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Netball Club Information System

Nur Izzati Amani Mohd. Rabiol[1], Nureize Arbaiy[1]*

[1]Fakulti Sains Komputer dan Teknologi Maklumat,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

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***Abstract**: Netball is a popular extracurricular activity that falls into the sports arena at the school. The school has formed a netball sports club to organise practises and competitions. All team and training-related data, along with other pertinent data, is processed manually using logbooks in some school. Due to the rapid advancement of technology and better database administration, a web-based information system is required to manage sports club information more effectively. The Netball Club Information System was created in this project to manage team information, training and scheduling, tournaments, and reporting. The SK Timbang Dayang Kota Belud Sabah co-curricular department is a project stakeholder. Teachers, administrators, and gamers are system users. Prototyping and coding using PHP and MySQL are used to develop the software. This proposed system will help this netball club organization in managing netball club information more systematically.*

***Keywords**: Netball club, Information system, Database*

1. Introduction

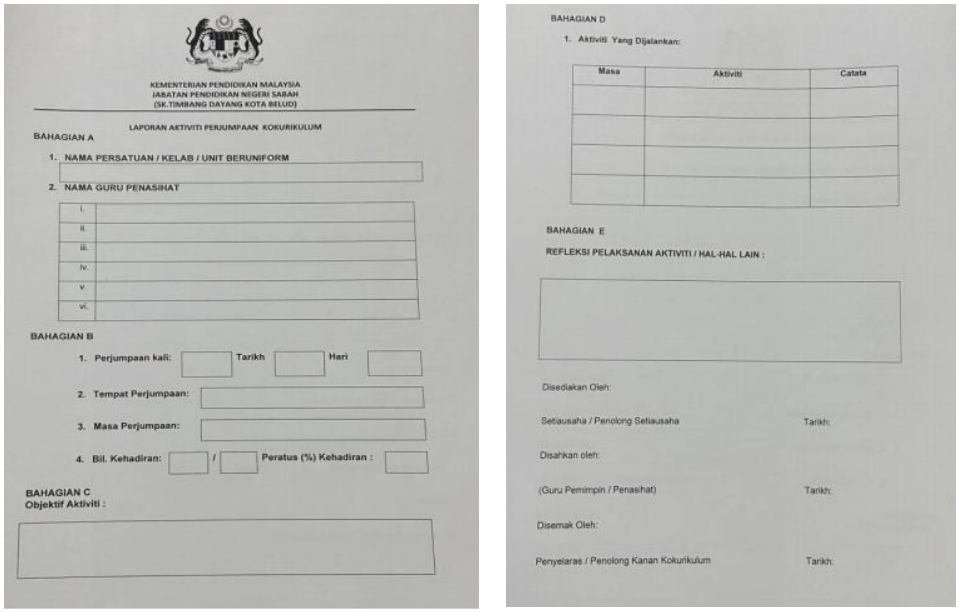
Sports programs are offered in every public school in the nation because they are so beneficial. In this context, sports have a significant impact on the creation of productive, healthy, and active individuals who will improve the nation's social cohesion and economic development [1]. Participants in sports management should plan, direct, and execute these operations in a methodical, useful, effective, efficient, and humane manner. To encourage students to adopt active and healthy lifestyles, many sport events are offered [1]. In Malaysia, netball is a favorite game for most female students in primary, secondary and tertiary universities [2]. Being muscular and flexible is advantageous in netball due to the frequent need for jumping, landing, changing directions, and footwork. As a team sport, netball teaches young athletes critical social and communication skills as they work together to achieve a shared goal.

In this project, Netball Club at SK Timbang Dayang Kota Belud Sabah has been selected as project case study. The netball club was established to manage associated activities while also keeping its data. Clubs help coordinate sports management. Additionally, it can enhance members' social and cooperative abilities, and it can specifically foster student athletes' talents. At present, this netball club's management employs a traditional filing system to store pertinent information in paper form. Because

*Corresponding author: nureize@uthm.edu.my

these sports clubs record and store data using traditional methods, they risk losing data such as training attendance lists and player profiles.

Figure 1 shows the paper-based form. When using a pen and paper, the ink can fade, and the writing becomes illegible. Papers containing this information are also at risk of being damaged by water (flooding) or fire. Besides, administrators have a problem with data retrieval. A traditional file environment could take a lot of time to access certain data because it is slower for data retrieval. It can take an hour to locate a few files in a large paper filing system. A traditional file environment also requires the administrators to check the data one by one and it is reducing the productivity of the organization. Paper-based record filing does not allow for automatic reporting. Users must manually calculate and generate the report. Spreadsheet software, on the other hand, only displays data that has been searched broadly, rather than in specific formats or reports that aid processes such as audits or decision making. Furthermore, in formal situations, notifications are difficult to make.


