



School Management System for Dutuwewa Maha Vidyalaya

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Abstract: This report presents the design and implementation of a comprehensive School Management System for Dutuwewa Maha Vidyalaya, a streamlined, user-friendly platform aimed at improving efficiency and communication within the school. Existing manual systems often focus on singular functionalities like attendance or grade taking, but there is a growing need for an integrated approach that addresses multiple administrative, academic, and communicative needs. The School Management System provides a centralized platform for school administrators, teachers, students, and parents to seamlessly manage and interact with key aspects of school life, including student enrolment, attendance, event management, resource allocation, and communication. With tools to support notifications, grade selection, and attendance taking, the system promotes increased transparency and engagement between the school and its community. By offering an intuitive interface and robust features, the system enhances operational efficiency, improves communication, and contributes to the school's overall success in meeting academic and administrative goals

Keywords: School Management System, Administrative automation, educational communication, Digital Transformation.

I. INTRODUCTION

Educational institutions generate and manage a large volume of academic, administrative, and student-related information in day-to-day activities. Effective management of this information is essential for supporting administrative decision making, maintaining accurate student records, facilitating communication, and improving the overall efficiency of school operations. Traditionally, many schools have relied on manual procedures and paper-based records to perform activities such as student enrolment, attendance management, assessment recording, event management, and communication. Although these approaches can support basic administrative activities, they can become time-consuming and difficult to manage as the volume of information and the number of stakeholders increase.

Manual school management processes can create several operational challenges. Paper-based records require physical storage and manual retrieval, which can make accessing information less efficient and increase the chances of errors in record keeping. Similarly, manually recording the student information and attendance is a time-consuming activity for both teachers and administrative staffs, communication between the school, teachers, students and parents will be less efficient and increase the possibility of errors in record keeping when information is distributed through conventional methods. These challenges indicate the need for computerized systems that can be used to store the information in a centralized manner and support the school activities through and integrated digital environment.

Dutuwewa Maha Vidyalaya, like many educational institutions, has traditionally relied on manual procedures to manage various administrative and academic activities, including student enrolment, attendance, communication, leave processing, appointment scheduling, resource management, report cards and assignments. These manual processes can create difficulties in managing school information efficiently and coordinating activities among school stakeholders. The study conducted at the school identified challenges in the existing management processes, while feedback from school staff indicated the need for a more efficient, centralized, and accessible approach. To address these issues, this study proposes a web-based School Management System (SMS) that integrates multiple school management functions into a single digital platform. The system provides role-specific access for administrators, teachers, students, and parents, supporting activities such as student enrolment, attendance tracking event management, resource allocation, assessment and grade management, appointment scheduling, assignment management, leave processing, and communication through notifications.



The proposed School Management System was developed using HTML, CSS, JavaScript, PHP, and MySQL, with Bootstrap supporting the user interface. Authentication and role-based access mechanisms are incorporated to ensure that users can access information and functions relevant to their responsibilities. The system was evaluated through unit, integration, functional, end-to-end, and security testing to assess the functionality and interaction of its major modules. The main contribution of this study is the design and implementation of an integrated web-based platform tailored to the management requirements of Dutuwewa Maha Vidyalaya. By digitalizing selected manual processes and centralizing school information, the system aims to improve administrative efficiency, facilitate timely access to academic and operational information, reduce dependence on paper-based records and strengthen communication among administrators, teachers, students, and parents.

II. SYSTEM DESIGN

The system describes the system design of the school management system (SMS) developed for Dutuwewa Maha Vidyalaya. It presents the use -case diagrams, class diagrams, requirement analysis, functional and non-functional requirements and database designs. The system was designed to support the schools' administrative and academic activities through a centralized web-based platform. The design incorporates four main user roles: Administrator, teacher, student and parent. Each role is provided with access to relevant system functions according to its responsibilities. The use case diagrams illustrate user interactions, the class diagram represents the structural design of the system, and the enhance entity relationship diagram (EERD) describes the organization of the database.

A.USE-CASE-DIAGRAMS

A use-case diagram is a graphical representation of the interactions between users and a system. It identifies the actors who interact with the system and the functions they can perform. In the proposed school management system, the use-case diagrams represent the interactions of the administrator, teachers, students and the parent with the system. Separate diagrams are used to illustrate the login process and the management activities associated with each user role.

ADMINISTRATOR: The administrator is responsible for managing the main administrative functions of the system. These functions include adding and viewing student and teacher record, managing parent information, maintaining user profiles, managing classes and school resources, creating events, viewing attendance information, and issuing notifications. The administrator also manages information requires for the overall operation of the system.

