FACULTY OF COMPUTING
UTM Johor Bahru

SESSION 2023/2024 SEMESTER II

SECD2613: SYSTEM ANALYSIS AND DESIGN

SECTION 08

Project

Phase 3: Analysis and Design (15%)

[*DolphinLearn Hub*]

GROUP 7

NO.	GROUP MEMBERS	MATRIC NUMBER
1.	KOK WEI YEE	A23CS0094
2.	TAY WEI CHENG	A23CS0190
3.	TAN QING QING	A23CS5034
4.	MUHAMMAD AMMAR BIN MOHAMAD IDHAM	A23CS0247

LECTURER'S NAME: DR. CIK SUHAIMI BIN YUSOF

Table of Contents

1.0 Overview of the Project

The Dolphin Tuition Centre, established by Mr. Lim, is a renowned educational institution dedicated to providing high-quality tutoring services to students. Over the years, the centre has earned a reputation for its commitment to academic excellence and personalized student support. However, the centre faces several operational challenges that hinder its ability to maximize its reach and efficiency. These challenges include a heavy reliance on manual processes, limited online presence, and difficulties in monitoring and engaging students outside of class hours.

To address these issues, the Dolphin Tuition Centre proposes the development of the DolphinLearn Hub, a comprehensive digital platform designed to modernize the centre's operations and enhance the overall learning experience for students. The DolphinLearn Hub aims to transform the centre's traditional methods by integrating advanced technology solutions to streamline administrative tasks, facilitate better communication, and provide robust tools for student engagement and progress tracking.

The primary objectives of the DolphinLearn Hub project are to:

- **Expand Reach and Enrollment**: Establish a strong online presence to attract and enroll more students from a broader geographic area.
- **Improve Operational Efficiency**: Automate administrative processes to reduce manual workload and minimize errors.
- **Enhance Student Engagement**: Implement interactive tools to engage students beyond the classroom, providing support and resources that foster continuous learning.
- **Optimize Student Monitoring**: Develop a comprehensive tracking system to monitor student progress and provide personalized support.

The DolphinLearn Hub will be a user-friendly, integrated platform accessible via a website and mobile application. Key features will include online payment options, real-time messaging, video conferencing capabilities, and a detailed student monitoring system. By leveraging these technologies, the Dolphin Tuition Centre aims to create a more effective, inclusive, and future-ready educational environment that aligns with the evolving needs of students and parents in the digital age.

In summary, the DolphinLearn Hub project is a strategic initiative to modernize Dolphin Tuition Centre's operations, enhance its educational offerings, and ensure sustainable growth. Through this project, the centre aims to overcome current challenges and position itself as a leader in the digital education space.

2.0 Problem Statement

The Dolphin Tuition Centre, despite its success and reputation, faces significant challenges that hinder its operational efficiency and ability to provide an optimal learning experience for students. The key issues identified are as follows:

1. **Limited Reach and Enrollment**:
    - The centre's current marketing and enrollment strategies are heavily reliant on word-of-mouth and traditional advertising methods, limiting its ability to attract a broader audience. The absence of a strong online presence means the centre cannot effectively reach potential students outside its immediate geographic area.

2. **Inefficient Administrative Processes**:
    - The centre's administrative tasks, including student enrollment, scheduling, attendance tracking, and payment processing, are predominantly managed through manual processes. This reliance on manual operations leads to inefficiencies, higher error rates, and increased workload for staff, impacting overall productivity.

3. **Challenges in Student Engagement**:
    - Engaging students outside of classroom hours remains a significant challenge. The centre lacks effective tools and platforms to facilitate continuous learning and interaction between tutors and students. This gap results in missed opportunities for reinforcing learning and providing timely support to students.

4. **Inadequate Student Monitoring and Support**:
    - Monitoring student progress and providing personalized support is difficult with the current system. The absence of a robust tracking mechanism means that tutors and administrators cannot efficiently track academic performance, identify areas needing improvement, and tailor support to individual student needs.

5. **Limited Communication Channels**:
    - Communication between the centre, students, and parents is primarily through traditional means such as phone calls and emails. This approach is not only time-consuming but also fails to provide the real-time interaction and collaboration necessary for addressing concerns promptly and effectively.

These challenges highlight the need for a comprehensive digital solution that can streamline administrative operations, expand the centre's reach, enhance student engagement, and improve communication and support mechanisms. Addressing these issues is critical for Dolphin Tuition Centre to sustain its growth, improve educational outcomes, and remain competitive in the evolving educational landscape.

The proposed DolphinLearn Hub aims to tackle these challenges by integrating advanced technological solutions to modernize the centre's operations and enhance the overall learning experience for its students.

3.0 Proposed Solutions

To address the challenges identified in the problem statement, Dolphin Tuition Centre proposes the development of the DolphinLearn Hub, an innovative digital platform designed to streamline operations, expand the centre's reach, enhance student engagement, and improve monitoring and support mechanisms. The key features and benefits of the DolphinLearn Hub are as follows:

1. **Expansion of Online Presence**:
    - **Website and Mobile Application**: Develop a user-friendly website and mobile application to showcase the centre's services, facilitate online enrollment, and provide accessible information to prospective students and parents.
    - **Online Marketing**: Implement digital marketing strategies, including search engine optimization (SEO), social media marketing, and online advertising campaigns to attract a broader audience and increase enrollment.

2. **Automation of Administrative Processes**:
    - **Enrollment and Scheduling**: Automate student enrollment and class scheduling processes to reduce manual workload, minimize errors, and improve efficiency.
    - **Attendance Tracking and Reporting**: Implement an automated attendance tracking system that allows tutors to record attendance digitally and generate reports easily.
    - **Payment Processing**: Integrate secure online payment options to streamline fee collection and provide convenient payment methods for parents.

3. **Enhanced Student Engagement**:
    - **Real-Time Messaging and Notifications**: Introduce a messaging system that enables real-time communication between students, tutors, and administrators. This feature will facilitate timely feedback, reminders, and announcements.
    - **Interactive Learning Tools**: Provide access to interactive learning resources such as quizzes, videos, and educational games that students can use outside of class hours to reinforce their learning.

- **Virtual Classrooms**: Implement video conferencing capabilities to conduct virtual classes, allowing for remote tutoring sessions and increased flexibility for students.

4. **Comprehensive Student Monitoring and Support**:
    - **Student Progress Tracking**: Develop a robust tracking system that monitors student performance, attendance, and participation. This system will enable tutors to identify areas where students need additional support and tailor their teaching strategies accordingly.
    - **Personalized Learning Plans**: Create individualized learning plans based on student progress data, helping tutors provide targeted support and resources to improve academic outcomes.

5. **Improved Communication Channels**:
    - **Parent and Student Portals**: Develop dedicated portals for parents and students to access important information, track progress, communicate with tutors, and stay informed about upcoming events and announcements.
    - **Feedback and Support System**: Implement a feedback mechanism that allows students and parents to provide input on the learning experience, facilitating continuous improvement and addressing concerns promptly.

The DolphinLearn Hub aims to transform the operational and educational landscape of Dolphin Tuition Centre by leveraging modern technology to address current inefficiencies and challenges. By implementing these solutions, the centre will be able to provide a more effective, engaging, and supportive learning environment, ultimately leading to better educational outcomes and sustained growth.

4.0 Current Business Process/Workflow

The current business processes at Dolphin Tuition Centre involve several manual workflows and traditional methods to manage administrative tasks, student engagement, and progress tracking. Below is a detailed description of the current scenarios and workflow:

Scenarios and Workflow for Customers (Students and Parents):

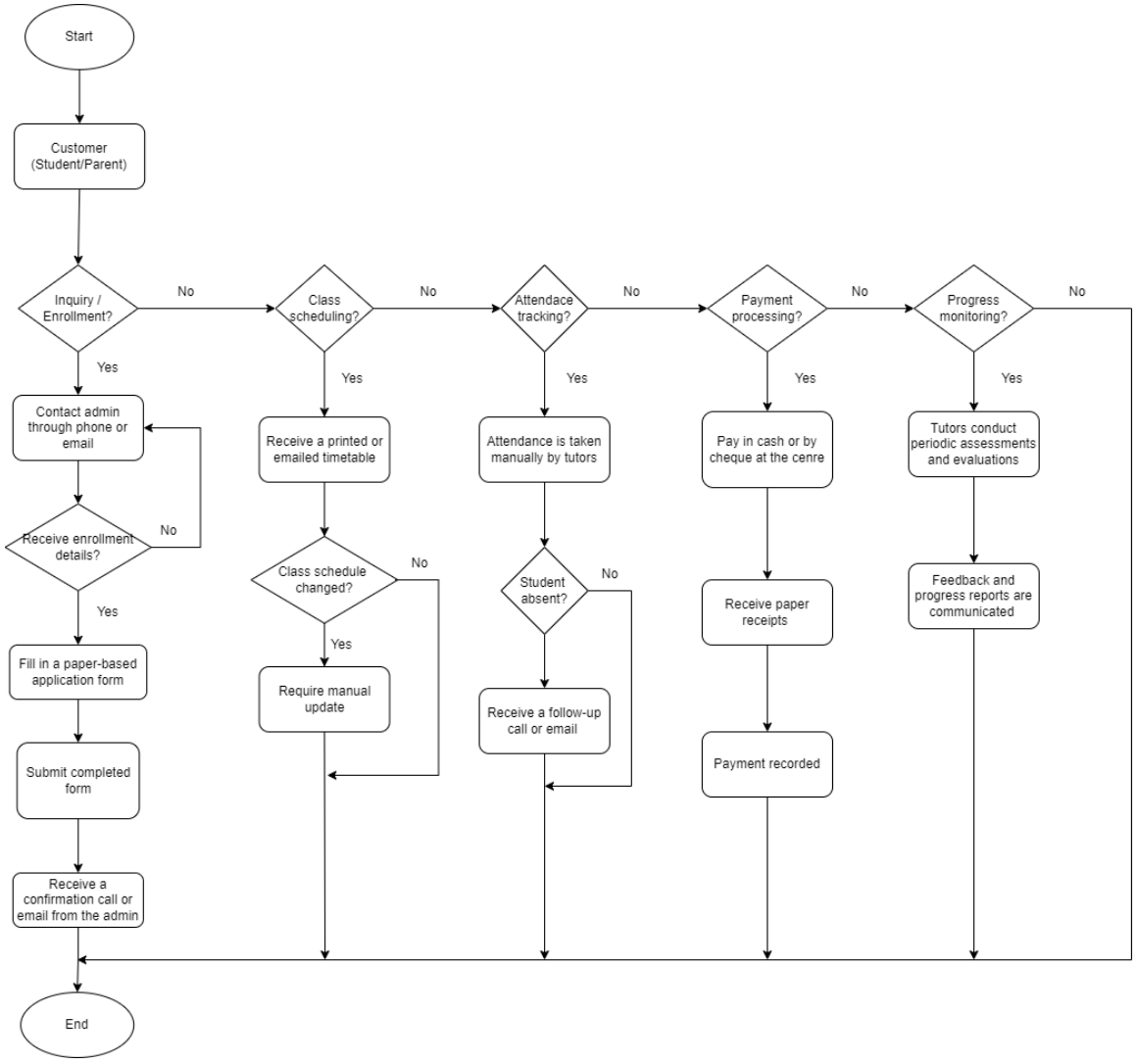
1. Inquiry and Enrollment:
    1.1. Customers contact the admin of Dolphin Tuition Centre through phone or email.
    1.2. Customers receive details about courses, fees, schedules, and enrollment procedures.
    1.3. Customers fill in a paper-based application form, providing personal details, course selection, and contact information.
    1.4. Customers submit the completed form to the Centre.
    1.5. After processing, customers receive a confirmation call or email from the admin, along with the course enrollment record.

2. Class Scheduling:
    2.1. Customers receive a printed or emailed timetable created manually by the staff.
    2.2. Any changes to the schedule are communicated through phone calls or emails, requiring manual updates.

3. Attendance Tracking:
    3.1. Attendance is taken manually by tutors using paper-based attendance sheets.
    3.2. In case of absences, customers receive a follow-up call or email from the admin.

4. Payment Processing:
    4.1. Customers can pay in cash or by cheque at the Centre.
    4.2. Customers receive paper receipts for their payments.
    4.3. Payment details are manually recorded by the admin.

5. Progress Monitoring and Support:
    5.1. Tutors conduct periodic assessments and evaluations.
    5.2. Feedback and progress reports are communicated during parent-teacher meetings or via emails.



Scenarios and Workflow for Centre Staff (Administrators):

1. Inquiry and Enrollment:
    1.1. Staff receive inquiries from potential students or parents via phone or email.
    1.2. Staff provide information about courses, fees, schedules, and enrollment procedures.
    1.3. Staff collect paper-based application forms filled in by customers.
    1.4. Staff manually enter application details into spreadsheets.
    1.5. Staff contact customers to confirm enrollment through phone or email.