KEMENTERIAN PENDIDIKAN MALAYSIA
JABATAN PENDIDIKAN NEGERI SABAH
(SK.TIMBANG DAYANG KOTA BELUD)

LAPORAN AKTIVITI PERJUMPAAN KOKURIKULUM

BAHAGIAN A

1. NAMA PERSATUAN / KELAB / UNIT BERUNIFORM
2. NAMA GURU PENASIHAT

i. ii. iii. iv. v. vi.

BAHAGIAN B

1. Perjumpaan kali: Tarikh Hari
2. Tempat Perjumpaan:
3. Masa Perjumpaan:
4. Bil. Kehadiran: / Peratus (%) Kehadiran :

BAHAGIAN C
Objektif Aktiviti :

BAHAGIAN D

1. Aktiviti Yang Dijalankan:

Masa	Aktiviti	Catata

BAHAGIAN E

REFLEKSI PELAKSANAN AKTIVITI / HAL-HAL LAIN :

Disediakan Oleh:

Setiausaha / Penolong Setiausaha Tarikh:

Disahkan oleh:

(Guru Pemimpin / Penasihat) Tarikh:

Disemak Oleh:

Penyelaras / Penolong Kanan Kokurikulum Tarikh:

Figure 1: Co-Curricular Activities Report Form

Based on the current situation and problem that faced by netball club of SK Timbang Dayang Kota Belud, a web-based system with database is needed to support club's data management. This system provides a variety of functions for managing the data stored in the database in a systematic manner. Modules in the new system include registration and login, team members, game and event management, and training management. Administrators can manage player information and system users and generate reports. Besides, players can view their profile, training schedule, performance, letter of authorization and club information. Teachers can add, delete, update the latest information, an authorization letter can be generated, the coach can assess the player's performance and lastly, relevant reports can be generated.

This article contains five sections. The introduction section provides details about the project's background. In the literature review section, topics related to current system procedures, methods, and technologies used for the creation of new systems are discussed, including information management systems, web-based systems, and system comparisons. The project methodology is described in the third section including findings from system analysis and design. The fourth section compiles implementation and testing results. The final section presents the main conclusions.

2. Related Work

Female students in primary, secondary, and tertiary institutions favor it as their game of choice. The development of the Malaysian School Sports Council (MSSM) served as the sport's motivation [3].

There are two teams in netball, each with seven players. In this sport, points are determined based on how many balls are scored the most. All throughout the game, only the striker and goal scorer positions are capable of scoring goals. The game time is divided into 4 quarters [4]. Each quarter has 15 minutes of play. Each quarter has a 4-minute break between the 1st to 2nd quarter and the 3rd to 4th quarter. While the 2nd to 3rd quarter is counted as half time and given a 12-minute safe break. Each team must change court position each time entering a new quarter. Sports play a significant role in helping children achieve their physical potential and express a smart mind that resides in a healthy body [5]. Sports in this context play a significant part in developing people who are healthy, active, and productive to contribute to the social well-being and economic growth of the nation [6]. Strength and agility are aided by the numerous times that jumping, landing, changing directions, and footwork are required in netball.

Netball sports has been part of co- curriculum activity in school. Netball sports activities are done once a week and it can be more if there is an inter-school tournament. During training, players learn a basic skill such as basic ball skills, stamina building and coordination exercises. Each play will take on a position on court and a game consist of 4 x 10 minutes quarters with an interval of 3 minutes after the first and third quarters. In this project Netball Club at SK Timbang Dayang Kota Belud Sabah has been selected as project case study. This school has a netball club for co-curriculum activities, and it is the most active club in this school. The netball club is important because it can improve students' social skills and develop students' talents, especially in sports. This netball club is managed by the schoolteachers. Students that participate in this netball club are students in standard two, three, four, five, and six. The club's management, events, meeting minutes, training, and other information are documented for future reference.

A web-based information system has been chosen as the approach used in system development for the proposed system. A web-based information system, also known as web information system, is an information system which uses Internet web technologies for delivering information and services to users [7]. Web-based information system is the combination of one or more web applications [8]. Web-based applications are compatible on different platforms than traditional installed software. The requirement of the web-based application is a web browser [9]. Therefore, it only needs to be installed on the server which makes the system easier to maintain and update. In addition, web-based applications can be used by multiple users at the same time [10]. It also can reduce costs due to simplified architecture and lower requirements on end-user systems. This application can decrease the risk of losing data due to an unexpected computer virus. Web- based applications provide data backup service either a basic service or the paid backup service.

Table 1: System's Comparison

System / Features	Netball Victoria	Sports Union Club	Badminton Association of Malaysia (BAM)	Netball Club Information System
Registration and login	√	√	X	√
Player profile	√	X	√	√
Event & tournament	√	√	√	√
Training Management & notification	√	√	√	√
Report	√	X	X	√

An investigation has been done to look at the existing relevant system to learn more about system development. The existing related system is any software application that is currently in use. It includes everything from recently released software to software that has been around for years. Most of the

features such as registration and login module, event and tournament module and training management & notification module are available for all systems. The results of this study are important to see the good features that can be implemented in a new system. The effectiveness of the organization in managing the club information can be improved by this newly built system, which was created to manage data utilizing a web-based information system. Table 1 summarizes the comparison.

