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Little Empire Daycare Management System

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Abstract

The necessity for efficient and transparent daycare management systems has become paramount in today's fast-paced world, where parents seek real-time updates and seamless interactions with childcare providers. The Daycare Management System (LE-DMS) developed for Little Empire Childcare Centre aims to address the inefficiencies of traditional childcare management through the integration of advanced web-based technologies. This system is engineered using the Waterfall development methodology to ensure a structured and phased implementation. The core functions of LE-DMS include attendance management, which allows administrators to mark students as present or absent, record complete records, and allow parents to access and download their child's attendance history, as well as faster invoicing processes and activity updates. This paper explores the system's development process, emphasizing the technological solutions adopted to enhance operational efficiency, parent-admin communication, and overall data management. By automating routine tasks and providing a platform for instant updates and parental engagement, the system optimizes administrative workflows and enriches the childcare experience. The expected outcome is a significant reduction in administrative burdens and an increase in satisfaction levels among staff and parents, paving the way for a more interactive and fulfilling childcare environment.

1. Introduction

Little Empire Childcare Centre, located in Bandar Puteri Klang, stands as a beacon of nurturing care and excellence in early childhood education within our community. To enhance its operations and the overall experience for both staff and families, the center is introducing a sophisticated Daycare Management System (DMS). This innovative system is engineered to streamline administrative tasks, reduce paperwork, and optimize workflows, thereby allowing caregivers to devote more time and attention to the children. The DMS eliminates common inefficiencies and errors associated with manual, paper-based processes by automating essential functions such as attendance tracking, data management, and billing. It also provides parents with unprecedented access to real-time updates on their child's daily activities and developmental progress through personalized communication channels. This level of transparency and engagement is crucial in building a strong partnership between parents and the center, ensuring that each child's unique needs are met and fostering a foundation of positive mental health and a robust desire for learning. Moreover, the system enhances financial operations by automating billing processes, improving both accuracy and security. By adopting this advanced technology, the center improves its operational efficiency. It strengthens its role as a cornerstone of early childhood education in our community, enhancing the lives of children and families for generations to come.

The problem of Daycare facilities like Little Empire Childcare Centre frequently encounters inefficiencies and errors due to reliance on manual record-keeping for tracking attendance and managing data, consuming valuable staff time and leading to inaccuracies affecting daycare operations. These manual processes make it challenging to maintain up-to-date and reliable records, impacting the accuracy of attendance reports and creating communication gaps between administrators and parents, hindering transparency about children's daily activities, development, and well-being. Additionally, the daycare struggles with inefficient financial operations due to manual billing and invoicing methods, which lead to errors, delays, and security risks associated with cash or check payments. The lack of automated systems for financial transactions complicates reconciliation and undermines financial transparency and efficiency. To address these issues, Little Empire needs to implement an integrated management system that automates billing, enables online payments, and supports real-time financial reporting, thereby streamlining payment processes and enhancing overall efficiency and trust in daycare management.

The objectives of developing the Little Empire Daycare Management System are as follows:

i. To design a Daycare Management System for the Little Empire childcare center using the waterfall methodology.
ii. To develop the LE-DMS using the waterfall web-based approach
iii. To test the developed system by targeted users.

The scope of the Little Empire Daycare Management System (LE-DMS) is designed to encompass a comprehensive suite of functionalities that streamline operations, enhance enrollment process, communication, Attendance management, and improve financial management within the daycare setting. This system is structured around several core modules that cater to the specific needs of administrators, Staff and parents, ensuring a seamless integration of technology into daily childcare management.

This report is organized into five chapters. Chapter 1 provides the project background, outlining the problem statement, objectives, scope, expected outcomes, and the significance of the proposed system. Chapter 2 is a detailed literature analysis that examines existing systems and identifies shortcomings that LE-DMS wants to address. Furthermore, this chapter analyzes significant case studies, such as Brightwheel, Procare, and the KiddoCare system, establishing foundations for the project. Chapter 3 describes the methodology used, emphasizing the waterfall development model and elaborating on the system requirements analysis, design, and implementation processes. Chapter 4 describes the system's design, including user interface designs, database schema, system architecture, and functional and user acceptability test results. Chapter 5 summarizes the findings, conclusions, and recommendations for LE-DMS enhancements in the future.

2. Related Work

This section discusses the current understanding of a computerized system and compares it with the proposed system through a literature review. The review aims to gather data and identify issues while also serving as the project's source material. The literature review helps understand linked initiatives and solve important issues. Brightwheel, ProCare Solution & kiddoCare, and Little Empire Daycare Management system are the systems that are compared in this section [3].

2.1 Brightwheel

Brightwheel offers comprehensive features designed to enhance daycare management, including automated attendance tracking, robust messaging, and reporting capabilities. Although it has basic safety protocols focused on emergency alerts, it compensates with its overall efficiency and ease of use. The system provides individual user accounts for staff and parents, supports resource and lesson planning, and promotes parental engagement through a user-friendly mobile app. While its simplicity benefits user accessibility, the limited customization options may not satisfy all needs of daycare centers seeking advanced functionalities [1]. Brightwheel remains a practical choice for streamlining daycare operations, particularly in attendance and communication.

2.2 ProCare

ProCare Solutions is notable for its robust safety features and advanced financial management tools, making it ideal for daycare centers focused on security and efficient operations. The system includes emergency alerts and customizable user permissions, as well as supports billing and payment functionalities. Although it allows some customization and offers basic communication options like messaging and announcements, it falls short in providing real-time tracking, which may be a limitation for centers needing immediate updates [2]. Despite this, ProCare Solutions remains a comprehensive choice for facilities prioritizing child safety and streamlined financial processes.

2.3 KiddoCare System

KiddoCare is a comprehensive daycare management system specifically tailored for childcare centers in Malaysia. It's designed to streamline administrative tasks and enhance communication between childcare providers and parents. With features like attendance tracking, parent communication tools, billing and invoicing functionalities, and staff management capabilities, KiddoCare empowers daycare centers to manage their operations efficiently. For parents, KiddoCare offers real-time updates on their child's activities and attendance records and even facilitates online payments [4]. KiddoCare ensures a seamless experience for childcare providers and parents by fostering transparency and engagement.

2.4 Comparison between related system

This comparison highlights the features and capabilities of each daycare management system, including login, automated attendance, communication modules, Daily updates, financial management, user management, resource management, parental access, Notification, overall efficiency, and system customization. The LE-DMS aims to provide a comprehensive solution tailored specifically to the needs of Little Empire Childcare Centre, offering advanced features to enhance operational efficiency, communication transparency, safety, and parental engagement. Its user-friendly, web-based platform is accessible from anywhere [5]. Utilizing PHP, HTML, CSS, JavaScript, and SQL, MCM-IMS ensures reliable performance and scalability. Table 1 compares LE-DMS with existing systems.