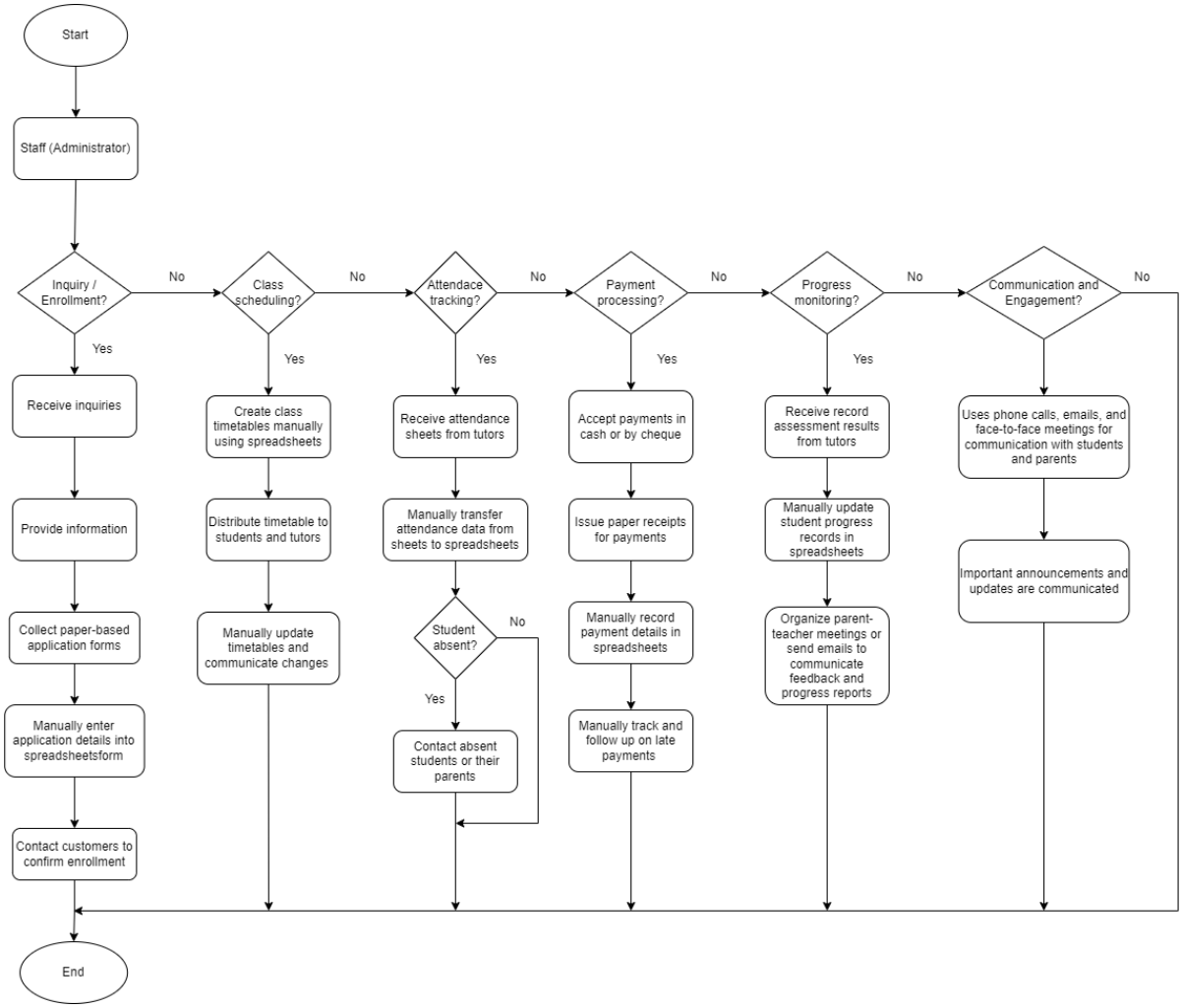
2. Class Scheduling:
    2.1. Staff create class timetables manually using spreadsheets, considering tutor and classroom availability.
    2.2. Timetables are distributed to students and tutors via printed copies or email.
    2.3. Staff manually update timetables and communicate changes through phone calls or emails.

3. Attendance Tracking:
    3.1. Staff receive attendance sheets from tutors.
    3.2. Staff manually transfer attendance data from sheets to spreadsheets.
    3.3. Staff contact absent students or their parents via phone or email.

4. Payment Processing:
    4.1. Staff accept payments in cash or by cheque.
    4.2. Staff issue paper receipts for payments.
    4.3. Staff manually record payment details in spreadsheets.
    4.4. Staff manually track and follow up on late payments through phone calls or emails.

5. Progress Monitoring and Support:
    5.1. Tutors conduct periodic assessments and evaluations.
    5.2. Staff receive record assessment results from tutors.
    5.3. Staff manually update student progress records in spreadsheets.
    5.4. Staff organize parent-teacher meetings or send emails to communicate feedback and progress reports.

6. Communication and Engagement:
    6.1. The Centre uses phone calls, emails, and face-to-face meetings for communication with students and parents.
    6.2. Important announcements and updates are communicated via emails and printed notices.



Scenarios and Workflow for Tutors:

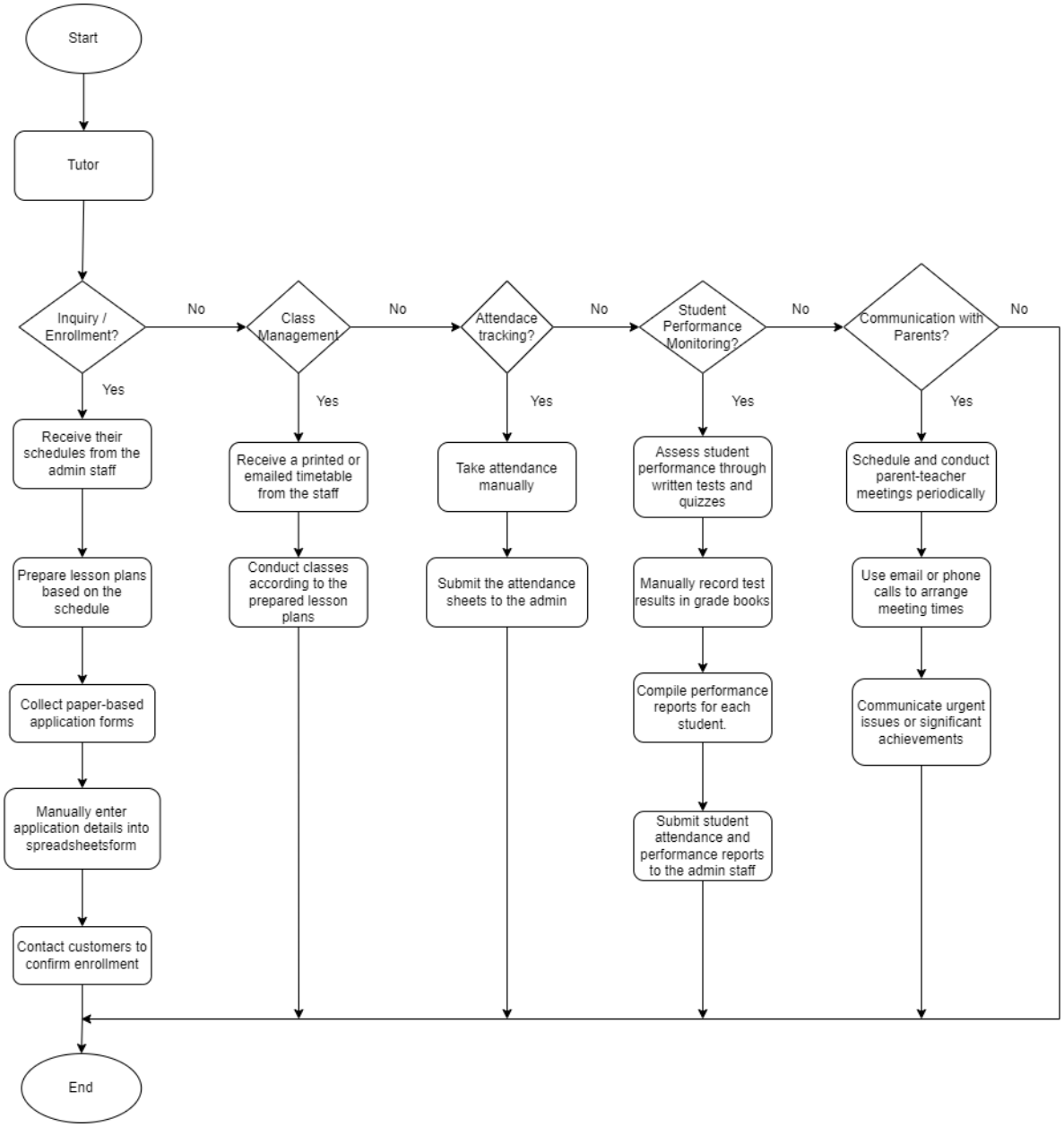
1. Inquiry and Enrollment:
    1.1. Tutors receive their schedules from the admin staff either via email or a printed timetable distributed at the Centre.
    1.2. Tutors prepare lesson plans based on the schedule, which includes courses, class timings, and student groups.

2. Class Scheduling:
    2.1. Tutors receive a printed or emailed timetable from the staff.
    2.2. Tutors conduct classes according to the prepared lesson plans, using physical textbooks and handouts.

3. Attendance Tracking:
    3.1. Tutors manually record attendance using paper-based attendance sheets at the beginning of each class.
    3.2. Tutors submit the attendance sheets to the admin for manual entry into spreadsheets.

4. Student Performance Monitoring:
    4.1. Tutors assess student performance through written tests and quizzes conducted during class hours.
    4.2. Tutors manually record test results in grade books.
    4.3. Tutors compile performance reports for each student.
    4.4. At the end of each month, tutors submit student attendance and performance reports to the admin staff.

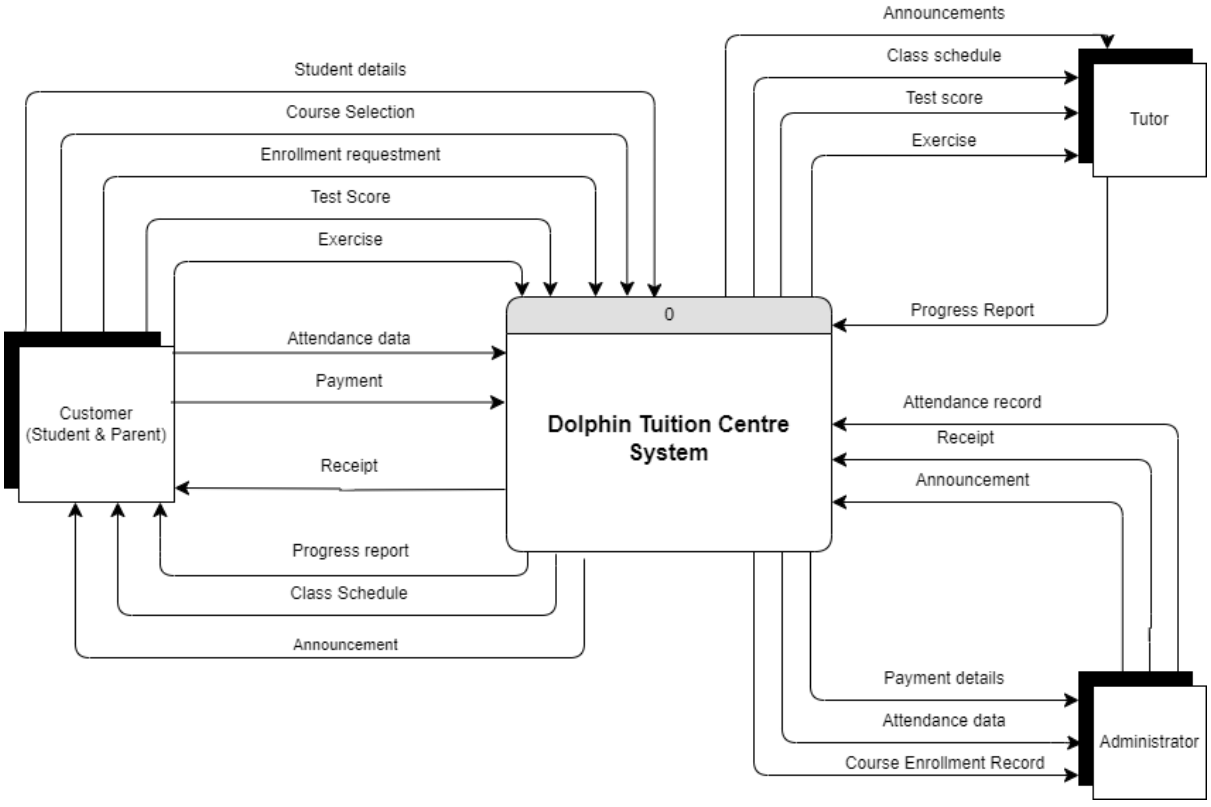
5. Communication with Parents:
    5.1. Tutors schedule and conduct parent-teacher meetings periodically to discuss student progress.
    5.2. Tutors use email or phone calls to arrange meeting times and to communicate urgent issues or significant achievements.


