APPLIED INFORMATION TECHNOLOGY AND COMPUTER SCIENCE
e-ISSN: 2773-5141

AITCS

Vol. 6 No. 2 (2025) 300-319
https://publisher.uthm.edu.my/periodicals/index.php/aitcs

DunBian Club Event Management System

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DOI: https://doi.org/10.30880/aitcs.2025.06.02.017

Article Info

Received: 11 June 2025
Accepted: 3 November 2025
Available online: 30 November 2025

Keywords

Event Management System, Event, DunBian Club, Web-based System

Abstract

The Secretariat of Chinese Debate at University Tun Hussein Onn Malaysia (UTHM) faces challenges in managing events due to reliance on scattered tools like Google Forms and social media platforms, leading to inefficiencies, miscommunication and time-consuming verification tasks. The DunBian Club Event Management System project aims to address these issues by developing a centralized, web-based platform to streamline event promotion, registration, recruitment and feedback collection. The system is built using an iterative waterfall methodology with PHP, MySQL, HTML, CSS and JavaScript. The developer used tools such as Visual Studio Code for coding and XAMPP for local hosting and testing to ensure efficient processes. The findings show that it reduces administrative tasks and minimizes errors, thereby improving the overall management and success of the DunBian Club's events.

1. Introduction

The Secretariat of Chinese Debate, commonly known as DunBian Club established in 2017 under the Pejabat Hal Ehwal Pelajar (HEPA) at Universiti Tun Hussein Onn Malaysia (UTHM) to promote the art of debate among students. The club organizes various activities ranging from competitive debates to casual events like escape room challenge which aims to enhance student engagement and awareness. However, the club faces challenges in managing its events and activities due to reliance on fragmented tools and manual processes. Event promotions are primarily conducted through social media platforms like Facebook and Instagram which limit visibility. Registration and payments rely on Google Forms and external banking apps, leading to inefficiencies and inconsistencies. Back and forth communication with participants for managing interviews is managed through WhatsApp groups, creating disorganization and increasing the administrative workload. Furthermore, the club lacks a systematic way to track participant engagement, reducing its ability to involve active members.

To address these issues, the development of a centralized Event Management System is proposed. The primary objectives of this project are to design, develop and test a web-based DunBian Club Event Management System to manage event promotion, event registration, event recruitment and feedback collection. The target user of the project includes the administrator and the students. The system consists of seven modules, including user registration and authentication, event management, event recruitment management, feedback management, student profile management, reporting and announcement management. By streamlining operations, the system aims to produce a user-friendly platform that reduces administrative workloads, improves communication, enhances participant engagement, builds a dynamic and engaged community centered around debating. Adopting such event management systems reduces reliance on outdated tools which could make event management more effective and resource efficient [1]. With features like digital registration, automated workflows and post-event data analytics, Event Management System platforms play a vital role in making event management more organized, scalable and impactful [2].

2. Related Work

2.1 Study of Current System in DunBian Club

Currently, the DunBian Club begins by posting announcements on social media to attract students interested in organizing events. Interested students will complete and submit a Google Form, after which the club committee reviews applications, shortlists qualified candidates and arranges interview time slots via WhatsApp. Successful applicants are assigned roles and added to a group chat to begin planning an event. Then, it promotes events through social media platforms such as Instagram and Facebook to reach potential participants and sets up physical booths at UTHM Parit Raja (main campus) and Pagoh (branch campus) to encourage student engagement. Registration links are shared in social media captions and students register via Google Forms. For paid events, participants use external banking apps and upload payment proofs which the administrator manually verifies through banking apps or TNG eWallet. When registrations are near capacity, announcements are posted and forms are closed once full. Furthermore, a day before each event, the club will send reminders via WhatsApp groups to inform participants of the upcoming event. On the day of the event, attendance is recorded using physical sign-in sheets. The post-event feedback is collected via online Google Forms. Additionally, the club stores all relevant files and documents on Google Drive.

2.2 Study of Existing Related System

A comparative study was conducted on three related existing systems and the proposed system. The existing systems reviewed include Eventbrite, Eventbee and Peatix. This comparison highlights the advantages and limitations of each system. All of these will be considered as reference for improving the proposed system. Eventbrite is a leading self-service ticketing platform that helps users discover events by location or category, offering organizers tools for event page design, sales tracking and performance analysis. However, its service fees of 4.99% per ticket can be a financial burden particularly for non-profit events [3]. Besides, Eventbee offers flexible event creation, registration and ticketing with customizable pages and tracking tools but advanced features like attendee badges and email notifications are limited to higher-tier plans with added costs [4]. Moreover, Peatix focuses on community-building with features like attendee management, ticket transfers and personalized recommendations, though its limited customization and 4.9% service fee can pose challenges for smaller organizers [5]. Table 1 shows the comparison between the existing systems and the proposed system. It shows the proposed system provides more advantages than the three existing systems based on the evaluation of 14 features. All the existing systems do not provide event recruitment features and no-service-charge events while the proposed system lack of Google Map Integration. Eventbrite and Peatix do not collect feedback.

Table 1 *Comparison Between the Existing Systems and Proposed System*

Feature	Eventbrite	Eventbee	Peatix	DunBian Club Event Management System
Platform	Web and Mobile	Web and Mobile	Web and Mobile	Web
Register/Login	✓	✓	✓	✓
Event Promotion	✓	✓	✓	✓
Event Discovery	✓	✓	✓	✓
Payment Processing	✓	✓	✓	✓
Event Registration	✓	✓	✓	✓
Event Recruitment	×	×	×	✓
Social Sharing	✓	✓	✓	✓
User Management	✓	✓	✓	✓
Engagement Tracking	✓	✓	✓	✓
Reports	✓	✓	✓	✓
Feedback Collection	×	✓	×	✓
No-Service-Charge Events	×	×	×	✓
Google Map Integration	✓	✓	✓	×

* ✓ means system includes specific features
** × means system does not include specific features

3. Methodology/Framework

Methodology refers to a structured system of methods and principles that guide problem-solving and decision-making throughout a project. It ensures tasks are completed efficiently, keeping the project organized and aligned with its objectives for successful outcomes.

3.1 Iterative Waterfall Model

The Iterative Waterfall methodology is an improved version of the traditional Waterfall model which addresses some of its limitations by introducing an iterative feedback mechanism. This model retains the sequential structure of the traditional Waterfall approach such as requirements, design, implementation, testing, deployment and maintenance. It allows developers to revisit and refine earlier phases when errors or defects are identified [6]. This iterative approach makes it suitable for projects with well-defined objectives and moderate complexity [7]. However, it is less suited for scenarios requiring frequent changes [8].

Iterative Waterfall Methodology involves 6 phases. The first phase is Requirements Gathering and Analysis. It includes collecting system requirements through observation and meetings with the head of DunBian Club to understand workflows, event management and recruitment processes. Documents such as the problem statement, objectives, scope and Gantt Chart were also prepared. In the Design Phase, diagrams like System Architecture, Context Diagram, DFDs and ERD were created and UI wireframes were designed in Draw.io. During the Implementation Phase, the design was translated into a functional web-based system using PHP for backend development and HTML, CSS and JavaScript for frontend development. Integration and Testing phase involved both functional testing and User Acceptance Testing (UAT). After deployment, feedback was collected and used for refinement while the Maintenance Phase focused on monitoring and fixing issues. Fig.1 shows the iterative waterfall methodology.

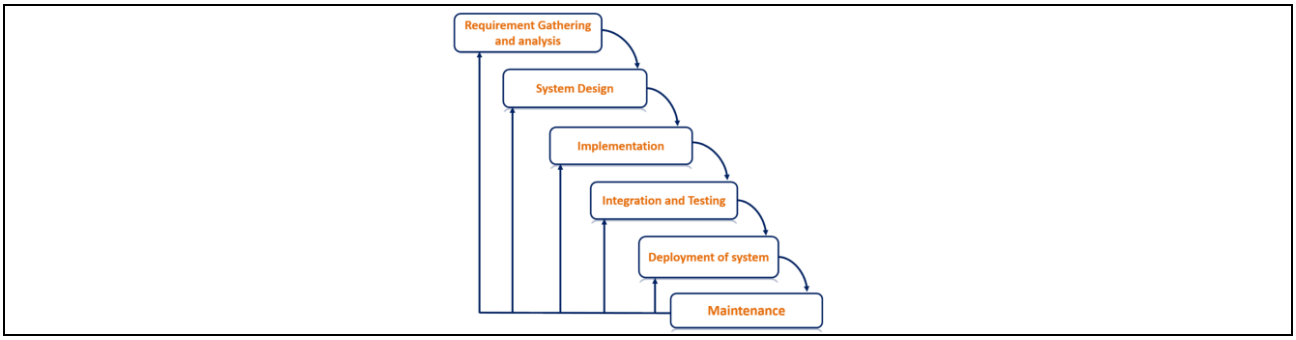

Fig. 1 *Iterative Waterfall Methodology [9]*

3.2 System Development Workflow

The system development workflow is based on the Iterative Waterfall methodology which consists of a total of six phases. As shown in Table 2, each phase has its own specific tasks and outputs that need to be produced during the entire project development.

Table 2 *System development task and output of each phase*

Phase	Task	Output
Requirement Gathering and Analysis	1. Propose the project title 2. Define the project scope 3. Gather and analyze user requirements, system development needs and technical specifications 4. Set project timeline	• Confirm the project title • Problem identification and data collected from interview • Comprehensive list of system requirements • Generate Gantt Chart
System Design	1. Create system architecture diagram and context diagram. 2. Design Data Flow Diagrams (DFD) 3. Design Entity Relationship Diagram (ERD) and database schema 4. Design wireframes, user interface layouts and define system's module	• Generate system architecture diagram and Context diagram • Generate DFD Level 0 and 1 • Generate ERD and Database Schema • Generate wireframes and UI layout

Table 2 *System development task and output of each phase (cont)*

Phase	Task	Output
		• Generate detailed system design document
Implementation	1. Develop system modules 2. Database connection.	• Source code for each system module
Integration and Testing	1. Perform integration testing to ensure modules work together.	• Generate system test result.
Deployment of System	1. Organise source file 2. Write README file	• Source code in zip file • README file
Maintenance	1. Conduct regular maintenance and update.	• Latest version of system

3.3 System Requirement Analysis

System requirement analysis is the process of identifying and understanding what a system needs to achieve to meet the goals of users and stakeholders. For this project, two types of requirement analyses are carried out which are functional requirements and non-functional requirements.

