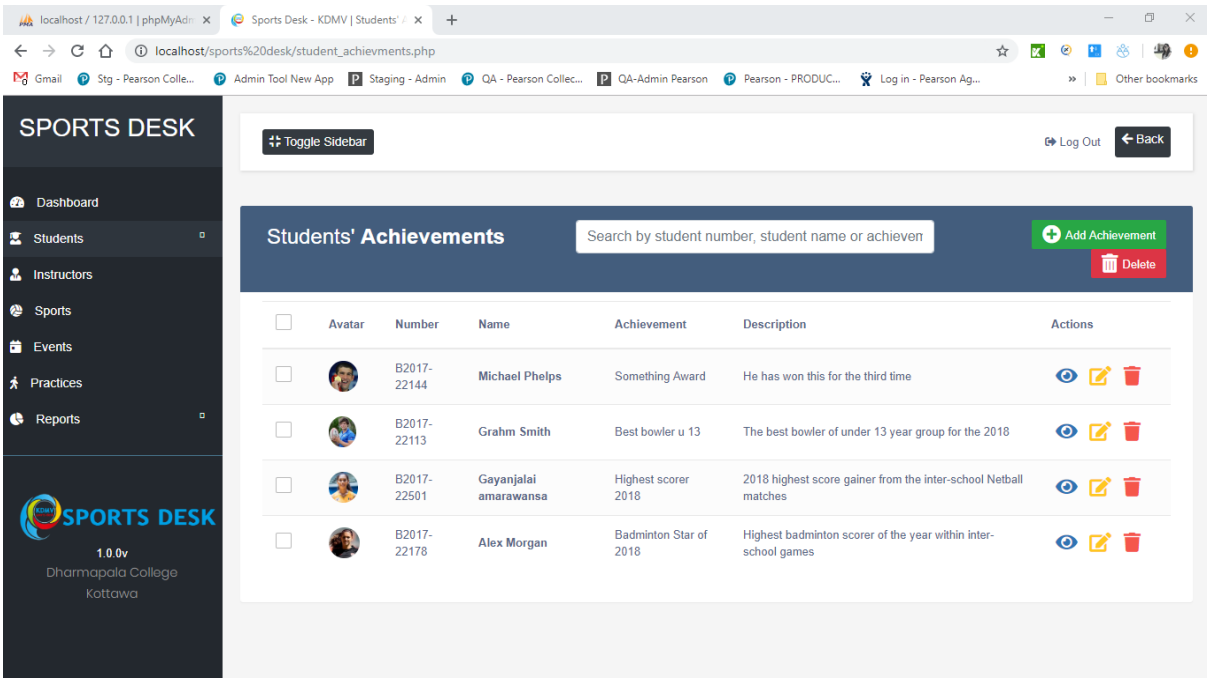

Figure B.38 Students' Achievements – Administrator

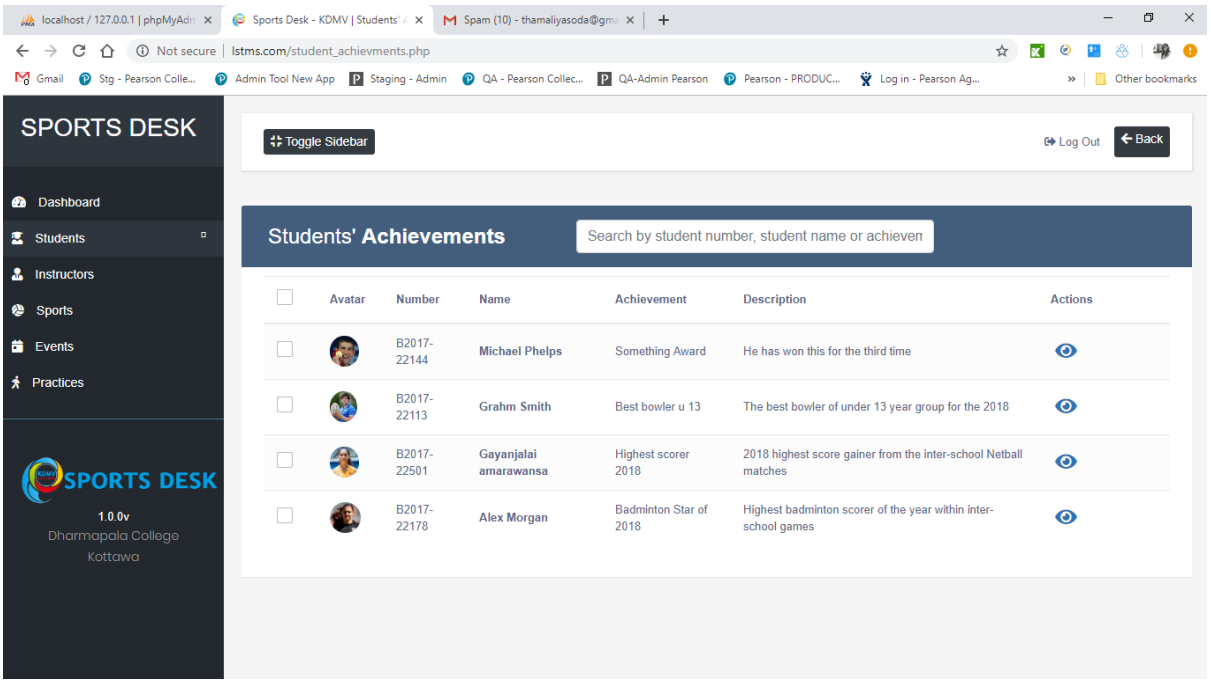

Figure B.39 Students' Achievements – Student

View, Update or Delete Achievement

Figure B.38 to B.41 will figure the pages where user can view added achievement, edit data of an achievement or delete an achievement. Student will only have View right of the records in the system, where visitor users will not be permitted. Once user clicks on View he can view selected achievement. And click on edit will enable user to edit entered value and update. Deletion icon will allow user to delete the selected record from the system. Admin user will have all the access rights for all the functionalities.