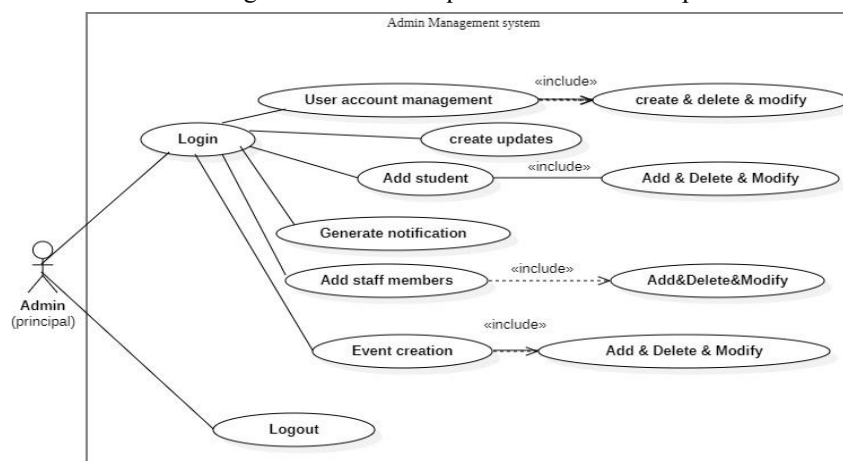


Fig. 1 Administrator Use Case Diagram

TEACHERS: teachers interact with the system to perform academic and classroom management activities. Their functions include marking student attendance, managing classroom resources, scheduling appointments, managing assignments, recording student marks, and submitting leave information. These functions support the maintenance of academic record and the management of daily teaching activities.

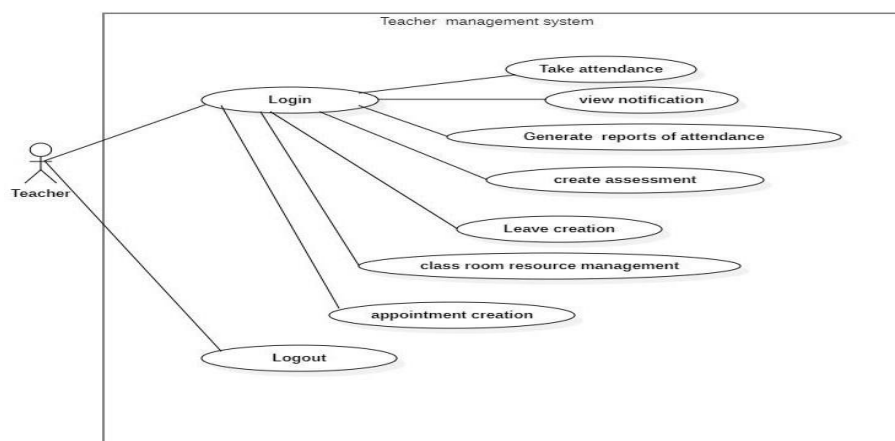


Fig. 2 Teacher Use Case Diagram

STUDENTS: Students use the system to access relevant academic information. The available functions include viewing attendance records, accessing assignment and marks information, viewing personal profiles, and submitting comments through the system. These functions help students access their academic information and interact with the school management platform.

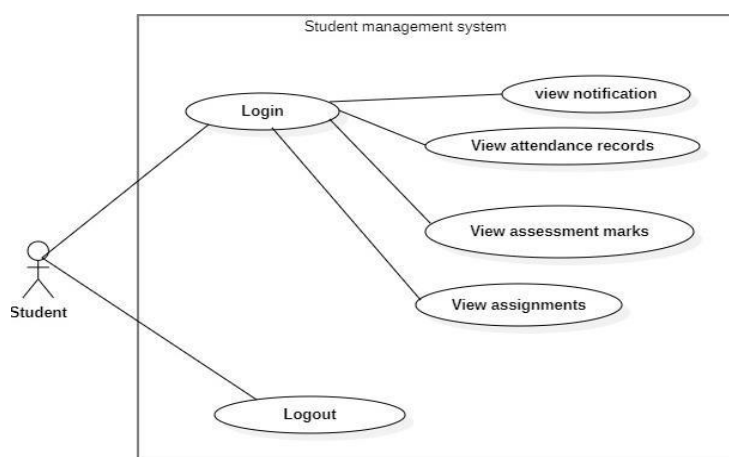


Fig. 2 Student Use Case Diagram

PARENTS: Parents can use the system to view their children's academic details and access relevant information provided by the school. The system also supports the submission of complaints and access to parent profile information and interact with the school management platform.