3. Methodology

A prototype model was chosen for this project. Prototyping is required to confirm some criteria because their expectations might not be clearly stated in specifications. Like other SDLC models, the prototyping model also comprises numerous phases. The first stage will start with analysis to ascertain initial requirements before iterating on the design, building a prototype, and getting consumer feedback. Implementation and testing come after the steps of analysis and iteration. Once that prototype fulfilled the requirement and it will be upgraded with other features until a final product form [11]. As shown in Table 2, each phase has its own assignment and output that must be produced throughout the project development process. Aside from that, the output was completed within the time frame specified.

Table 2: Software development activities

Phase	Task	Output
Analysis	Determine the system requirements and modules as the problem solution.	Proposal Gantt Chart System requirements DFD and ERD diagrams Flowchart
Design	Design the system architecture, database, and system's user interfaces,	System architecture Database schema Data dictionaries User interfaces design
Construct prototype	Construct prototypes in 3 separated parts according to the latest quick design of each module and interface.	Prototypes
Customer evaluation and modification	Determine whether the prototype satisfies the requirements or not. Any modification is needed to add on or remove requirements.	Customer reviews, modification record.
Implementation	Develop the final system, together with the modules based on the prototypes.	System program with functions.
Testing	Use case testing, Records the use case testing result, Analyses results and finalizes the report.	Test case results, final project report.

3.1 Requirement Gathering and Analysis Phase

Requirements define what the system will do, independently of how it does. There are four dimensions of requirements which are project, environment, goals, and system [12]. Requirement analysis is the

process of determining the requirements a developed system must meet, as well as what users expect from the proposed system. Functional and non-functional requirements, user requirements, and system requirements are all part of the system requirements. The system's functional modules are summarized in Table 3.

Table 3: Modules of Netball Club Information System

Modules	Function	User
1. Login and Registration Module	• Allows users to login into the system through ID and password. • The system will direct valid users to the main page. • The system will show error message to invalid users.	Administrator Teacher / Coach Player
2. Player profile Module	• Allow players to edit their profile. • Allow player to view their achievement.	Player
3. Event & Tournament Module	• Allow players to view information about upcoming tournaments. • Allow players to view player achievement records for every tournament. • Allow administrator to update player achievement for every tournament. • Allow teacher / coach to update event details.	Administrator Teacher / Coach Player
4. Training Management & Notification Module	• Allows administrator to edit training schedule for every week. • Allows teacher / coach to record player's attendant for each training session. • Allows teacher / coach to record player's fitness level. • Allows teacher / coach to generate consent letter for player. • Allows players to view notification.	Administrator Teacher / Coach Player
5. Report Module	• Allows users to generate a report for overall achievement.	Administrator Teacher / Coach

Table 4: Functional requirements

	Modules	Function
1.	Registration and login Module	• The system should allow users to login into the system through ID and password. • The system should allow direct valid users to the main page. • The system should show error message to invalid users.
2.	Player Profile Module	• The system should allow users to edit their profile and view their achievement.
3.	Event & tournament Module	• The system should allow users to view information about upcoming tournaments, and view player achievement records for every tournament. • The system should allow users to update the player's achievement for every tournament. • The system should allow users to update event details.
4.	Training Management & Notification Module	• The system should allow users to update the training schedule for every week. • The system should allow users to record the player's attendance for each training session. • The system should allow users to record the player's fitness level. • The system should allow users to generate consent letters for players. • The system should allow users to view notification.
5.	Report Module	• The system should allow users to generate a report.

The level of requirements details could be classified into two types which are functional and nonfunctional requirements. Functional requirement is defined as a main basic action or feature that must be included in a system to support the main driving system activities. Non-functional requirement is defined to present the tasks performance in term of the overall system. The system's functional and non-functional requirements are given in Tables 4 and 5, respectively.

Table 5: Non-functional requirements

No.	Requirements	Description
1.	Operational	• The system should be user-friendly. • The system should be easily maintained and updated. • The system should be able to work on most web browser.
2.	Performance	• The system should be available 24 hours per day. • The system should get access to Internet easily.
3.	Security	• Users can only access their own account with user email and password.

User requirements are defined for the end user. It states how the equipment or process should work in terms of the system that should be developed. User requirements also provide information that forms the basis for further specification, design, and validation of the proposed system. The user requirements are explained in Table 6. The users of the system consist of players, teachers, coach, and administrator.