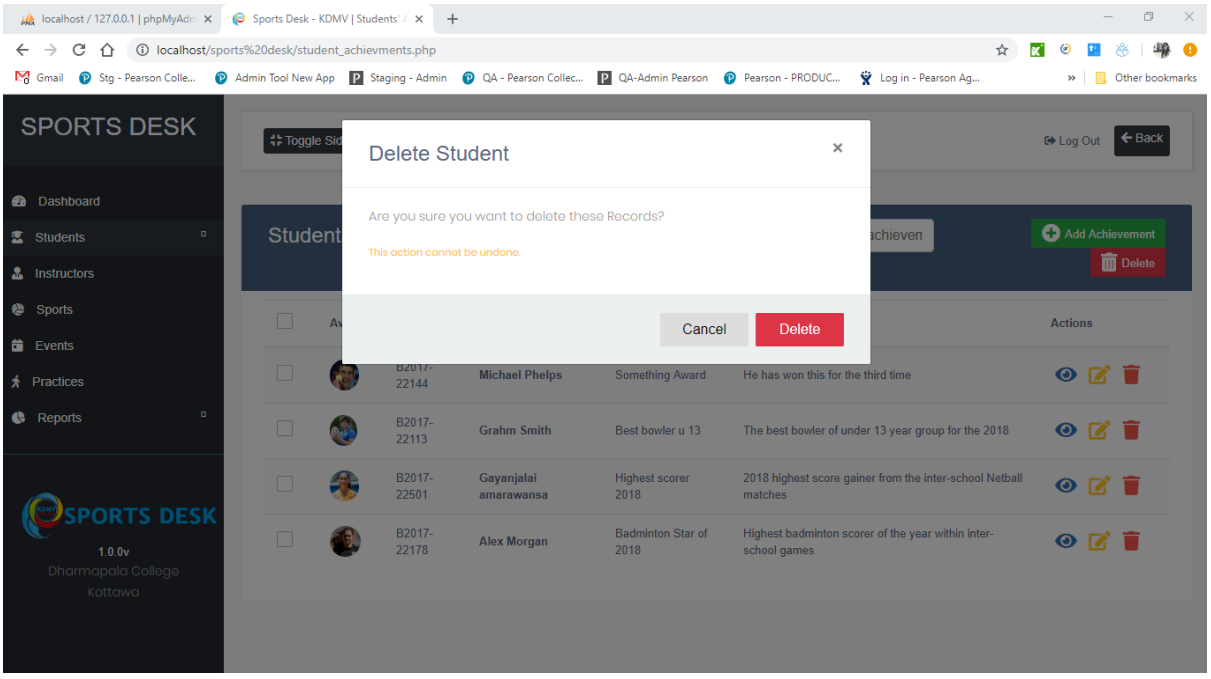

Figure B.40 Students' Achievements – Delete Student

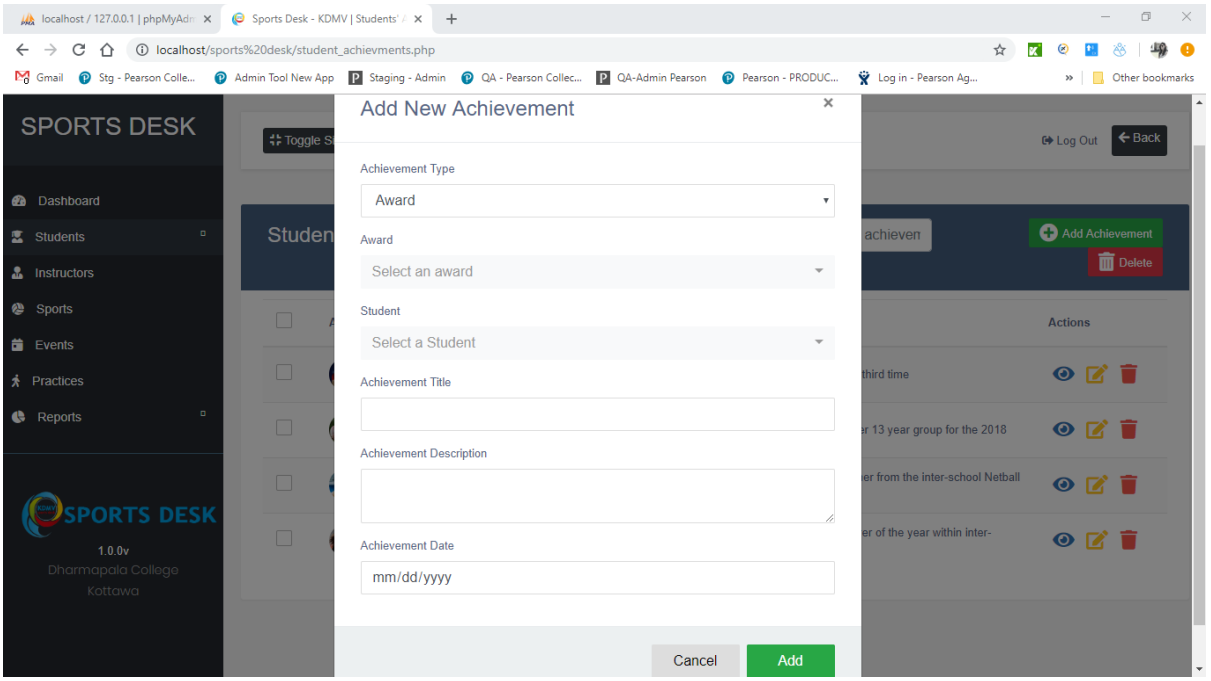

Figure B.41 Add Achievement

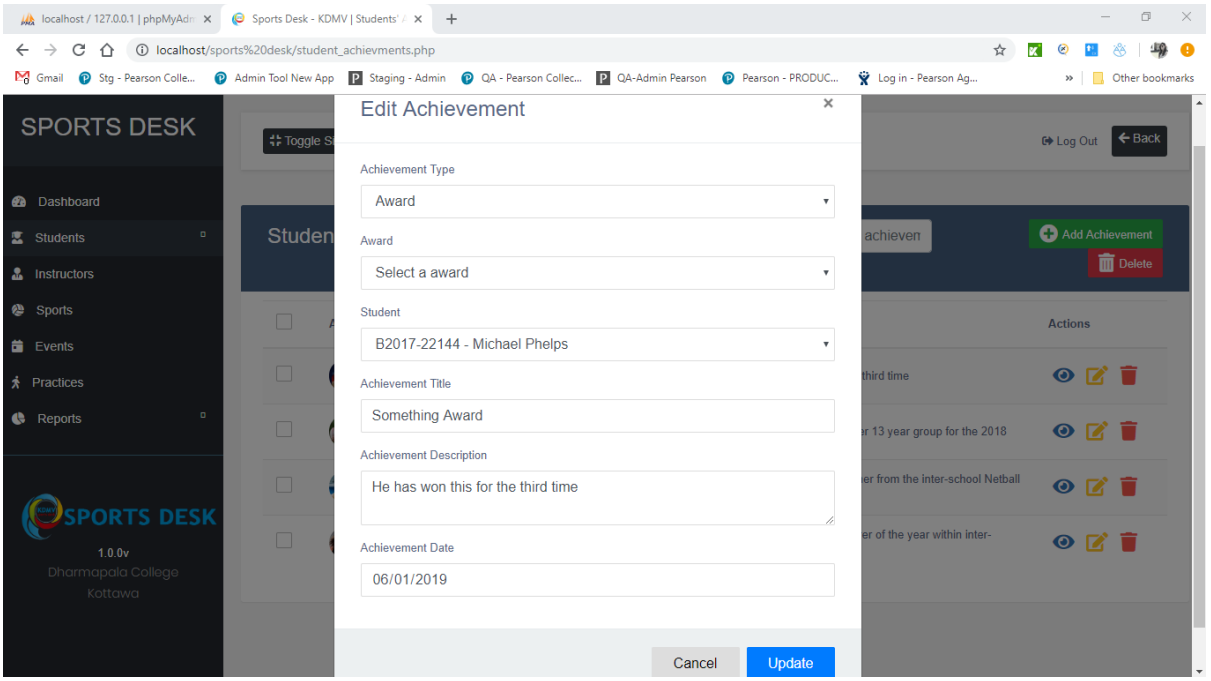

Figure B.42 Edit Achievement

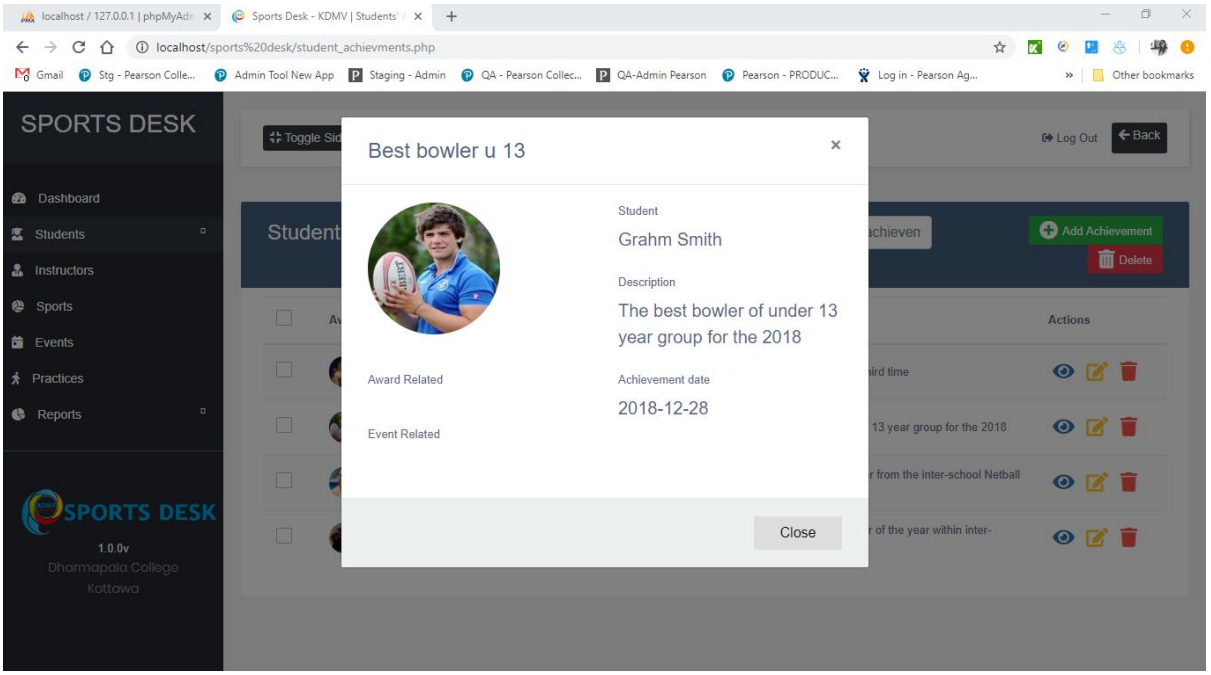

Figure B.43 View Achievement

Reports

Figure B.42, B.43, B.44 and B.45 show the Reports generated via the system. This will be only visible for the admin users of the system. User can access reports menu via navigation panel.