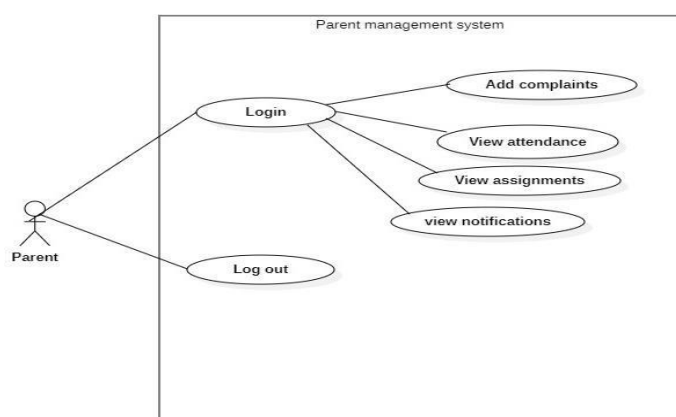


Fig 4.Parent Use Case Diagram



The use case diagrams provide an overview of the system's functional scope and illustrate how its main users interact with the available services.

B.CLASS DIAGRAM

A class diagram represents the structural organization of an object-oriented system by illustrating its classes and the relationships among them. In the proposed School Management System, the classes and the relationships among them. In the proposed School Management System, the class diagram represents the main classes involved in managing school information and supporting the system's administrative and academic functions. It provides a structural view of the system and helps describe how related information and operations are organized. The class diagram, presented in Fig.5, forms part of the proposed software design and supports the organization of the system's main components.

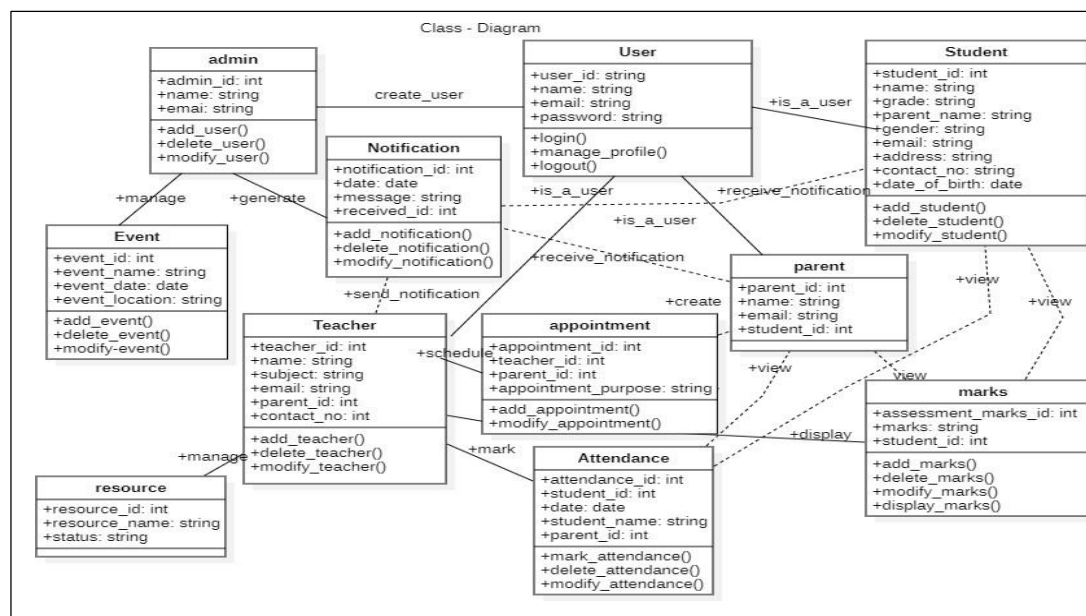


Fig. 3 Class diagram

C.REQUIREMENT ANALYSIS

Requirement analysis identifies the functions and operational needs that the School Management System must address. The requirements were considered in relation to the existing school management activities at Dutuwewa Maha Vidyalaya, where manual procedures were used for several administrative and academic tasks. The proposed system brings these activities together within a centralized web-based platform.

The system requirements include maintaining student and teacher information, recording student attendance, managing assessment information and assignments, maintain school resources, managing events and appointments, processing leave-related information, and facilitating communication through notifications. In addition, the system will provide different interfaces for administrators, teachers, students and parents. User authentication and role-based access help to ensure that the users interact with functions relevant to their assigned roles.