3.3.1 Functional Requirement Analysis

Functional testing focuses on verifying that the system's functions or features according to the requirements. Table 3 shows the functional requirement analysis for the developed system.

Table 3 *Functional Requirements Analysis for The Developed System*

Module	Functional Requirements
User Registration and Authentication	• Allow students to create accounts by entering personal details. • Allow students and administrator to log in to their accounts using the correct email and password and reset their password by providing an email address.
Event Management	• Allow administrator to create events by inputting details such as title, description, date and location. • Allow administrator to update event details, including changing the description or date and delete events which make them unavailable for registration. • Allow administrator to mark students as present or absent for events. • Allow administrator to view a list of students who have registered for the event.
Event Recruitment Management	• Allow administrator to create, update, read and delete recruitments. • Allow administrator to create and schedule interview timeslots. • Allow students to apply for recruitment roles for events.
User Profile Management	• Allow students to view their profile which includes personal information and event participation history. • Allow students to update their personal details. • Allow administrator to view and manage profiles.
Feedback Management	• Allow administrator to create custom feedback forms. • Allow administrator to send feedback forms to registered participants after an event. • Allow students to fill in feedback forms for events they have attended. • Allow administrator to review feedback responses for each event.

Table 3 *Functional Requirements Analysis for The Developed System (cont)*

Module	Functional Requirements
Reporting	• Allow administrator to generate and print reports for attendance data, registration data and recruitment applications.

3.3.2 Non-functional Requirement Analysis

Non-functional requirements define the system's performance and behavior, focusing on aspects such as usability, security and efficiency to ensure smooth user experience. Table 4 outlines the non-functional requirements of the developed system.

Table 4 *Non-Functional Requirements Analysis for The Developed System*

Module	Non-Functional Requirements
Performance	• The system should respond to user in a reasonable amount of time without system breaking down.
Usability	• The system should have a user-friendly interface for students and administrator to easily find all the functions and use the features.
	• The system should display clear error messages for users who make mistakes while using the system in order to guide them in correcting the issue.
Security	• Students and administrator can only log in by entering correct details to prevent unauthorized access.
	• Passwords must be securely stored using bcrypt hashing to protect user data.
Operational	• The system only can be accessed when there is an Internet connection.
	• The system must support common web browsers such as Chrome, Firefox and Safari in which all users can access the website.

4. Result and Discussion

4.1 System Design

System design involves planning the structure, components and architecture of a system to meet project goals. It includes models such as the context diagram (CD) and Data Flow Diagrams (DFD) Level 0 and Level 1 which illustrate data flow, user interactions and system components. This process serves as a blueprint for consistent development and feature implementation.

4.1.1 Context Diagram

A context diagram is a high-level data flow diagram that represents the entire system as a single process which shows its interactions with external entities. It outlines the system's boundaries and the flow of information between the system and its users. As illustrated in Fig. 2, the system interacts with two main external entities which are the Administrator and the Student. Administrator logs in to perform tasks such as managing events, recruitments, interviews, feedback, announcements and profiles. They can also monitor registration status, applications, view attendance, access student data and generate reports. Students register by submitting personal details and once they are registered, they can login and register for events, apply for recruitment, update profiles, receive announcements and submit feedback. These interactions ensure smooth coordination between users and the system.

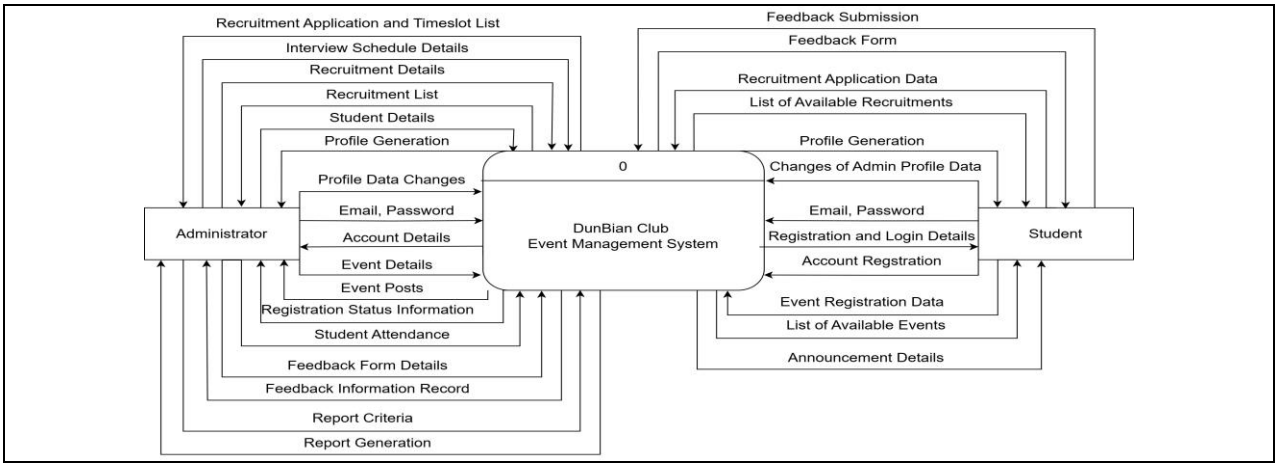

Fig. 2 *Context Diagram*

4.1.2 Level 0 Data Flow Diagram (DFD)

The Level 0 Data Flow Diagram (DFD) provides a high-level view of the system's main processes, data stores and external entities involved. It visually represents how data moves between the system's key processes and how external entities interact with the system. The purpose of this DFD Level 0 diagram is to map out seven essential processes which are 1.0 authenticating user, 2.0 managing user profile, 3.0 managing events, 4.0 managing event recruitment, 5.0 managing feedback, 6.0 managing announcements and 7.0 managing reports. It illustrates how information is input, processed and output within the system. Each process interacts with one or more external entities such as students or administrator and communicates with internal data stores. The data flows between processes and entities are clearly labelled to indicate the type of information being exchanged. The suggested system's overall procedures involve eleven data stores and two external entities. Appendix A shows the DFD Level 0 Diagram.

4.2 Database Design

Database design involves structuring and organizing data to ensure efficient storage and easy access. It includes defining tables, relationships and data flow within the system to support smooth data management.

4.2.1 Entity Relationship Diagram (ERD)

An Entity-Relationship Diagram (ERD) is an essential tool used in database design to map out the structure and relationships of data within a system. It provides a visual representation of how different entities interact with each other. By organizing data in this way, ERD provides a high-level overview of the database's architecture and can serve as a guide to ensure consistency and efficiency during database implementation. Appendix B shows the ERD of proposed system, it consists of 11 tables which are Admin, Students, Recruitment, Announcements, Events, Attendance, Recruitment_Applications, Events_Registration, Interview_Times, Feedback_questions and Feedback table.

4.3 Implementation of Module

DunBian Club Event Management System consists of several modules. This section illustrates the implementation of the system's main modules. Each module is supported with user interface screenshots and explanations of their functionality.

4.3.1 User Registration and Authentication

Fig. 3 shows the registration page interface. New students are required to register by filling in personal details such as their name, gender, phone number, faculty, year of study, ic number, email and password. After completing the form, they click "Register" to create a new account.

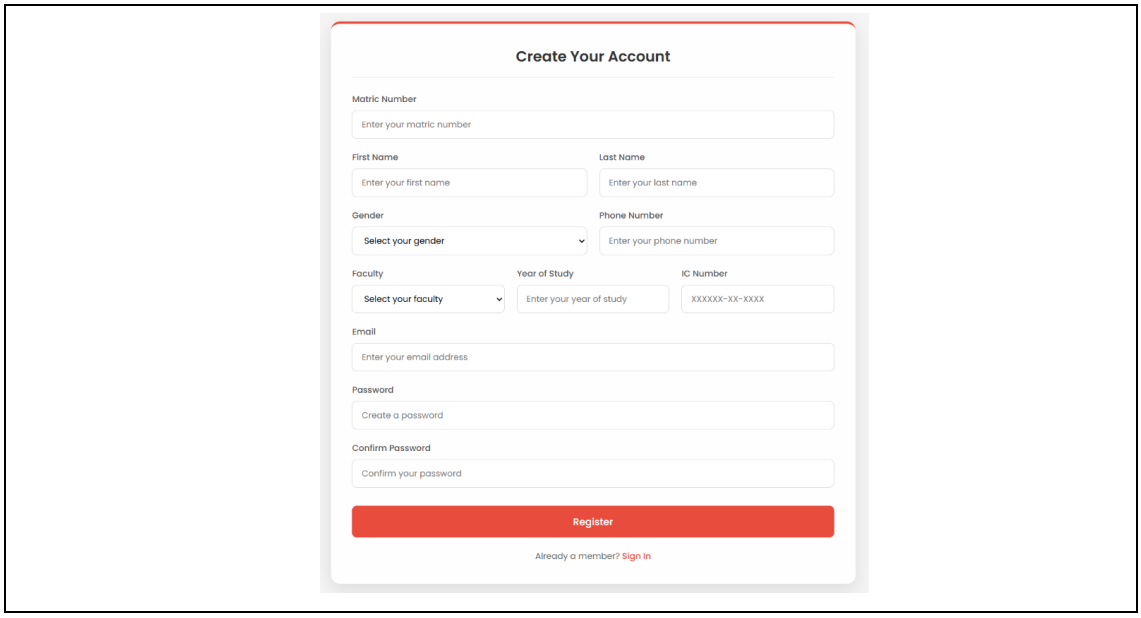

Fig. 3 *Registration Interface*

Fig. 4 shows the login page interface. Both students and admin can log in by selecting their user type and entering their email and password. Then, they click "Login as Student" or "Login as Admin" to access their respective dashboards.