Start
Tutor
Inquiry / Enrollment?
No
Class Management
No
Attendace tracking?
No
Student Performance Monitoring?
No
Communication with Parents?
No
Yes
Receive their schedules from the admin staff
Prepare lesson plans based on the schedule
Collect paper-based application forms
Manually enter application details into spreadsheetsform
Contact customers to confirm enrollment
Yes
Receive a printed or emailed timetable from the staff
Conduct classes according to the prepared lesson plans
Yes
Take attendance manually
Submit the attendance sheets to the admin
Yes
Assess student performance through written tests and quizzes
Manually record test results in grade books
Compile performance reports for each student.
Submit student attendance and performance reports to the admin staff
Yes
Schedule and conduct parent-teacher meetings periodically
Use email or phone calls to arrange meeting times
Communicate urgent issues or significant achievements
Yes
End

5.0 Logical DFD (AS-IS)

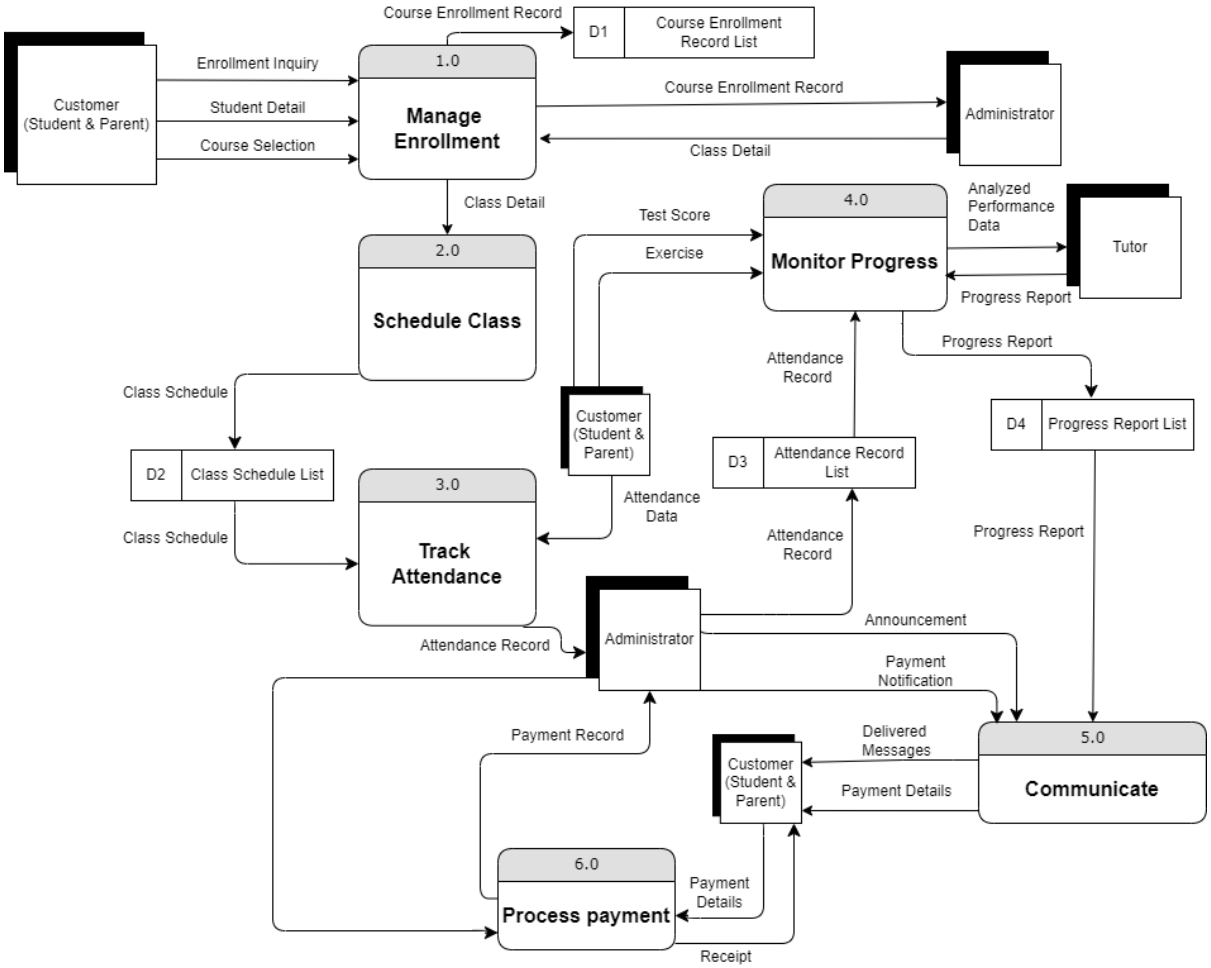
Context Diagram

Process	**Input**	**Output**
Dolphin Tuition Centre System	Enrollment inquiry, Student details, Course selection Class details Attendance data Test scores, Exercises Announcement	Course enrollment record Class schedule Attendance record Progress reports Receipt Delivered Messages Payment Details



Level 0 Diagram

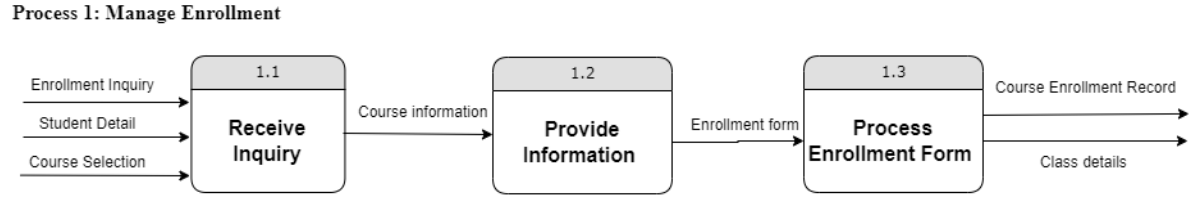
Process ID	Process	Input	Output
1.0	Manage Enrollment	Enrollment inquiry, Student details, Course selection	Course enrollment record, Class details
2.0	Schedule Classes	Class details	Class schedule
3.0	Track Attendance	Class schedule Attendance data	Attendance record
4.0	Monitor Progress	Attendance record, Test scores, Exercises	Progress reports
5.0	Communicate	Progress report, Announcement, Payment notification	Delivered messages, Payment details
6.0	Process Payments	Payment details	Receipt, Payment record



Level 1 Diagram

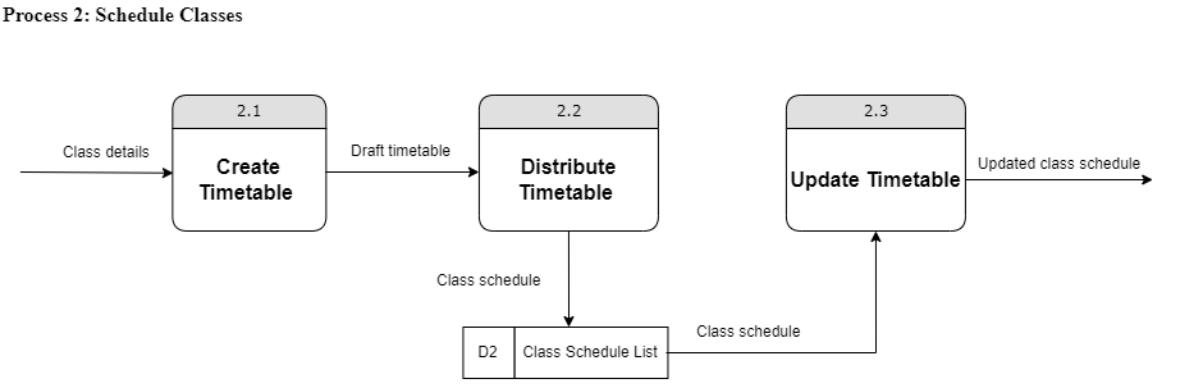
Process 1: Manage Enrollment

Process ID	Process	Input	Output
1.1	Receive Inquiry	Enrollment inquiry, Student details, Course selection	Course information
1.2	Provide Information	Course information	Enrollment form
1.3	Process Enrollment Form	Enrollment form	Course enrollment record, Class details



Process 2: Schedule Classes

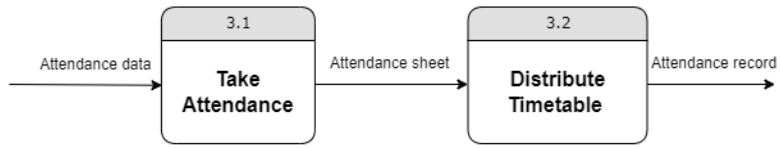
Process ID	Process	Input	Output
2.1	Create Timetable	Class details	Draft timetable
2.2	Distribute Timetable	Draft timetable	Class schedule
2.3	Update Timetable	Class schedule	Updated class schedule



Process 3: Track Attendance

Process ID	Process	Input	Output
3.1	Take Attendance	Class schedule Attendance data	Attendance sheet
3.2	Transfer Attendance Records	Attendance sheet	Attendance record

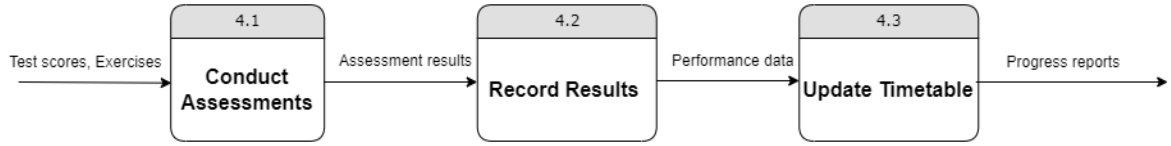
Process 3: Track Attendance



Process 4: Monitor Progress

Process ID	Process	Input	Output
4.1	Conduct Assessments	Attendance record Test scores, Exercises	Assessment results
4.2	Record Results	Assessment results	Performance data
4.3	Provide Feedback	Performance data	Progress reports

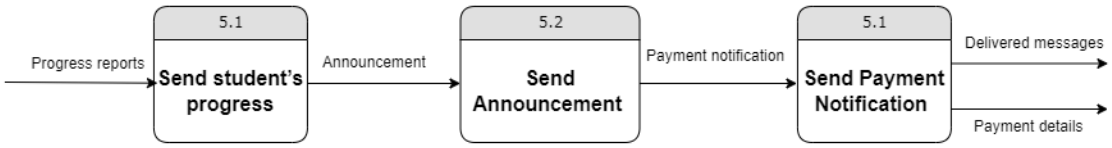
Process 4: Monitor Progress



Process 5: Communicate

Process ID	Process	Input	Output
5.1	Send student's progress	Progress reports	Announcement
5.2	Send Announcement	Announcement	Payment notification
5.3	Send Payment Notification	Payment notification	Delivered messages, Payment details

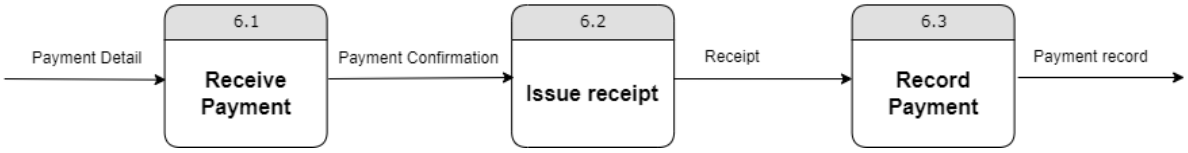
Process 5: Communicate



Process 6: Process Payments

Process ID	Process	Input	Output
6.1	Receive Payment	Payment details	Payment confirmation
6.2	Issue Receipt	Payment confirmation	Receipt
6.3	Record Payment	Receipt	Payment record