Table 6: User requirements

No.	User Requirements
1.	Player should be able to input user's ID and password to login into the system.
2.	Player should be able to edit their profile.
3.	Player should be able to view information about upcoming tournament.
4.	Player should be able to view their achievement records for every tournament.
5.	Player should be able to view notification.
6.	Player should be able to log out of system.
7.	Teacher / coach should be able to input user's ID and password to login into the system.
8.	Teacher / coach should be able to record player's fitness level.
9.	Teacher / coach should be able to record player's attendance.
10.	Teacher / coach should be able to update event details.
11.	Teacher / coach should be able to generate consent letter for player.
12.	Teacher / coach should be able to generate a report for overall achievement.
13.	Teacher / coach should be able to log out of system.
14.	Administrator should be able to input admin's ID and password to login into the system.
15.	Administrator should be able to update player achievement for every tournament.
16.	Administrator should be able to update training schedule for every week.
17.	Administrator should be able to generate a report for overall achievement.
18.	Administrator should be able to log out of system.

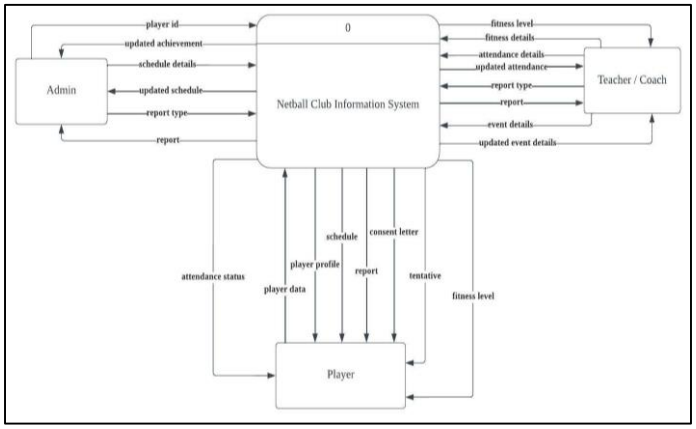


Figure 2: Context Diagram

Context diagrams present an overview of interaction between the system and its user. Context diagram also shows the input and output to and from its user and system. **Figure 2** and **Figure 3** show the context diagram and level 0 diagram of the new system.