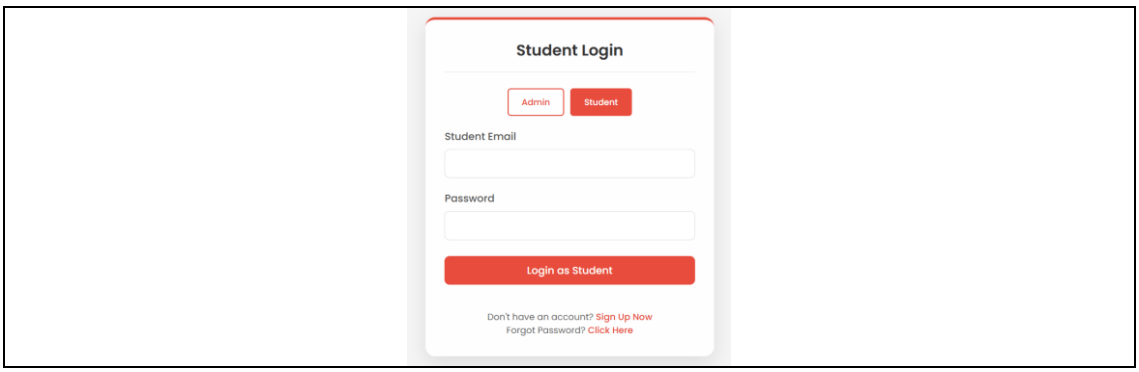

Fig. 4 *Login Interface*

4.3.2 Event Management

Fig. 5 displays the admin-side event management interface. Admins have options to create, edit and delete events. Fig. 6 shows the event creation page where the admin inputs details such as the event title, description, date, time, location, participant limit, event fee and poster. The registration deadline is automatically set to one day before event.

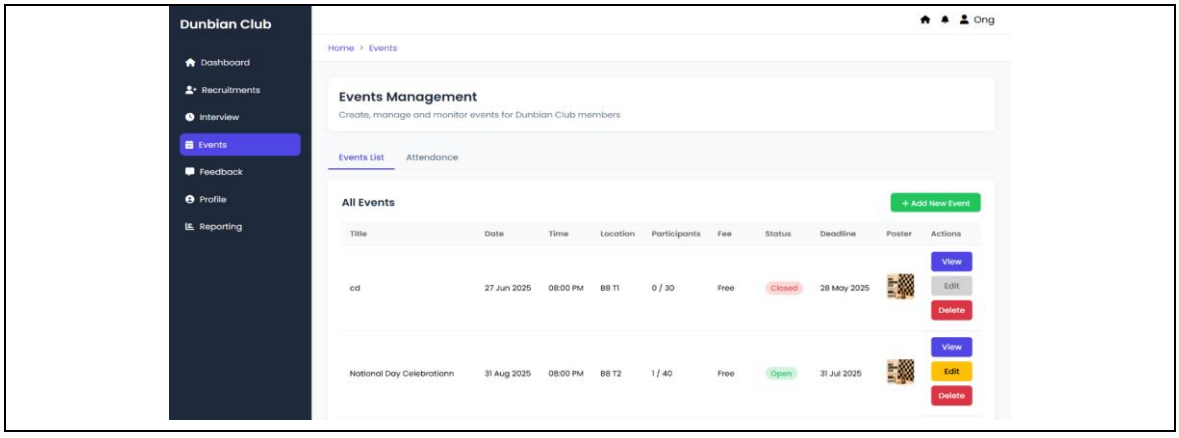

Fig. 5 *Event Management Page Interface*

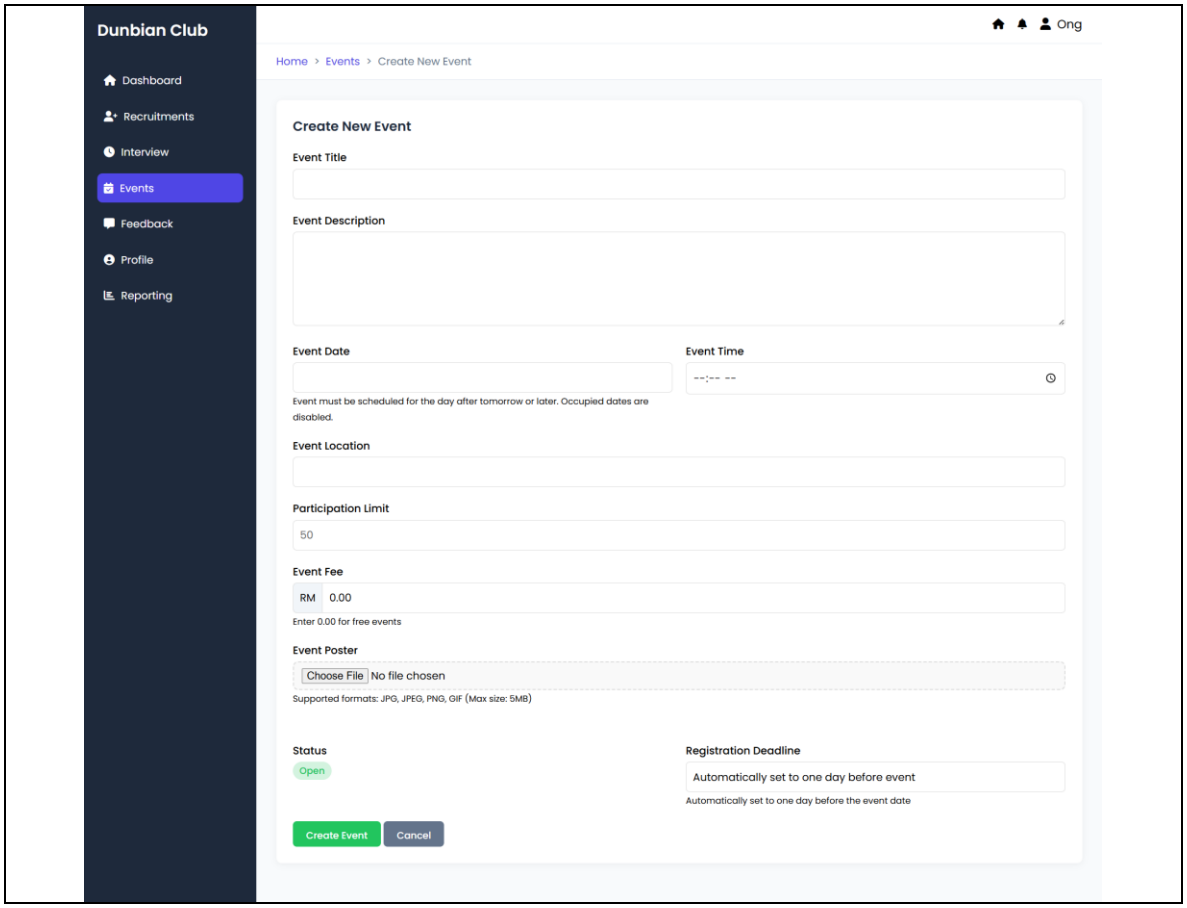

Fig. 6 *Creating event page interface*

If the admin wants to take attendance for an event, they can navigate to the "Attendance" tab and select the relevant event. The system will display a list of participants, allowing the admin to update their attendance status. Fig. 7 shows the attendance interface.

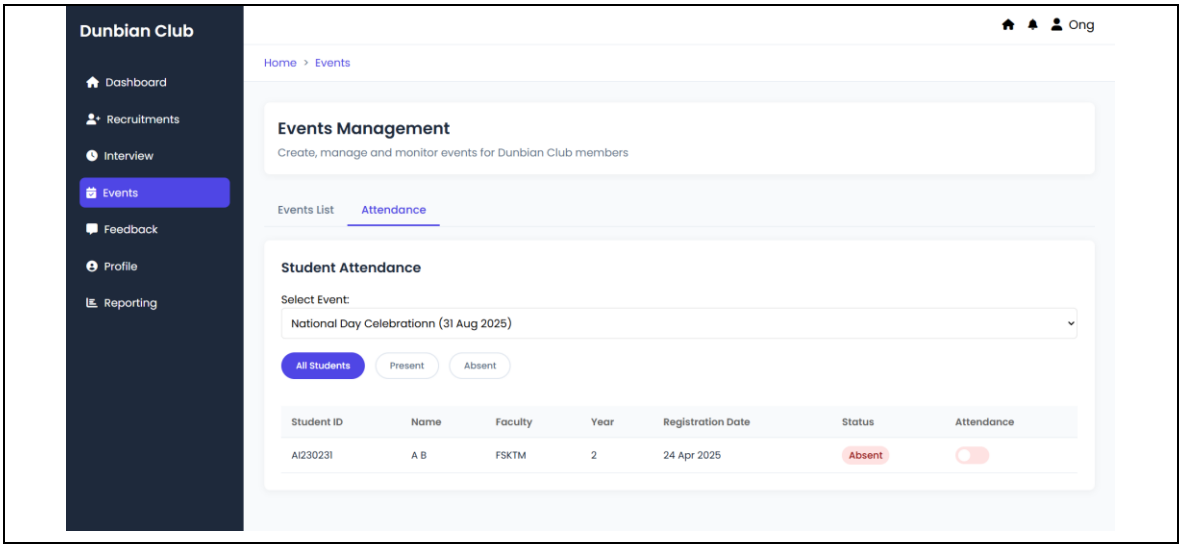

Fig. 7 *Attendance Interface*

Fig. 8 shows the student-side event listing page where students can browse and search for available events to join.