Process 6: Process Payments

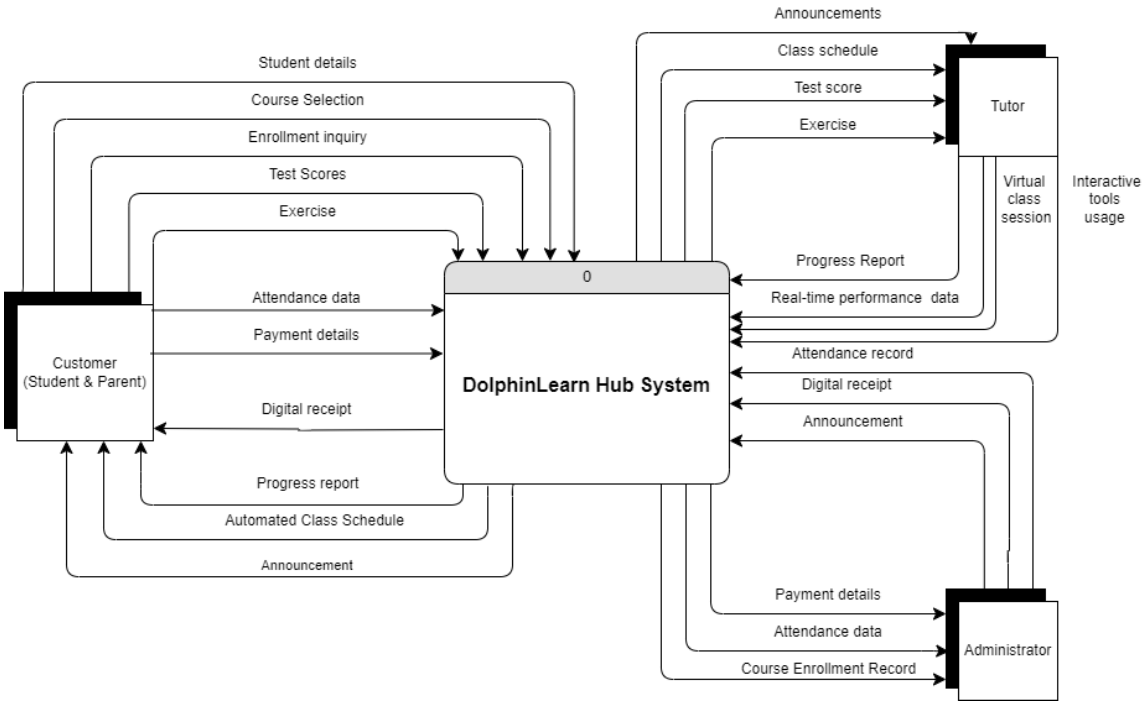


6.0 System Analysis and Specification

6.1 Logical DFD TO-BE system (Context Diagram, Diagram 0, Child)

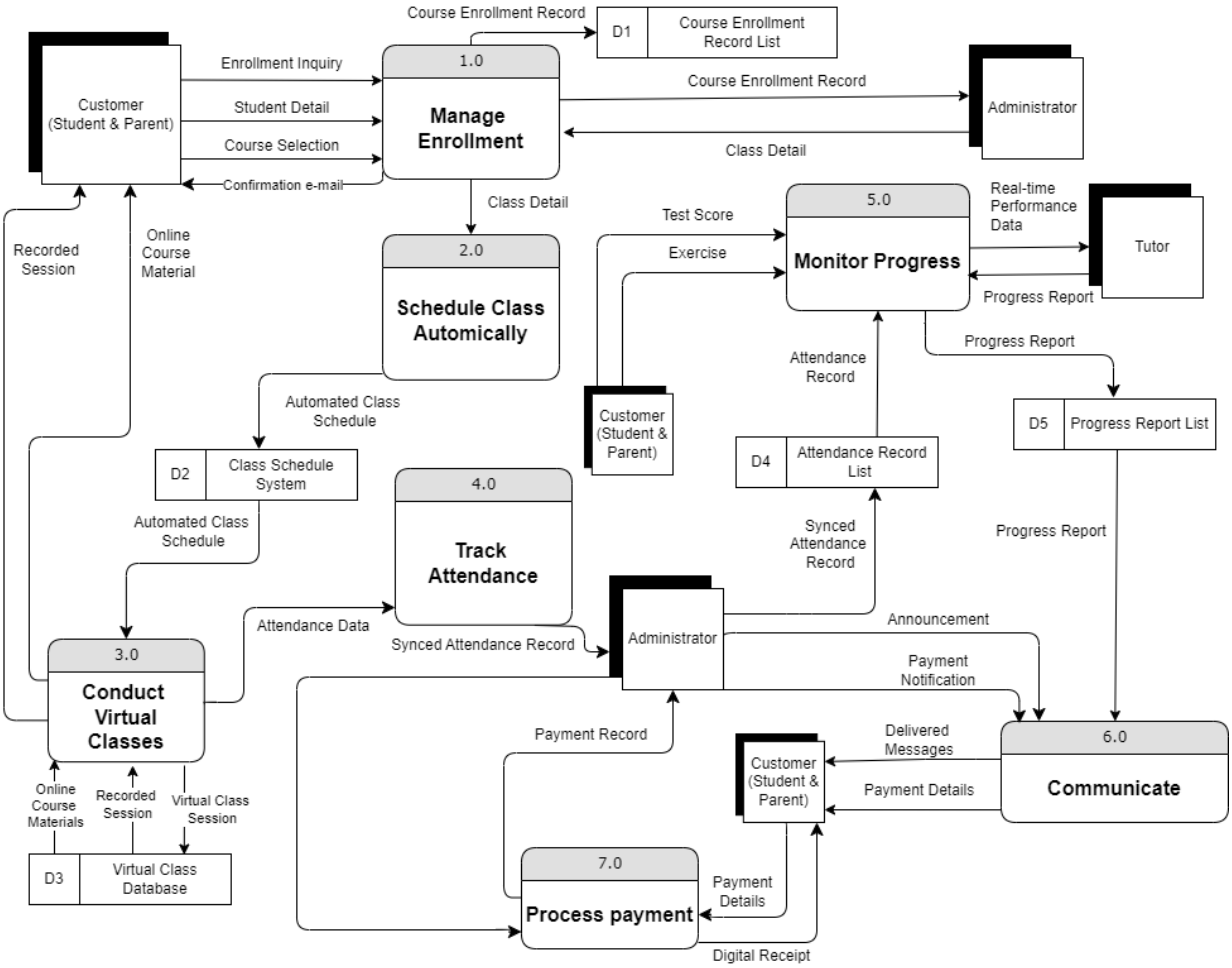
Context Diagram

Process	**Input**	**Output**
DolphinLearn Hub System	Enrollment inquiry, Student details, Course selection Class details Class schedule, Course materials Attendance data Test scores, Exercises Announcements Payment details	Course enrollment record, Confirmation email Automated class schedule, Notifications Virtual class sessions, Recorded lessons Attendance record Real-time performance data, Progress reports Digital receipt



Level 0 Diagram

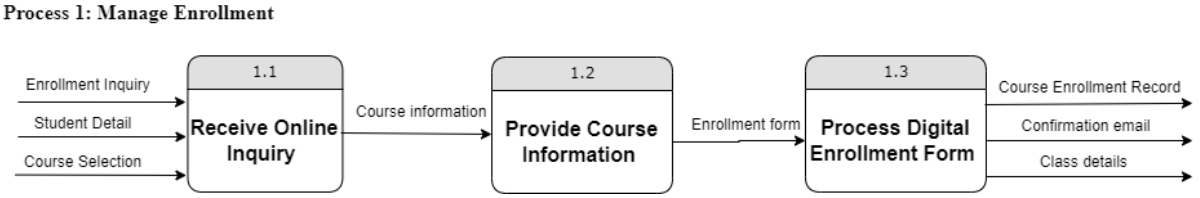
Process ID	Process	Input	Output
1.0	Manage Enrollment	Enrollment inquiry, Student details, Course selection	Course enrollment record, Confirmation email, Class details
2.0	Schedule Classes automatically	Class details	Automated class schedule, Notifications
3.0	Conduct Virtual Classes	Automated class schedule, Online Course materials	Virtual class sessions, Recorded lessons, Attendance data
4.0	Track Attendance	Attendance data	Attendance record
5.0	Monitor Progress	Attendance record, Test scores, Exercises	Real-time performance data, Progress report
6.0	Communicate	Progress report	Delivered Messages, Payment details
7.0	Process Payments	Payment details	Digital receipt, Payment confirmation



Level 1 Diagram

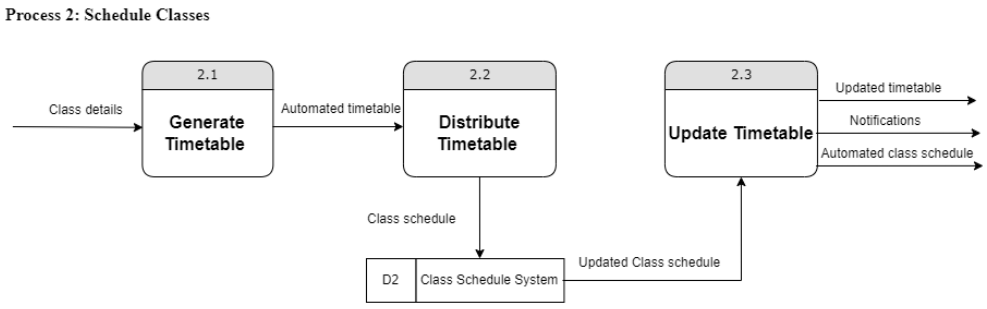
Process 1: Manage Enrollment

Process ID	Process	Input	Output
1.1	Receive Online Inquiry	Enrollment inquiry, Student details, Course selection	Course information
1.2	Provide Course Information	Course information	Enrollment form
1.3	Process Digital Enrollment Form	Enrollment form	Course enrollment record, Confirmation email, Class details



Process 2: Schedule Classes

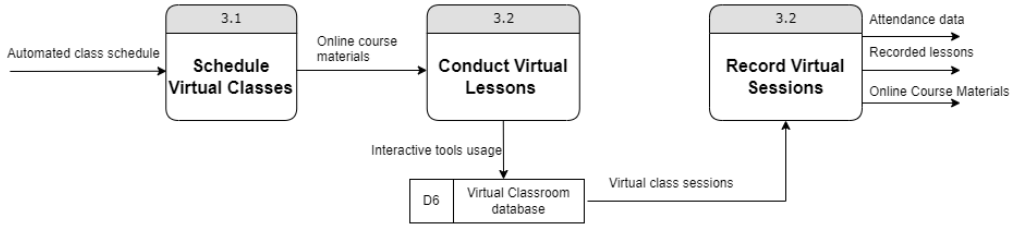
Process ID	Process	Input	Output
2.1	Generate Timetable	Class details	Automated timetable
2.2	Distribute Timetable	Automated timetable	Class schedule
2.3	Update Timetable	Class schedule	Updated timetable, Notifications, Automated class schedule



Process 3: Conduct Virtual Classes

Process ID	Process	Input	Output
3.1	Schedule Virtual Classes	Automated class schedule	Online course materials
3.2	Conduct Virtual Lessons	Online course materials	Interactive tools usage, Virtual class sessions
3.3	Record Virtual Sessions	Virtual class sessions	Recorded lessons, Attendance data

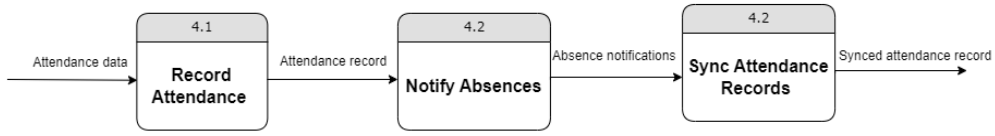
Process 3: Conduct Virtual Classes



Process 4: Track Attendance

Process ID	Process	Input	Output
4.1	Record Attendance	Attendance data	Attendance record
4.2	Notify Absences	Attendance record	Absence notifications
4.3	Sync Attendance Records	Absence notifications	Synced attendance record

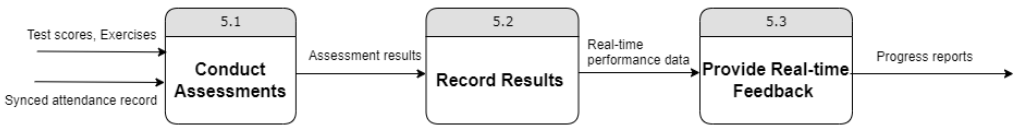
Process 4: Track Attendance



Process 5: Monitor Progress

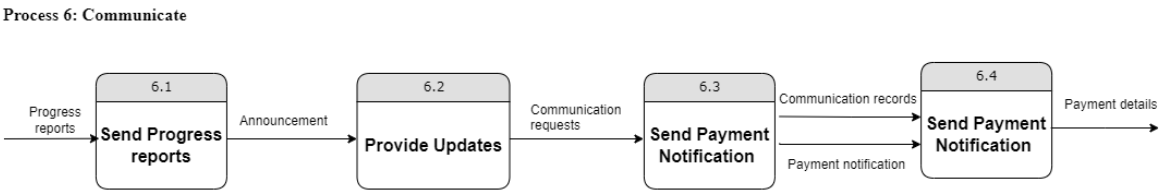
Process ID	Process	Input	Output
5.1	Conduct Digital Assessments	Synced attendance record Test scores, Exercises	Assessment results
5.2	Record Results	Assessment results	Real-time performance data
5.3	Provide Real-time Feedback	Real-time performance data	Progress reports

Process 5: Monitor Progress



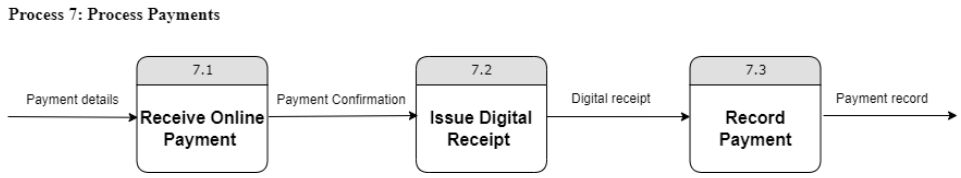
Process 6: Communicate

Process ID	Process	Input	Output
6.1	Send Progress reports	Progress reports	Announcement
6.2	Provide Updates	Announcement	Communication requests
6.3	Facilitate Communication	Communication requests	Communication records, Payment notification
6.4	Send payment notification	Payment notification	Payment details



Process 7: Process Payments

Process ID	Process	Input	Output
7.1	Receive Online Payment	Payment details	Payment confirmation
7.2	Issue Digital Receipt	Payment confirmation	Digital receipt
7.3	Record Payment	Digital receipt	Payment record



6.2 Process Specification (based on Logical DFD TO-BE)

Structured English is utilized to model and illustrate the processes of the Logical TO-BE system, which are based on the Logical DFD TO-BE.

