

PPAK UTHM Connect System

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Abstract

The Pusat Pendidikan Awal Kanak-Kanak (PPAK) UTHM, encompassing Taska Hikmah UTHM and Tadika Khalifah Junior, aims to modernize operations with a centralized digital platform. This platform will streamline administrative tasks like payment tracking, attendance logging, and communication via memos and notifications. Replacing the current manual system, it reduces errors, inefficiencies, and reliance on physical records. Parents will gain real-time updates on their child's progress, improving engagement and communication. The platform, developed for web will undergo rigorous testing to ensure usability and will support education for children aged 2-6, aligned with PERMATA and KSPK syllabi. Expected outcomes include operational efficiency, enhanced parent-teacher collaboration, and a stronger connection between home and school, fostering a supportive learning environment.

1. Introduction

The PPAK UTHM Connect System is a proposed digital platform aimed at modernizing administrative and communication processes for Tadika Khalifah Junior under the Pusat Pendidikan Awal Kanak-Kanak (PPAK) UTHM. It addresses inefficiencies in the current manual system by digitizing payment tracking, attendance logging, and parent-teacher communication, enhancing transparency and engagement.

Key challenges include time-consuming manual processes, reliance on hardcopy memos for communication, and limited real-time access to children's records. The system introduces features like secure login, payment management, activity tracking, and real-time notifications for administrators, teachers, and parents. Objectives include designing the system with an object-oriented approach, developing it for web and mobile platforms, and conducting comprehensive testing. Expected outcomes include improved efficiency, reduced errors, reliable communication, and increased parental involvement.

The platform also aligns with the growing demand for digital transformation in early education, serving as a model for modernizing preschool operations and fostering collaboration between parents and educators. The project is organized into six chapters, covering introduction, literature review, methodology, analysis and design, implementation and conclusion, ensuring a structured and thorough approach. The chapter underscores the pivotal role of technology in addressing these challenges, proposing the development of an automated application and web-based system [1].

2. Literature Review

This section explains the study of the current PPAK UTHM system, kindergarten management, and study of existing related systems.

2.2 Current PPAK UTHM System

PPAK UTHM has traditionally relied on manual processes for daily operations, including hardcopy memos, physical payment records, and paper-based activity logs. These methods are increasingly inefficient, prone to errors, and limit communication and accessibility for parents. Handwritten receipts and physical records can cause financial discrepancies and delays, while hardcopy memos are easily lost, leading to missed deadlines. Additionally, paper activity logs prevent real-time updates, restricting parental involvement. Issues like data inaccuracies, difficulty in retrieval, and vulnerability to damage as major drawbacks of manual systems [7]. Digital solutions offer integrated platforms for communication, payment management, and activity tracking, addressing these inefficiencies with features like mobile notifications, automated billing, and real-time updates. However, existing systems often fail to meet the specific needs of institutions like PPAK UTHM, creating an opportunity to develop a tailored digital platform that aligns with local curricula, payment systems, and workflows.

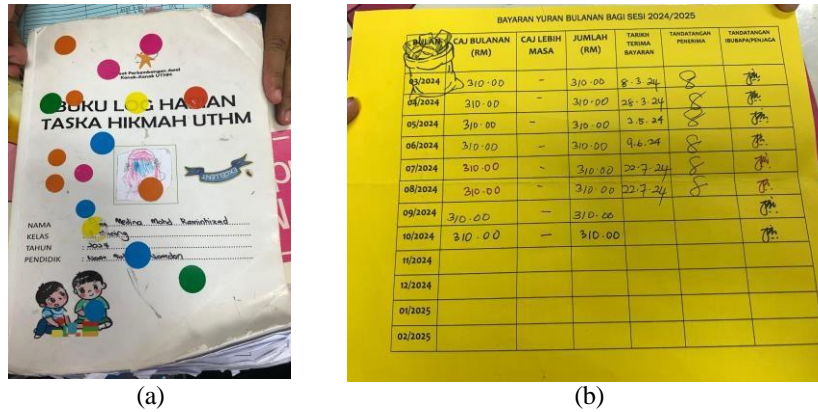


Fig. 1 (a) Manual log activity book; (b) Fee payment history card

2.4 Kindergarten Management

Early childhood education is vital for a child’s academic success and personal growth, with kindergartens serving as foundational institutions for cognitive, social, and emotional development. Effective kindergarten management is crucial, involving curriculum organization, resource management, and strong communication between educators and parents. Moreover, institutions like Tadika Khalifah Junior showcase diverse approaches to early education, many preschools, including PPAK UTHM, still rely on manual systems. These traditional methods are increasingly unsustainable, leading to inefficiencies, errors, and limited real-time engagement. Transitioning to digital management solutions can streamline operations, enhance transparency, and improve parent-teacher collaboration, fostering a more supportive and efficient early learning environment. The challenges faced by Kindergarten Khalifah Junior UTHM are examined in detail, highlighting the inefficiencies of traditional methods, such as the potential for data loss and the time-consuming process of manual reporting [2]. This analysis paves the way for proposing a comprehensive Kindergarten Management System aimed at optimizing administrative tasks and improving data accuracy [3]. The proposed system will serve administrators, teachers, and parents, encompassing a wide range of functionalities.

2.4 Study of Current Related System

The table compares the features of existing kindergarten management systems, including Little Caliphs, Q-Dees, Brainy Bunch, and the proposed PPAK UTHM Connect System. It highlights various functionalities such as user management, payment management, activity logging, and communication platforms. The comparison underscores the limitations of existing systems in providing comprehensive solutions and demonstrates how the PPAK UTHM Connect System integrates essential features to address these gaps effectively. Also, existing systems in Samutprakan Province, Thailand show similar approaches to digital management [10].

Table 1 Comparison with the Existing Systems

| Features / Application | Little Caliphs | Q-Dees | Brainy Bunch | PPAK UTHM |
|------------------------|----------------|--------|--------------|-----------|
|------------------------|----------------|--------|--------------|-----------|

| | | | | |
|-------------------------------|-----|-----|-----|-----|
| Register and login | Yes | Yes | Yes | Yes |
| User Management | Yes | Yes | No | Yes |
| Event Memo | Yes | No | Yes | Yes |
| Activity and Progress Logging | No | No | Yes | Yes |
| Daily Update | No | No | No | Yes |
| Communication tools | Yes | Yes | Yes | Yes |
| Notifications | Yes | Yes | Yes | Yes |

2.5 Digital Transformation in Early Childhood Education

The table compares the features of existing kindergarten management systems, including Little Caliphs, Q-Dees, Brainy Bunch, and the proposed PPAK UTHM Connect System. It highlights various functionalities such as user management, payment management, activity logging, and communication platforms. The comparison underscores the limitations of existing systems in providing comprehensive solutions and demonstrates how the PPAK UTHM Connect System integrates essential features to address these gaps effectively. Features like real-time updates, secure payment gateways, and parent-teacher communication modules improve transparency, increase parental involvement, and streamline administrative tasks. However, challenges like high implementation costs and limited customization for local curricula hinder adoption, especially for smaller institutions. For PPAK UTHM, a tailored digital platform aligned with local standards like PERMATA could resolve these issues. Such a solution would enhance communication with parents through real-time notifications and progress tracking, fostering stronger collaboration between home and school while addressing the institution’s specific needs. Studies demonstrate how digital systems can improve efficiency and accuracy in school management by reducing reliance on manual processes [2].