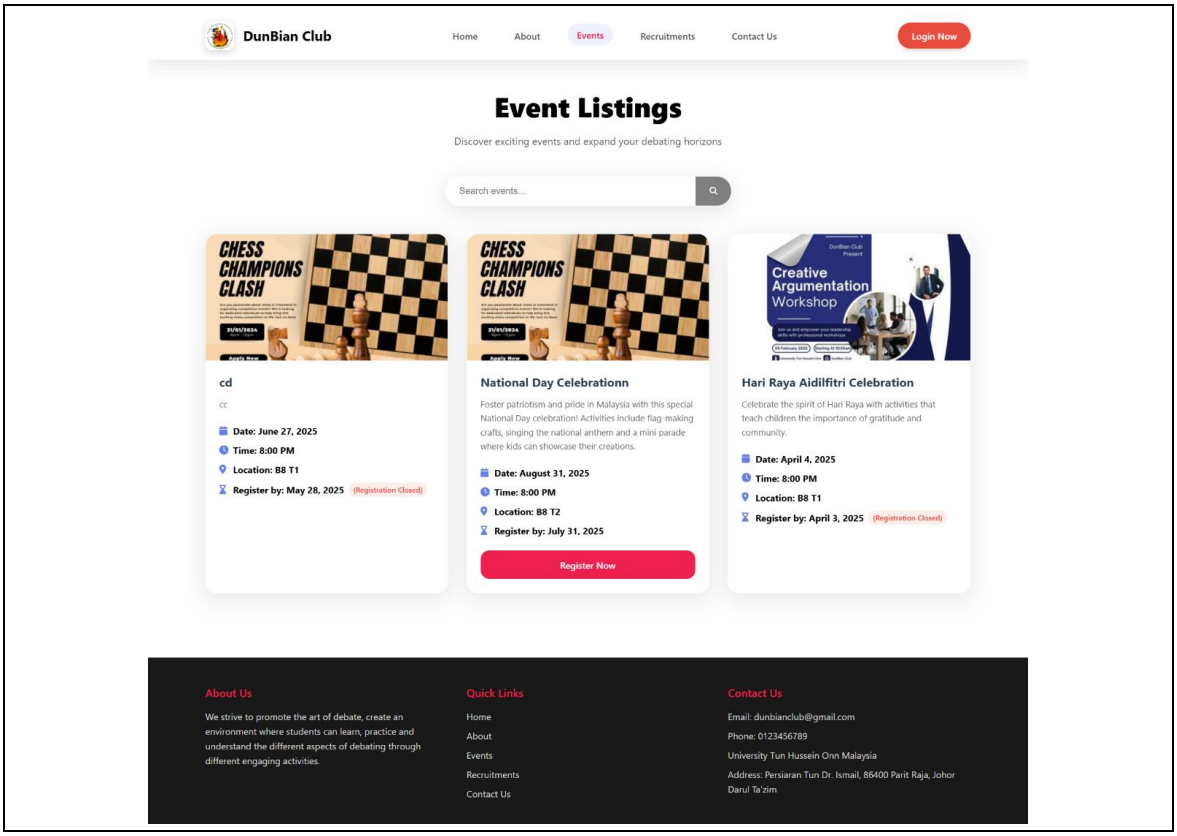

Fig. 8 *Event Listing Page Interface*

Fig. 9 displays the event registration interface. Student information is automatically retrieved from the database and prefilled. Students must answer relevant questions and click "Pay Now" to complete their registration. The panel on the right shows detailed event information, including event titles, date, time, location, description and registration fees.

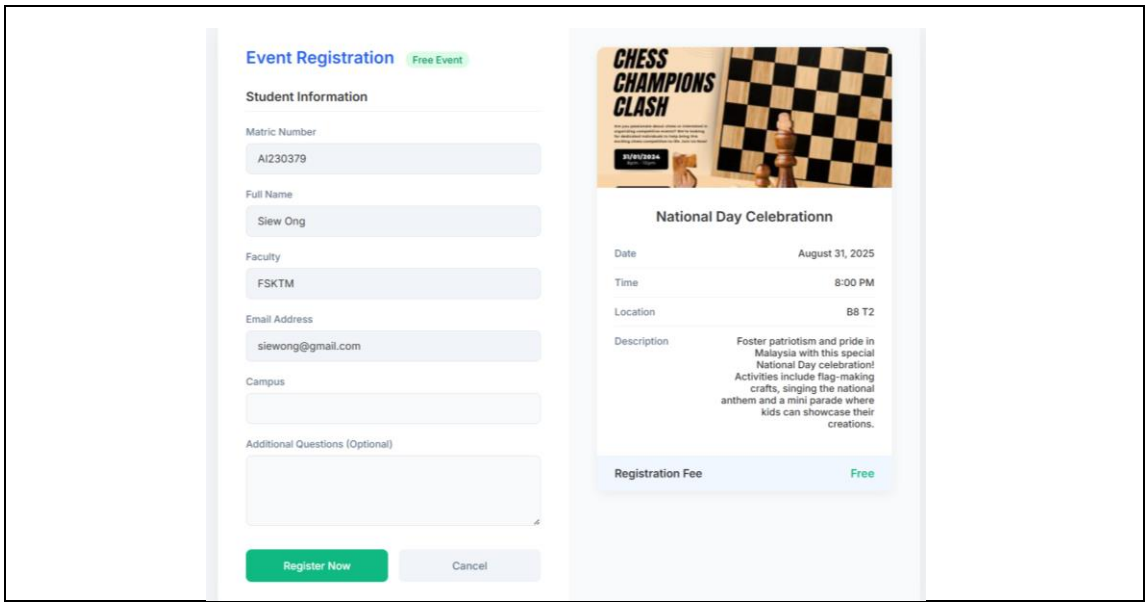

Fig. 9 *Event Registration Interface*

4.3.3 Event Recruitment Management

Fig. 10 shows the recruitment management interface for admins where they can create, view, edit and delete recruitment listings. Fig. 11 displays the applicant list interface where admins can view the students who have applied for each recruitment and see the selected interview time slots.

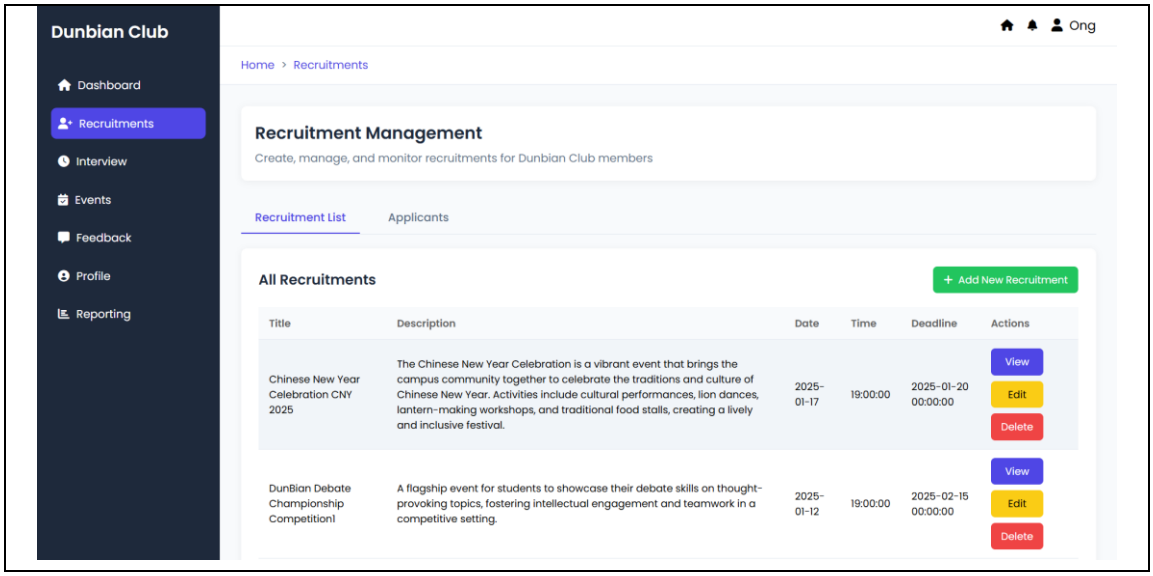

Fig. 10 *Recruitment Management Page Interface*

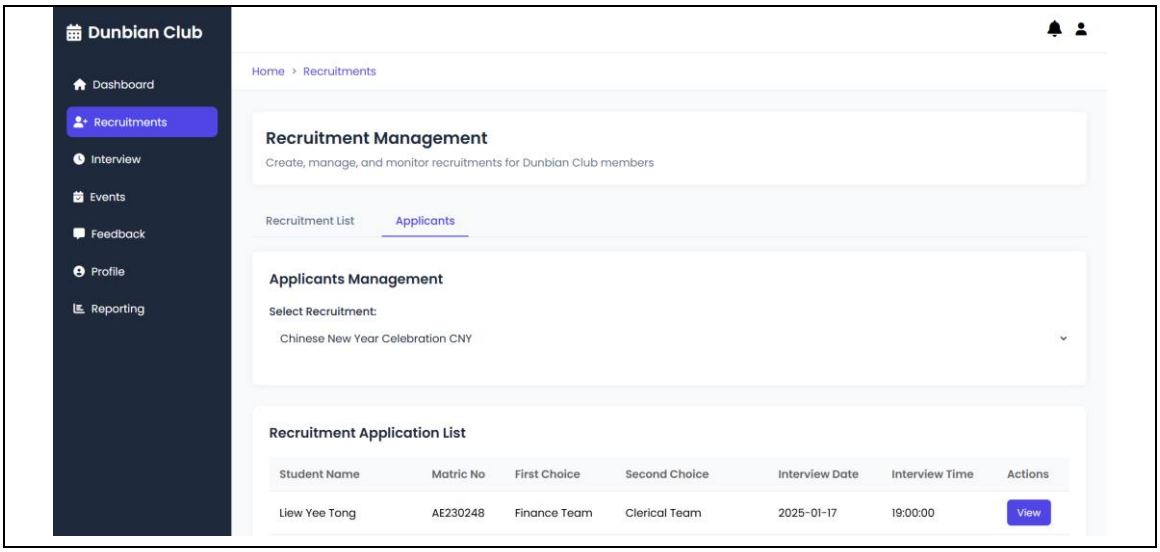

Fig. 11 *Recruitment Management Page Interface*

Fig. 12 shows the recruitment creation interface. Admins must enter the recruitment title, description, time, deadline and upload a poster. After completing the form, they click “Create Recruitment” to submit it.