D. FUNCTIONAL REQUIREMENTS

Functional requirements specify the operations that the School Management System is designed to perform. The main functional requirements are as follows:

- User Authentication: The system provides a login facility for administrators, teachers, students, and parents.
- Student Management: The administrator can add and view student information and maintain relevant student record.
- Teacher and Parent Management: The administrator can manage teacher and parent information within the system.
- Attendance Management: Teachers can record student attendance, while authorized users can access relevant attendance information.



- Assessment and Marks Management: Teachers can record student marks, and students can view their available marks information.
- Assignment Management: : Teachers can manage assignments, and students can access assignment-related information.
- Resource Management: The system supports the management of school resources by authorized users.
- Event Management: : The administrator can create and manage school events and provide related information to users.
- Appointment and Leave Management: The system supports appointment-related activities and the recording of leave information.
- Communication: Students can submit comments, while parents can submit complaints through the available system functions.

These functional requirements provide the basis for integrating the school's main administrative and academic activities into one platform.

E. NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements describe the quality attributes expected of the School Management System. The following requirements are relevant to the operations of the proposed web- based platform.

- Usability: The system should provide a clear and understandable interface so that administrators, teachers, students, and parents can use the functions available to them.
- Security: Authentication and role-based access should restrict access to system functions and information according to user permissions.
- Reliability: The system should perform its intended functions consistently and maintain accurate school records.
- Performance: The system should process routine user requests and retrieve stored information within a reasonable time.
- Maintainability: The system should support future corrections, updates and improvements to its software components.
- Accessibility: The web-based interface should enable authorized users to access relevant school information through supported web browsers.

These requirements support the development of a system that is usable, secure, and suitable for routine school management activities.

F. DATABASE DESIGN

Database design is an important part of the School Management System because the platform relies on structured data to manage administrative and academic information. The database design is represented using an Enhanced Entity-Relationship Diagram (EERD), which illustrates the organization of the data and the relationship among its entities. The EERD presented in Fig.6 forms part of the proposed design.

Fig. 4 Enhanced Entity- Relationship Diagram (EERD)

Fig. 5 Enhanced Entity- Relationship Diagram (EERD)

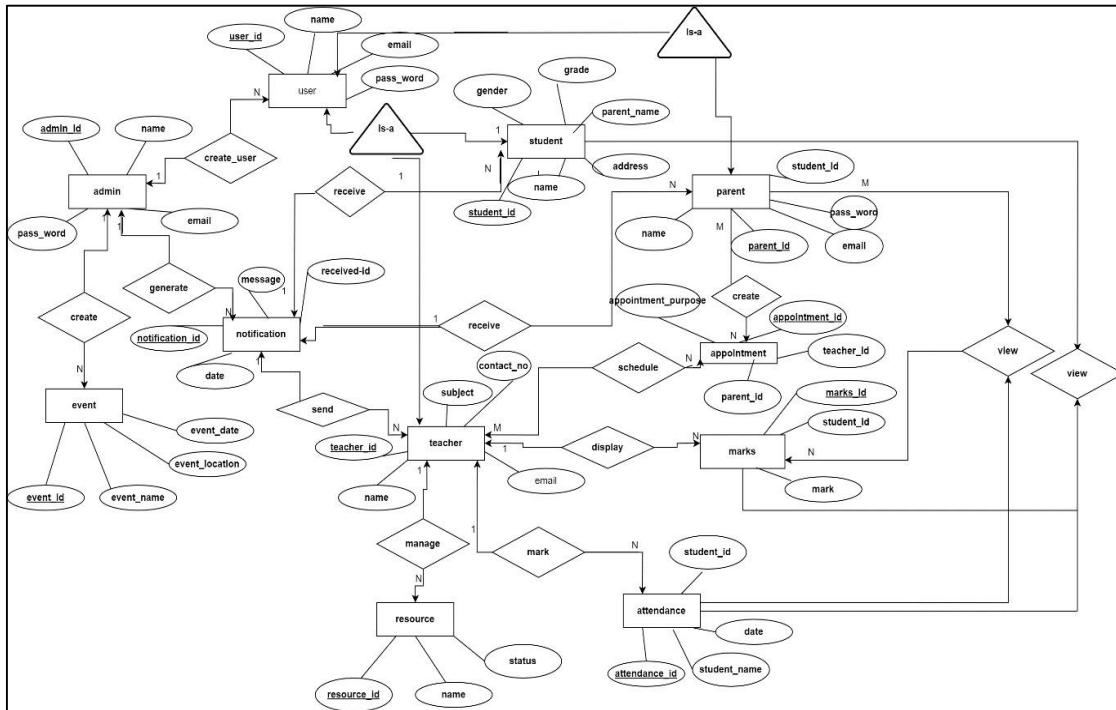


Fig. 6 Enhanced Entity- Relationship Diagram (EERD)

The system uses MySQL as its database management system and PHP for server-side processing and database integration. The database supports the storage and management of information required by the system, including student, teacher, parent, attendance, assessment, assignment, event, resource and user-related records. Organizing these records in a structured database enables the application to store, retrieve, and update information through its various modules.