Table 1 *Comparison between the proposed system and the existing systems*

Comparison/ System	Brightwheel	Procare Solution	KiddoCare	LE-DMS
Modules:				
Login	Yes	Yes	Yes	Yes
Register parent	No	No	No	Yes
Child Enrolment	Yes	Yes	Yes	Yes
Babysitter Enrolment	No	No	No	Yes
Attendance Management	Yes	Yes	Yes	Yes
Communication	Yes	Yes	Yes	Yes
Activity updates	No	No	No	Yes
Notification	Yes	Yes	Yes	Yes
Invoice Management	No	No	No	Yes
Payment Management	Yes	Yes	Yes	Yes
Parental Access	No	No	No	Yes
Generate Report	No	No	No	Yes

3. Methodology

Table 2 illustrates the tasks completed in each phase of the waterfall model, including requirement analysis, design, implementation, testing, and maintenance [10]. A detailed Gantt chart in Appendix A (Fig A.1) outlines the sequential tasks and their timeframes, serving as a roadmap from requirements analysis to maintenance. This visual tool in the appendix provides a clear summary of task dependencies and durations, aiding in the organized execution of the project.

Table 2 *Software development activities task*

Phases	Task/Activities	Deliverables	Tools
Requirement & Analysis	- Identify system scope and requirement - Analyze requirements: i. Data collection – interview client to identify system requirement -Project timeline – Gantt Chart	i. Proposal ii. Gantt Chart	i. MS Word ii. TeamGantt.com

Table 2: (cont)

Design	- Design user interface, database as per requirement -Design Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD	i. Context Diagram (CD) ii. Data Flow Diagram (DFD) iii. Entity Relationship Diagram (ERD) iv. Schema table v. Interface	i. Draw.io ii. PowerPoint iii. Lucidchart
Implementation	The designated design will be converted to actual code	To execute the system	i. Visual Studio Code ii. XAMPP Control Panel
System Testing	Alpha testing	Test the functionalities and acceptance test	i. Visual Studio Code ii. XAMPP Control Panel
Maintenance	Involve correcting errors and upgrading due to current trends and needs	Make sure the system is ready to use by the stakeholder and ensures the quality of use which provides effectiveness, efficiency, satisfaction, reliable and secure	i. Visual Studio Code ii. XAMPP Control Panel

3.1 System Requirement Analysis

Functional requirements delineate the specific system functions or features essential for users to accomplish their tasks, capturing the intended behavior of the system. These requirements, expressed as services, tasks, or functions, guide the developer in implementing the necessary functionalities for the Little Empire Daycare Management System. Additionally, non-functional requirements, also known as quality attributes, set criteria for evaluating the system's operation and are crucial in ensuring the overall effectiveness and performance of the system for administrators, staff, and parents [6]. Both functional and non-functional requirements play pivotal roles in shaping the capabilities and quality standards of the Little Empire Daycare Management System. Tables 3 and Table 4 show the functional and non -functional requirements for the proposed system.

Table 3 *Functional requirements*

Modules	Functions
Login Modules	In this process, Admin needs to log into the system by providing the correct e-mail and password by using the login interface. Fig.B1 shows the interface of login page. The system will then validate the e-mail and password. If both e-mail and password are correct, the system will redirect Admins to the dashboard shown in Fig.B2. If one of the e-mail or passwords is incorrect, the system will automatically display an error message.

Table 3 (cont)

Register Parent	In this process admin can register new parents. In Fig.B3 depicts the admin interface for manage new parents in the LE-DMS. It shows the interface for modifying existing parent information. It allows searching, updating, or deleting parent details and displays key information in a table, facilitating quick and efficient management of parent records.
Child Enrollment	Admins must fill in with details like the child's name, age, and parent information, capturing essential data for new entries. The admin can Manage New Enrollment which lists all enrolled children in a table with options to edit or delete records, simplifying profile updates and maintenance. Fig.B4 shows the interface of manage babysitter.
Manage Babysitter	In the system the admin can add babysitters, where the admin must input the babysitter's essential information such as full name, email address, mobile number, subject, and profile picture. The admin can also manage babysitters' information by updating, deleting, and resetting the record of babysitters. New babysitters' information will be collected systematically for effective record-keeping purposes. Fig.B5 shows the interface of manage babysitter.
Invoice Management	The administrator will generate an invoice for each parent. This module enables administrators to efficiently create and manage billing documents for each parent. Fig.B7 shows the interface of manage invoice.
Manage Attendance	This interface represents the attendance management interfaces. In Fig.B6 features a functional interface for daily attendance marking, to record each child as present or absent, streamlining the process for accurate and immediate updates.
Manage Notification	Notification sent by the administrator to the parent using this module. This includes fields for the title and body of the message, along with options for specifying the date and time when the Notification should be sent. Additionally, there's an option to select recipients, such as all parents, ensuring that relevant updates or information are effectively communicated to the right audience. Fig.B11 shows the interface of manage notification
Payment	Parents can make their payment online securely using stripe. Fig.B9 shows the interface of payment of parent.
Manage feedback	This module enables parents to send feedback to admin. Admin can view feedback from the parent. Fig.B10 shows the interface of manage feedback.
Generate Report	This allows the users to access and generate reports on payment, child activities and attendance. Fig.B12 shows the interface of generate report.
Manage Child Activity	In activity updates staff can update child's daily activities in the system. This interface allows staff to manage existing activities, providing tools to edit, delete, or review details, ensuring up-to-date records of child engagements. Fig.B8 shows the interface of managing child activity by staff.

Table 4 Non-*Functional requirement*

Modules	Functions
Usability	User-friendly interface, design an intuitive interface for easy navigation and use by administrators and parents. Minimal training required, ensure that the system is easy to use and requires minimal user training.
Performance	Response time, Ensure the system responds quickly, especially when there are many users. Scalability, the system should be able to handle an increasing number of users and data without compromising performance.
Security	Secure login, Implement secure authentication processes to ensure only authorized users can access the system. Data encryption: Use encryption techniques to protect sensitive data, such as child and parent information.
Operational	The system can be used in any web browser such as Chrome and Microsoft Edge.

3.2 System Analysis

A Data Flow Diagram (DFD) visually represents the flow of data within an information system, illustrating its movement between internal processes, external entities, and data stores [7]. In the upcoming section dedicated to the Little Empire Daycare Management System, various diagrams will be presented, including the Context Diagram, DFD Level 0 and Entity Relationship Diagram (ERD).

3.2.1 Context Diagram

A context diagram is a graphical representation of a system and its relationships with other elements [8]. It is particularly useful for stakeholders unfamiliar with the system or those seeking a quick understanding of its overall functionality. Fig. 1 illustrates the context diagram for the Little Empire Daycare Management System. This diagram outlines the input and output data processing involving the administrator, staff and parent entities.