3. Methodology

The Waterfall Model has been chosen for the development of the PPAK UTHM Connect system. This sequential software development model ensures a structured approach by dividing the process into distinct, predefined stages. Each phase must be completed before proceeding to the next, providing a clear progression of activities and deliverables. This model is ideal for projects with well-defined requirements and a clear scope, making it suitable for the PPAK UTHM Connect system. With its linear approach, the Waterfall Model allows for thorough documentation and minimizes the risk of overlapping tasks, ensuring the system meets the expectations of all stakeholders [4].

3.1 Waterfall Model

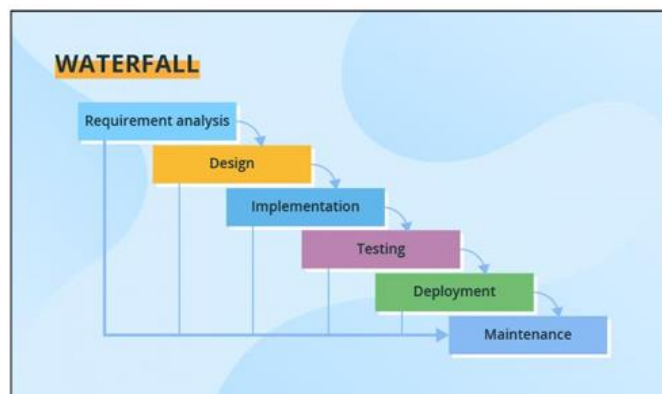


Fig. 2 Waterfall Model [4].

3.2 Requirement Analysis

This phase identifies the system’s functional and non-functional needs by consulting stakeholders like administrators, teachers, and parents. Key requirements include student activity tracking, fee monitoring, event scheduling, report generation, and parent-teacher communication.

3.3 Design

System architecture, UI/UX, and workflows are designed to meet user needs. Wireframes and mockups are created for main features (registration, login, payments, activity logs, memos). Risk assessments are conducted to foresee integration or technical challenges.

3.4 Implementation

The implementation phase focuses on building the system using appropriate technologies. HTML, CSS, and JavaScript are used for creating a responsive frontend, while Flutter supports cross-platform development for both web and mobile. MySQL handles data storage, and XAMPP serves as the local server for testing and configuration. This setup ensures the system is robust, scalable, and user-friendly.

3.5 Testing

In the testing phase, various methods are used to ensure system functionality and reliability. Unit testing checks individual components, integration testing verifies module interactions, and system testing ensures overall performance. User acceptance testing (UAT) gathers feedback from real users to confirm the system meets their needs. Issues found are resolved before deployment to ensure quality.

3.6 Deployment

The system is moved to a live server. Training is provided to users. Monitoring is conducted post-launch to track performance and fix issues. Support includes minor updates and technical assistance to ensure smooth operation.

3.7 Maintenance

Continuous updates and performance monitoring keep the system secure and efficient. User feedback drives improvements. A final report summarizes achievements, issues, and recommendations for future system enhancements to support evolving needs.

4. Analysis and Design

User requirement analysis is the process of identifying and documenting the needs of end users for a software system. This gathered information is then utilized to design and develop the system.

4.1 Requirements Analysis

User requirement analysis is the process of identifying and documenting the needs of end users for a software system. This gathered information is then utilized to design and develop the system.

Table 2 *Requirements Analysis*

| No | Requirement |
|----|--|
| 1 | Administrators should be able to log in securely using unique credentials to access the platform and administrative features. |
| 2 | Administrators should be able to manage user, such as adding, editing, or deleting teacher and student information. |
| 3 | Administrators should be able to track and manage payments, including fees, monitoring payment status, and issuing receipts. |
| 4 | Administrators should be able to send and delete memos or announcements about school events to teachers and parents. |
| 5 | Administrators should be able to approve a registration account to ensure only valid and verified users gain access to the system. |
| 6 | Teachers should be able to log in securely to access their profiles and platform features. |
| 7 | Teachers should be able to update and maintain records of student progress and activities. |
| 8 | Teachers should be able to view memos issued by administrators regarding school events and activities. |
| 9 | Teachers should be able to communicate with parents via messaging or notifications within the platform. |

- 10 Teachers should receive real-time notifications about updates, upcoming events, and new messages.
- 11 Parents should be able to securely log in to their profiles and register their accounts linked to their children’s information.
- 12 Parents should be able to view pending payments, make payments online, and download digital receipts for transactions.
- 13 Parents should be able to update their child’s daily activity information before school.
- 14 Parents should be able to view records of their child’s activities, progress, and participation in events.
- 15 Parents should receive memos and updates about school events, keeping them informed of important announcements.
- 16 Parents should be able to communicate with teachers and administrators about their children progress or concerns.
- 17 Parents should receive real-time notifications about fee reminders, child activities, and event announcements.

4.2 Functional and Non-Functional Requirements

Table 3 *Functional Requirements*

| No | Module | Description |
|----|-------------------------------|---|
| 1 | Registration | The system shall allow parents to register for the PPAK UTHM Connect system by providing personal information, including child name, child age, parent name, email, IC, phone number and password |
| 2 | Login | The system shall allow teachers, parents and administrators to log in securely using their credentials to access their profiles and utilize the system's features. |
| 3 | User Management | The system should provide functionality to manage user accounts, such as adding, editing, or deleting teacher and student profiles. |
| 4 | Payment Management | The system shall allow administrators to track tuition fees and other payments, monitor payment status, and issue digital receipts for transactions. |
| 5 | Memo Management | The system shall enable administrators to create and send memos or announcements about school events to teachers and parents through the platform. |
| 6 | Student Progress and Activity | The system shall allow teachers to update student progress and activity records, ensuring accurate documentation of student achievements. |
| 7 | Event Memo | The system allows parents and teachers to view memos issued by administrators, allowing them to plan and organize activities accordingly. |
| 8 | Communication | The system should enable teachers and parents to communicate directly through messaging within the platform to ensure seamless parent-teacher interaction. |
| 9 | Notification | The system shall send real-time notifications to parents and teachers about updates such as memos, upcoming events, and messages. |
| 10 | Payment | The system allows parents to view pending payments, make payments online, and download digital receipts for transactions. |
| 11 | Daily Update | The system should enable parents to update their child’s daily activity details before school, providing administrators and teachers with necessary information. |
| 12 | Activity Tracking | The system shall allow parents to view records of their child’s daily activities, track progress, and monitor participation in school events and assignments. |

Table 4 *Non-Functional Requirements*

| No | Module | Description |
|----|--------|-------------|
|----|--------|-------------|

| | | |
|---|--------------|---|
| 1 | Performance | The system must be able to handle many concurrent users, especially during peak usage periods, without noticeable performance degradation. |
| 2 | Usability | The system must provide an intuitive and user-friendly interface for both parents and administrators, ensuring easy navigation and accessibility on multiple devices. |
| 3 | Availability | The system must maintain 99.9% uptime and ensure availability during peak periods, such as during event registration or payment deadlines. |
| 4 | Scalability | The system must be scalable to handle an increasing number of users or expanded features without compromising performance or availability. |

4.3 Use Case Diagram

A case diagram visually represents how users (actors) interact with a system's key functions. It provides a high-level overview of system operations, helping to define user needs, system features, and overall project scope. This tool is essential for understanding requirements and supporting effective communication during system design.