The database design supports the integration of the system's main functions and provide a common data source for authorized users. For example, student information is used in student management and academic activities, while attendance and assessment records supports the viewing of relevant student information. Appropriate relationships between related record help maintain data consistency and support the operation of the system's administrative and academic modules.

III.RESULTS

The School Management System developed for Dutuwewa Maha Vidyalaya was implemented as a web-based application to support the school's administrative and academic activities. The system provides separate interfaces for administrators, teachers, students, and parents, allowing users to access functions according to their roles. The implemented modules were evaluated through functional testing, and the results demonstrated that the tested operations performed as expected. The main interfaces and testing results of the system are described below.

A. LOGIN FORM

The login interface provides access to the School Management System for registered users. Users enter their login credentials to access the relevant dashboard. The system validates the entered credentials and provides access when valid details are supplied. When invalid credentials are entered, an error message is displayed to inform the user that the login attempt was unsuccessful. Figure 7 and 8 illustrates the successful and unsuccessful login test cases, respectively.

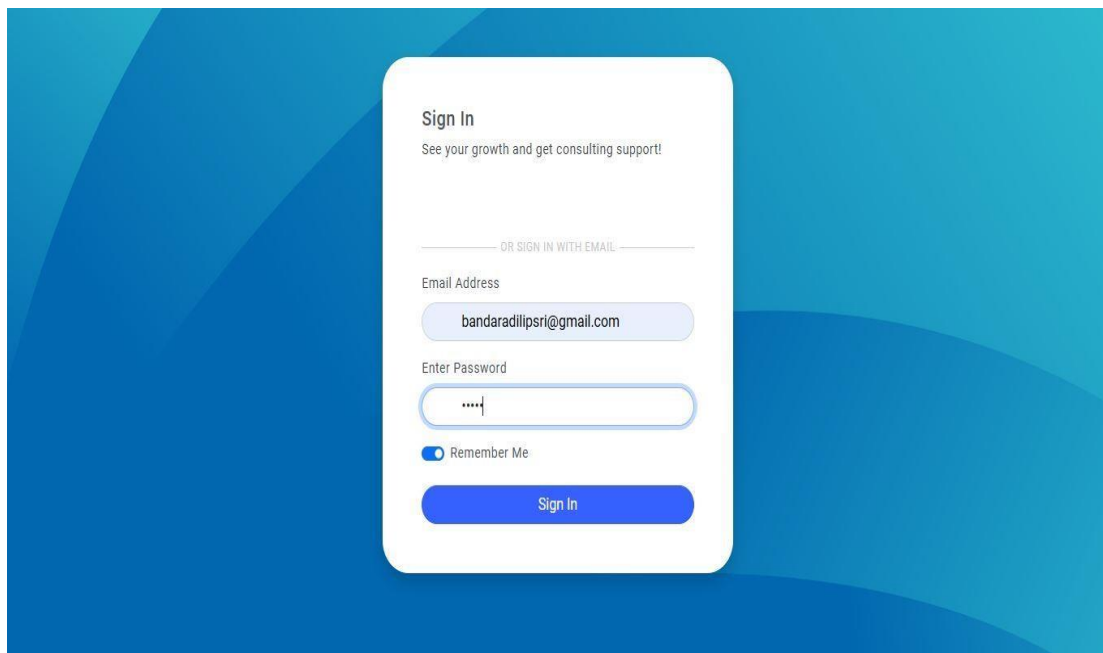


Fig. 6 Successful Login

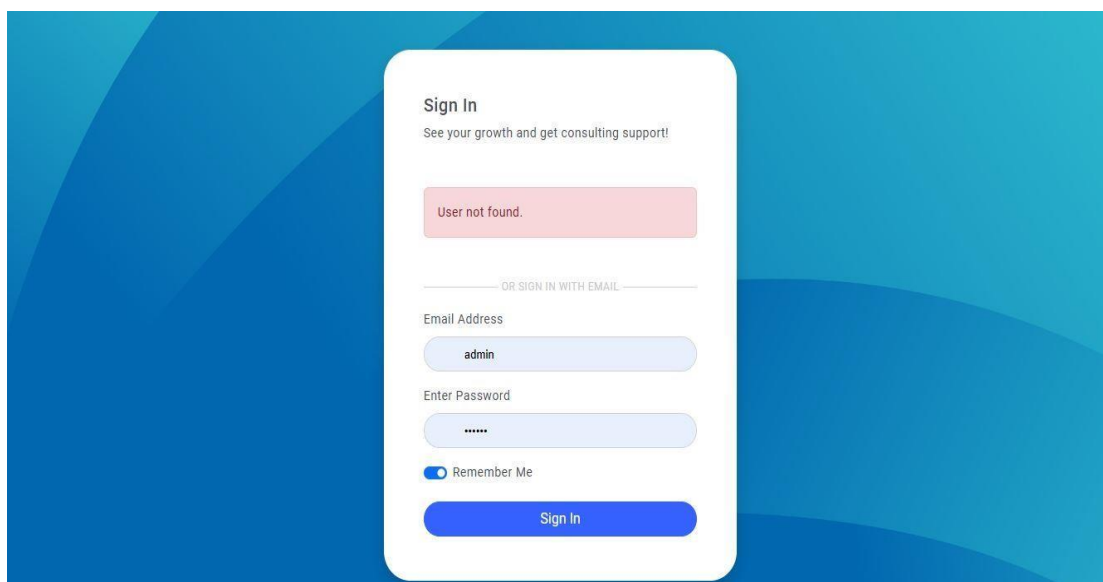


Fig. 7 Unsuccessful Login

B. STUDENT ENROLLMENT FORM

The student enrolment module enables the administrator to register new students in the system. The form collects student information, including the student's name, initials, address, telephone number, class details, parent information, and registration email. After the information is entered, the administrator can save the student record. The testing process also examined the system's response when an existing email address was used, with an error message displayed for the invalid registration attempt. Figure 9 illustrates the student enrolment interface, while Figure 10 shows the error message generated during testing.



Fig. 8 Add Student

Fig. 9 Pop-up error

C. STUDENT ATTENDANCE MANAGEMENT