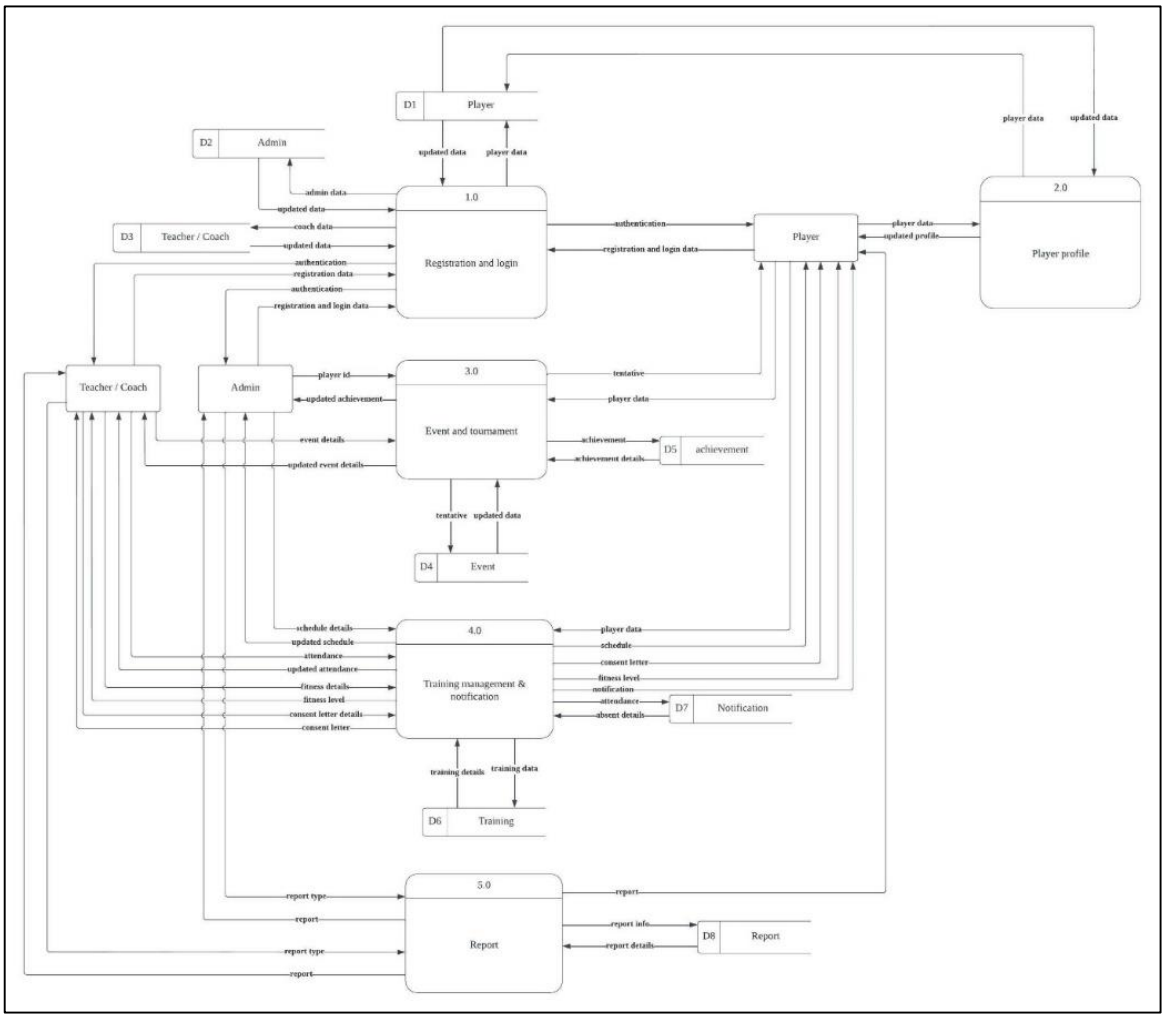


Figure 3: Data Flow Diagram Level 0

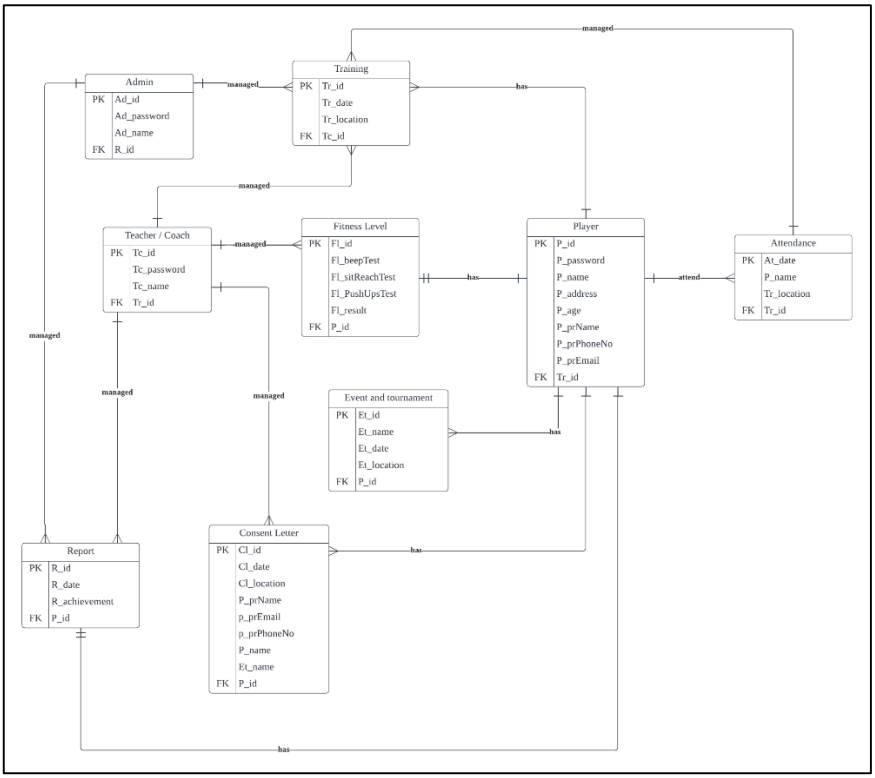


Figure 4: Entity Relationship Diagram

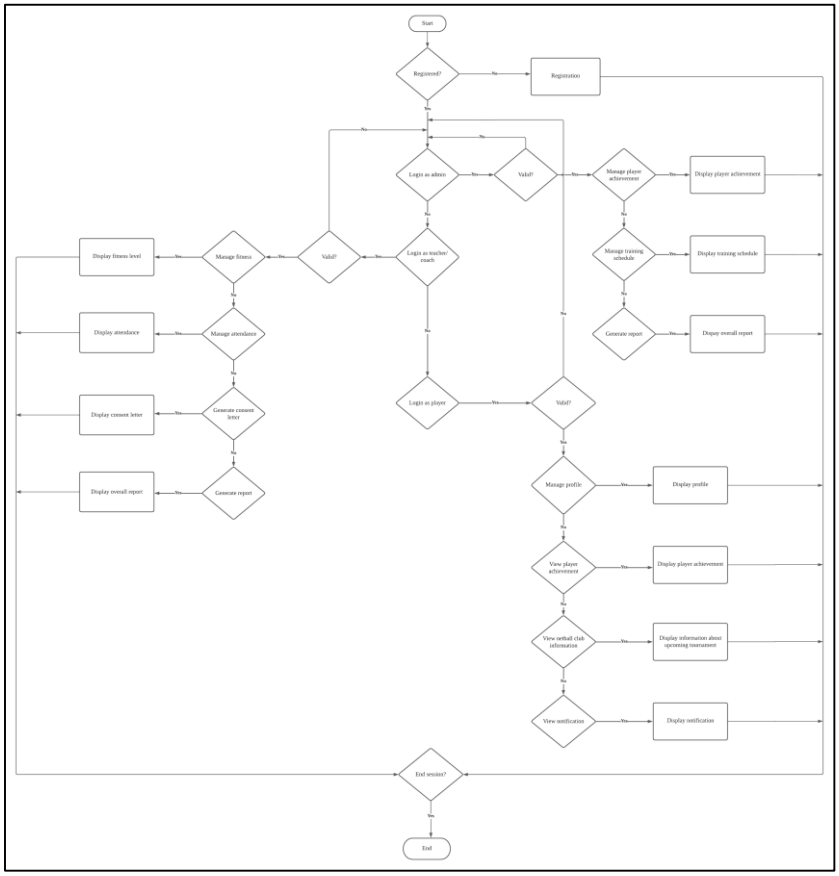


Figure 5: System's Flowchart

Entity relationship diagram (ERD) is a graphical representation among the users, objects, places, or events within the information technology system. An ERD uses data modelling technique to define the business process for a relational database. Figure 4 shows ERD for the netball club information system. It has nine entities which are player, teacher/ coach, administrator, event and tournament, training, fitness level, attendance, consent letter and report.

Flowchart is a type of diagram that represents a workflow or process in sequence order. It is a generic tool that can be adapted for a variety of processes to solve a problem, develop understanding of how the process is done and to study an improvement process on the system. Figure 5 shows a flowchart diagram for the netball club information system.

3.2 System Design