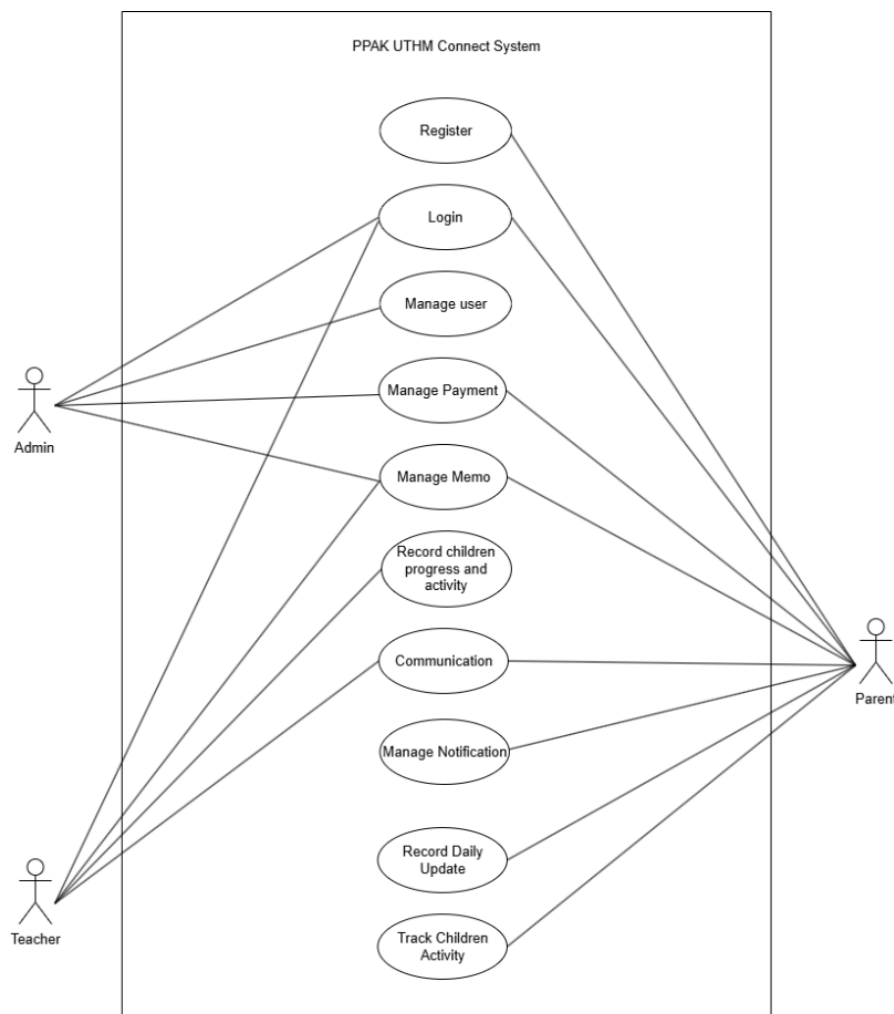


Fig. 3 Use Case Diagram

4.4 Class Diagram

The class diagram for the PPAK UTHM Connect system presents the main system entities, including admin, parents, and teachers, along with supporting classes like memo, payment, daily update, activity, progress and notification. It shows how users interact with key system features based on their roles. The class diagram is provided in Appendix A.

4.5 Interface Design

The interface is designed to be simple, user-friendly, and accessible for parents, with clear navigation and

responsive layouts suitable for mobile use.

4.5.1 Parent Modules

The parent modules include login and registration, a home dashboard, daily updates on the child’s condition, and records of the child’s activities. Each screen is designed to help parents easily track and manage their child’s preschool information.

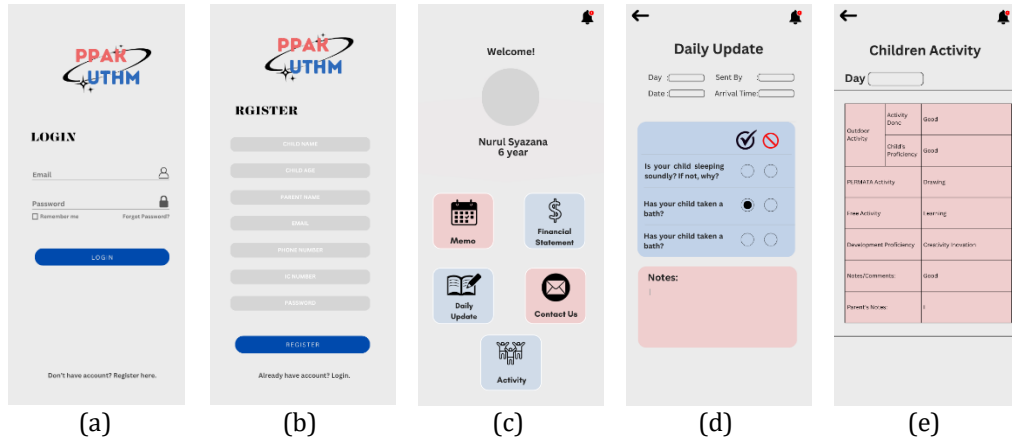


Fig. 4 (a) Parent login page, (b) Parent registration page, (c) Parent homepage, (d) Parent daily update, (e) Parent activity tracking

4.5.2 Admin Modules

The admin modules provide secure access and tools for managing teacher accounts and student payment records efficiently.