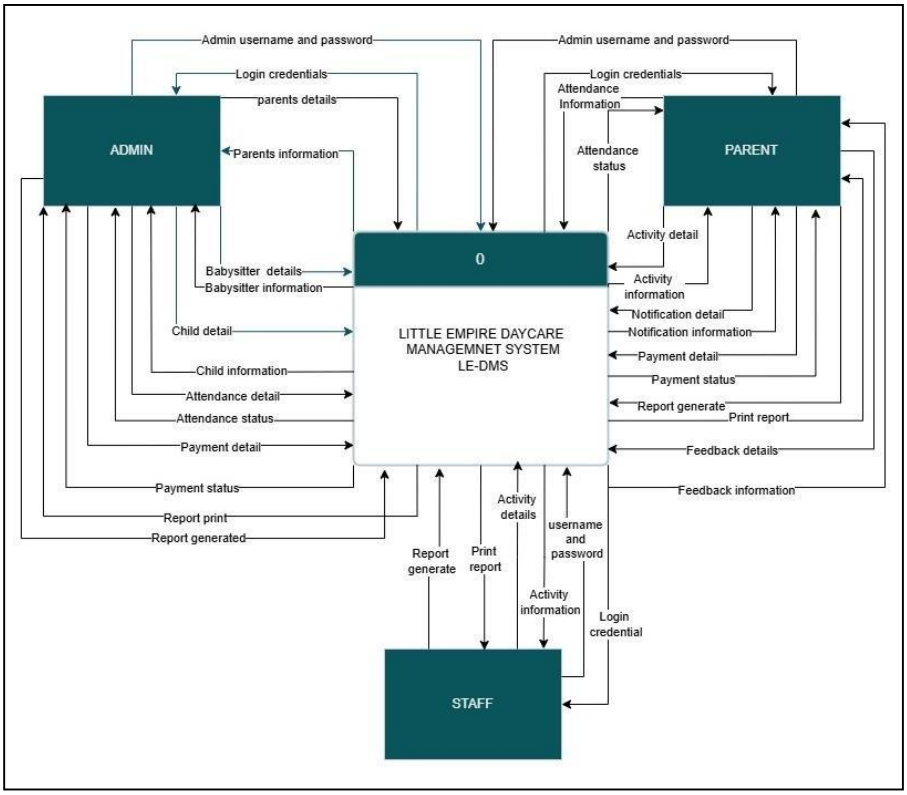

Fig. 1 Context Diagram of Little Empire Daycare Management System.

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3.2.2 DFD Level 0

The Little Empire Daycare Management System's level 0 data flow diagram may be seen in Fig. 2. The data flow involved in Fig. 1 is described in the Data flow Diagram Level 0. The relationships between each process and the entities at level 0 of the data flow diagram are depicted below the figure.

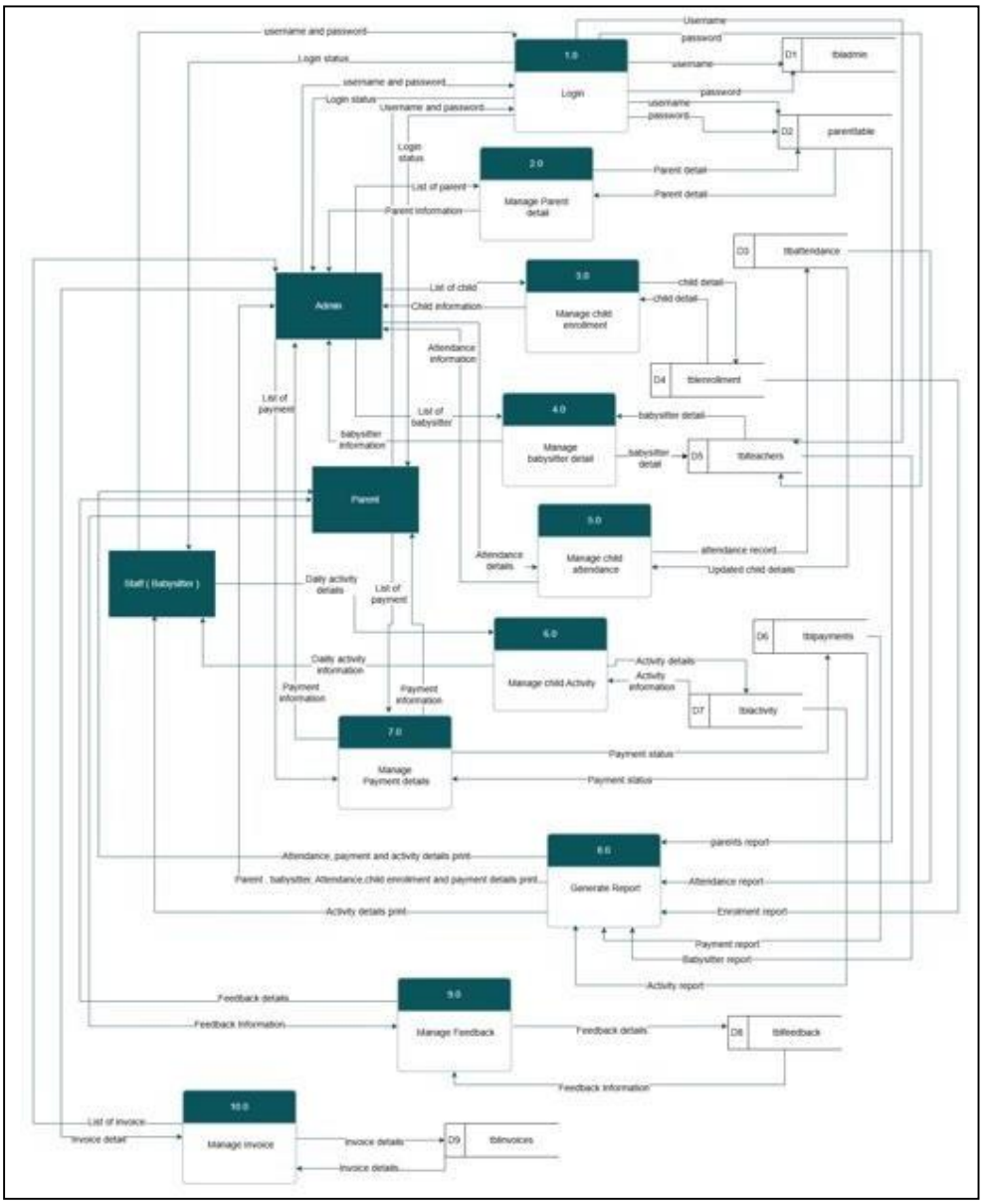

Fig. 2 Flow Diagram Level 0 (DFD 0)

3.2.3 Entity Relationship Diagram

An entity-attribute relationship diagram is a complete diagram that demonstrates the relationship between the two [9]. An entity connection diagram is constructed to demonstrate how external entities, and the system are connected. The Entity Relationship Diagram below explains the relationship between the Little Empire Daycare Management System and external entities such as parents and administrators and Staff.