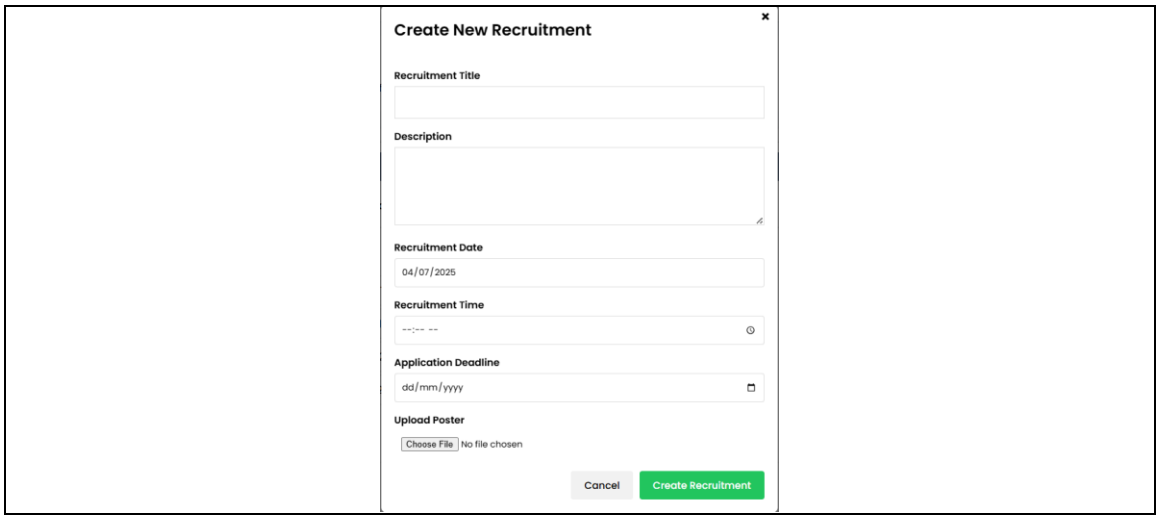

Fig. 12 *Recruitment Creation Page Interface*

Fig. 13 displays the student-side recruitment listing interface. Students can browse available recruitments and click “Apply Now” to proceed with the application. When the application deadline is over, the apply button will disappear.

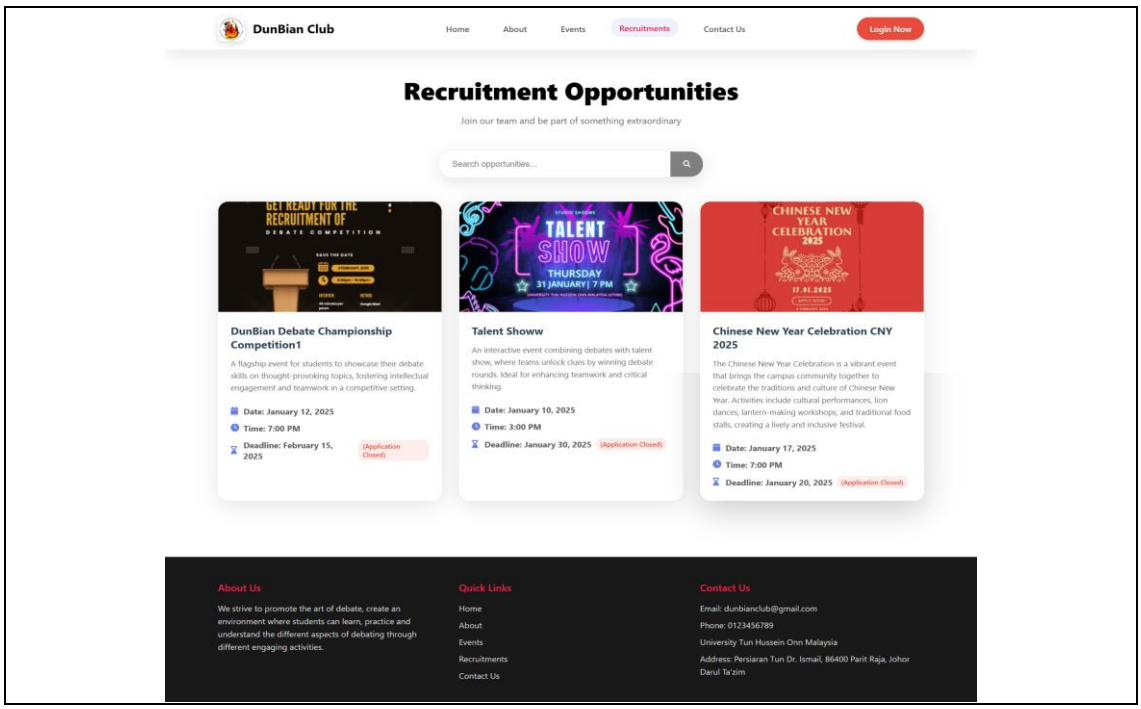

Fig. 13 *Recruitment Listing Page Interface*

Fig. 14 shows the recruitment application page. Students must select their available interview timeslot, choose their preferred departments and answer questions about past experience and interest in leadership roles. After completing the form, they click “Submit Application.”.

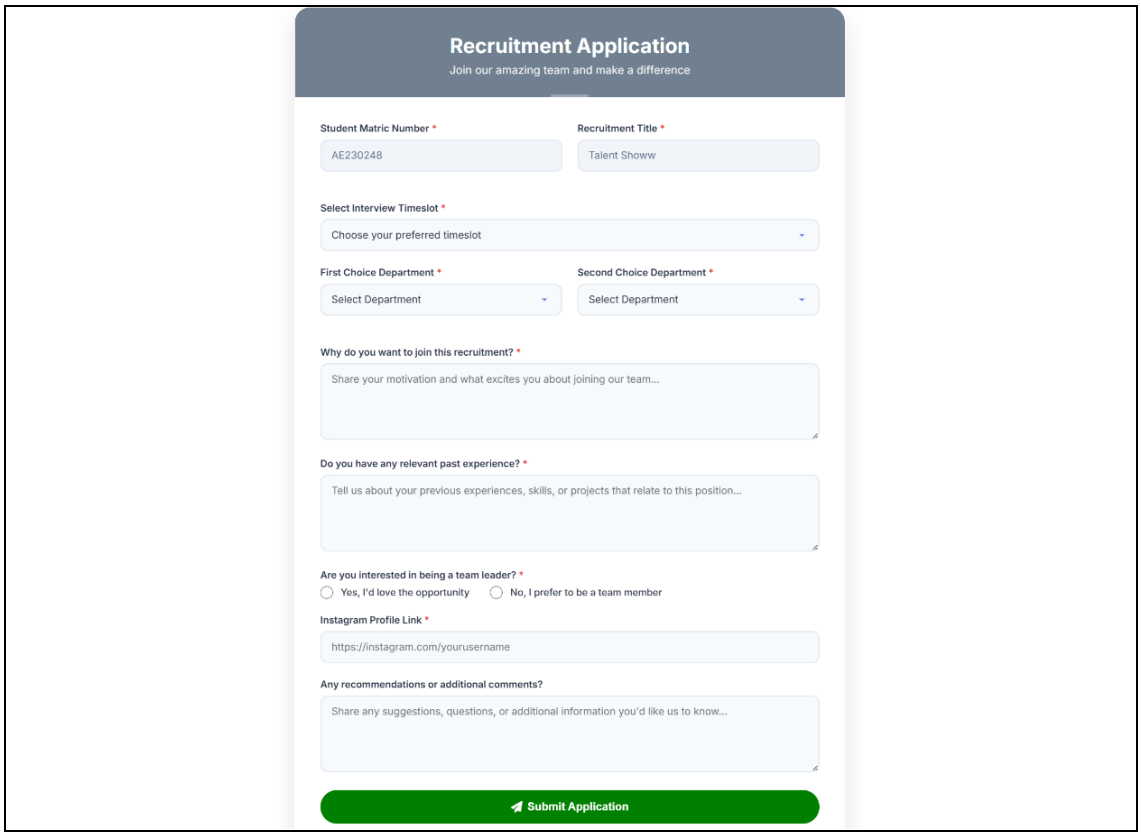

Fig. 14 *Recruitment Application Page Interface*

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4.3.4 Feedback Management

Fig. 15 shows the admin-side feedback management interface. Admins can create, view, edit or delete feedback forms.

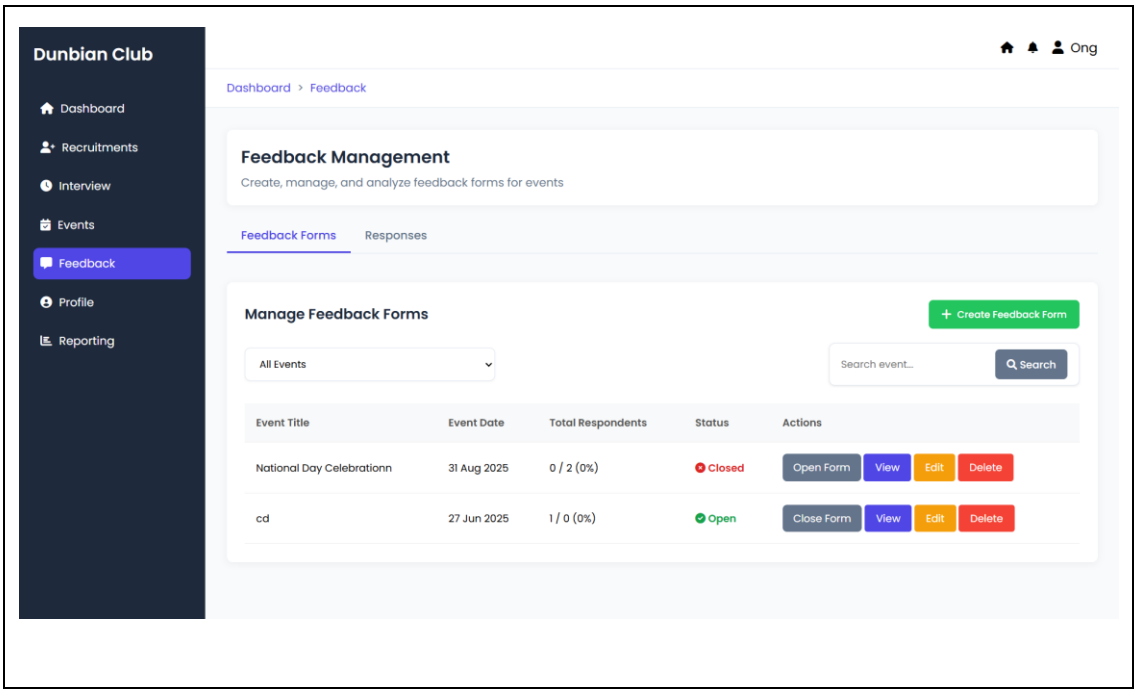

Fig. 15 *Feedback Management Page Interface*

Fig. 16 shows the student-side feedback form interface. Event and student details are automatically retrieved from the database. Students only need to answer the feedback questions and click "Submit Feedback" to submit the form.