Process 1: Manage Enrollment

```
DO
RECEIVE Enrollment Inquiry
RECEIVE Digital Enrollment Form
BEGIN IF
IF Enrollment Inquiry is received
        DISPLAY Course Information
IF Digital Enrollment Form is submitted
        READ Student Details from Form
        READ Course Selection from Form
        UPDATE Student Information Database with Student Details
        UPDATE Course Information Database with Course Selection
        GENERATE Course Enrollment Record
        SEND Confirmation Email to Student
ELSE continue
END IF
END
```

Process 2: Schedule Classes

```
DO
RECEIVE Class Details
RECEIVE Updated Timetable
BEGIN IF
IF Class Details are received
        GENERATE Timetable
        STORE Timetable in Class Schedule System
        SEND Notifications to Students and Tutors
IF Timetable is updated
        UPDATE Timetable in Class Schedule System
        SEND Update Notifications to Students and Tutors
```

```
ELSE continue
END IF
END
```

Process 3: Conduct Virtual Classes

```
DO
RECEIVE Automated Class Schedule
RECEIVE Online Course Materials
BEGIN IF
IF Automated Class Schedule is received
        SCHEDULE Virtual Class Sessions
        STORE Schedule in Virtual Class Database
IF Virtual Class Session is conducted
        USE Video Conferencing Tools
        RECORD Virtual Class Sessions
        STORE Recorded Lessons in Virtual Class Database
        RECORD Attendance
        STORE Attendance Data in Attendance Database
ELSE continue
END IF
END
```

Process 4: Track Attendance

```
DO
RECEIVE Attendance Data
BEGIN IF
IF Attendance Data is received
        CHECK Attendance in Attendance Database
        IF Student is absent
                SEND Absence Notification to Parents and Students
        ELSE continue
ELSE continue
```

```
SYNC Attendance Records in Attendance Database
END IF
END
```

Process 5: Monitor Progress

```
DO
RECEIVE Attendance Record
RECEIVE Test Scores
RECEIVE Exercises
BEGIN IF
IF Assessment is conducted
        RECORD Assessment Results in Performance Database
IF Results are recorded
        PROVIDE Real-Time Feedback
        GENERATE Progress Report
        SEND Progress Report to Students and Parents
ELSE continue
END IF
END
```

Process 6: Communicate

```
DO
RECEIVE Progress Report
RECEIVE Announcement
RECEIVE Payment Notification
BEGIN IF
IF Progress Report is generated
        SEND Progress Report to Students and Parents
IF Announcement is received
        SEND Announcement to Students and Parents
IF Payment Notification is received
        SEND Payment Details to Students and Parents
```

```
ELSE continue
MANAGE Communication Requests
RECORD Communication Records in Communication Database
END IF
END
```

Process 7: Process Payments

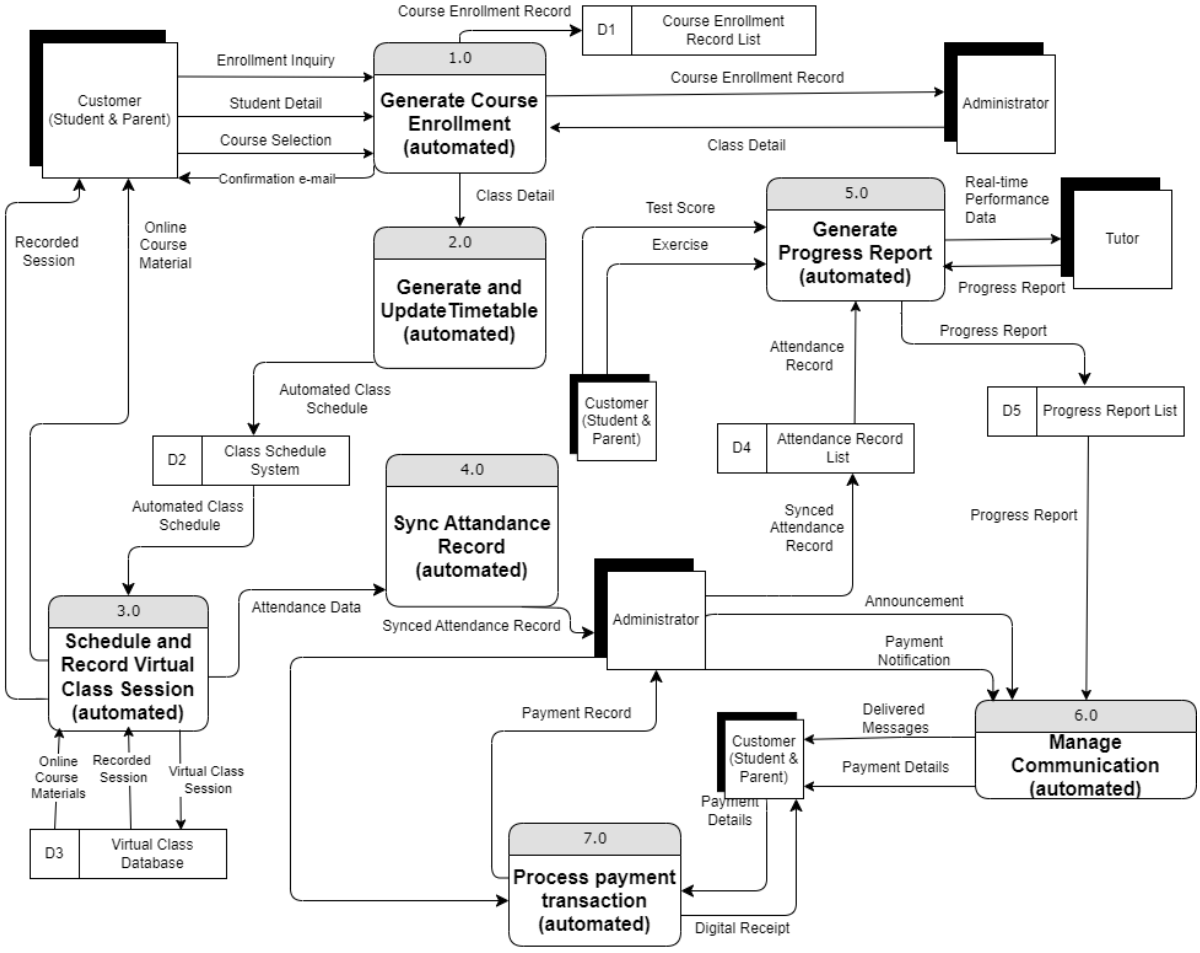
```
DO
RECEIVE Payment Details
BEGIN IF
IF Payment Details are received
        PROCESS Payment Transaction
        GENERATE Digital Receipt
        SEND Digital Receipt to Customer
        RECORD Payment in Payment Database
ELSE continue
END IF
END
```

7.0 Physical System Design

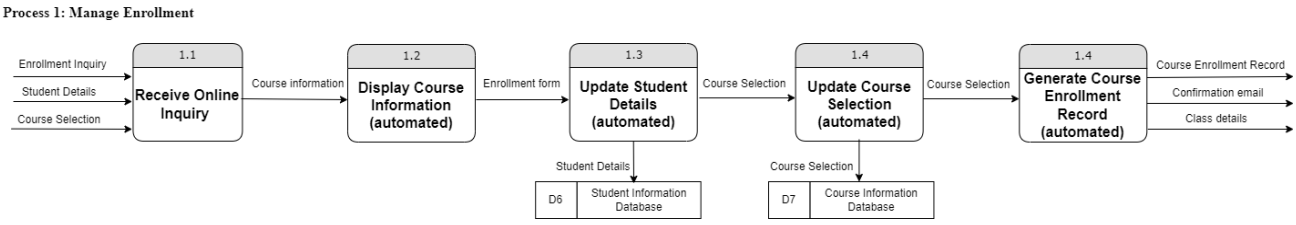
The physical system design translates the logical design into physical components, specifying hardware, software, network infrastructure, and data storage requirements. This section also includes the design of user interfaces and other system components that support the operation of the system.

7.1 Physical DFD TO-BE system

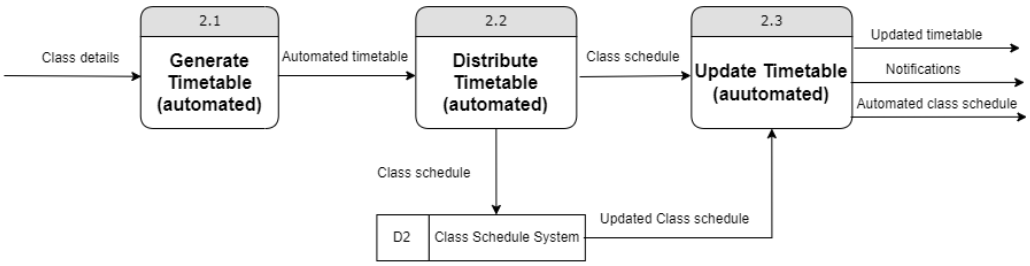
7.1.1 Diagram 0 (Physical DFD)