The attendance management module enables teachers to record student attendance. The teacher selects the relevant class to display the students associated with that class and then marks each student's attendance status. The attendance information is saved in the system for subsequent access. During testing, the system successfully displayed the attendance management interface and updated attendance records. It also displayed an error message when a class had not been selected before attempting to display students. Figure 11 and 12 illustrates the attendance marking and attendance display interfaces.



Student Name	Present	Absent
Isuru frenando	☐	☐
Udunuwara Gedara sayuri Nimsara	☐	☐
chathusha sewwandi	☐	☐
Udunuwara Gedara Nimasha Priyamali	☐	☐
V G M Tharusha Ranaweera	☐	☐
R M S wimukthi Rathnayaka	☐	☐
K G N Ranjith Kumara	☐	☐
A N G A Imeshika Gunarathne	☐	☐

Fig. 10 Attendance Marking

Grade	Status	Date
GRADE 2025 A/L ART	present	2024-11-10
GRADE 2025 A/L ART	present	2024-11-18

Fig. 11 Attendance Display

D. EVENT MANAGEMENT

The event management module enables the administrator to create and manage school events. Relevant event details are entered through the event management interface and saved in the system. The testing process examined the creation, modification, and deletion of event information. The recorded test results indicated that the event management interface operated as expected and that newly created event information was saved successfully. Figure 13 shows the event creation interface and Figure 14 illustrates the saved event information.

Fig. 12 Add Event

Fig. 13 Add Event



Fig. 13 Add Event

Fig. 14 View Event

IV. CONCLUSION

The proposed School Management System helps automate the existing manual activities at Dutuwewa Maha Vidyalaya. It provides a centralized web-based platform for managing student information, attendance, academic details, school events, assignments, learning resources and communication between teachers, students, and parents. The system reduces paperwork, simplifies administrative tasks, and enables authorized users to access relevant information when needed. It also supports timely communication through notifications and provides validation mechanisms to reduce data-entry errors. Furthermore, maintaining school information in a centralized database design can help the administration manage records more efficiently and support informed decision making. Therefore, the proposed School Management System offers a practical solution for improving information management, administrative efficiency, and collaboration among the school's stakeholders.

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