Web application architecture describes the interfaces between apps, middleware systems, and databases to ensure that several applications may work together. With any typical web application, there are two different codes (sub-programs) running side-by-side which are client-side code that is in the browser and responds to some user input and server-side code that is on the server and responds to the HTTP requests. Figure 6 shows the fundamental system architecture for the web based for Netball Club Information System.

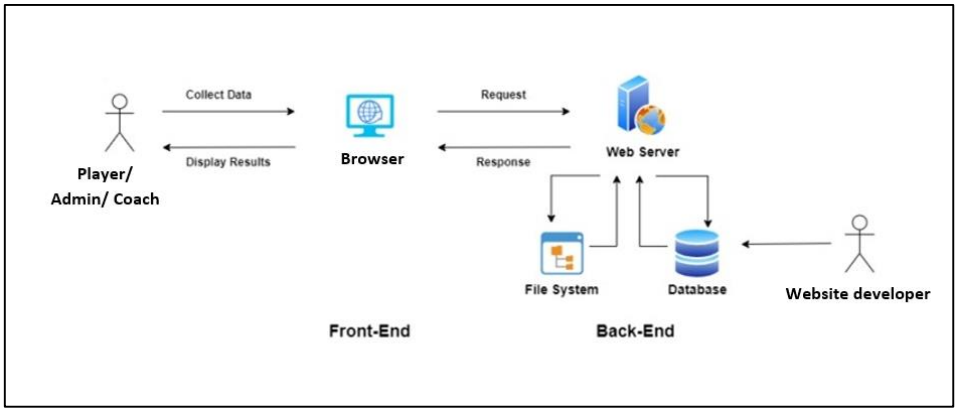


Figure 6: System Architecture

The relational schema for database tables is listed as follows:

i. `Player (P_id, P_password, P_name, P_address, P_age, p_prName, p_prPhoneNo, p_prEmail, Tr_id)`
ii. `Admin (Ad_id, Ad_password, Ad_name, R_id)`
iii. `Coach (Tc_id, Tc_password, Tc_name, Tr_id)`
iv. `Training (Tr_id, Tr_date, Tr_location, Tc_id)`
v. `Fitness Level (Fl_id, Fl_beepTest, Fl_sitReachTest, Fl_PushUpsTestFl_result, P_id)`
vi. `Event and tournament (Et_id, Et_name, Et_date, Et_location, P_id)`
vii. `Attendance (At_date, P_name, Tr_location, Tr_id)`
viii. `Consent Letter (Cl_id, Cl_date, Cl_location, p_prName, p_prPhoneNo, p_prEmail, P_name, Et_name P_id)`
ix. `Report (R_id, R_date, R_achievement, P_id)`

Figure 7 to Figure 14 show interface design for registration and login, player profile, event, training schedule, attendance, and report page.