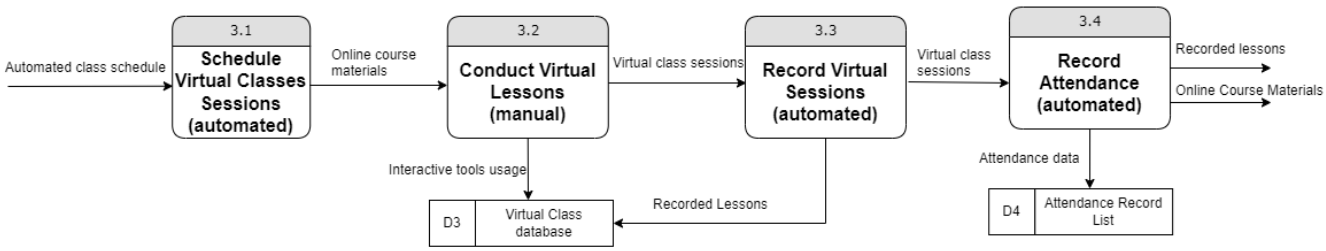
7.1.2 Child Diagram



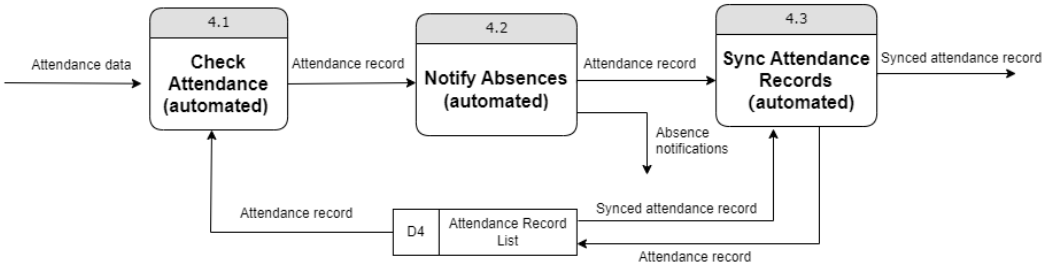
Process 2: Schedule Classes



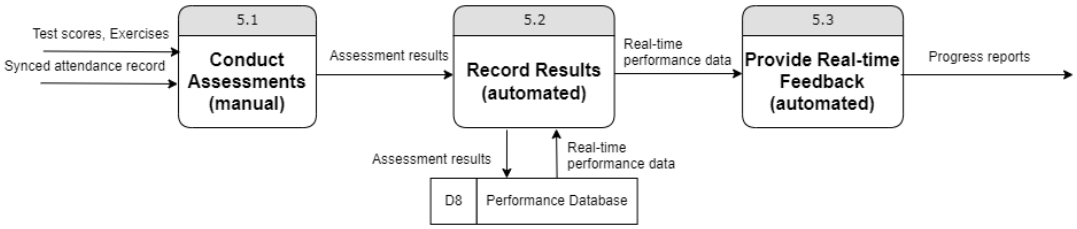
Process 3: Conduct Virtual Classes



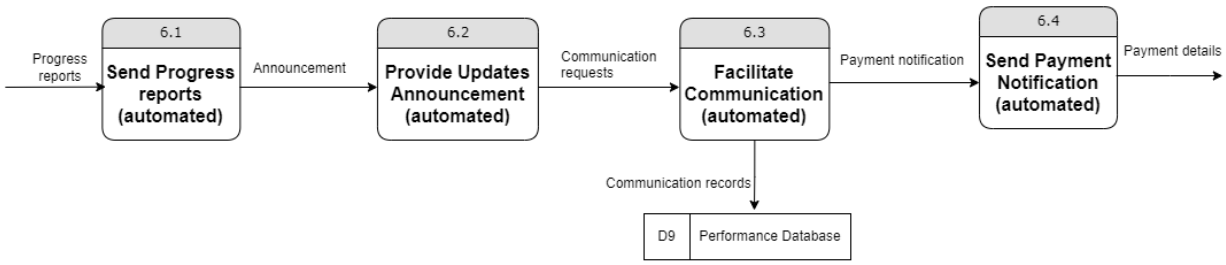
Process 4: Track Attendance



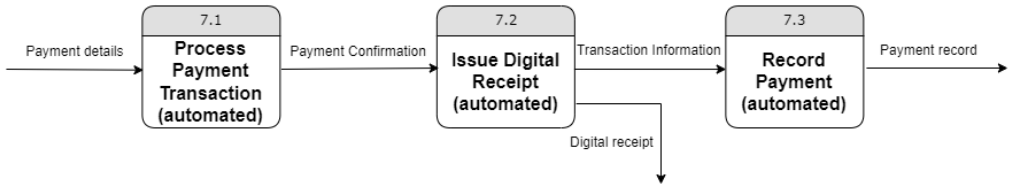
Process 5: Monitor Progress



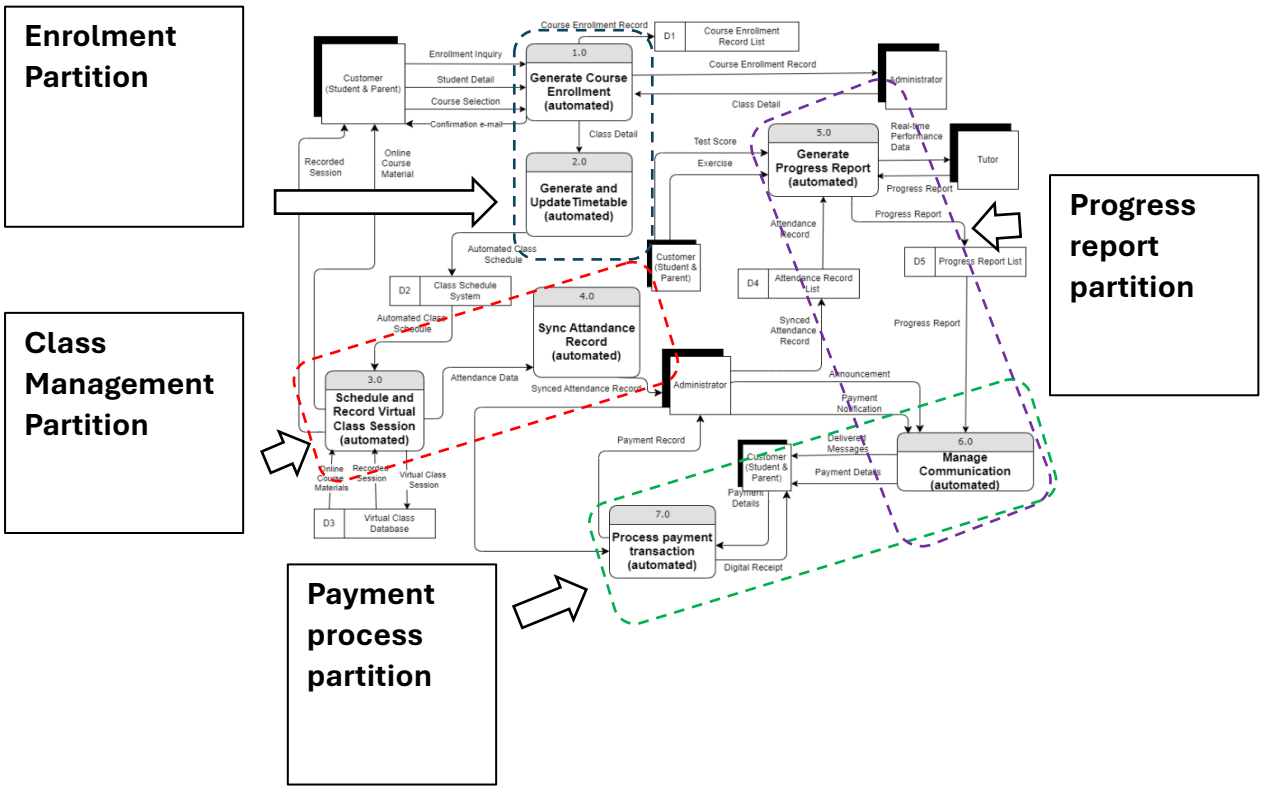
Process 6: Communicate



Process 7: Process Payments



7.1.3 Partitioning



Enrolment Partition

Includes processes:

Generate Course Enrolment (automated) (Process 1.0)

Generate and Update Timetable (automated) (Process 2.0)

Reasons for partitioning:

1. Timing and Efficiency: These two processes will be executed at the same time. The timetable can only be generated and/or updated as a subsequence of the course enrolment process. By grouping them, this will make the processes faster and more efficient.
2. Consistency of data: These two processes will handle the same class details when they are executed. By grouping them, we can ensure the data stays consistent.

Class Management Partition

Include processes:

Schedule and Record Virtual Class Session (automated) (Process 3.0)

Sync Attendance Record (automated) (Process 4.0)

Reasons for partitioning:

1. Timing and Efficiency: Grouping these two processes together can ensure that attendance record is synced as soon as the virtual classes are done. This will save a lot of time and runtime.
2. Consistency of data: The attendance record used by both processes must stay consistent and accurate, therefore grouping these two processes help with achieving those goals.

Progress Report Partition

Include processes:

Generate Progress Report (automated) (Process 5.0)

Manage Communication (automated) (Process 6.0)

Reasons for partitioning:

1. Consistency of data: Both processes use the same progress report data. Grouping these two processes will help to keep the data consistent.
2. Timing and Efficiency: By grouping these two processes together, this will improve the timing and efficiency

Payment Process Partition

Include processes:

Process payment transaction (automated) (Process 7.0)

Manage Communication (automated) (Process 6.0)

Reasons for partitioning:

1. Consistency of data: By grouping these two processes, we can achieve to keep certain data that is used by both processes, which is the payment details, consistent and accurate.
2. Security: These processes deal with extremely sensitive data. Therefore, these processes must be partitioned from the rest to ensure the security of the data handled during payment.

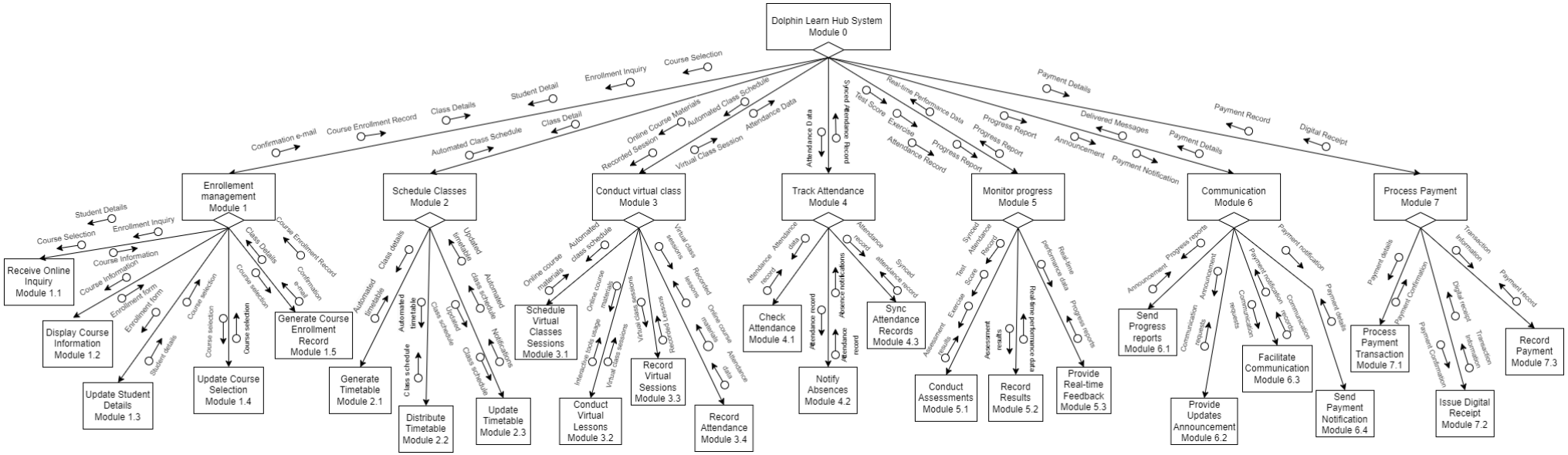
7.1.4 CRUD Matrix

Activity	Course Enrolment Record List	Class Schedule System	Virtual Class Database	Attendance Record List	Progress Report List
Generate Course Enrolment	**C**				
Generate and Update Timetable		**CU**			
Schedule and Record Virtual Class Session		**R**	**CR**		
Sync Attendance Record				**U**	
Generate Progress Report					**C**
Manage Communicaiton					**R**

7.1.5 Event Response Table

Event	Source	Trigger	Activity	Response	Destination
Enrolling into a course	Customer	Enrolment inquiry, student details and course selection	Updates course enrolment record. Sends confirmation email.	Confirmation email	Customer
Progress Report	Tutor	Progress report	Updates progress report list. Send real-time performance data.	Real-time performance data	Tutor
Customer making a payment	Customer	Payment details	Sends digital receipt	Digital receipt	Customer
Attendance Marking	Tutor	Attendance recording	Updates attendance record	Attendance Confirmation	System
Course Update	Admin	Course detail update	Update course details and notifies students	Course update and notification	Student
Message Sending	Admin/ Customer	Message creation	Send messages	Message delivery	Customer/ Tutor/Admin

7.1.6 Structure Chart



Full structure chart link: https://drive.google.com/file/d/1tdSwZsXRwEC5ZUf8bDvqKkoVExfe7Q-w/view?usp=sharing

7.1.7 System Architecture

1. User Interface (UI) Layer

Mobile Application

- Platforms: iOS and Android

  Features:

  - User sign up
  - User sign in
  - User register course
  - User access to course materials and resources
  - User receive real-time notifications and messaging
  - User attend virtual class
  - Attendance record
  - User tracking student progress
  - User conduct online payment

2. Application Layer

This layer handles the core functionalities and business logic of the system.

- User Management: Handles registration, authentication, and user profiles
- Course Management: Manages course enrollment, scheduling, and attendance
- Communication System: Manages real-time messaging, notifications, and virtual classrooms
- Payment Processing: Integrates online payment systems and manages payment tracking
- Student Monitoring and Support: Tracks student progress, generates reports, and creates personalized learning plans
- Content Management: Manages the resource library and interactive learning tools

3. Data Aspect Architectures Layer

This layer manages data storage, retrieval, and processing.

Database Management

- Use MYSQL for storing data
- User database: user information, payment details
- Site database: course enrolment record, course schedule, notification, messages, attendance record, course materials and resources, student progress

Data Security and Privacy

Implements security measures to protect sensitive data, ensuring compliance with privacy regulations

Backup and Recovery

Regular data backups and disaster recovery protocols

High-Level Workflow

For Users (Students and Parents):

- Registration and Login: Users register and log into the system via the mobile application.
- Course Enrollment: Users enroll in courses through the user-friendly interface.
- Attendance and Engagement: Students attend virtual classes, engage with interactive tools, and track their progress.
- Communication: Users receive notifications, communicate with tutors, and access the parent/student portal.
- Payments: Users make payments through the integrated online payment system.

For Staff (Tutors and Administrators):

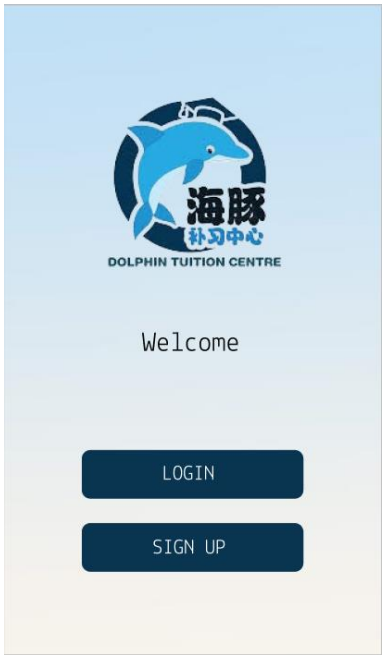
- User and Course Management: Staff manage user registrations, course schedules, and attendance.
- Content Delivery: Tutors upload course materials and online classes recording
- Student Monitoring: Tutors track student progress, provide feedback, and develop personalized learning plans.
- Communication: Staff use the messaging system to communicate with students and parents and manage notifications.
- Administrative Tasks: Administrators handle payment processing, generate reports, and ensure smooth operation of the platform.