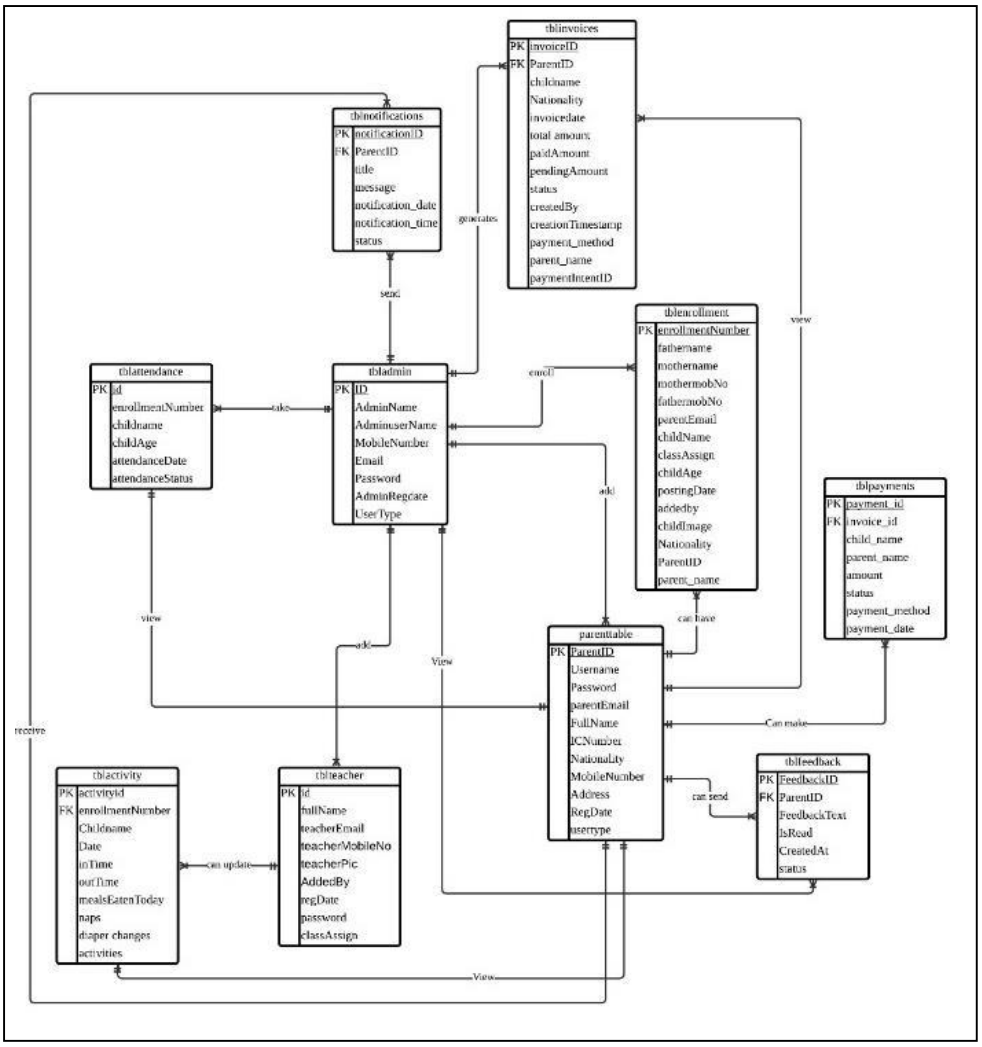

Fig. 3 ERD Diagram

4. Result and Discussion

A web platform was used to build the system. This section presents the results of the system implementation and testing. The HTML, CSS, and PHP programming languages were used to build the system. In the meantime, XAMPP is used to setup the MySQL connection. The system implementation and system testing are discussed in this section.

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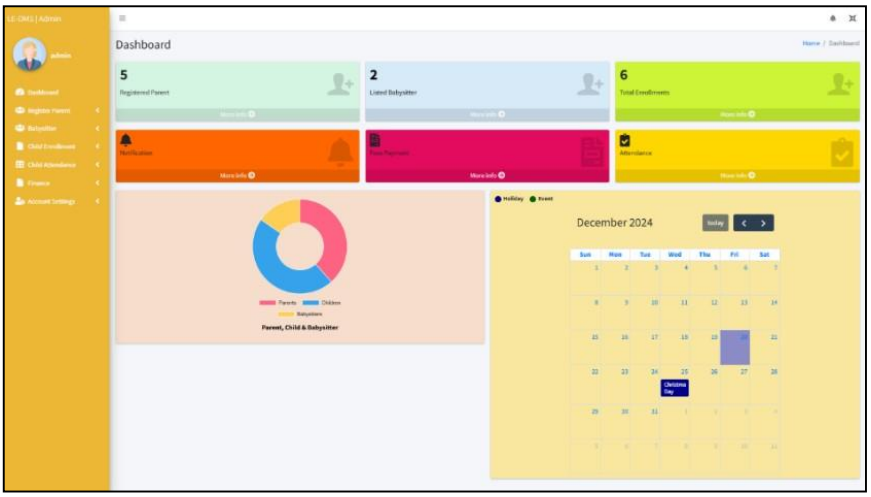
Fig. 4 Login page

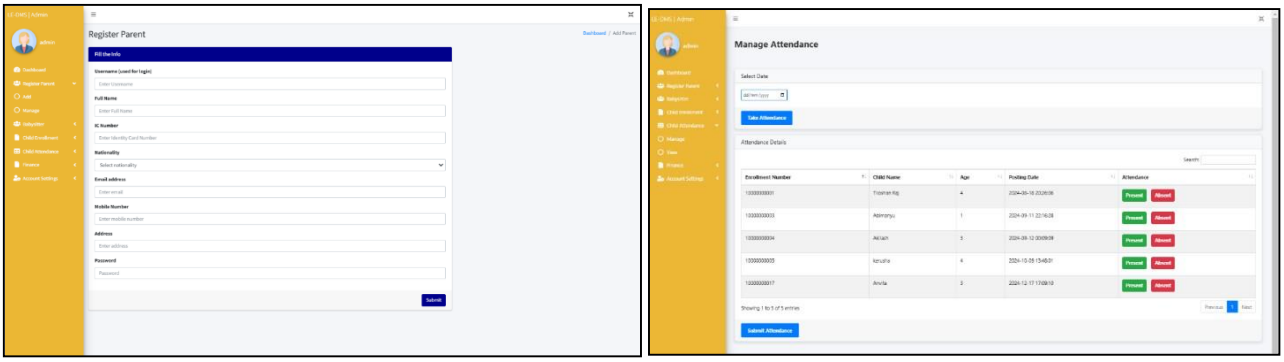
Fig. 4 shows the interface of the Little Empire Daycare Management System login page. On the login page, users, including the admin, staff and parent are required to log in to access the system. They are granted access only if they provide valid login credentials. If incorrect credentials are entered, an alert message is displayed on the screen. The various test cases for this module are detailed in Table 5.

Table 5 *Test Case for Login Module*

Test Case ID	Description	Expected Output	Actual Output
M1-1	To check whether administrator, staff and parent can log in into the system	The user should be able to log in into the system	The user has successfully logged in into the system
M1-2	To check whether administrator could create account for other users	The administrator should be able to create account for another user	The administrator has successfully created account for another user
M1-3	To check whether the system will restrict login whenever a wrong credential is entered	The system should restrict login when incorrect email credentials has been entered	The system restricted the login when an incorrect email or no credentials has been entered



(a)



(b) **(c)**

Fig. 5 *(a) Interface of Admin dashboard; (b), (c) Features of admin*

In the Fig. 5 admin dashboard, administrators have access to all system modules. They can navigate through the sidebar to manage staff, parent, child, Attendance management, manage invoices, manage notification and generating reports. The various test cases for Administrator management module are detailed in Table 6.