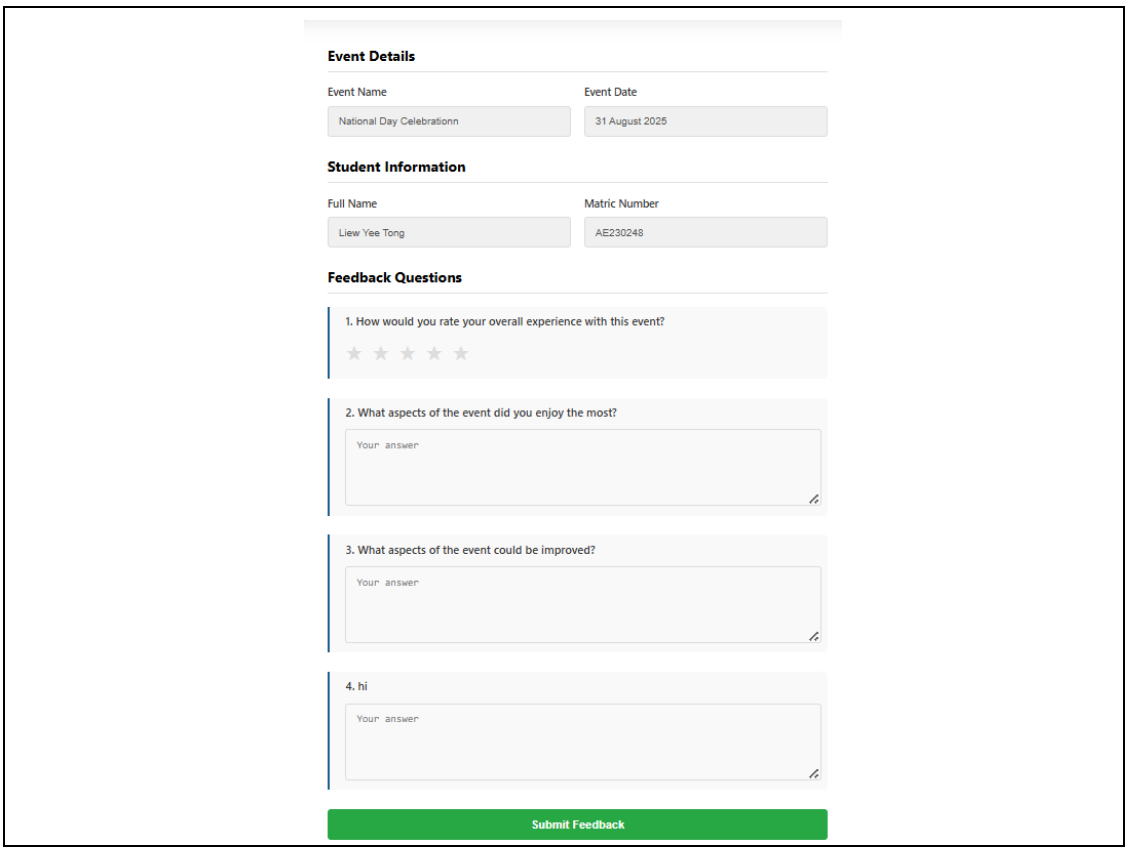

Fig. 16 *Feedback Form Interface (Student Side)*

4.3.5 Announcement Management

Fig. 17 shows the admin-side announcement management interface. Admins can view and delete announcements. Each announcement includes a title, activity, date and time. Furthermore, Fig. 18 shows the student-side announcement interface. Each time the admin publishes a new announcement, it is automatically updated on the student side.

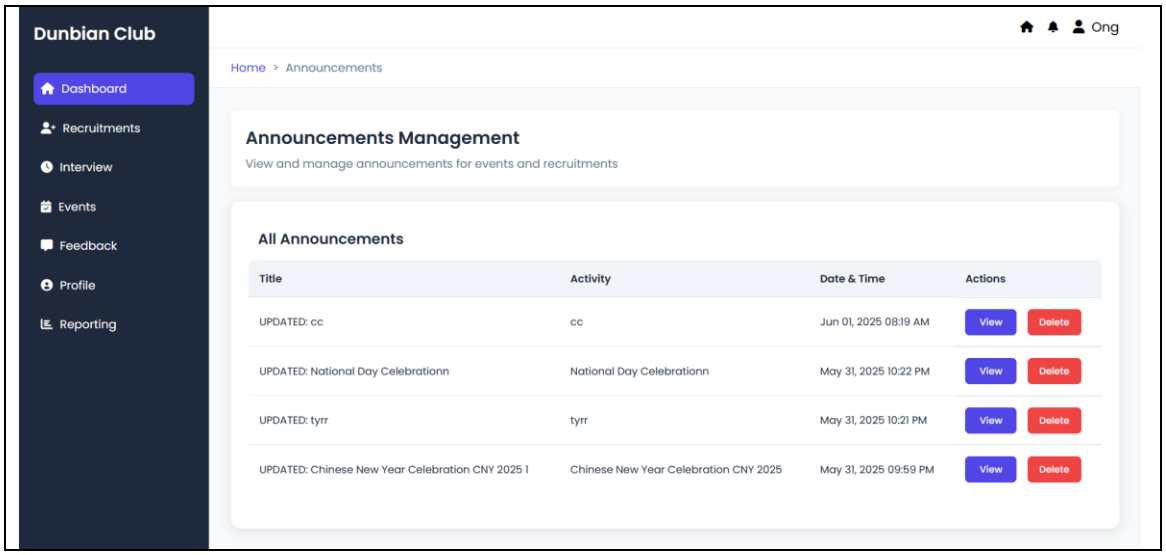

Fig. 17 *Announcement Page Interface*

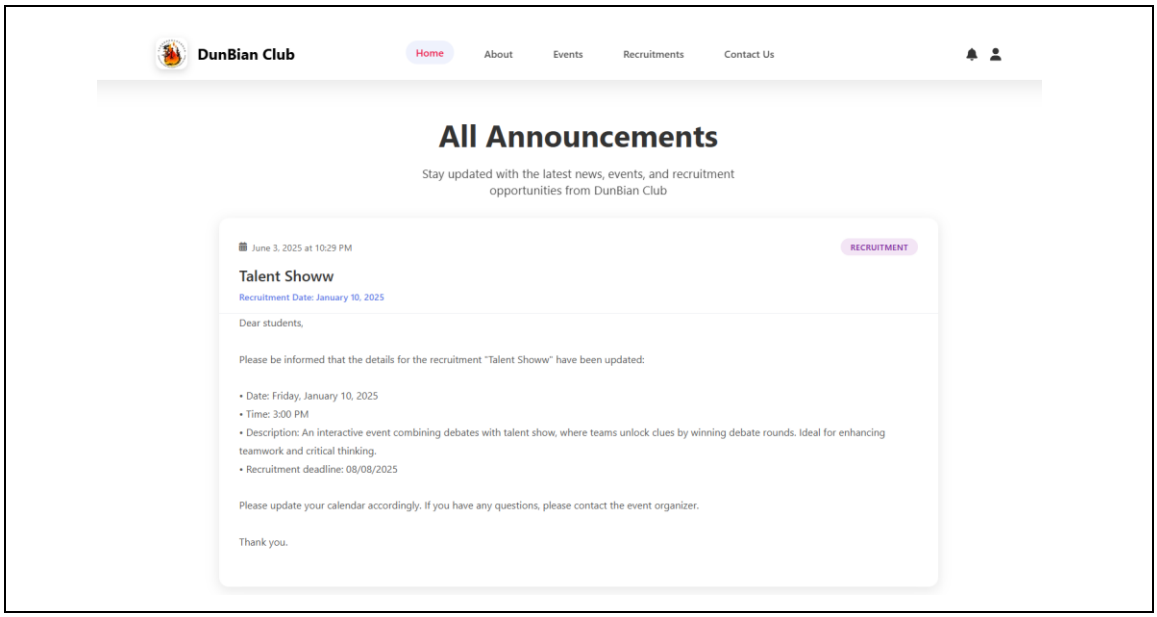

Fig. 18 *Announcement Page Interface (Student Side)*

4.3.6 Student Profile Management

Fig. 19 shows the student profile interface. It includes personal details, a list of joined events and a history of recruitment applications. Students can access feedback forms once the admin opens the form. They can also click "Edit Profile" to update their personal information.