8.0 System Wireframe (Input Design, Output Design)

Prototype Link:
https://www.figma.com/proto/Hu50K18xIOEz3YbDeCn8TU/wireframe?node-id=0-1&t=619Zb06lvpGgsuJ4-1

Prototype Demo Video Link: https://youtu.be/CdU7d55mo0M

8.1 Welcome Page

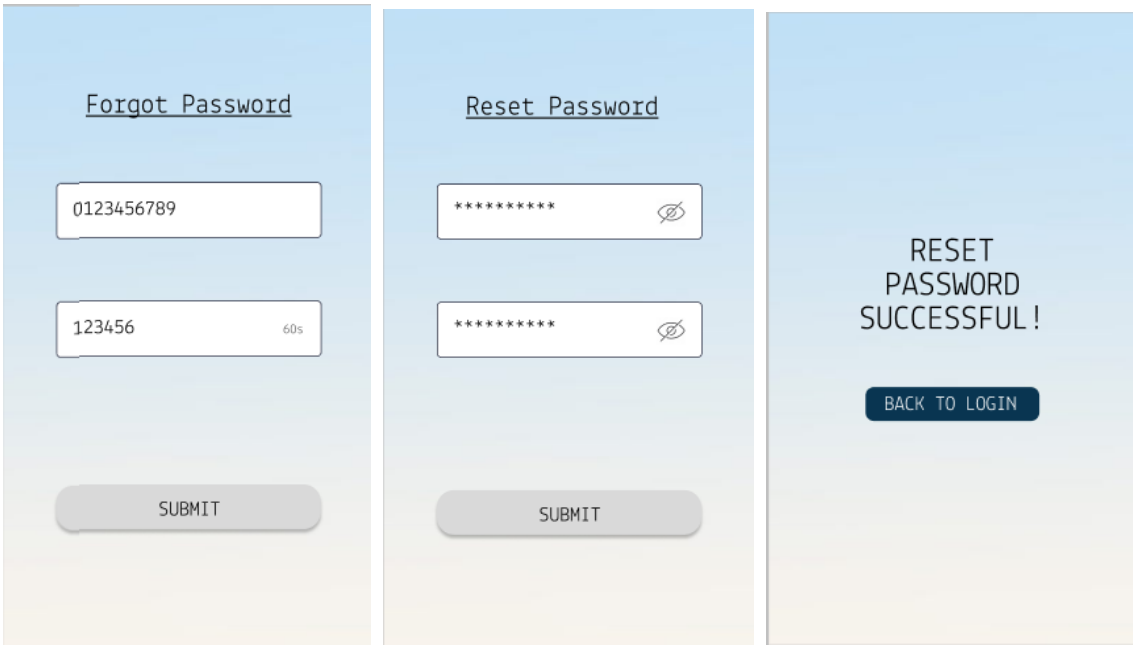


This is the main page of the Dolphin Tuition Centre application. Students and tutors can choose to login or sign up for the application, and the administrator can also choose to login to the system from the main page.

8.2 Login Page
8.2.1 Login

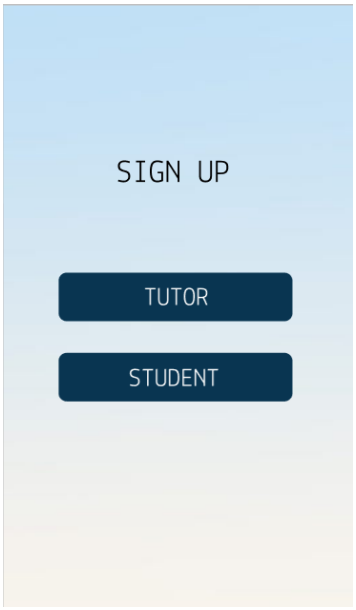
This is the login page. Users will be requested to enter their email or phone number and the password they've created. They can choose to tick 'Remember me', so they don't need to login again next time. If they forgot their password, they could click on 'Forgot Password?' to reset their password.

8.2.2 Forgot Password



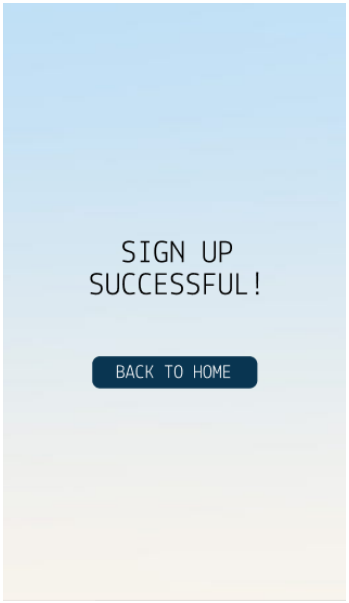
This is the page for resetting the password. The users will be asked to enter their email or phone number. The system will send the OTP number to the email or phone number that they've entered. After that, the user can reset their password and login again.

8.3 Sign-up Page



This is the sign-up page. Users can choose their identity, whether they're students or tutors to sign up.

8.3.1 Tutor sign-up page

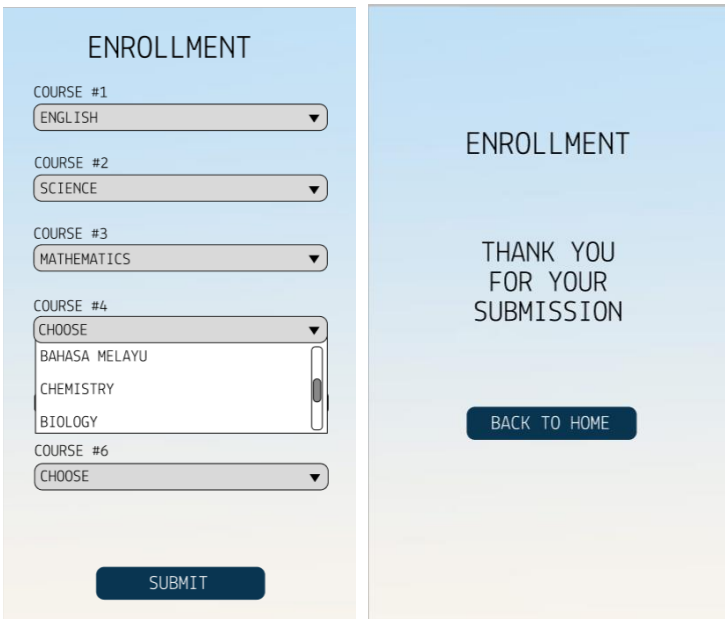


For the tutor, they will be requested to enter their name, tutor ID, contact number, email, and password. The tutor id will be given by the administrator. The tutor will also need to enter the password that they created again to confirm their password. After sign-up, the tutor can click on 'Back to Home' to enter the main menu of the application.

8.3.2 Student sign-up page

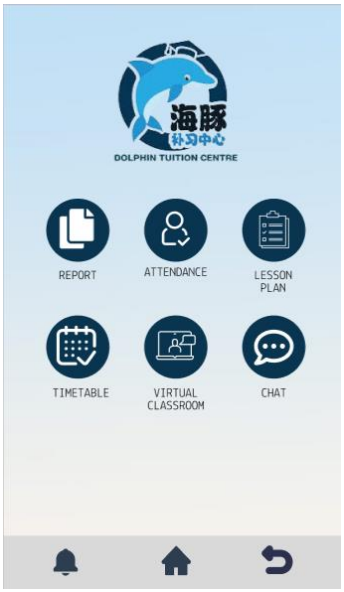
For students, they will be requested to enter their name, age, contact number, email, and password. They will also need to enter the confirmation password. After finishing sign-up, they need to click on 'Next' for the next step, which is to view the course details and complete the application form.

Before the student completes the application form, they can choose to view the course details. In the course details, the application will list out the courses that the tuition centre has taken. The students can click on the course that they are interested in enrolling in to view the details of the course, which will show the time of classes, fees, and other details.

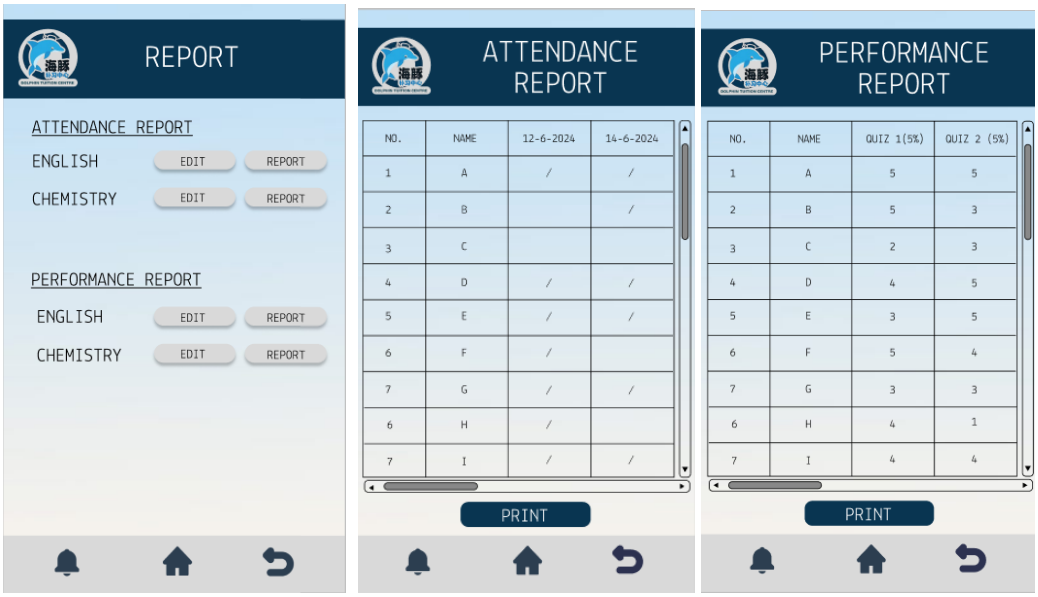


After they view the course details, they can click on the application form for their enrollment. They just need to choose the course they want to enroll in and submit the form. After finishing enrollment, students can click on ‘Back to Home’ to go to the main menu.

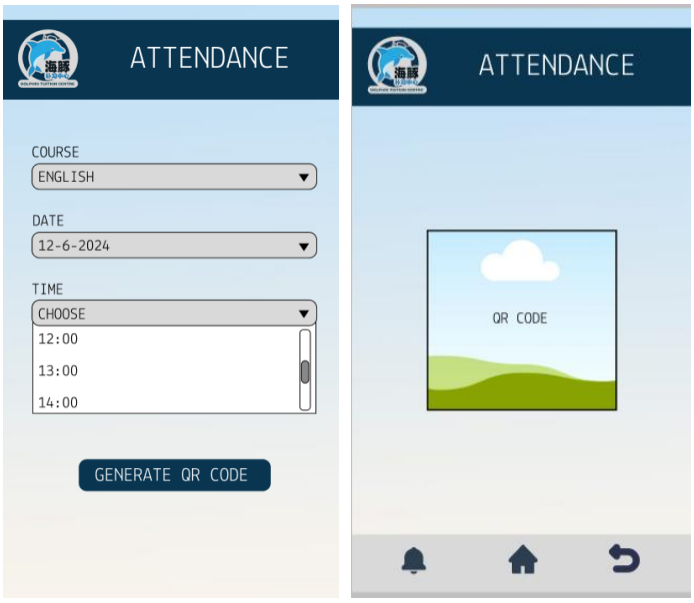
8.4 Main Menu Page
8.4.1 Tutor



This is the main menu for tutors. It includes report, attendance, lesson plan, timetable, virtual classroom and chat.

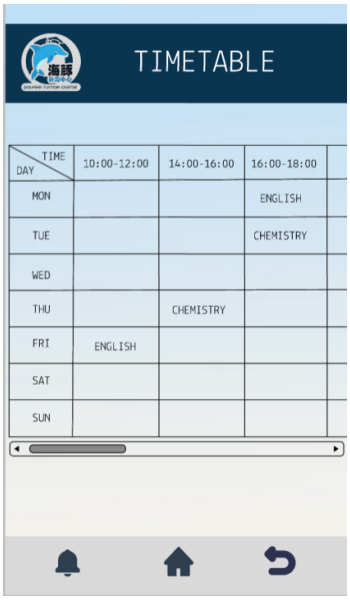


For report, tutors can edit and view students' attendance and performance report. They can update students' attendance and their coursework. The report will update automatically after they finished edit.



For attendance, tutors can generate a QR code for students' attendance. Students' attendance will be recorded in the attendance report after student scan the QR code.