Table 6 *Test Case for Administrator Management Module*

Test Case ID	Description	Expected Output	Actual Output
M2-1	To check whether the system could display the dashboard for administrator	The system should be able to display the dashboard for administrator	The system has successfully displayed the dashboard for administrator
M2-2	To check whether the administrator can navigate through other modules via the dashboard	The admin should be able to navigate through other modules via the dashboard	The admin has successfully navigated to other modules via dashboard
M2-3	To check whether the administrator can log out from the system	The admin should be able to log out from the system	The admin has successfully logged out from the system
M2-4	To check whether the admin can add, update and delete new staff information into the system.	The admin should be able to add, update and delete new staff informationinto the system	The administrator has successfully added, updated and deleted staff information into the system
M2-5	To check whether the admin can add, update and delete new parent information into the system.	The admin should be able to add, update and delete new parent information into the system.	The administrator has successfully added, updated and deleted parent information into the system.
M2-6	To check whether the admin can record attendance of child	The admin should be able to mark attendance for child in the system	The teacher successfully recorded the attendance of child
M2-7	To check whether the admin can add, update, delete invoice information into the system.	The admin should be able to add, update, delete invoice information into the system	The administrator has successfully added invoice information into the system
M2-8	To check whether the admin can create and send notification into the system.	The admin should be able to create and send notification into the system.	The administrator has successfully created and send notification into the system
M2-9	To check whether the admin can generate report	The admin should be able to generate report	The administrator has successfully generated report
M2-10	To check whether the admin can view feedback records	The admin should be able to view Feedback information	The administrator has successfully viewed Feedback information.

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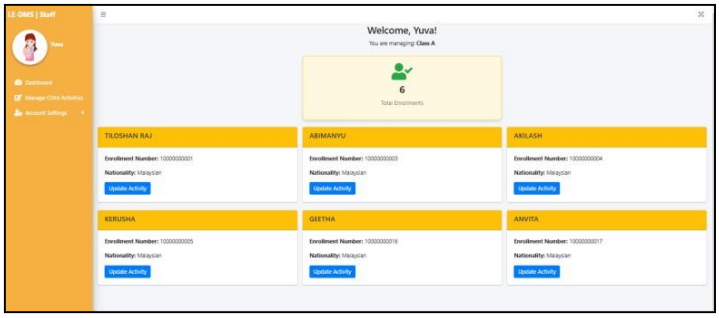
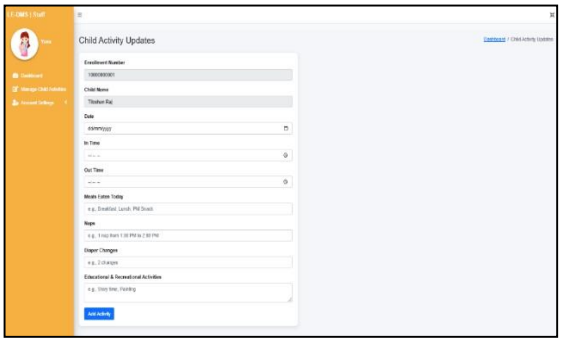
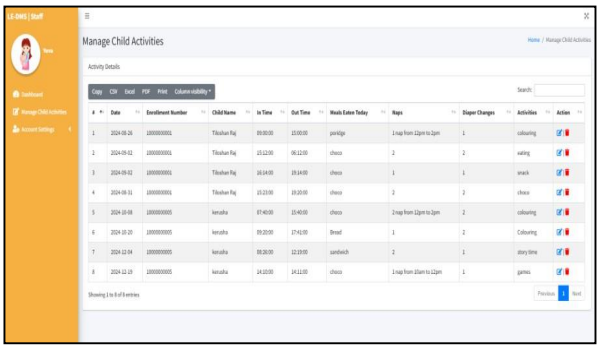


(a)





(b) **(c)**

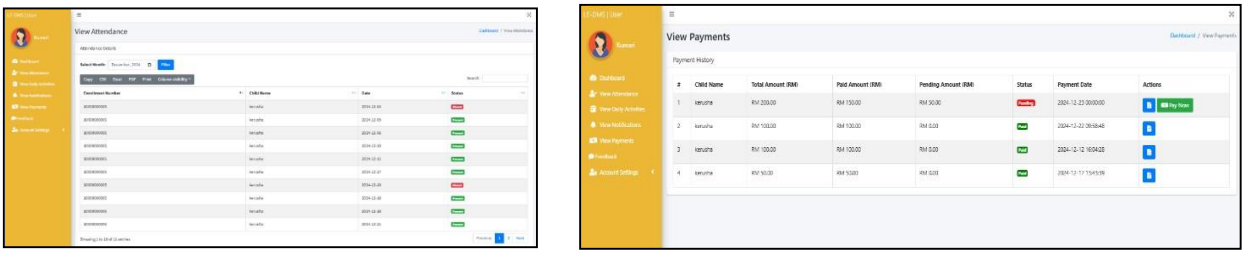
Fig. 6 *(a) Interface of Staff dashboard; (b), (c) Features of Staff*

Fig. 6 depict the staff interface to enter daily activity information for child. It contains data such as enrolment number, child name, date, in-time, out-time, meals taken, nap length, diaper changes, and educational or recreational activities. Staff can view, edit, or delete activity records as needed. The various test cases for this module are detailed in Table 7.

Table 7 *Test Case for Staff Management Module*

Test Case ID	Description	Expected Output	Actual Output
M3-1	To check whether the staff can view child information	The staff should be able to view child information in the system	The staff successfully viewed their child's information
M3-2	To check whether the staff can add, update, delete child's daily activity record	The staff should be able to add, update, delete child's daily activity information in the system	The staff has successfully added child's daily activity into the system
M3-3	To check whether the staff can view the total number of children enroll in their class	The staff should be able to view total number of children enroll in their class	The staff has successfully viewed the total number of children enroll in their class.

(a)



(b) **(c)**

Fig. 7 *(a) Interface of parent dashboard; (b), (c) Features of parent*

In the parent dashboard, parents have access to more detailed information and functionalities. They can navigate through the sidebar to view child attendance, view child daily activity, view notification, send feedback, handling payments and potentially other relevant features tailored specifically for parent users. Figure 7(a) show the interfaces of parent dashboard page. The view attendance section, shown in Figure 9(b) and 9(c) shows the payment section. Parents can securely enter payment information by using stripe as the online payment platform and view outstanding payments, make online payments through the integrated gateway, and potentially generate receipts. Table 8 shows the Test Case for Parent Management Module details the specific test cases related to this module.