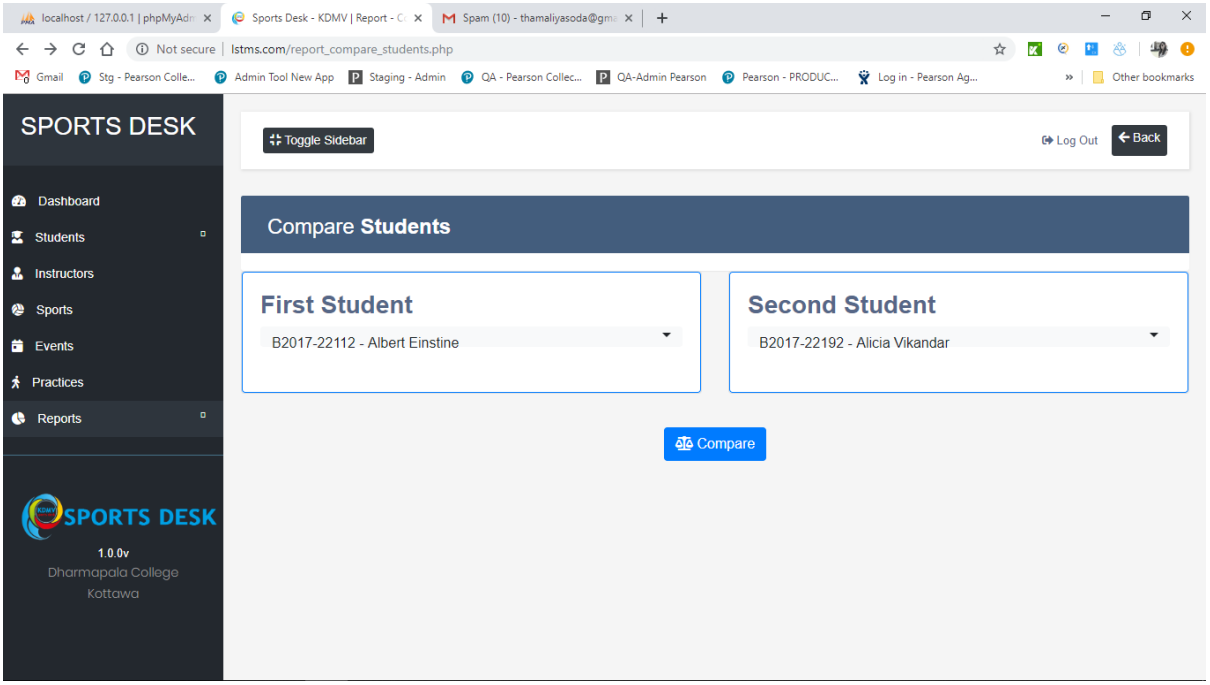

Figure B.44 Compare Students

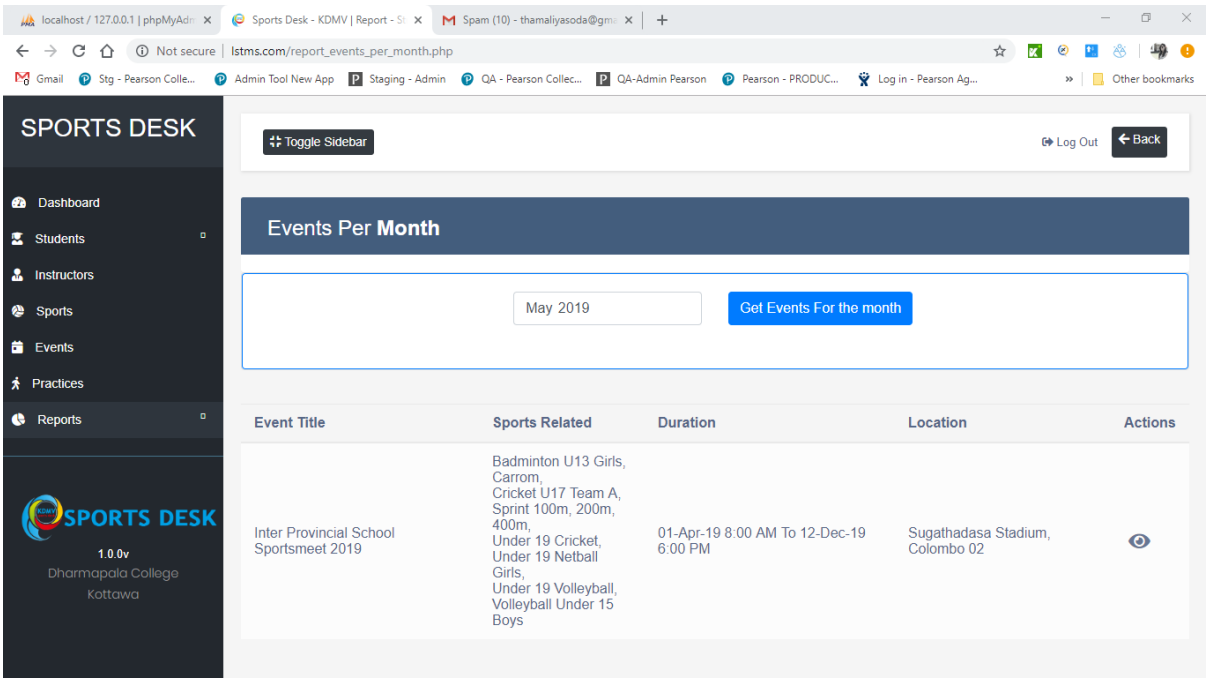

Figure B.45 Events per Month Report

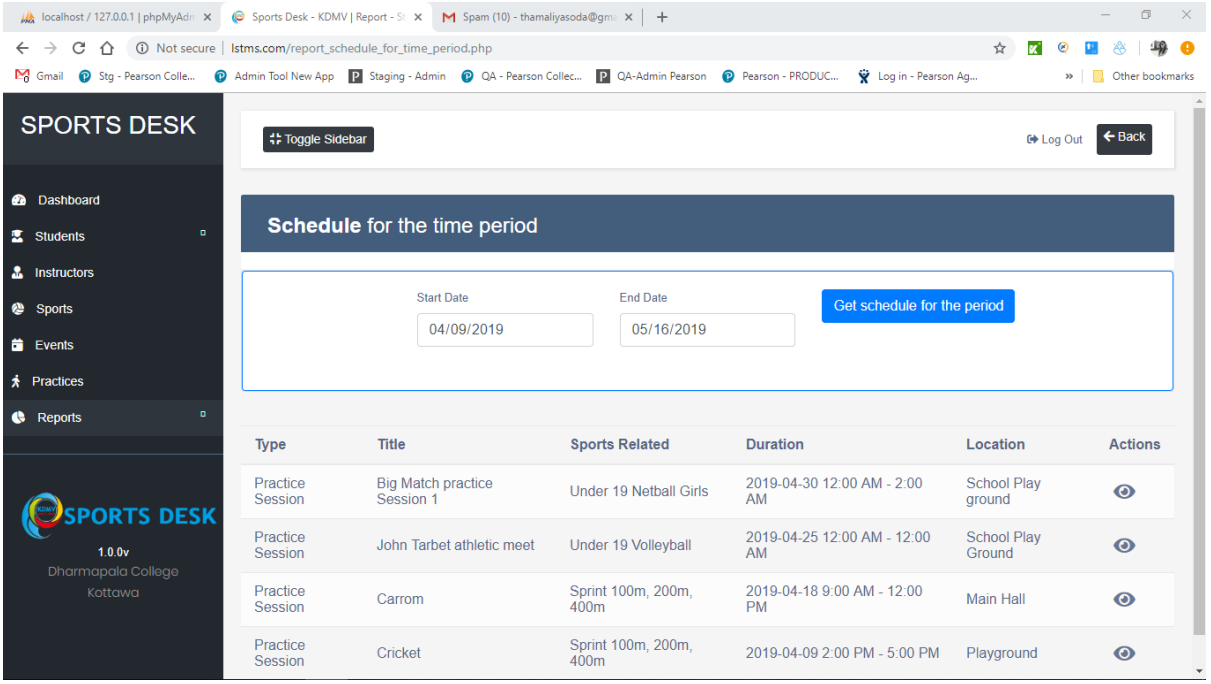

Figure B.46 Schedule for Time Period Report

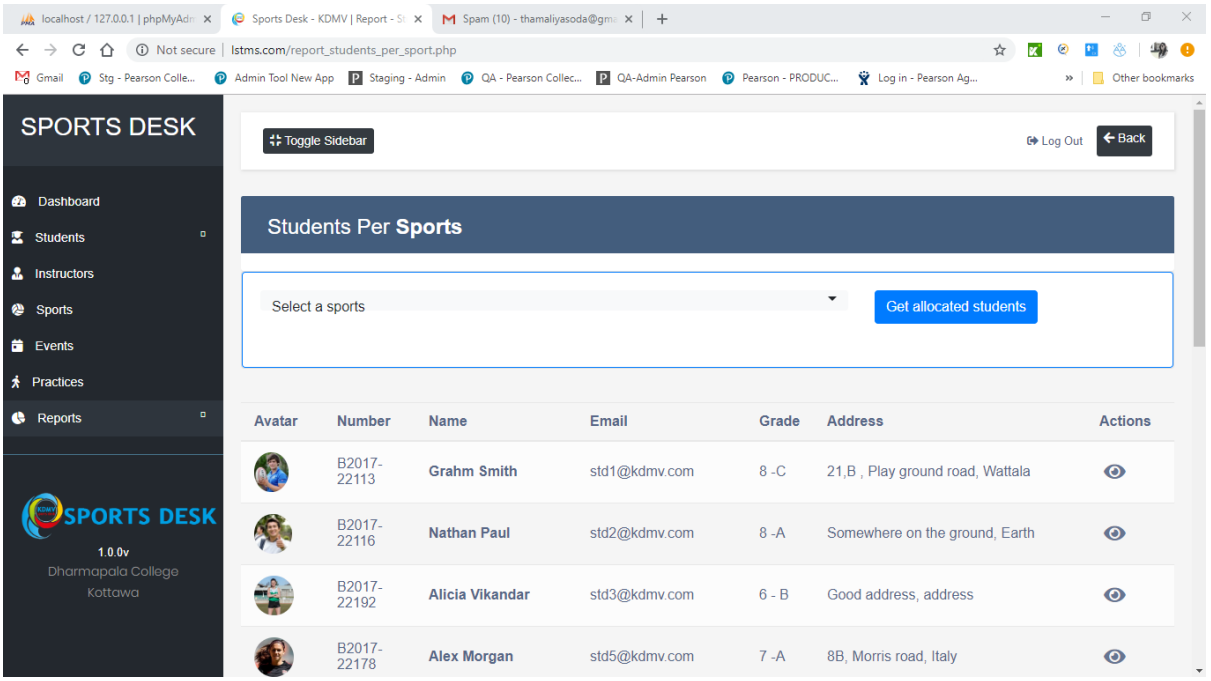

Figure B.47 Students per Sport Report

Appendix C – System Documentation

System Documentation will give the guidelines to set up KDMV Sports Desk web services along with the database set up and frontend. This mainly focused on served set of the system to host the services to the user. Since the project is developed using php technology it holds a flat structure setup will be rather easy.

Component,

- XAMPP Control Panel
- phpMyAdmin DB[24],[25]

Since this system is a web-based system there is no specific user configurations required. Only necessity will be the availability of uninterrupted internet connectivity.

Here will be describe on how to get up the deployment environment to host the services,

Database Setup – Deployment Environment Setup

Step 01:

Navigate to https://www.apachefriends.org/download.html and download the XAMPP[23] for the appropriate version to support the version and the operating system used in the machine.