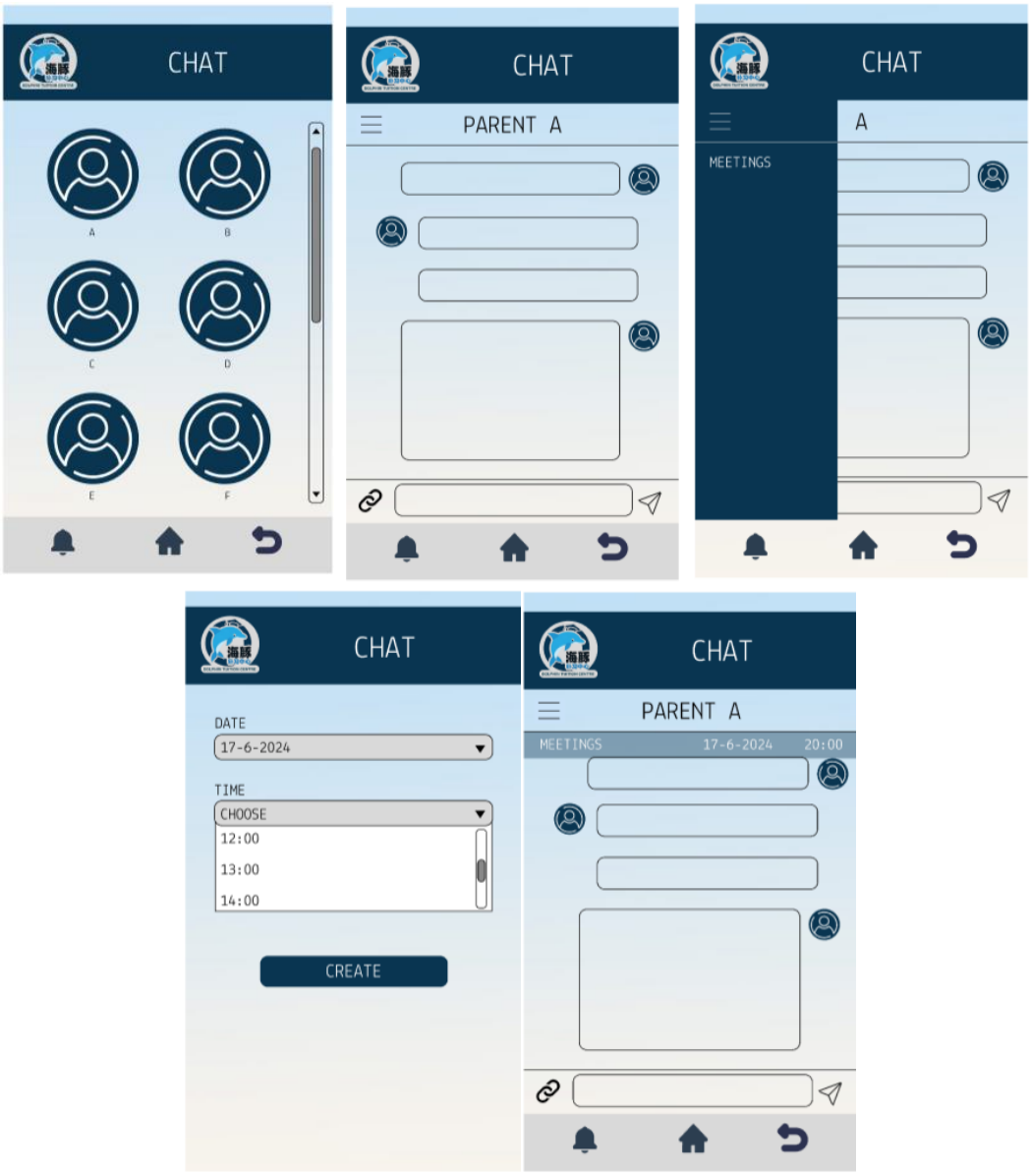
For lesson plan, tutor can upload the module and tutorial for every subject. Tutor also can teach the topic of each subject by following the plan in the lesson plan.



For timetable, tutor can view their class time for the courses they teach and start the class by follow the schedule.

To join the link for virtual classroom, tutor can copy the link for the classroom that generate earlier and join the link by using the join button on the bottom of page.

For the create link for virtual classroom, tutor can choose to use any application such as Zoom, Google Meet or Webex to generate the classroom link. The link generated will appear in the first page of virtual classroom with the class detail.

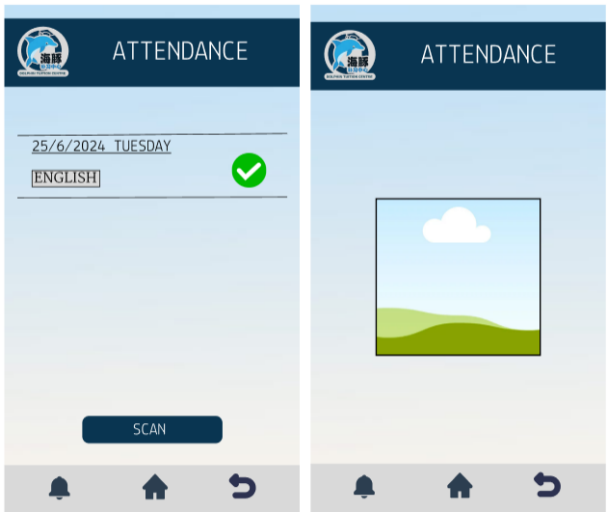


For chat, tutor can contact student and parent to send information and communicate the learning progress. They can create a meeting by select the date and time, and it will show in their chat.

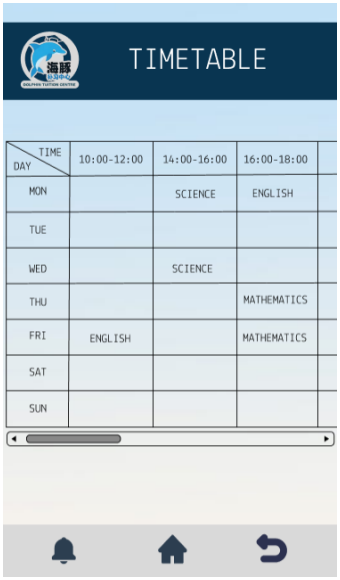
8.4.2 Student

This is the main menu for student. It includes application form, course, attendance, timetable, virtual classroom, chat, contact us function, feedback and financial status. In case of student need to apply for more courses, they can use the application form to apply extra course.

For course, student can check the course their applied and get the information of course such as time, date and fees. They can also check for the module that the tutors uploaded.

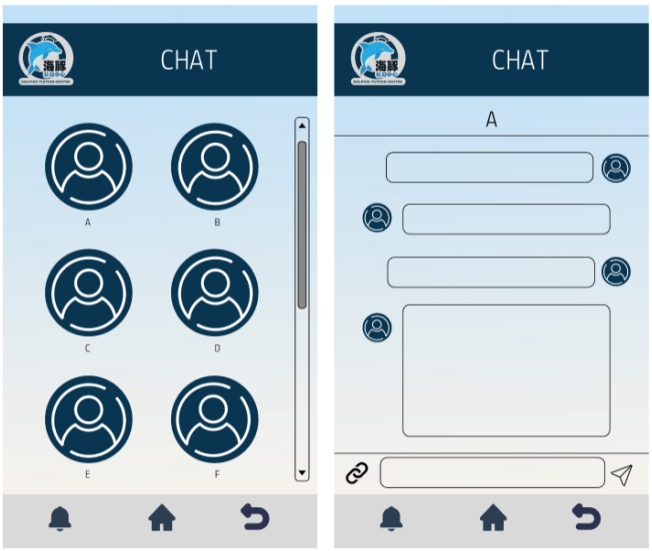


For attendance, student can scan the QR code which generates by tutor to record the attendance.

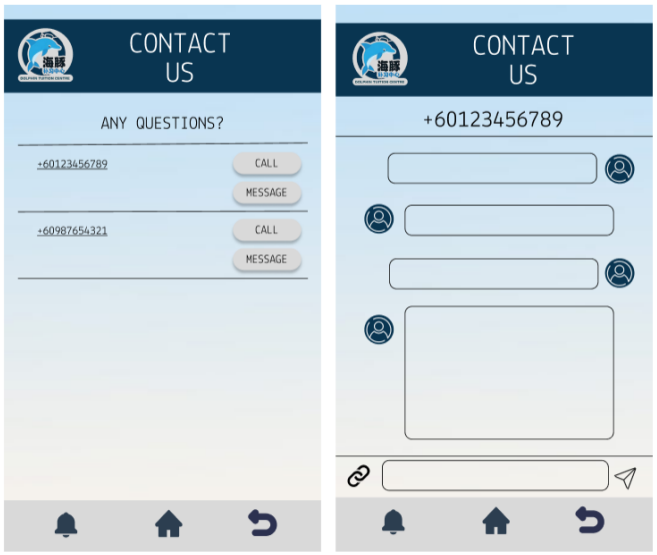


For timetable, student can check the timetable for each course to make sure they attend the class on time.

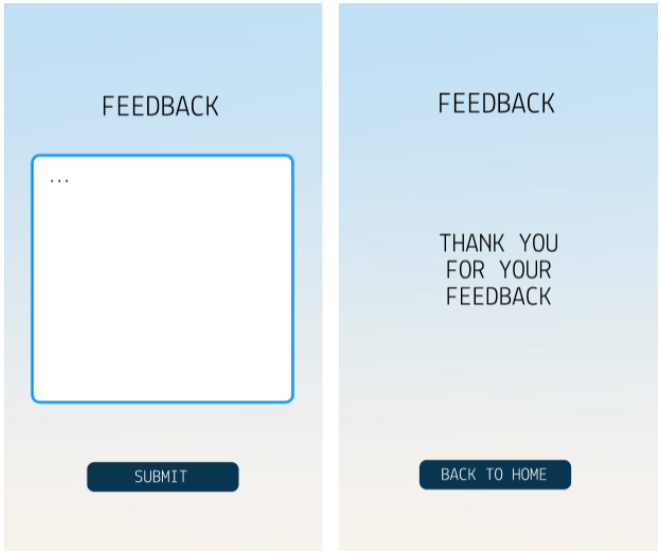
For virtual classroom, student can copy and paste the classroom link to join the classes



For chat, student can communicate with tutor and other student to share information and chat



Student can use the contact us function to contact with tuition centre to share any problem when using the application



For feedback function, student can give feedback for any problem such as tutor's teaching method or financial problems.

Student can check how much the amount of course's fee they need to pay by using the payment function in financial status. They can use different way of paying method such as credit card, Malaysia E-banking, PayPal to pay the fees. It will show 'Payment Successful!' if the proceed of payment is success. However, it will request the users back to transaction again if the payment is unsuccessful.

Student can check the history payment for every past month following by the details and receipt of payments.

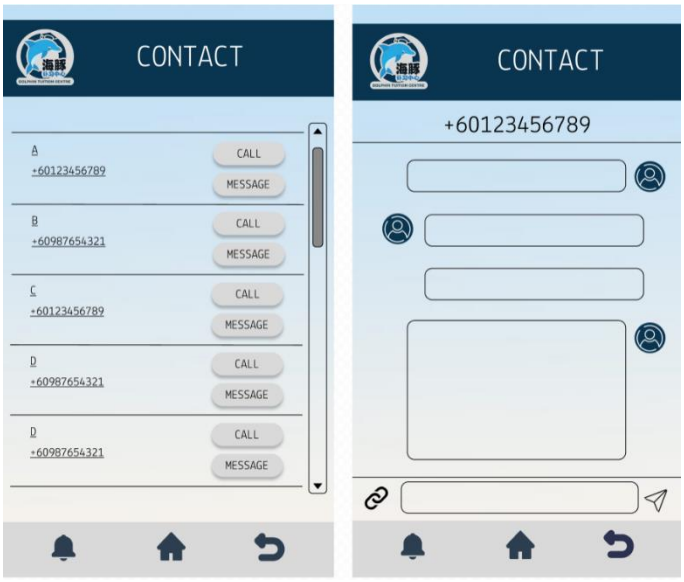
8.4.3 Administrator

For application form, administrator can receive application form and details of courses from students. They can generate the timetable for each student follow by the detail of course in form, and the timetable will update for student automatically.

Administrator can update and manage the course information such as the time, date and fee for each course by using the course information function.

Administrator can access to all the attendance for any time and date of every course to follow up the attendance performance for every student by using attendance function.

Administrator can monitor every student's performance report to follow up the learning process for each student by using assessment function.



Administrator can contact tuition centre to provide any information and updates of application.

Administrator can access to payment function to monitor the any detail of payment such as amount of payment and paying method.

9.0 Summary of proposed system

Our group has successfully completed the system analysis and design for the Dolphin LearnHub system. In phase 3, we developed the Logical DFD TO-BE system, process specifications using structured English, and the Physical DFD TO-BE system. The existing AS-IS system required customers to enroll manually and attend physical classes. Tutors and administrators also found it hard to handle data due to inconsistency and poor organization, leading to inefficiencies and potential errors.

The TO-BE system, Dolphin LearnHub, automates the online learning process. Customers can check course availability, select their preferred courses, and make payments through the application. Staff can track and approve enrollment requests, with notifications sent to customers upon approval. Enrollment statements are automatically emailed to customers. By storing customer, course, and payment records in a database, the TO-BE system ensures long-term data retention and reduces the risk of data loss or enrollment errors.

Additionally, in phase 3, we developed a prototype for the TO-BE Dolphin LearnHub system, which includes functionalities such as viewing course availability, selecting courses, entering enrollment dates, and making payments using PayPal, Touch 'n Go e-wallet, and credit cards. Customers provide their personal information, and after payment, staff verify and approve the enrollment. Approved enrollments trigger notifications and automatic email receipts to customers. The system also features analytics, showing monthly and yearly income. This makes it easier for tutors and administrators to handle payments and manage all data, reducing the risk of data loss.

The TO-BE Dolphin LearnHub system also includes robust functionalities for virtual classes and attendance tracking. Students can join virtual classes directly through the platform, where instructors can manage and conduct their sessions. The system tracks attendance automatically, recording when students join and leave the virtual classes. Instructors can access attendance records, ensuring accurate tracking of student participation. Moreover, the system provides a platform for students and tutors to message each other, facilitating communication about progress and other course-related matters.

However, the TO-BE system currently still requires some manual data entry. Another limitation is the inability to track student progress in real-time. Future enhancements could

incorporate progress tracking functionality, allowing instructors and students to monitor learning progress effectively.

Overall, the Dolphin LearnHub system effectively addresses the inefficiencies of the AS-IS manual system by streamlining staff operations, providing customers with a convenient, detailed, and efficient learning experience, enhancing the management and delivery of virtual classes, and improving communication between students and tutors.

URL of the GitHub Repository： https://github.com/KOKWEIYEE/Project1_SAD_20232024