Table 8 *Test Case for Parent Management Module*

Test Case ID	Description	Expected Output	Actual Output
M4-1	To check whether the parent can view child information	The parent should be able to view the child information in the system	The parent successfully viewed the student information in the system
M4-2	To check whether the parent can pay the Daycare fee through the system using Stripe	The parent should be able to make a payment using Stripe in the system	The parent successfully made a payment using Stripe
M4-3	To check whether the parent can download the payment receipt	The parent should be able to download the receipt after payment	The parent successfully downloaded the payment receipt
M4-4	To check whether the parent can send feedback in the system	The parent should be able to send feedback information in the system	The parent successfully sends feedback information in the system
M4-5	To check whether the parent can view child attendance record	The parent should be able to view child's daily activity record	The parent successfully viewed child's daily activity record
M4-6	To check whether the parent receives email notifications	The parent should receive email notifications from the system	The parent successfully received email notifications
M4-7	To check whether the parent can view child's daily activity record	The parent should be able to download the receipt after payment	The parent successfully downloaded the payment receipt

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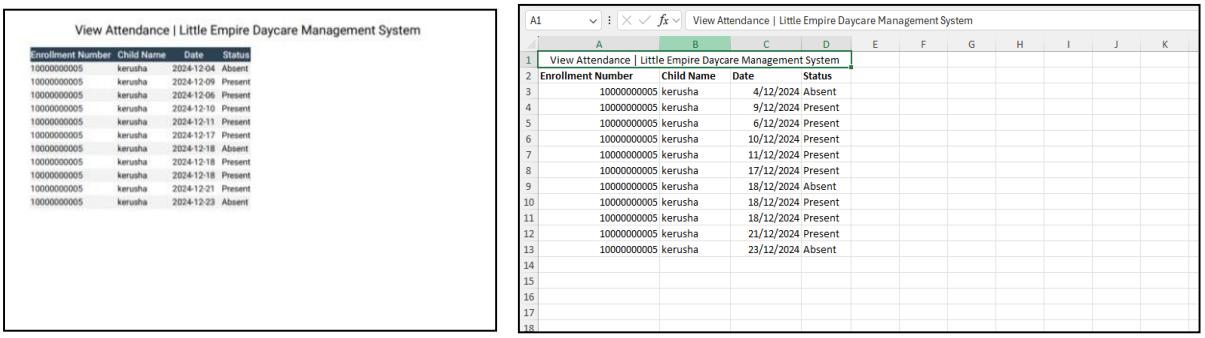

(a) **(b)**

Fig. 8 (a) *Interface of Report Module; (b), (c) Export file of attendance in excel*

Fig. 8(a) show the report module in pdf. Admin and parent can download to view attendance details. Fig. 8(b) show the interface of the attendance records. The various test cases for report module are detailed in Table 9.

Table 9 *Test Case for Report Module*

Test Case ID	Description	Expected Output	Actual Output
M5-1	To check whether the administrator can filter attendance by date	The administrator should be able to filter the attendance records by specifying a date range	The administrator successfully filtered the attendance records by date
M5-2	To check whether the system can generate an attendance report based on filtered dates	The system should be able to generate an attendance report for the specified date range	The system successfully generated an attendance report for the specified date range
M5-3	To check whether the system can export the attendance report to an Excel and file	The system should be able to export the generated attendance report to an excel and pdf file	The system successfully exported the attendance report to an Excel and pdf file
M5-4	To check whether the system can generate a report of registered parents	The system should generate a report containing details of registered parents	The system successfully generated a report of registered parents
M5-5	To check whether the system can generate a report of registered babysitters	The system should generate a report containing details of registered babysitters	The system successfully generated a report of registered babysitters
M5-6	To check whether the system can generate a report of registered children	The system should generate a report containing details of registered children	The system successfully generated a report of registered children
M5-7	To check whether the system can generate a report of child activity records	The system should generate a report containing child activity records	The system successfully generated a report of child activity records
M5-8	To check whether the system can generate a report of invoices and payments	The system should generate a report containing invoices and payment details	The system successfully generated a report of invoices and payments

Conclusion

The Little Empire Daycare Management System (LE-DMS) significantly enhances operational efficiency and parental engagement at Little Empire Childcare Centre. The system reduces manual workloads by automating key processes like Child enrollment, managing babysitter records, attendance, invoicing, and communication, enabling the admin to focus more on childcare. It also strengthens the bond between parents, staff and the center by providing real-time updates on children's activities, thereby fostering trust and satisfaction. This integration of advanced web-based technologies represents a pivotal improvement in childcare management.

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Appendix A

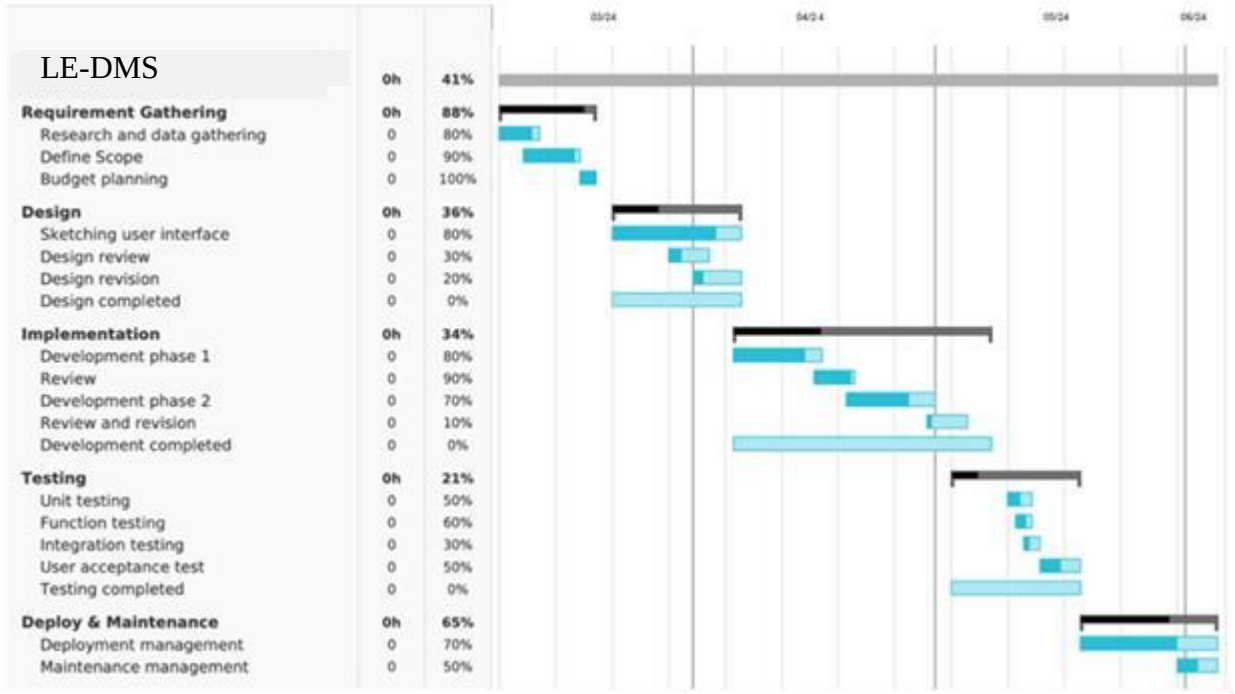
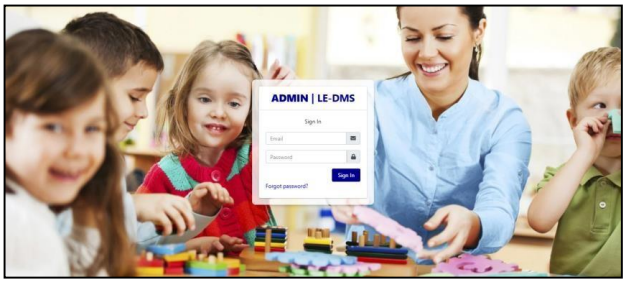


