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Information Technology Project

Topic: Primary School Classroom Management Module

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August 19, 2024

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1 System Overview

1.1 Introduction

This report will present an overview of the general architecture for some functions of the **Primary School Classroom Management Module**, including interview questions, requirements collection questionnaire, functional and non-functional requirements described by the use case diagram and specification. The thesis will also mention the technology selected to implement the project and the reasons for the choice. In addition, the thesis also includes database design using Entity Relationship Diagram and Physical Database Model.

1.2 System Specification

An primary school has a need to develop a **Primary School Classroom Management Module** on a web app to improve the efficiency of student and classroom data management. In addition, the web app also supports parents to know the schedule, student's learning progress, class and school announcements. At the request of the school, the system will have 4 main types of users with separate functions including: parent, student, teacher and principal.

In this module, **students** can view schedule, score sheet of semesters in different school years, class and school announcement.

Meanwhile, **parents** can not only perform all the functions that students can perform, but also can change the student's personal information, view the student's attendance history, and view the teacher's information.

For **teachers**, Teachers can check attendance for students, view managed student lists and their information. Teachers can also view schedule and edit student score sheet. In addition, teachers can send class announcements to parents via email, view managed class statistics and modify teacher's information.

For **principal**, The principal can not only perform all the functions of the teacher, but also create and manage the class, the timetable of each class and verify the student's grades scored by the teacher.

1.3 Topic Scope

This project is a **Primary School Classroom Management Module**, only ensuring some basic functions just enough for teachers and parents to interact and understand the learning process of students. It also helps the principal to observe the students learning progress as well as manage the class and schedule of each class.

1.3.1 Objects and Functions Boundaries

- Objects Boundary: Parents, Students, Teachers, Principal
- Functions Boundary:

- Parents: view student's attendance, view teacher's information, modify student's information, view announcement, view score sheet, view schedule
- Students: view announcement, view score sheet, view schedule

- Teachers: check attendance, modify teacher's information, view student's information, view list students, make announcement, view score sheet, view schedule, view student statistics, modify score sheet.
- Principal: view attendances, view teacher's information, view student's information, view list students, make announcement, view score sheet, view & modify schedule, view student statistics, modify & verify score sheet, create class.

1.3.2 Technologies Boundaries

- Main technology used:

- Front-end: HTML, CSS, JavaScript, Bootstrap
- Back-end: ExpressJS
- Database: MongoDB

1.4 Practical Implications

- Supporting individuals to use the system in managing and monitoring the learning of elementary students
- Store the score sheet, the announcement for students.
- Support to manage class information and class timetables.

1.5 Thesis Layout

- Thesis consists of 4 parts:

- Part 1 - System Overview: Introduction to the goal, scope and practical significance of the topic.
- Part 2 - System Analysis and Design: Presents functional requirements, non-functional requirements, Use Case diagram, Use Case specification, Entity-relationship diagram, Physical Database Model
- Part 3 - System Implementation: Present the project APIs, the APIs Documentation, the expected technology to be used to deploy the module and the reasons for its choice.
- Part 4 - System Demo: Presents system demo script and system demo
- Appendix A - Question List Collect Request: Presents interview questions and questionnaire

2 System Analysis and Design

2.1 Functional Requirement

2.1.1 Check Attendance

- The system allows teachers to take attendance of students.
- The system allows principals, parents and students to view attendance history

2.1.2 Modify Teacher's Information

- The system allows teachers to change personal information.
- The system allows the principal to view the teacher's information

2.1.3 View Student Information

- The system allows teachers and principals to view student information

2.1.4 View List Student

- The system allows teachers to see the list of students in the class the teacher is teaching
- The system allows the principal to view a list of all students in the school or view a list by grade of school years

2.1.5 Send an Announcement via Email

- The system allows teachers and principals to send notifications to parents via email and on the system.
- The system allows parents and students to view announcements sent by teachers or principals.

2.1.6 View Score Sheet

- The system allows principals, teachers, parents and students to view students transcripts

2.1.7 View Schedule

- The system allows principals, teachers, parents and students to view the classes timetable

2.1.8 View Student Statistics

- The system allows principals and teachers to view class or student statistics - The system allows principals to view grade statistics

2.1.9 Modify Score Sheet

- The system allows teachers and principals to add and edit transcripts

2.1.10 Verify Score

- The system allows the principal to verify the student's grades are graded by the teacher.

2.1.11 Create Class

- The system allows the principal to create classes and add teachers and students to the class

2.1.12 Modify Schedule

- The system allows principals to add or adjust schedules by class, by semester, and by school year

2.1.13 View Teacher's Information

- The system allows parents to view teacher information

2.1.14 Modify Student Information

- The system allows parents to adjust students' personal information

2.2 Non-functional Requirement

- Operational: The system can work on any browser and on most devices with Internet
- Performance:
 - System has a fast response time
 - The system is open 24/7
- Security:
 - No user can log in to another account without a password
 - To use the system, users must have an account and password provided by the system manager
- Cultural and Political:
 - The module fully complies with the legal provisions on network information security of Vietnam
 - The module complies with the general education standards of the Vietnamese Ministry of Education

2.3 Use Case Diagram



Figure 1: Use Case Diagram of Primary School Classroom Management Module

2.4 Use Case Specification

2.4.1 Use Case Login

Use case ID	UC001
Use case Name	Login
Primary Actor	Teacher, Student, Parent, System Manager, Principal
Stakeholder and Interests	None
Summary	The function helps users log into the system before using other functions
Pre-Condition	User must have an account in the database
Trigger	User click the Login button on the system interface
Post-condition	User successfully logged into the system
Relationships	Include: - All use cases in the diagram → Login
Main scenario	<ol style="list-style-type: none">1. User want to access the system to use the functions for their work through the link.2. The browser sends a request to the system. The system displays the login interface for User.3. User fill in all the information that the system requires and click the Login button.4. The system checks that the information is sufficiently entered.5. The system checks that the information entered by staffs is correct.6. The system switches the interface to the system interface corresponding to the logged in user
Alternatives	<ol style="list-style-type: none">4.a. If the system checks the information entered is missing. The system will send a notification of additional missing information5.a. If the system checks the information entered is incorrect. The system will send a notification to the user to check the entered information.