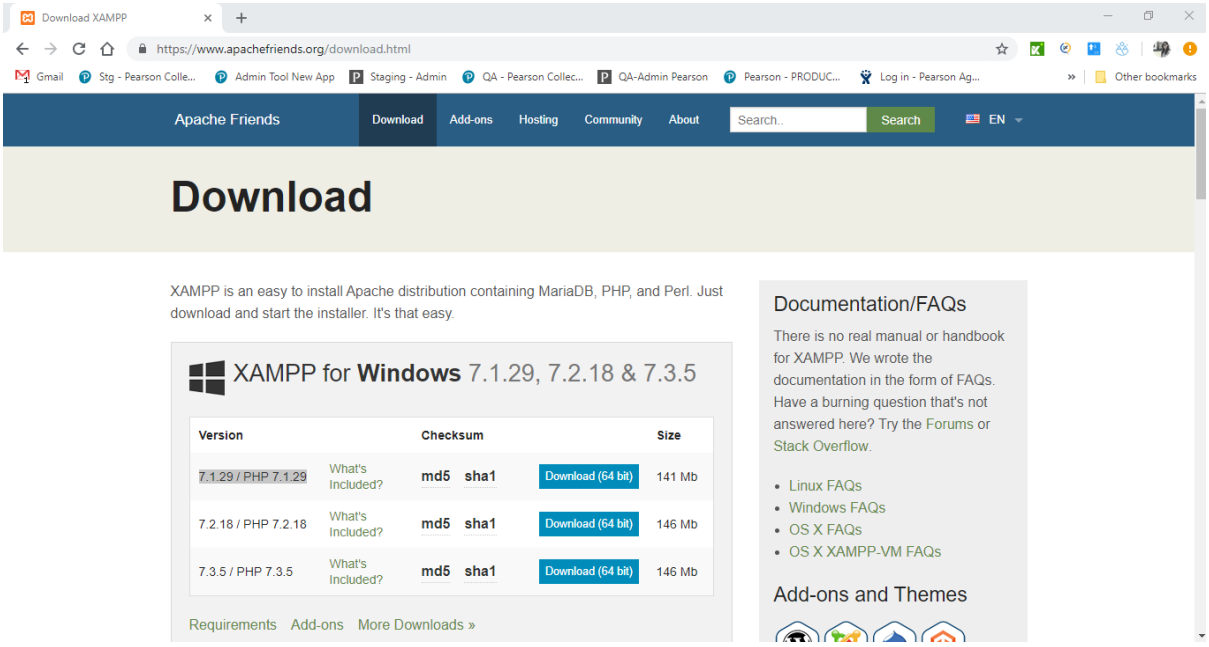

Figure C.1 Download XAMPP Control Center

Step 02:

Run the downloaded setup file and get the XAMPP control center installed as per following figures.