Figure 7: Login page

Figure 8: Registration page

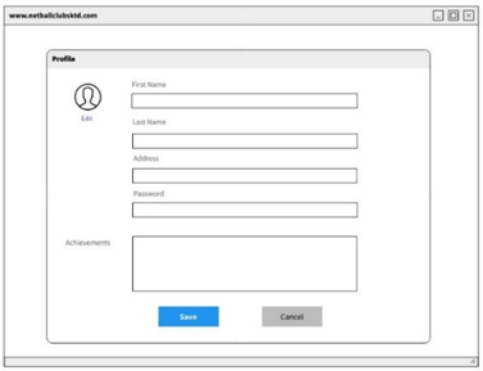


Figure 9: Player profile page

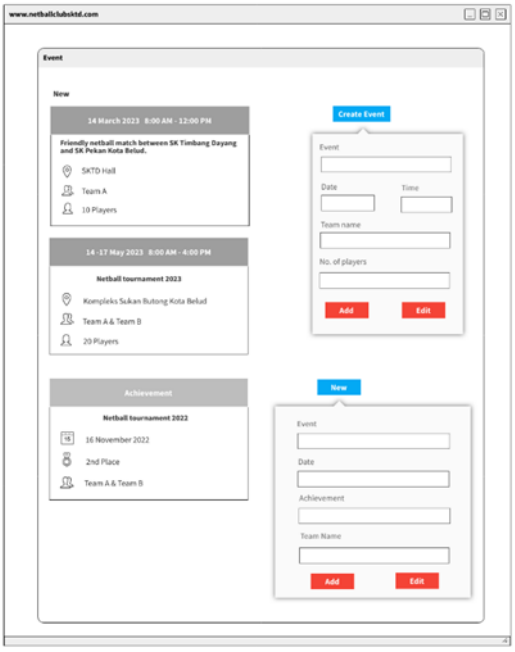


Figure 10: Event page

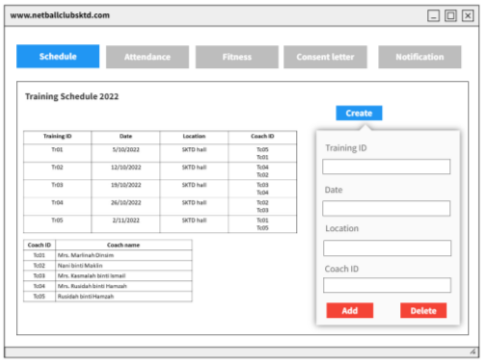


Figure 11: Training schedule page

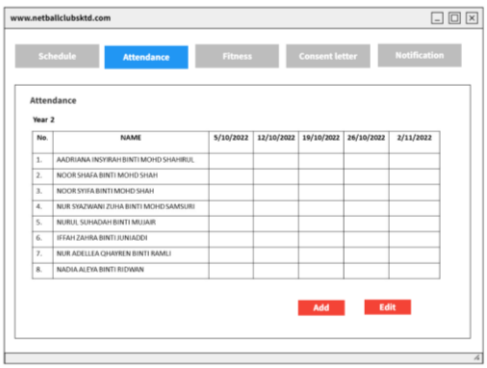


Figure 12: Attendance page

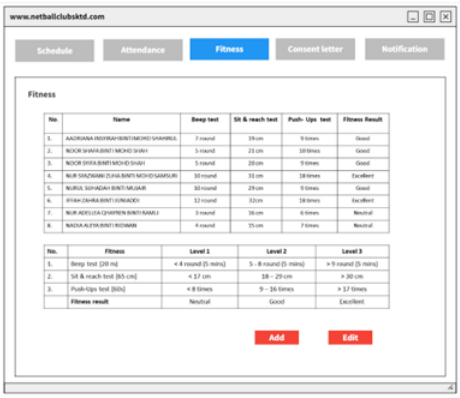


Figure 13: Fitness level page

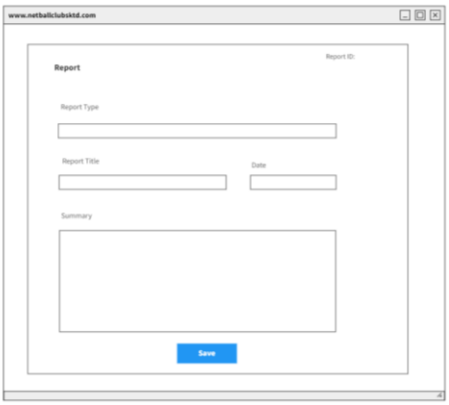


Figure 14: Report page

After that, a programming language and software for system development will be used to put this user interface design into practice. The results of the testing and implementation will be discussed in the next section.

4. Result and Discussion

To implement this project, system modules development is using several software like XAMPP and Visual Studio Code. The coding languages used are HTML, CSS, JavaScript, and PHP programming languages for developing the website.

4.1 Registration and Login Module

The username and password are needed for the login process, as shown in Figure 15. In accordance with the user's user role type, the system takes them to their homepage. Figure 16 illustrates how a for loop is used to validate user authentication while a switch case will lead the user to the homepage based on their user role.

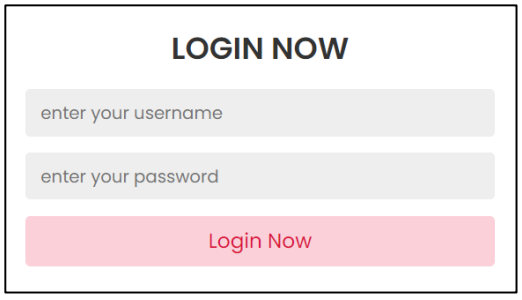


Figure 15: Login interface

Figure 16: Login code segment

4.2 Player Profile Module

Figure 17 and Figure 18 show the server-side coding and the user interface of the player profile module.