Fig. A.1 *Gantt Chart*

Appendix B

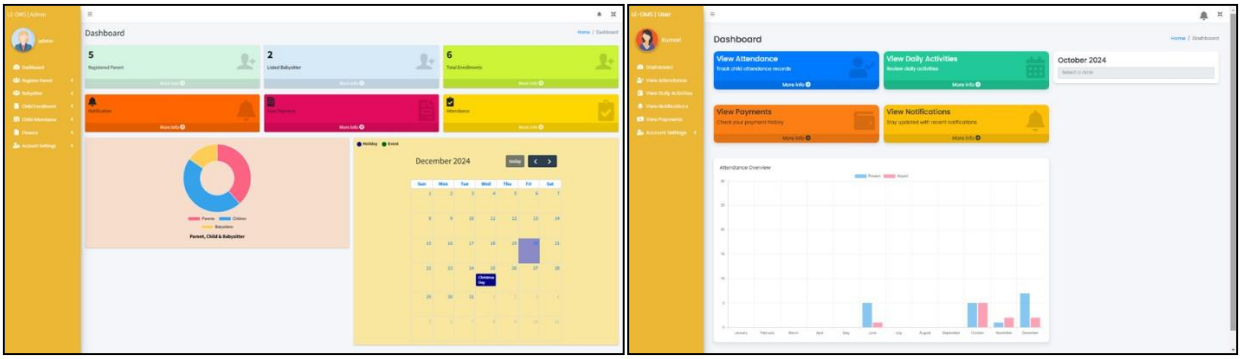


(a)

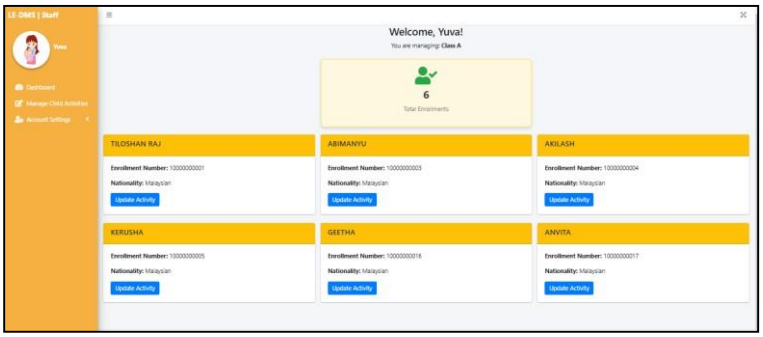
(b)

(c)

Fig.B1 *Login interface of admin, staff and parent*



(a) (b)



(c)