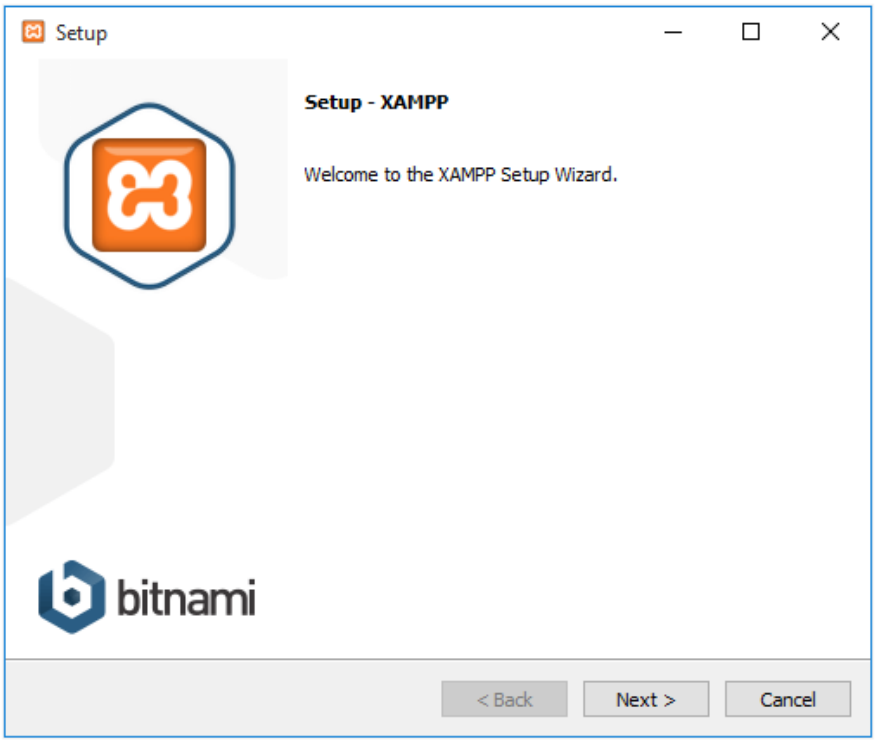

Figure C.2 Installing XAMPP

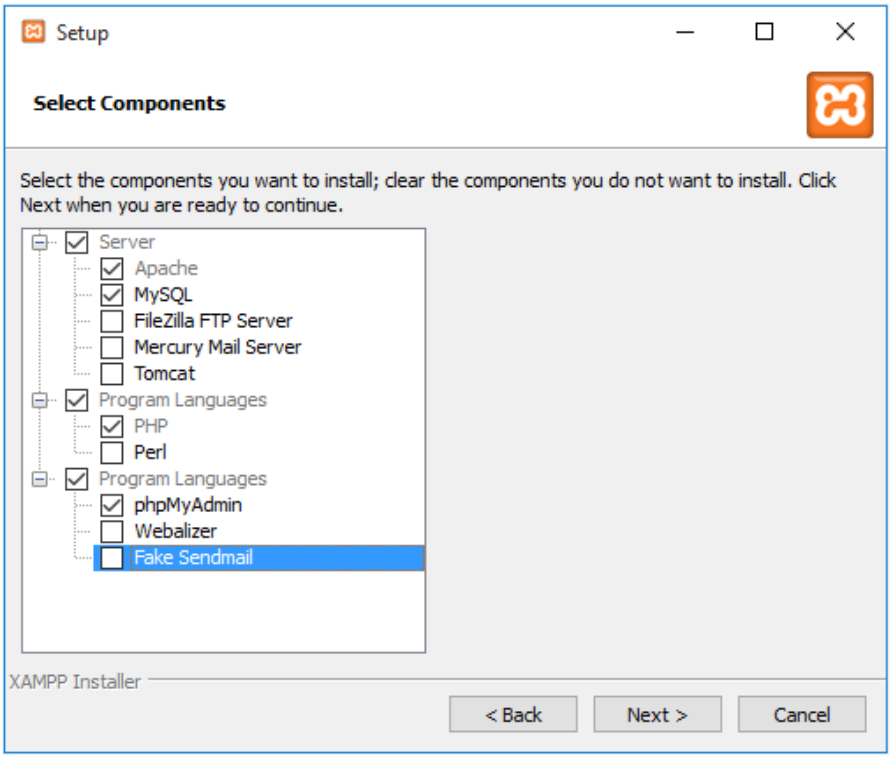

Figure C.3 Selecting Components

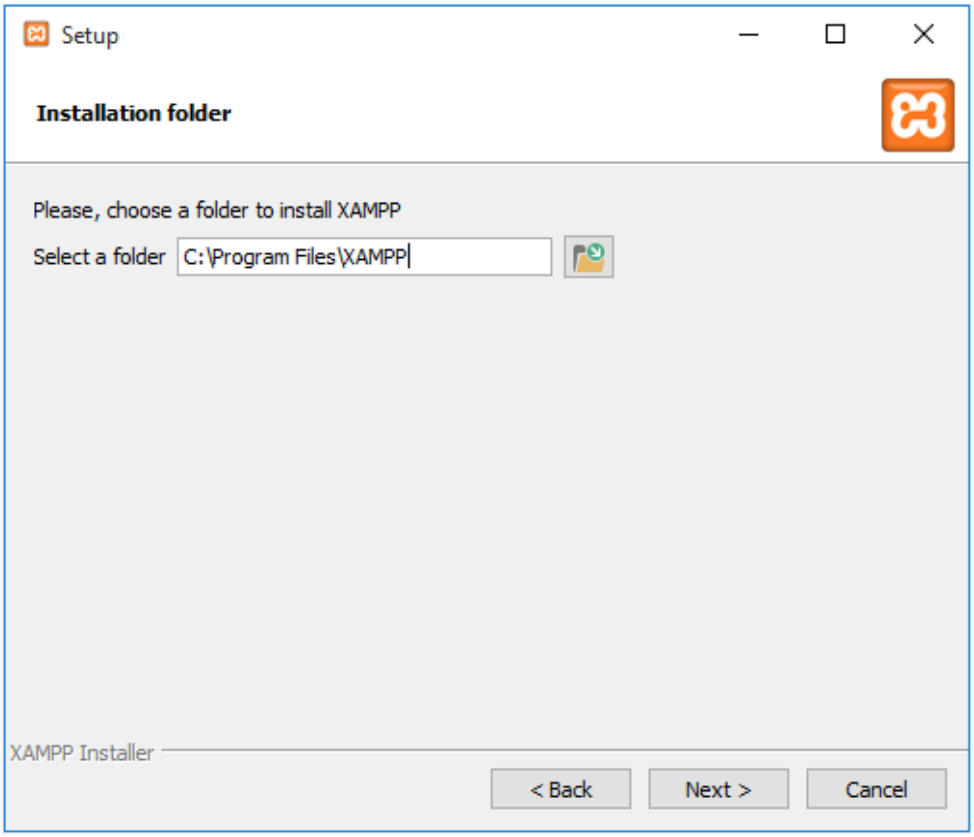

Figure C.4 Initializing File Location

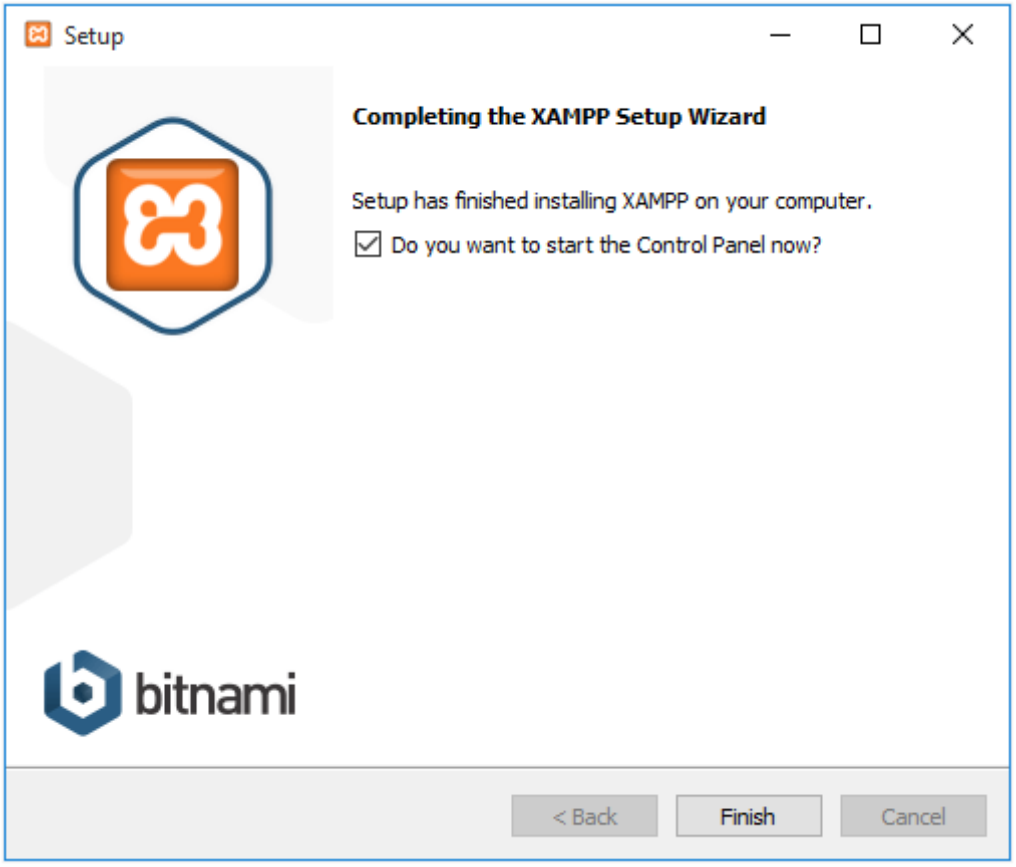

Figure C.5 Successful Installation

Step 03:

To starting MySQL and Apache services using XAMPP, open the XAMPP Control Center and click on Start buttons in front of both services.