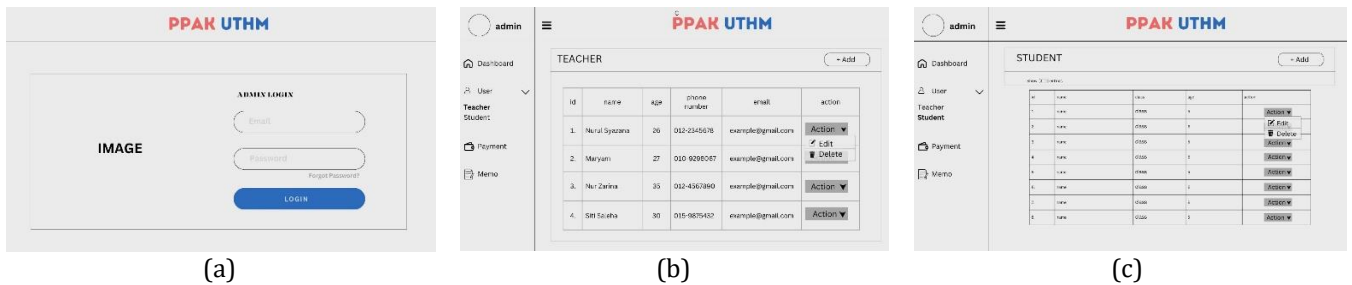


Fig. 5 (a) Admin login page, (b) Admin User Management (Teacher), (c) Admin Payment Management

4.5.3 Teacher Modules

The teacher modules enable secure login and offer interfaces for recording daily activities and tracking student progress using structured forms for consistent data entry.

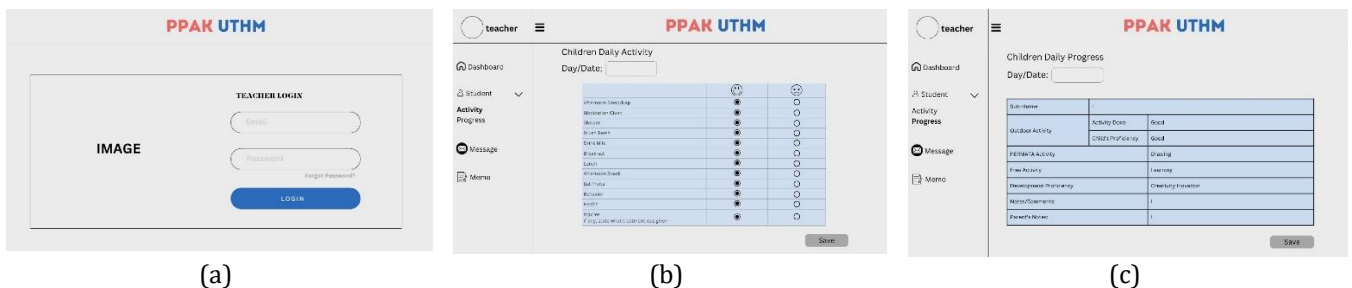


Fig. 6 (a) Teacher Login page, (b) Teacher Record Activity, (c) Teacher Record Progress

5. Implementation and Testing

The implementation phase involves coding and configuring the PPAK UTHM Connect system according to the

established design. The system's frontend is built using HTML, CSS, and JavaScript for responsive and user-friendly web interfaces. The testing phase ensures the system meets requirements and works properly. It includes system, and user acceptance testing (UAT) to check functionality, module integration, overall performance, and user satisfaction. Testing continues until all issues are resolved to ensure quality and reliability.

5.1 Security Implementation

The system enhances security by using hashed passwords to protect user credentials, ensuring that sensitive login data is not stored in plain text. Email link activation is also implemented during user registration, where users must verify their email addresses through a secure activation link.

5.1.1 Bcrypt Hashing Password

Bcrypt hashing secures user passwords by generating a unique salt for each one, making it difficult for attackers to reverse or guess them. In the PPAK UTHM Connect system, it ensures that stored passwords are protected even if the database is compromised.

```
// Hash the password
$hashed_password = password_hash($password, PASSWORD_DEFAULT);
```

Fig. 7 Bcrypt hash implementation

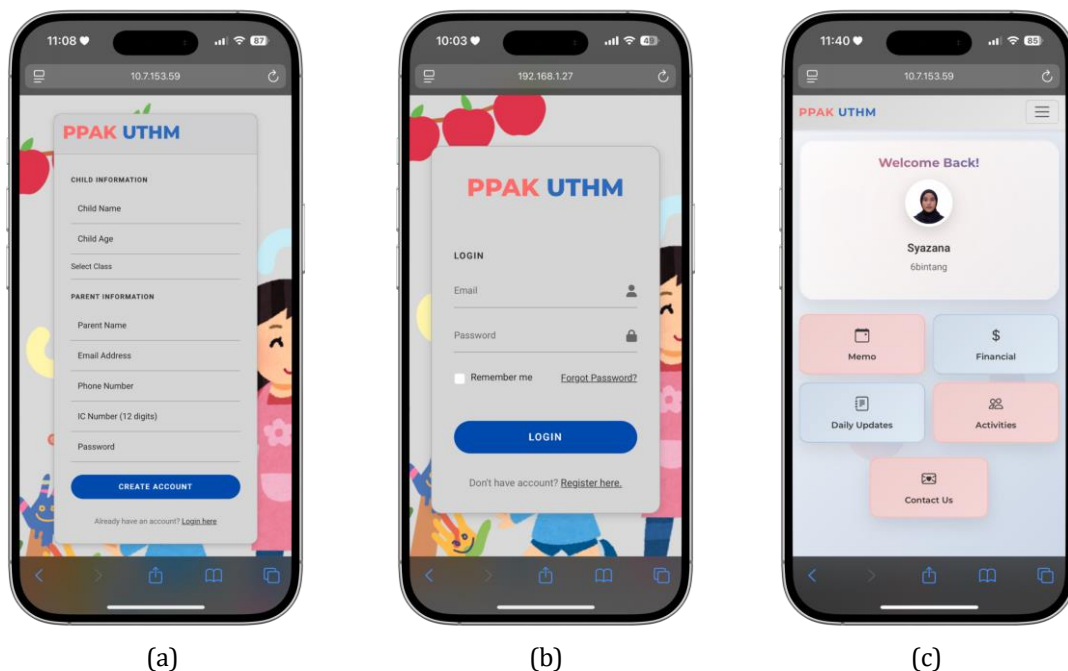
| PasswordField |
|---|
| \$2y\$10\$3o3.MdQUg028VgExxitGcuk7YfUBJrlx/bbhp0MZdg... |

Fig. 8 Hash password stored in Password table

5.2 Module Implementation

The Module Implementation section outlines the development of various modules within the PPAK UTHM Connect system, aimed at enhancing efficiency and user-friendliness. Dividing the system into specific modules simplifies the processes of development, testing, and maintenance. These modules cover all essential functions of the system, from user authentication to activity tracking and payment management.