Fig. B2 *Dashboard interface of admin, parent and staff*

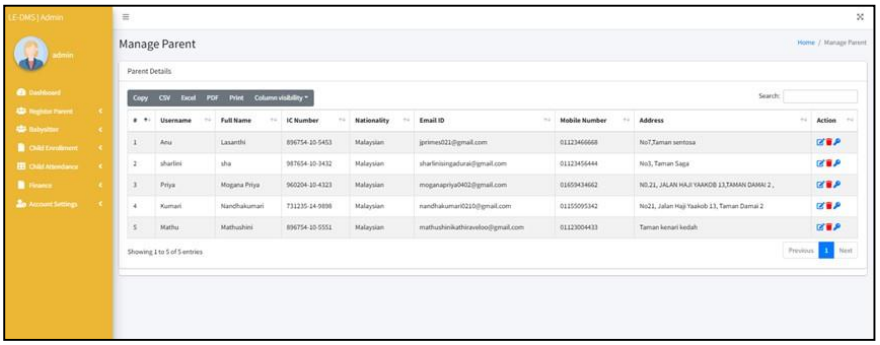


Fig.B3 *Manage new parent*

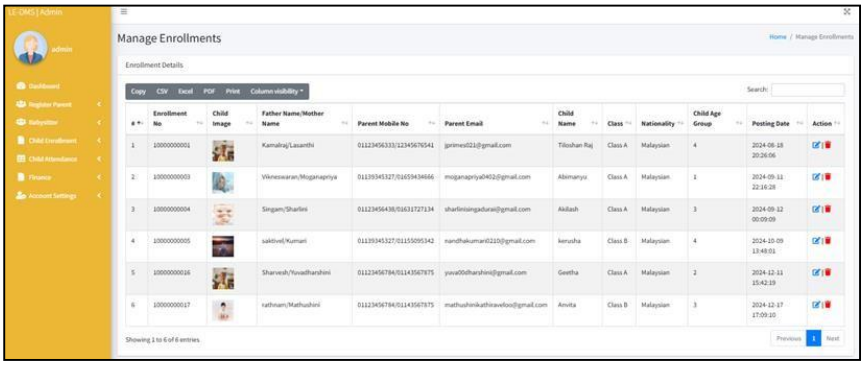


Fig.B4 *Manage New Enrollment*

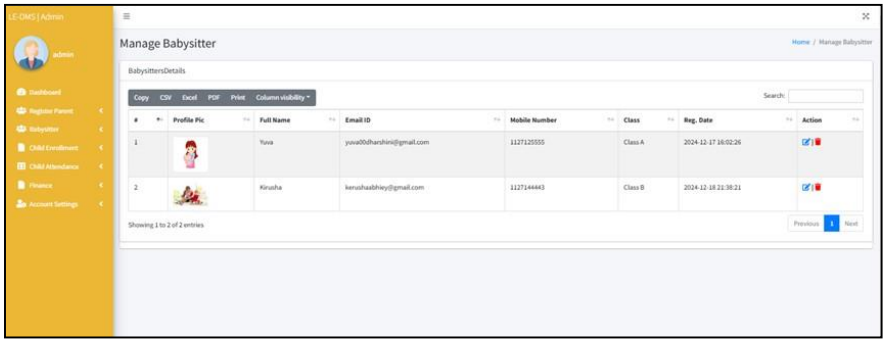


Fig.B5 *Manage babysitters*

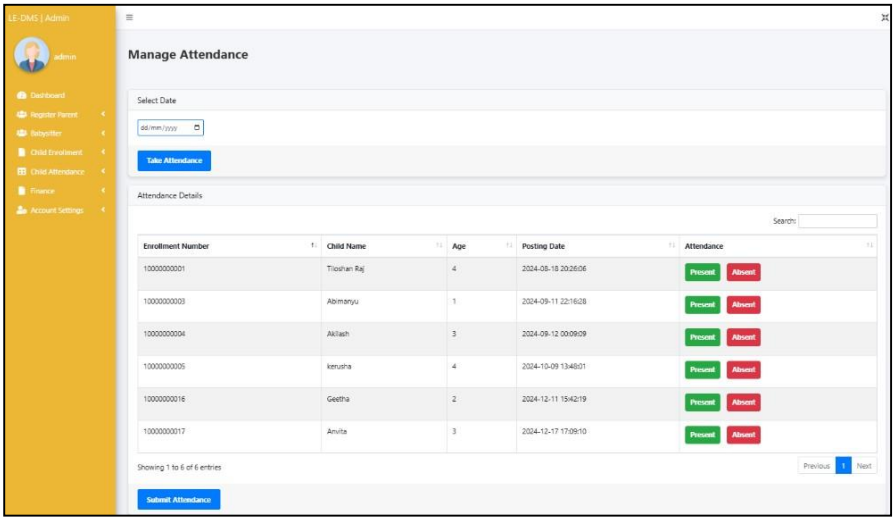


Fig.B6 *Manage attendance*

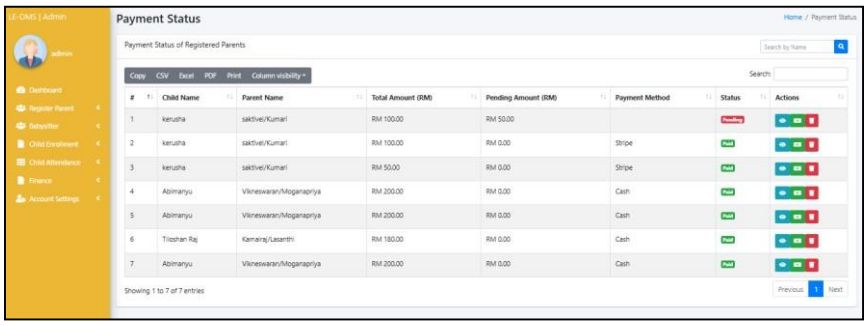


Fig.B7 *Manage Invoice*

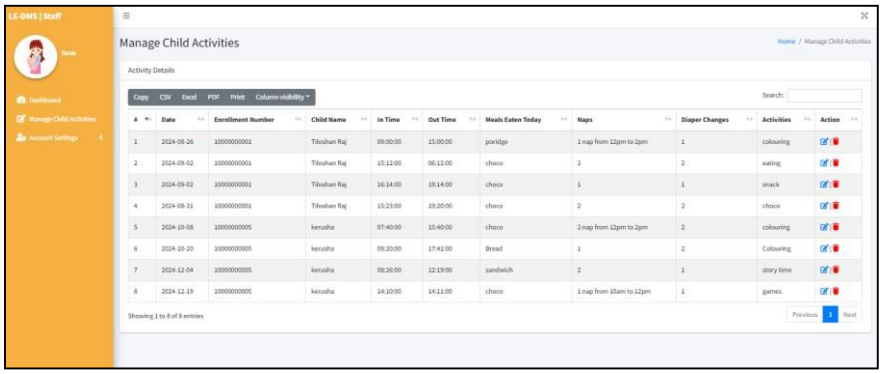


Fig.B8 *Manage Child activity*

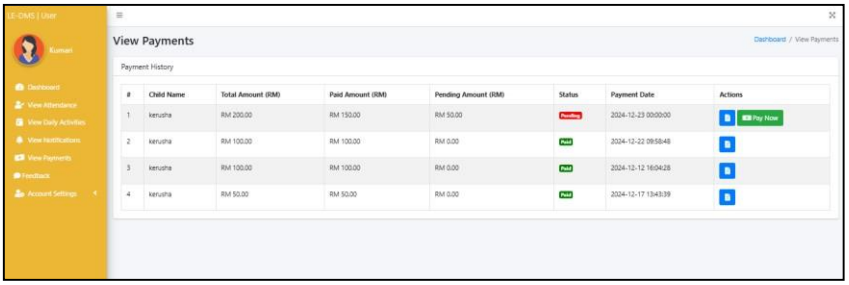


Fig.B9 *Manage payment*

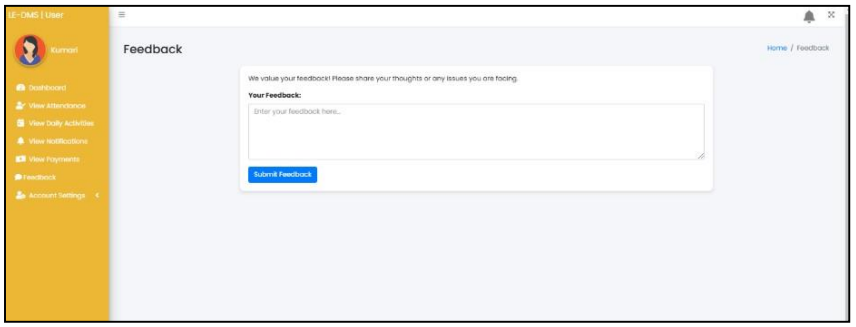


Fig.B10 *Manage Feedback*

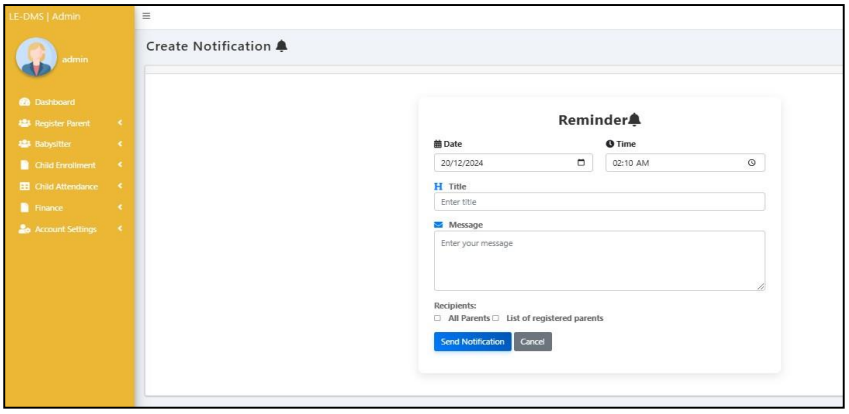


Fig.B11 Manage *Notification*

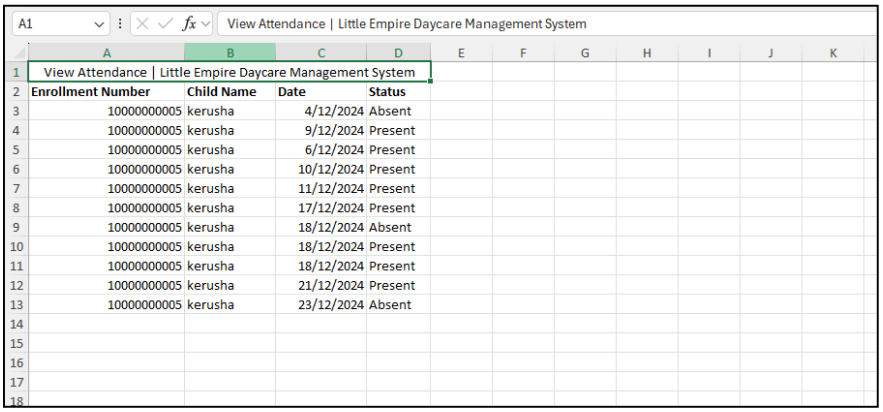


Fig.B12 Generate report in excel