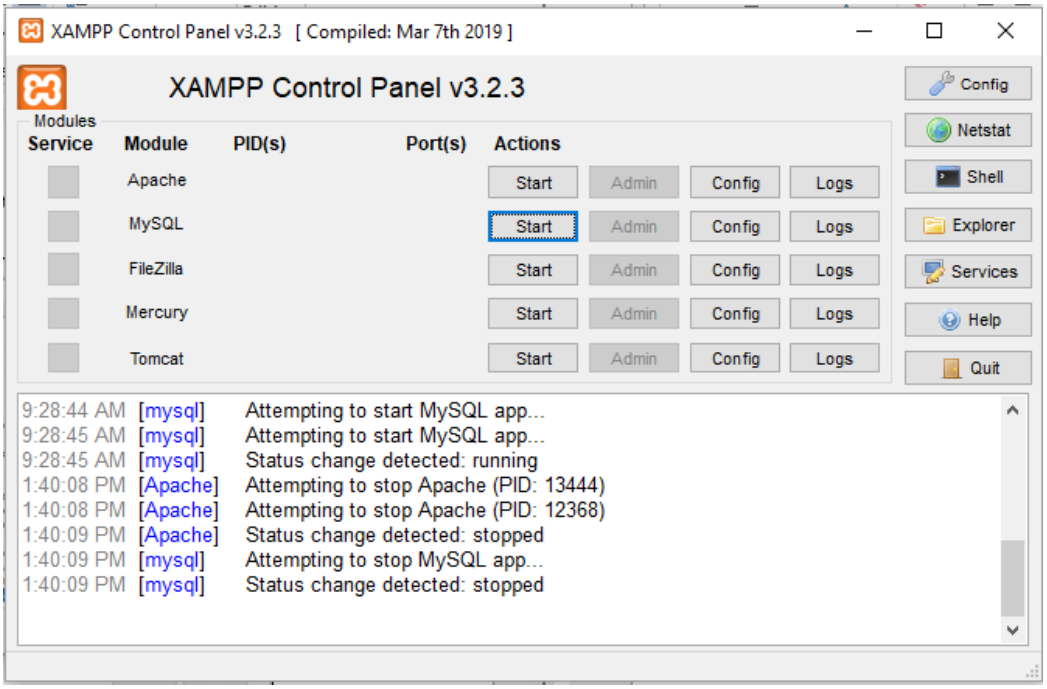

Figure C.6 XAMPP Control Panel

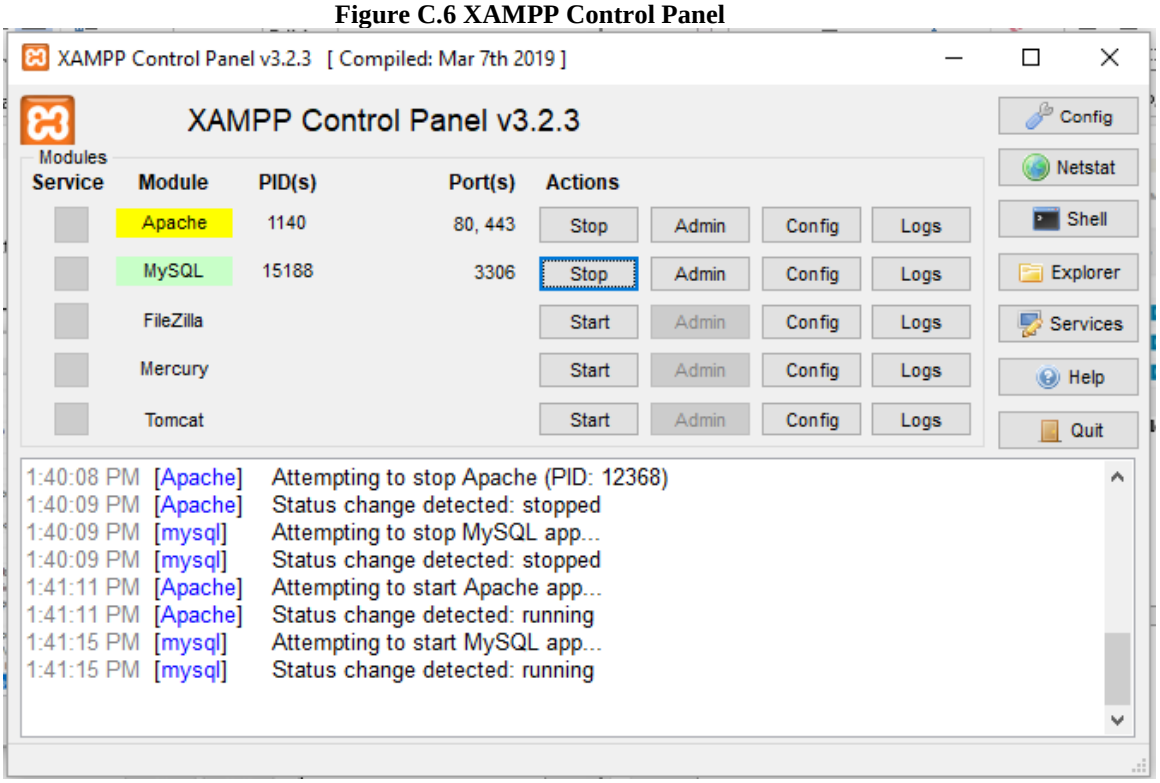

Figure C.7 XAMPP Control Panel – Starting Apache and MySQL Services

Step 04:

Verify that local server has been installed by typing “localhost” in the browser window and enter. Following page should be displayed once user had been installed server successfully.

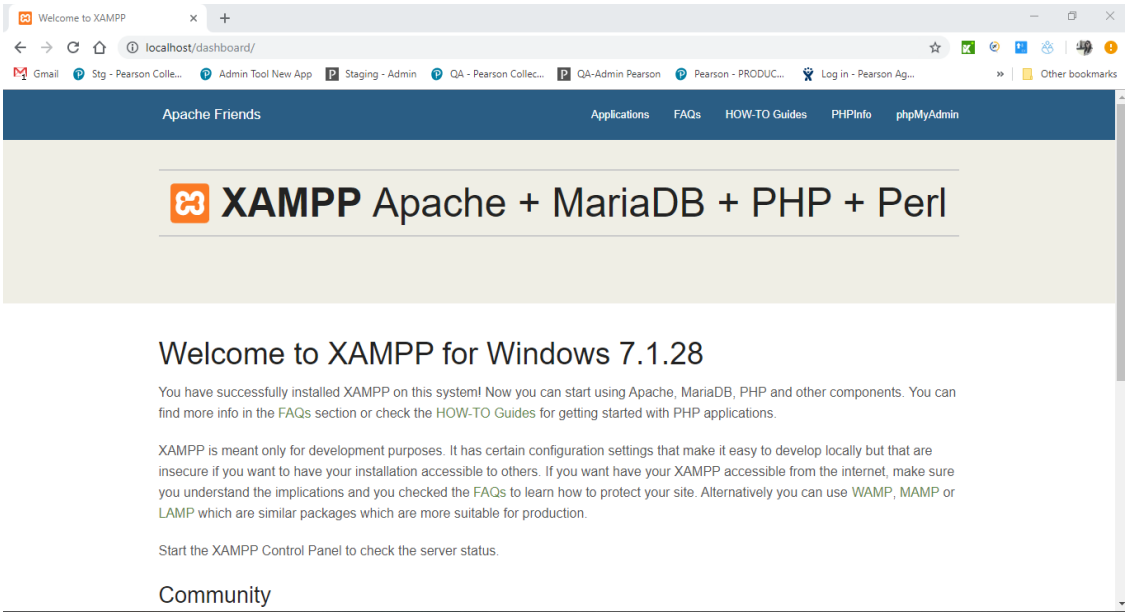

Figure C.8 Localhost Page

Step 05:

Type the “localhost/phpmysdmin” to view the database created via phpMyAdmin. Successful access to the database will display the database with the tables as figured in figure C.9.

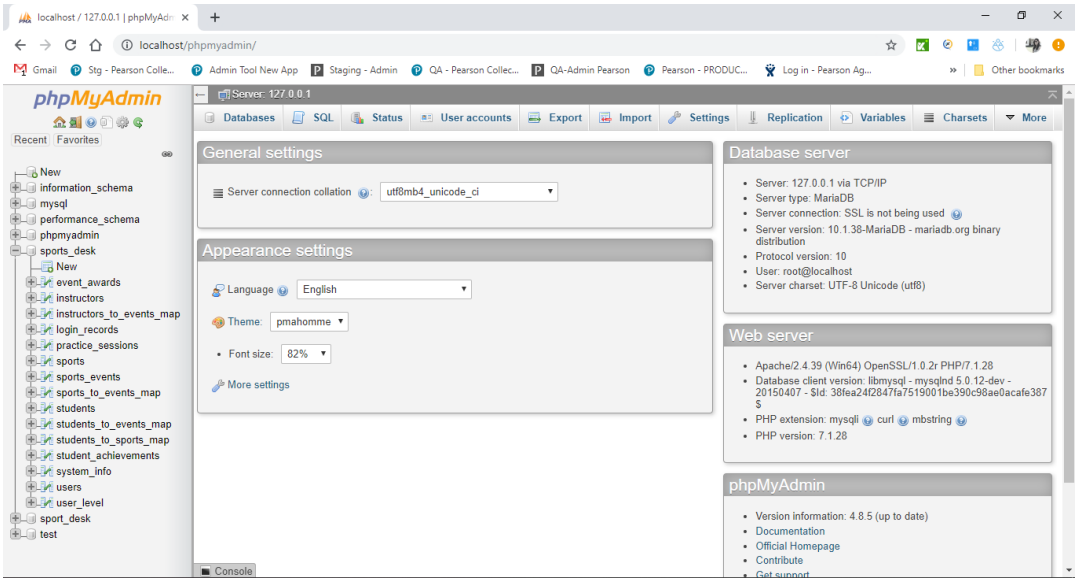

Figure C.9 phpMyAdmin Database

Step 06:

If the user importing the database in a new machine then he should create a database in the phpMyAdmin as “sports_desk” and navigate to Import tab and import the file.