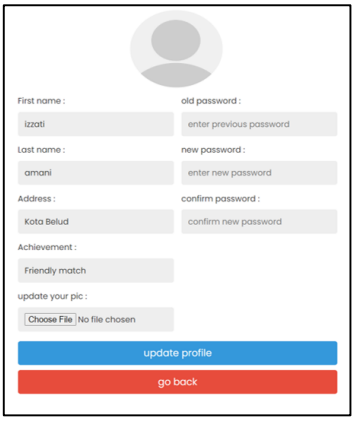


Figure 17: Player profile interface

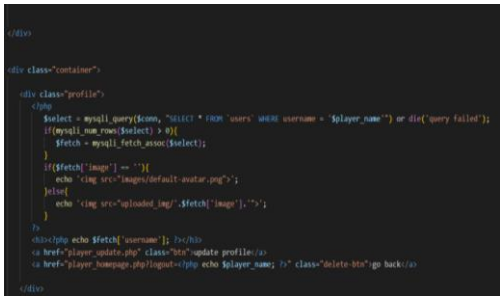


Figure 18: Player profile code segment

4.3 Event and Tournament Module

Figure 19 and Figure 20 show the server-side coding and the user interface of the event and tournament module.

Figure 19: Event and Tournament interface

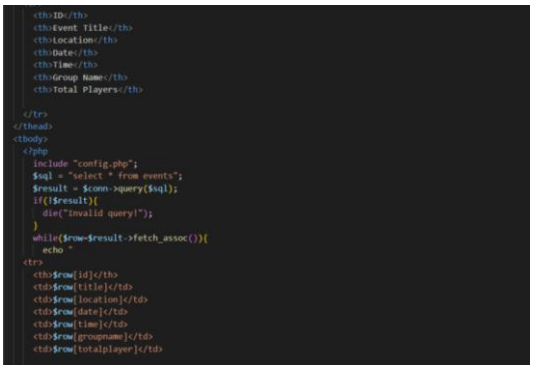


Figure 20: Event and tournament code segment

4.4 Training Management and notification Module

Figure 21 and Figure 22 show the server-side coding and the user interface of the training management and notification module.

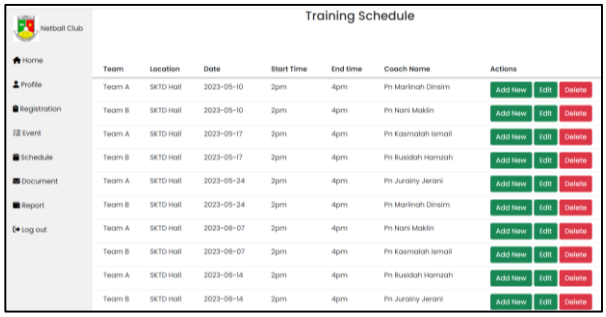


Figure 21: Training Management interface

Figure 22: Training Management code segment

4.5 Report Module

The server-side coding and user interface of the report module are shown in Figures 23 and 24.

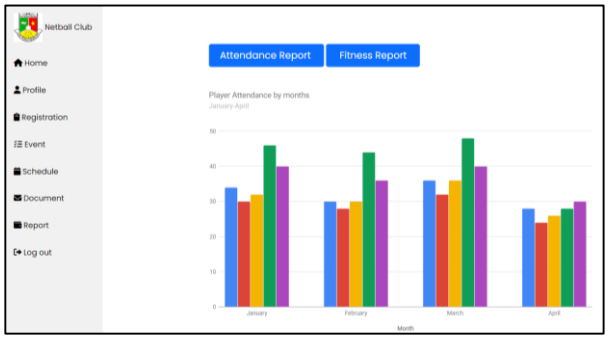


Figure 23: Report interface

```
while($post=mysqli_fetch_assoc($record)) {
  ?>

    <tr>
      <td><?php echo $post['playerID']; ?></td>
      <td><?php echo $post['name']; ?></td>
    <td><?php echo $post['date']; ?></td>
    <td><?php echo $post['attendance']; ?></td>
    </tr>

<?php } ?>

    </tbody>
  </table>
</div>

    <div class="text-center">
      <button onclick="window.print();" class="btn btn-primary" id="print-btn">Print</button>
    </div>
```

Figure 24: Report code segment

5. Conclusion

The Netball Club of Sk Timbang Dayang Kota Belud Sabah is the target audience for this system. Several modules are offered and created as the netball club's solution after analysing the problems experienced while handling the club's information. The three categories of users are teachers, administrators, and players. Regarding the state of the school's sports data management procedures, it is clear that the management must make use of the modern digital technology resources that are very helpful to data management. A combination of computer technology, information systems, databases, and Internet technologies can help these sports clubs store their data more efficiently. As a result, a web-based information management system for the school netball club is suggested in the project to control the process of data storage and management as well as report production. It offers the benefit of long-term data storage in addition to simplifying the system for consumers.

Acknowledgment

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