5.2.1 Parent Modules



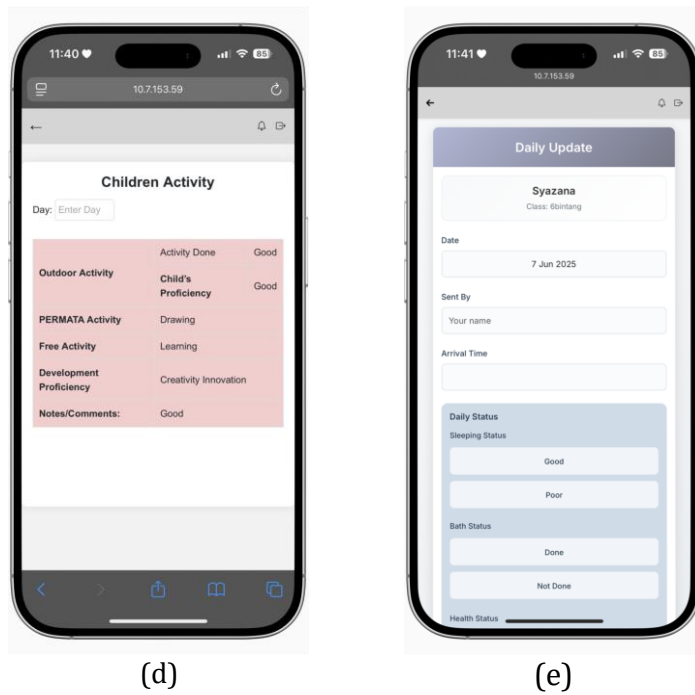
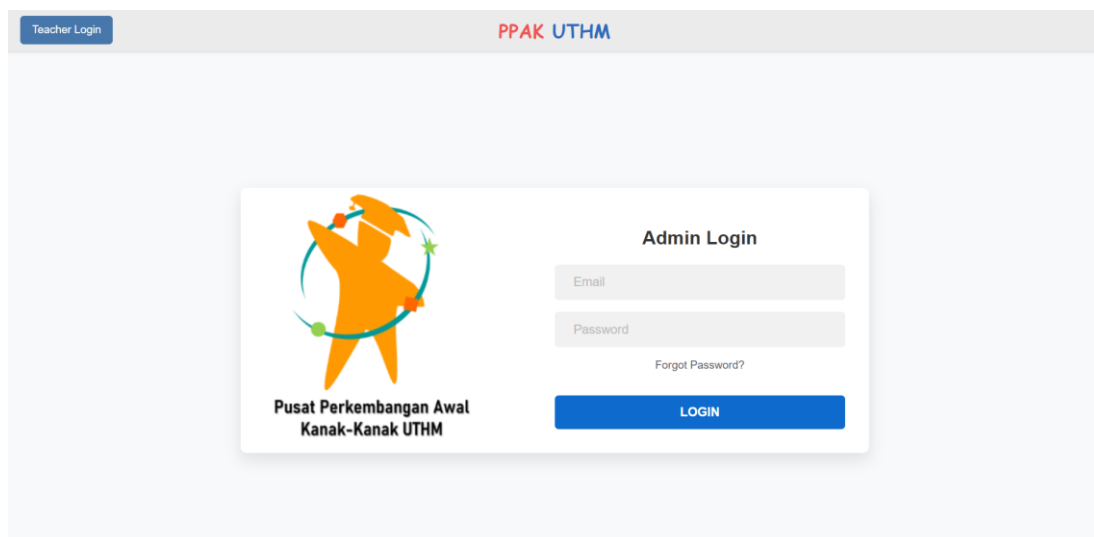


Fig. 9 (a) Register Account Page, (b) Login Page, (c) Parent Homepage, (d) View Activity Page (e) Daily Update Page

Figure 7 presents the interface for the Parent Module. Figure 7(a) shows the Parent Register Account page, where parents can create a new account by filling in both their personal information and their child's details. Figure 7(b) is the Parent Login Page, which allows registered parents to securely log into the system. Figure 7(c) displays the Parent Homepage, providing quick access to important features such as memos, payment status, and activity updates. Figure 7(d) is the View Activity interface, where parents can monitor their child's participation in school activities. Figure 7(e) shows the Daily Update page, which provides parents with regular updates on their child's attendance, behavior, and classroom engagement.

5.2.2 Admin Modules



(a)

Teacher Management Saturday, 07 June 2025

1 Total Teachers | 1 Active Teachers

Registered Teachers Filter

| Teacher Name | Teacher IC | Email | Activated | Status | Registered Date | Action |
|--------------|----------------|----------------------------|-----------|--------|------------------|-------------|
| farha | 000120-03-0800 | nurulsyazana0800@gmail.com | Yes | Active | 26/05/2025 22:57 | Edit Delete |

(b)

Payment Management Saturday, 07 June 2025

Filter Options

Month: All Months | Class: All Classes | Filter | Reset

Add New Payment Record

Student Name: Select Student | Class: Select Class | Month: Select Month | Overtime Hours: 0 | Add Record

Student Payment Records

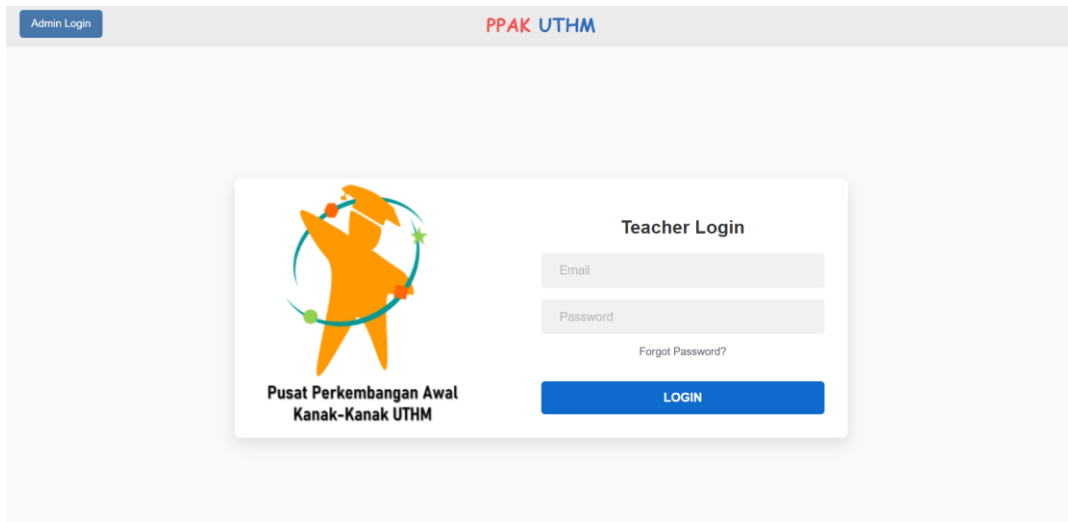
| No. | Student Name | Class | Month | Monthly Fee (RM) | Overtime Hours | Overtime Amount (RM) | Total Amount (RM) | Payment Status | Actions |
|-----|--------------|-------|---------|------------------|----------------|----------------------|-------------------|----------------|---------|
| 1 | Khali | | January | RM 310.00 | 1 hours | RM 6.00 | RM 316.00 | Ungold | |
| 2 | Syazana | | January | RM 310.00 | 0 hours | RM 0.00 | RM 310.00 | Ungold | |

(c)