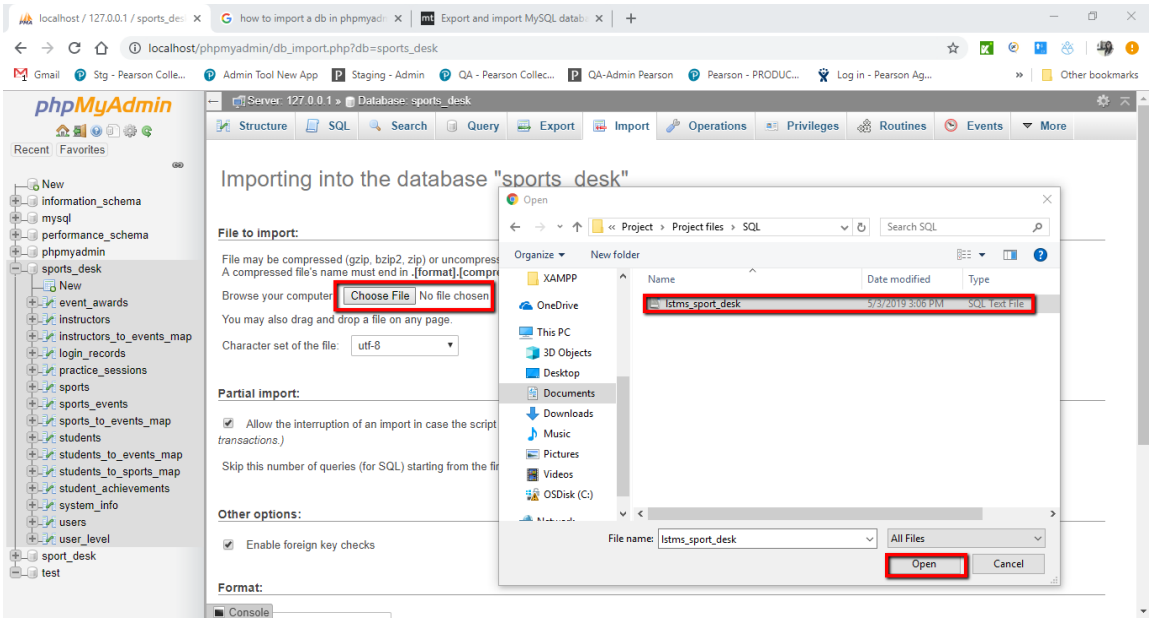

Figure C.10 Import Database

Backend – Deployment Environment Setup

Step 01:

Get the project files and locate them under the XAMPP folder on C: drive. File location will be “ C:\xampp\htdocs”.

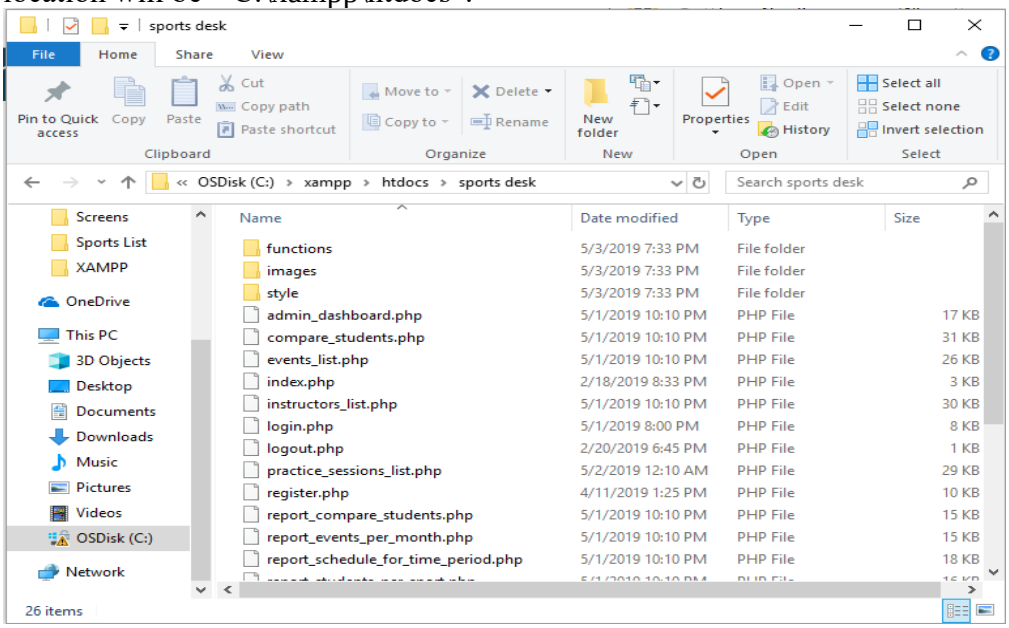

Figure C.11 Project Location

Step 02:

Get the user name of the created folder in htdocs and in the browser use the address “localhost/sports desk” and search.

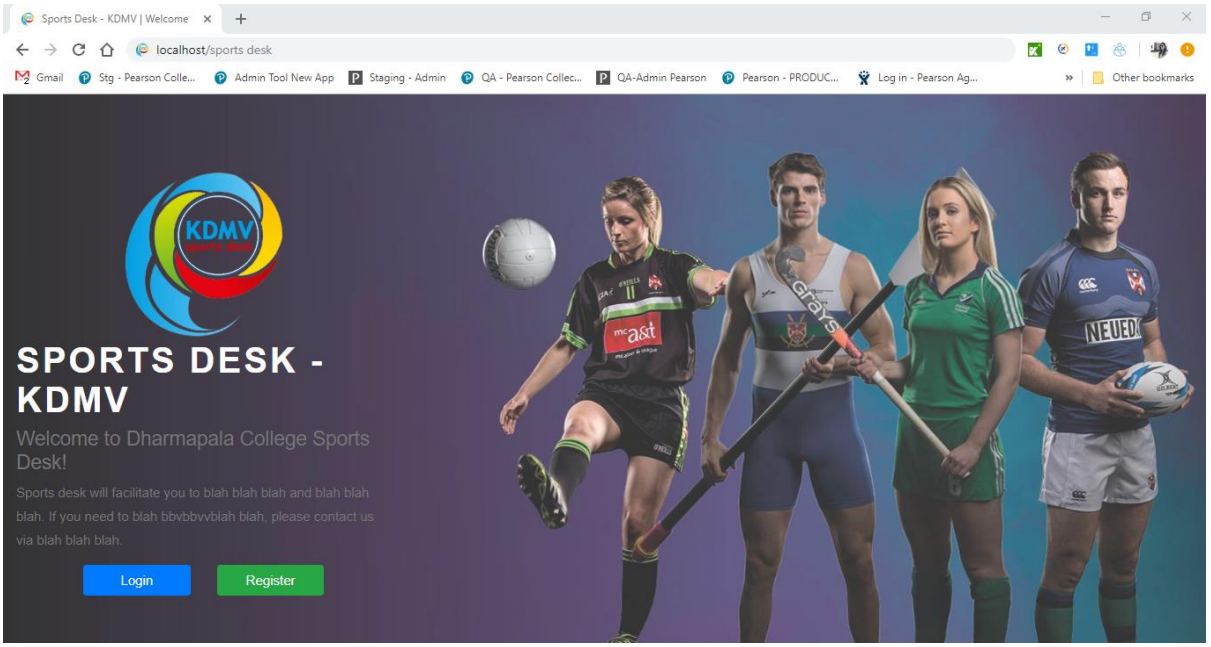

Figure C.12 Accessing Main Page