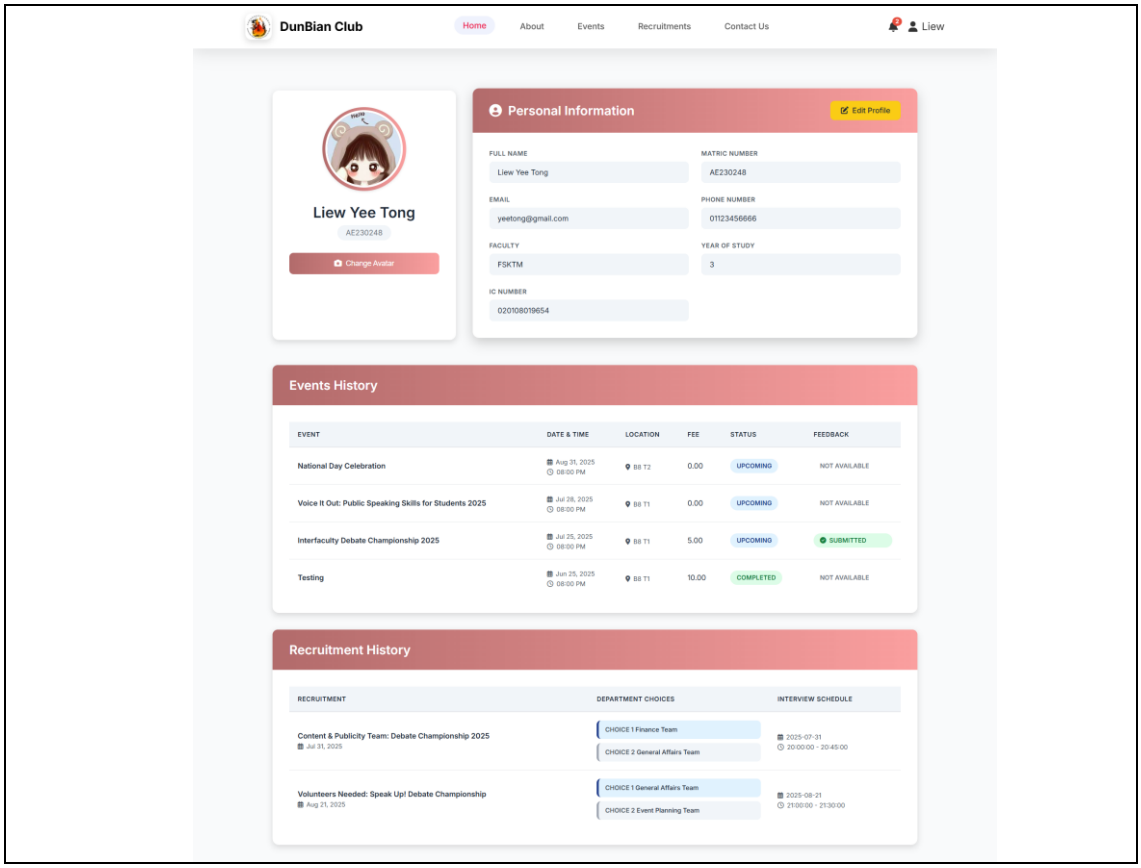

Fig. 19 *Student Profile Interface*

4.3.7 Reporting

Fig. 20 shows the reporting interface. Admin can generate three types of reports such as Event Registration Reports, Recruitment Applications Reports and Student Attendance Reports. To generate a report, the admin selects an event or recruitment and clicks “Generate Report”. A “Print” button is provided to print or save the report as a PDF.

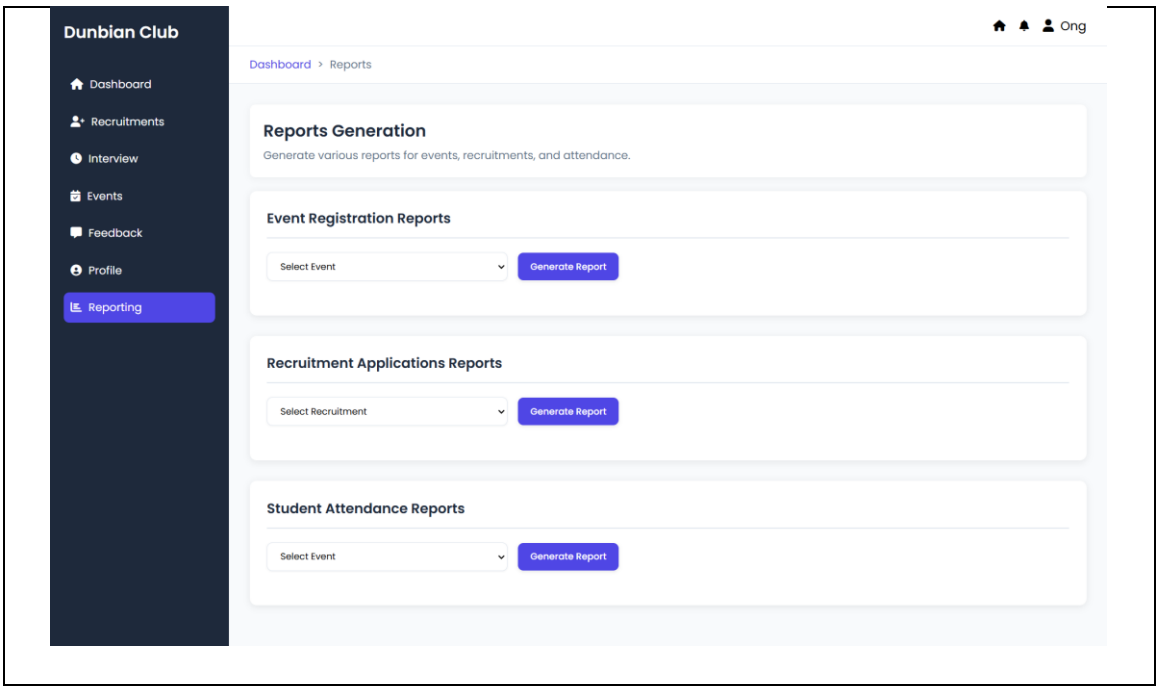

Fig. 20 *Reporting Page Interface*

4.4 Testing

4.4.1 Test Cases

Test cases are essential as they outline input, actions and expected results to verify that the system functions correctly. They help ensure the system meets its requirements and performs reliably. Table 5 shows the list of test cases for admin.

Table 5 *List of Test Cases for Admin*

No.	Test Cases	Expected Outcome	Result
A. User Registration and Authentication			
1.	Valid username and password	Success message prompts, admin is redirected to the dashboard.	Pass
2.	Invalid username and password	Alert message displays, admin must re-enter credentials.	Pass
3.	Reset Password	Get verification code via email and reset password.	Pass
B. Event Management			
1.	Create event	Success message shown and event is created.	Pass
2.	Edit and delete event	Event is updated or deleted in the database.	Pass
3.	View Event Registration Status	List of registrants with details is displayed.	Pass
4.	Record Event Attendance	Attendance status is updated and shown.	Pass
C. Event Recruitment Management			
1.	Create Recruitment	Recruitment details saved and shown to students side	Pass
2.	Edit and delete recruitment	Recruitment is updated or deleted in the database.	Pass
3.	View recruitment applications	Applicant list with details is displayed based on selected recruitment.	Pass
D. Feedback Management			
1.	Create Feedback for an Event and Recruitment	Success message shown, feedback saved into database.	Pass
2.	View Feedback for an Event and Recruitment	A list of feedback with details is displayed.	Pass
E. Reporting			
1.	Generate Types of Report	Report table shown based on selected type.	Pass
2.	Print a Report	PDF version of report is generated for printing or saved as pdf version.	Pass
F. Announcement			
1.	Create a New Announcement	Announcement saved and displayed in list.	Pass
2.	Delete an Announcement	Announcement deleted and the list is updated.	Pass

Table 6 shows the test cases for students. All the test cases are passed.

Table 6 *List of Test Cases for Student*

No.	Test Cases	Expected Outcome	Result
A. User Registration and Authentication			
1.	Complete registration	Success message shown, student redirected to login page.	Pass
2.	Incomplete data input	Alert message shown, student must re-enter credentials.	Pass
3.	Valid username and password	Success message shown, student redirected to homepage.	Pass
4.	Invalid username and password	Alert message displays, student re-enter details.	Pass

Table 6 *List of Test Cases for Student (cont)*

No.	Test Cases	Expected Outcome	Result
5.	Reset Password	Get verification code via email and reset password.	Pass
B. Event Participation Registration			
1.	View Event Posts	All event posts are displayed.	Pass
2.	Search for Events	Events matching keyword are shown.	Pass
3.	Click "Register Now" button	Students redirected to registration page.	Pass
4.	Register for event	Success message shown after clicking "Pay Now".	Pass
C. Event Recruitment Application			
1.	View Recruitment Listing	List of recruitments displayed.	Pass
2.	Search for Recruitments	Matching recruitments shown.	Pass
3.	Click "Apply Now" button	Students redirected to application page.	Pass
4.	Apply for a Recruitment	Success message shown after applying.	Pass
D. Feedback Management			
1.	Submit Feedback for an Event	Success message shown after feedback submission.	Pass
2.	Submit Feedback with Missing Fields	Error message shown, student must answer again.	Pass
E. Student Profile Management			
1.	View Student Profile	Student details are displayed.	Pass
2.	Edit Student Profile	Success message shown after profile update.	Pass
3.	View Event and Recruitment History	Shows all registered or applied events and recruitments.	Pass
F. Announcement Management			
1.	View Announcement List	List of current announcements with details is displayed.	Pass

4.4.2 User Acceptance Testing

User Acceptance Testing (UAT) was conducted to ensure that the DunBian Club Event Management System meets user needs and functions as expected. UAT focuses on usability and real-world performance to confirm that the system satisfies both administrator and students. This process also helps identify any overlooked issues or missing features to ensure the system is practical. The testing involved one administrator and ten students who rated their satisfaction with various system features using a questionnaire. Each feature was rated on a scale from 1 (low) to 5 (high). In the charts below, the x-axis represents the system features while the y-axis shows the number of respondents who selected each score.

Based on the results from the administrator, it shows that most of the system features were rated 5 which shows that they performed well and met expectations. For features such as Login and Logout, Event Recruitment Management and Announcement Management received full scores. However, Event Management, Interview Timeslot Management, Feedback Management and Reporting Management were each rated 4 which still reflects a good level of satisfaction but suggests that these areas still can be improved to enhance user experience. Fig. 21 presents the chart showing the UAT results from the administrator.