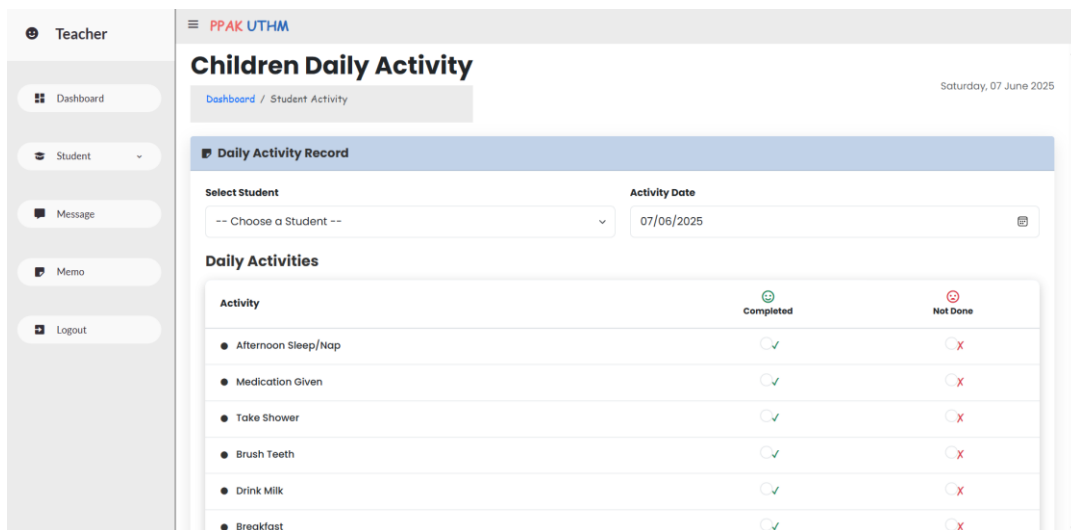
Fig. 10 (a) Admn Login Page, (b) User Management (Teacher)Page, (c) Payment Management Page

Figure 8 shows the interface for the Admin Module. Figure 8(a) is the Admin Login Module that authenticates admin and grants secure access to the backend system. Figure 8(b) is the Admin Teacher Management interface, which displays a summary of teacher statistics such as total and active teachers and provides a detailed list of registered teachers including their name, IC number, email, activation status, status, and registration date. The admin can view and manage teacher profiles through this interface. Figure 8(c) is the Admin Payment Management interface, which enables the admin to monitor and manage parent payment records, update transaction statuses, and ensure accurate monthly fee tracking.

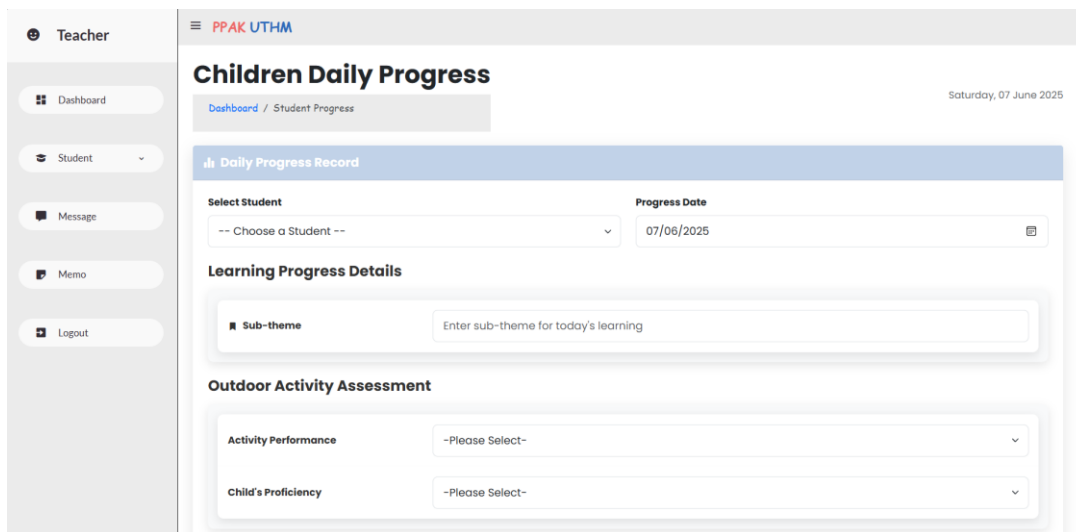
5.2.3 Teacher Modules



(a)



(b)



(c)

Fig. 11 (a) Teacher Login Page, (b) Record Progress Page, (c) Record Activity Page

Figure 9 illustrates the interface for the Teacher Module. Figure 9(a) shows the Teacher Login Page, which allows teachers to securely access their accounts using their registered credentials. Figure 9(b) displays the

Record Progress interface, where teachers can update and submit students' learning progress, including notes and assessments for each child. Figure 9(c) is the Record Activity interface that enables teachers to log daily or weekly classroom activities, helping to keep track of student involvement and participation for future reference and reporting.

5.3 Testing

After the system has been developed, it undergoes a thorough testing phase to ensure it functions correctly and meets all specified requirements. This phase includes System Testing, where the entire system is evaluated to verify that all components work together as intended, and User Acceptance Testing (UAT), where real users such as PPAK staff and administrators assess the system to ensure it is user-friendly, reliable, and meets their operational needs. System and acceptance testing are critical stages in the software engineering process to validate the system's functionality and usability from both technical and user perspectives [12].

5.3.1 System Testing

System Testing is the process of evaluating the entire system as a complete unit to ensure all components work together correctly. It checks the system's functionality, performance, and reliability against the specified requirements. This testing helps confirm that the system is ready for user acceptance and real-world use.

Table 5 System Testing

| Functional Module | TestCaseID | Description | Expected Result | Actual Result | Pass/Fail |
|-------------------------|------------|---|---|---|-----------|
| Register Account Module | TC001-001 | Enter full name, IC number, phone number, email address, password and confirm password | System displays success messages and sends accounts for admin approval | Success message shown; approval pending | Pass |
| | TC001-002 | Enter child name, child age, select class, parent name, email address, phone number, IC number and password | System displays success messages and sends accounts for admin approval | Success message shown; approval pending | Pass |
| | TC001-003 | Register with existing email | System displays "Email already exists" error | Error message displayed | Pass |
| | TC001-004 | Leave required fields blank during registration | System highlights required fields and shows "Please fill out this field" | Required field error displayed | Pass |
| | TC001-005 | Receive activation email after admin approval | User receives activation email with a working activation link | Email received with correct link | Pass |
| Login Module | TC001-006 | Enter valid email and password | Redirected to dashboard | Successfully logged in | Pass |
| | TC001-007 | Enter incorrect email or password | Show error message: "Invalid email or password" | Error displayed | Pass |
| | TC001-008 | Login with unapproved teacher/parent account | Error message "Account pending approval by admin" is displayed | Message shown as expected | Pass |
| Manage User | TC001-009 | Activate a teacher account | Modal form opens, Admin clicks "Activate", and status changes to "Yes" and "Active" | Data updated successfully Activation works as expected | Pass |
| | TC001-010 | Edit user record | Edit modal opens; after editing, data updates correctly | Changes saved and reflected | Pass |