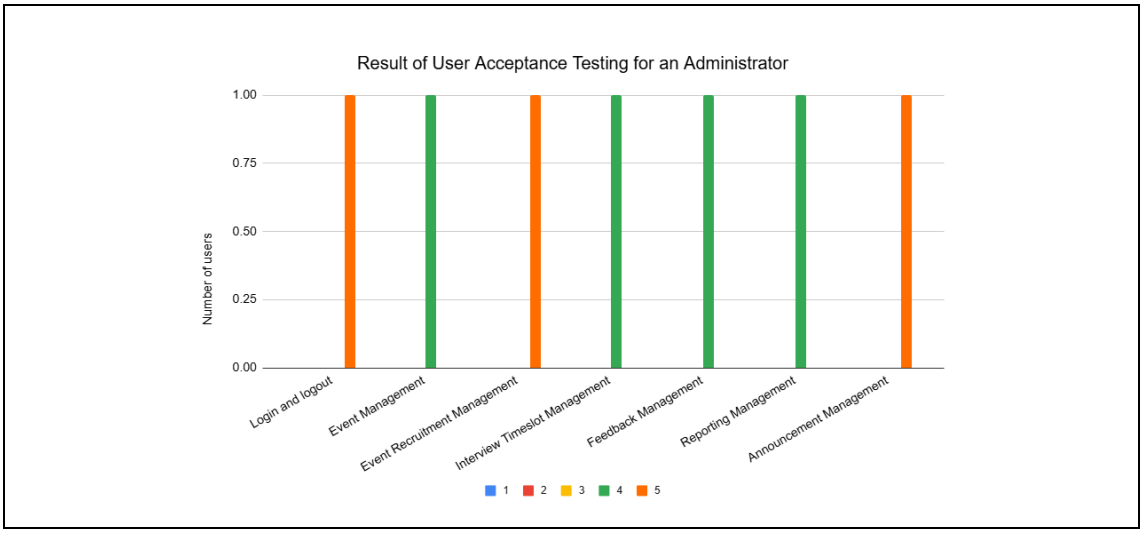

Fig. 21 *The result of user acceptance testing for an administrator*

Apart from that, based on the results from the ten students, most of the features such as Registration, Login and Logout and Search Functionality were mostly rated 5 which shows that these parts of the system worked well and met user needs. However, some features received a mix of ratings. Event Registration received a score of 5 from 8 students and 4 from 2 students. Payment was rated 5 by 9 students and 4 by 1 student. Recruitment Application received 5 from 6 students and 4 from 4 students. For the Feedback, it had slightly more varied results with 6 students giving a 5, 2 giving a 4 score and 2 giving a 3 score. Profile Update received 5 from 9 students and 4 from 1 student. Announcement Management was rated 5 by 7 students and 4 by 3 students. Although many features were rated highly, there are a few lower scores showing that some parts of the system can be further improved to provide better user experience and match student expectations. Fig. 22 presents the chart showing the UAT results from the 10 students.

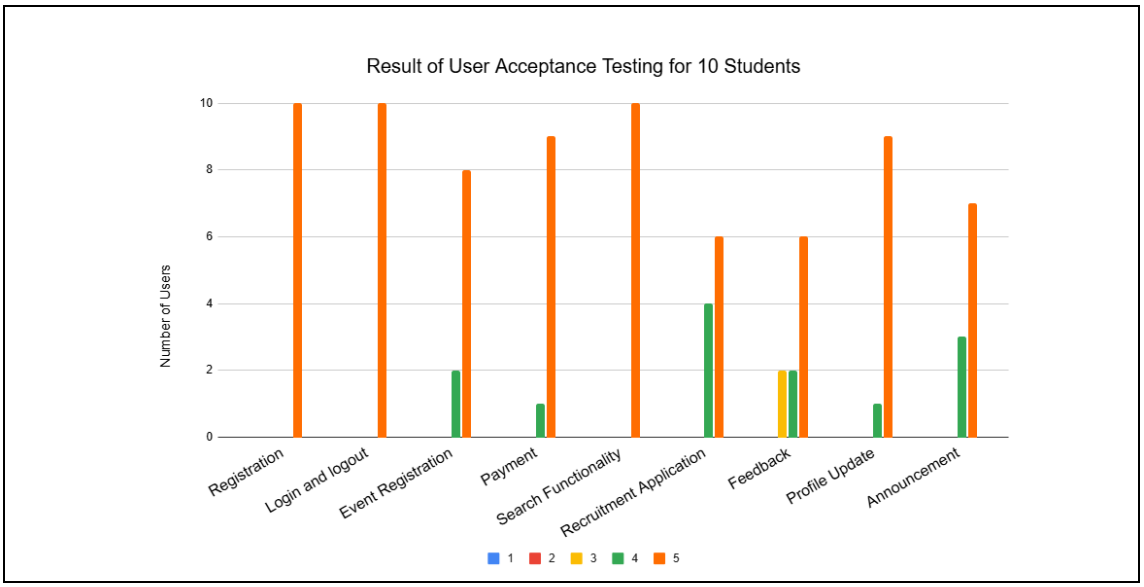

Fig. 22 *The result of user acceptance testing for 10 students*

5. Conclusion

The DunBian Club Event Management System has made significant progress in addressing the challenges faced by the club in managing its events. By streamlining processes like event promotion, registration, recruitment, announcements, report generation and feedback collection, the system reduces administrative workload and improves communication between administrator and students. Key modules such as user authentication, event and recruitment management, feedback, announcements and profile management have enhanced efficiency and accuracy. Overall, the system provides a comprehensive solution to boost event management efficiency, improve user experience and support the club's long-term success. For administrator, it streamlines event creation, attendance tracking, announcement posting, recruitment management, interview scheduling, feedback

collection and report generation. Students benefit from a user-friendly interface that allows them to register for events, apply for recruitment, receive updates, submit feedback, manage their profiles and contact the admin, making the overall experience more efficient and engaging.

Despite its benefits, the system has a few limitations. First, it is web-only which makes access less convenient for mobile users. Second, it lacks real-time communication features that require students to rely on a contact form or calls. Additionally, it only supports credit card payments, limiting options for students who prefer e-wallets or online banking. To improve the system, a mobile application should be developed for better accessibility. Next, adding a live chat feature would allow real-time communication between students and admin. Expanding payment options to include e-wallets and online banking would also make the system more flexible and user-friendly. In summary, the Dunbian Club Event Management System project has successfully delivered a system that centralizes and simplifies event and recruitment management for the club. While some limitations exist, they still provide valuable direction for future enhancements to create a more complete, accessible and user-focused solution.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Ong Yi Fung, Noryusliza Binti Abdullah;* ***data collection:*** *Ong Yi Fung;* ***analysis and interpretation of results:*** *Ong Yi Fung, Noryusliza Binti Abdullah;* ***draft manuscript preparation:*** *Ong Yi Fung, Noryusliza Binti Abdullah. All authors reviewed the results and approved the final version of the manuscript.*

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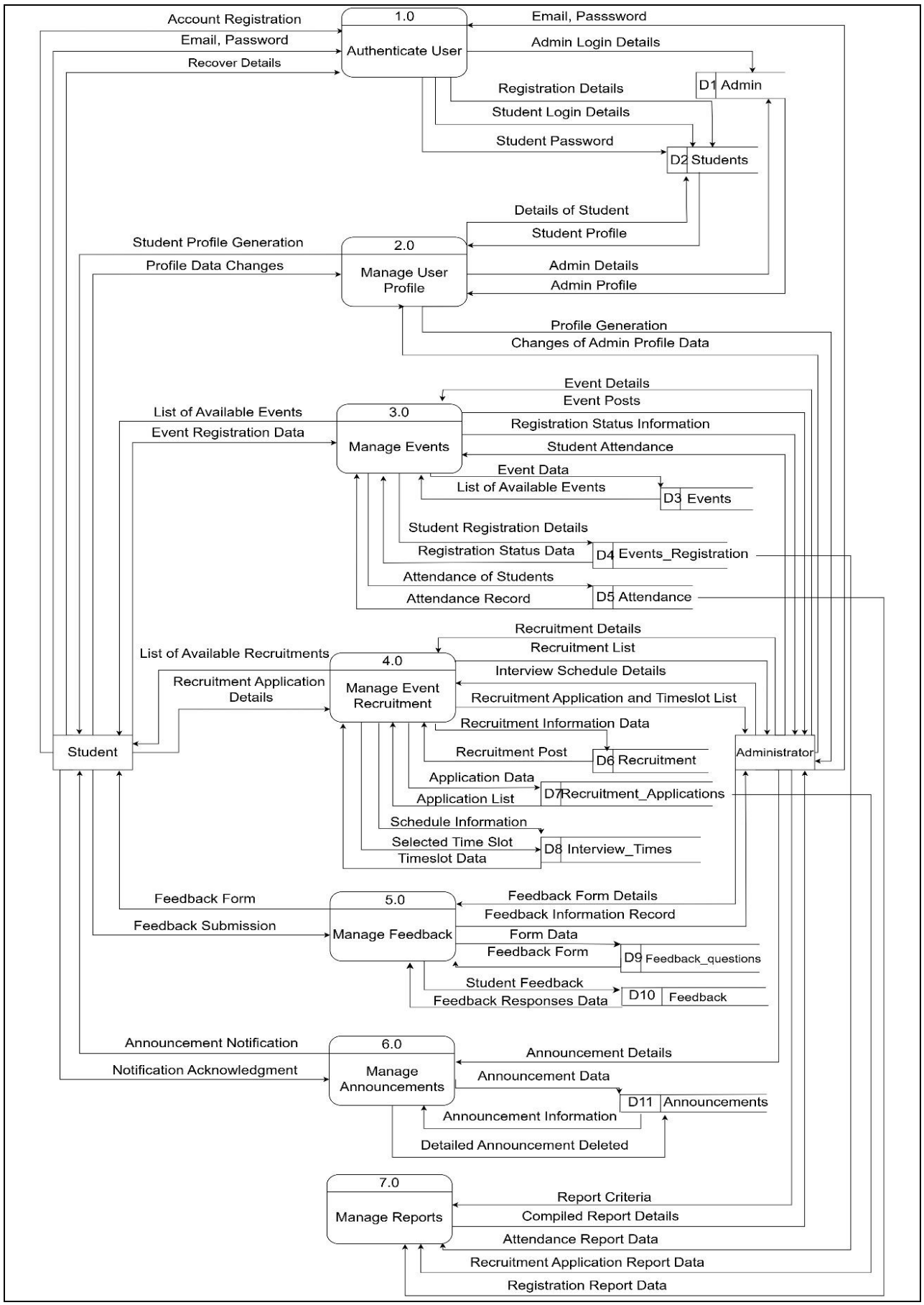
Appendix A: Data Flow Diagram Level 0



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Appendix B: Entity-Relationship Diagram (ERD)