| | | | | | |
|---------------------|-----------|--|---|--------------------------------------|------|
| | TC001-011 | Delete user record | After confirmation, the student is removed from the list | Student removed from list | Pass |
| Manage Payment | TC001-012 | Click "Add New Payment Record", fill form (student, class, month, hours), submit | New payment entry is added to the list | New payment for added successfully | Pass |
| | TC001-013 | Enter Monthly Fee and Overtime Hours | Total = RM310 + RM6 = RM316.00 | Correct total shown as RM316.00 | Pass |
| | TC001-014 | Click action to mark "Unpaid" record as "Paid" | Payment status changes to "Paid" | Status updated and green badge shown | Pass |
| Record Progress | TC001-015 | Click "Select Student" and choose a student | Student names are selected and bound to form | Student (e.g., Khali) selected | Pass |
| | TC001-016 | Select "Good" from Activity Performance dropdown | Selection appears correctly and is stored for submission | Dropdown working, value saved | Pass |
| | TC001-017 | Enter notes: "Child showed great improvement in social interaction." | Text accepts input and saves notes | Notes submitted successfully | Pass |
| Record Activity | TC001-018 | Tick for all listed activities | System stores all activity checkboxes as "Completed" | Data saved correctly | Pass |
| | TC001-019 | Leave student unselected and try to submit form | Error message shown: "Student selection required" | Validation error triggered | Pass |
| Record Daily Update | TC001-020 | Choose "Good" for Sleeping Status and "Done" for Bath Status | Statuses are stored and shown in summary correctly | Values saved accurately | Pass |
| | TC001-021 | Leave required fields (e.g., Arrival Time, Status) empty → Submit | Validation error displayed (e.g., "Arrival Time required") | Error messages shown | Pass |
| | TC001-022 | Parent clicks Pay button | User is redirected to Stripe payment gateway | Redirect successful | Pass |
| View Activity | TC001-023 | Parent click Activity on the homepage | Redirect to the activity page that display all activity for their child | Redirect successful | Pass |

5.3.2 User Acceptance Testing

User Acceptance Testing represents a critical phase in the PPAK UTHM system development lifecycle, where actual end-users evaluate the system's acceptance and usability against predefined requirements. An online survey methodology was implemented using Google Forms to collect comprehensive feedback from real users of the PPAK UTHM system with a total of 11 respondents.

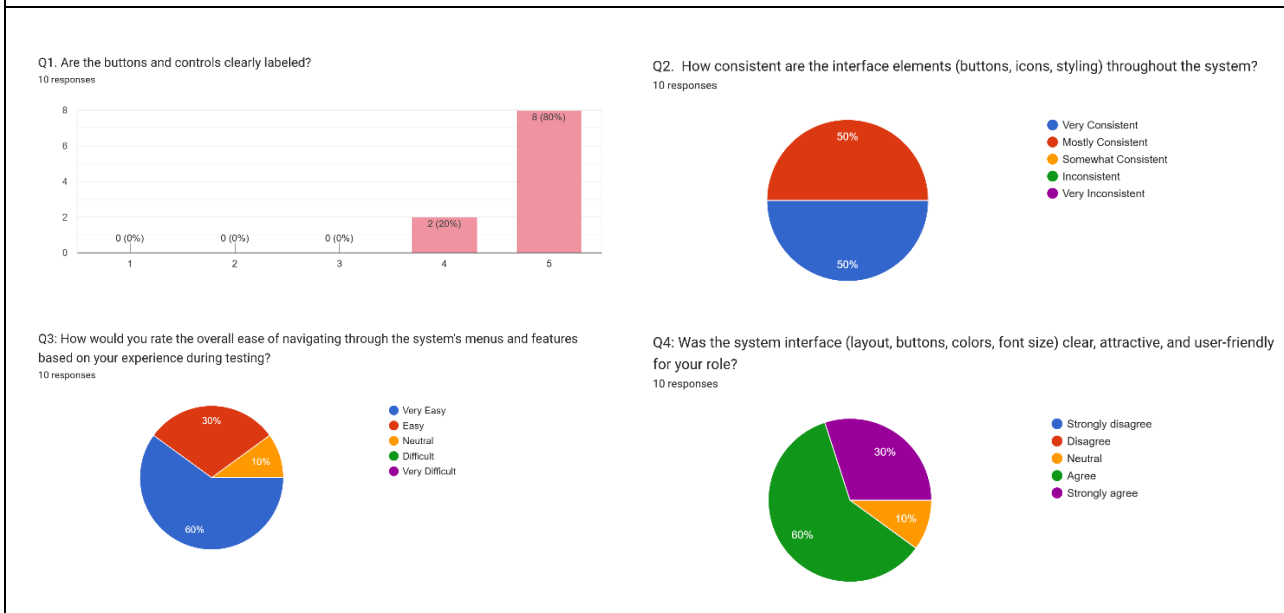


Fig. 12 Graphs of Testing Results for System Interfaces

The system interface received generally positive feedback across key usability metrics. Most users (80%) found buttons and controls to be clearly labeled, with only 20% rating them as somewhat unclear. Interface consistency was viewed favorably, with 50% rating elements as "Very Consistent" and another 50% as "Mostly Consistent," indicating no major consistency issues. Navigation through menus and features was particularly well-received, with 60% of users finding it "Very Easy" and 30% rating it as "Easy," suggesting the system's navigation structure is intuitive and user-friendly. However, the overall interface design (layout, buttons, colors, font size) showed more mixed results, with 60% of users agreeing it was clear and user-friendly, 30% strongly agreed, but 10% remaining neutral, indicating room for improvement in visual design elements to achieve universal user satisfaction.

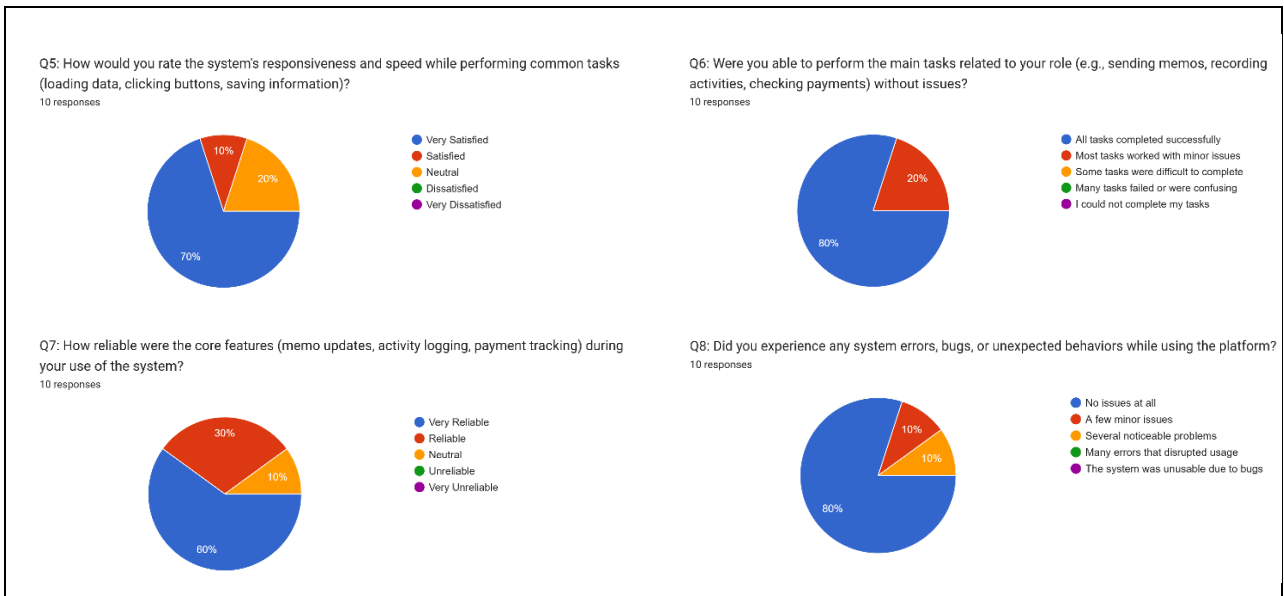


Fig. 13 Graphs of Testing Results for System Functionalities

The system functionality testing results demonstrate strong overall performance with some areas for improvement. System responsiveness and speed received highly positive ratings, with 70% of users very satisfied and 20% satisfied, indicating excellent performance for common tasks like loading data and saving information. Task completion was similarly successful, with 80% of users able to complete all main role-related tasks without issues, though 20% experienced minor problems. Core system features showed good reliability, with 60% rating them as very reliable and 30% as reliable, suggesting stable functionality for critical operations like payments. However, the system stability results reveal room for improvement, as while 80% of users experienced no issues or only minor problems, 20% encountered several noticeable problems or significant errors that disrupted usage, indicating the need for enhanced error handling and system stability measures.

6. Conclusion

The PPAK UTHM Connect System marks a key step in modernizing Tadika Khalifah Junior by replacing manual processes with a digital platform that streamlines payment tracking, activity logging, and communication. Designed with specific modules for administrators, teachers, and parents, the system improves efficiency, accuracy, and real-time engagement in children's learning. The implementation involved careful development and deployment tailored to the kindergarten's needs. Comprehensive testing—including internal alpha testing with staff and external beta testing with parents and teachers—ensured the system's functionality and usability in real-world settings. Feedback from these tests helped refine the platform to be user-friendly and reliable.

By digitalizing operations, the system reduces administrative workload, enhances transparency, and strengthens parent-teacher collaboration. It also minimizes errors common in manual systems and allows stakeholders to access information anytime and anywhere, which is crucial for informed decision-making and timely communication. The use of information systems in early childhood education settings can significantly boost organizational efficiency and service quality through automation and improved data management [11].

Acknowledgement

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Conflict of Interest

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

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

The authors confirm contribution to the paper as follows: study conception and design: Nurul Syazana binti Abdu Ghani, Ts. Dr. Mazidah binti Mat Rejab; data collection: Ts. Dr. Mazidah binti Mat Rejab; analysis and interpretation of results: Nurul Syazana binti Abdu Ghani, Ts. Dr. Mazidah binti Mat Rejab; draft manuscript preparation: Ts. Dr. Mazidah binti Mat Rejab. All authors reviewed the results and approved the final version of the manuscript.

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Appendix A: Class Diagram

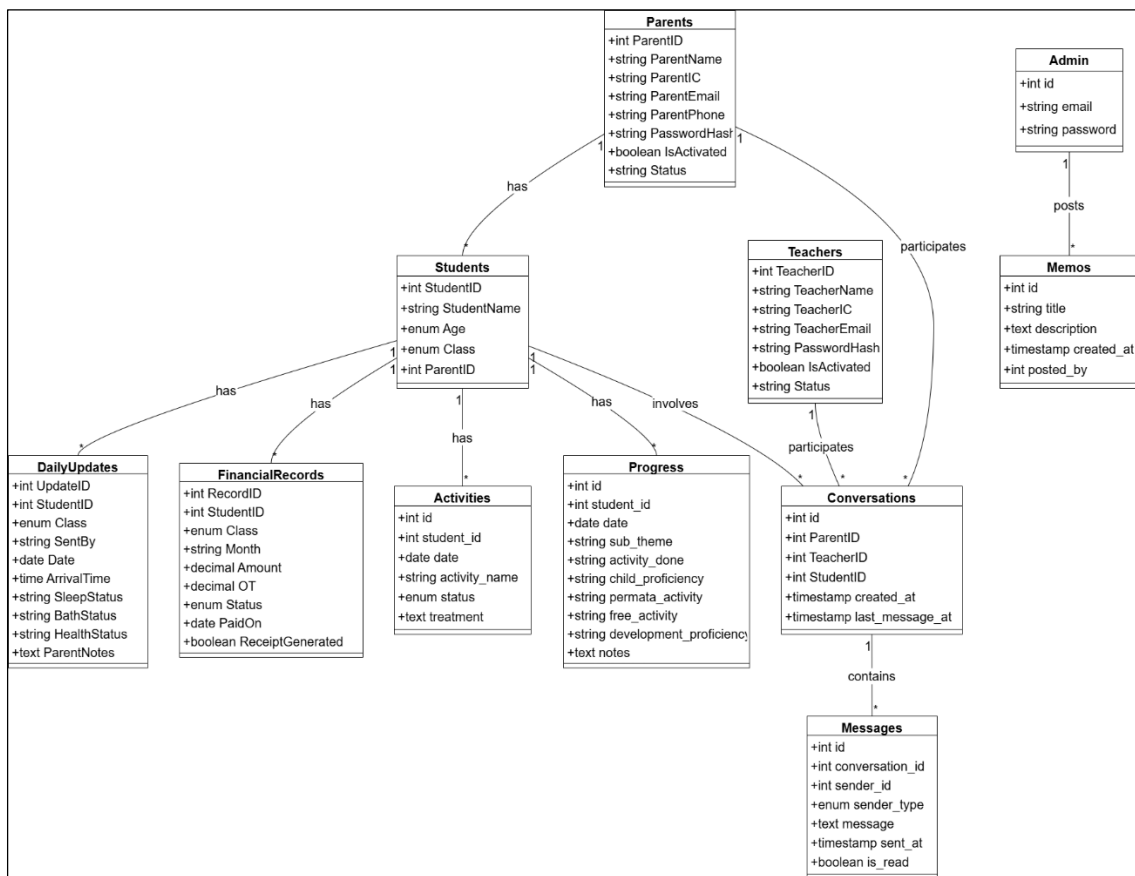


Fig. A.1 Class Diagram