Table 1: Login use case specification

2.4.2 Use Case Logout

Use case ID	UC002
Use case Name	Logout
Primary Actor	Teacher, Student, Parent, System Manager, Principal
Stakeholder and Interests	None
Summary	The function helps Users log out of the system
Pre-Condition	User successfully logged in system
Trigger	Users click the Logout button on the system interface
Post-condition	Users successfully logged out of the system
Relationships	Include: Logout → Login
Main scenario	<ol style="list-style-type: none"> 1. After the session ends, the employee wants to log out of the system. Users presses the Logout button. 2. The system records and logs out the User's account. The system finishes session of user in browser and switches the interface to the login interface
Alternatives	None

Table 2: Logout use case specification

2.4.3 Use Case Check Attendance

Use case ID	UC003
Use case Name	Check Attendance
Primary Actor	Teacher
Offstage Actor	Student, Parent, Principal
Summary	Function to help teachers take attendance and allow students, parents and principals to view attendance history
Pre-Condition	<ul style="list-style-type: none"> - Teachers, Student, Parent, Principal must log in to the system - Principals must create successful classrooms
Trigger	The teacher clicks the attendance button
Post-condition	Teachers successfully take attendance for students
Relationships	Include: - Check Attendance → Login
Main scenario	<ol style="list-style-type: none"> 1. After the teacher successfully logged into the system and pressed the attendance button. 2. The system displays a list of students in the class for the teacher to take attendance. 3. The teacher choose the date to check attendance 4. The teacher checks the student and presses the corresponding attendance button of the student in the list. 5. After taking attendance, the teacher presses the submit button 6. The system records attendance information from the list and updates it to the system
Alternatives	None

Table 3: Check Attendance use case specification

2.4.4 Use Case Modify Teacher's Information

Use case ID	UC004
Use case Name	Modify Teacher Information
Primary Actor	Teacher
Offstage Actor	Principal
Summary	Function to help teachers edit personal information and help principals see that information
Pre-Condition	Teachers, Principal must log in to the system
Trigger	The teacher clicks the modify button
Post-condition	Teachers successfully modify teacher's information
Relationships	Include: - Modify Teacher Information → Login
Main scenario	<ol style="list-style-type: none">1. After the teacher successfully logged into the system and pressed the modify button.2. The system displays the teacher's information boxes for the teacher to enter new information3. The teacher fills in the information boxes that need to be changed4. The system checks that the information fields filled in by the teacher are correct5. The system updates that information to the system
Alternatives	<ol style="list-style-type: none">4.a. The system checks the information fields filled in by the teacher that do not meet the requirements of the system and sends a notice requesting the teacher to correct.

Table 4: Modify Teacher Information use case specification

2.4.5 Use Case View Student's Information

Use case ID	UC005
Use case Name	View Student Information
Primary Actor	Teacher
Stakeholder and Interests	Principal
Summary	Function to help teachers and principals view students information
Pre-Condition	- Teachers, Principals must log in to the system - Principals must create successful classrooms
Trigger	The teacher clicks a student from the list of student
Post-condition	Teachers and Principal successfully view the list of student
Relationships	Include: - View Student Information → Login
Main scenario	1. After the teacher successfully logged into the system and pressed the list student button. 2. The system displays the list of students in the class managed by the teacher 3. The teacher clicks on a student from the list 4. The system displays the student's information
Alternatives	None

Table 5: View Student Information use case specification

2.4.6 Use Case View List Students

Use case ID	UC006
Use case Name	View List Student
Primary Actor	Teacher
Stakeholder and Interests	Principal
Summary	Function to help teachers and principals view list of students
Pre-Condition	- Teachers, Principals must log in to the system - Principals must create successful classrooms
Trigger	The teacher clicks the list student button
Post-condition	Teachers and Principal successfully view the list of student
Relationships	Include: - View List Student → Login
Main scenario	1. After the teacher successfully logged into the system and pressed the list student button. 2. The system displays a list of all students for the principal and a list of students by class for the teacher
Alternatives	None

Table 6: View List Student use case specification

2.4.7 Use Case Send Announcement via Email

Use case ID	UC007
Use case Name	Send Announcement via Email
Primary Actor	Teacher, Principal
Offstage Actor	Parent, Student
Summary	Function to help teachers and principals send announcement via email and on system. It also help parent and student view the announcement
Pre-Condition	- Teachers, Principals, Parent, Student must log in to the system - Principals must create successful classrooms
Trigger	The teacher and principal clicks the compose button
Post-condition	Teachers and Principal successfully send announcement to parents. Parent and Student successfully view the announcement
Relationships	Include: - Send Announcement via Email → Login
Main scenario	1. After the teacher successfully logged into the system and pressed the compose button. 2. The system displays information boxes to help teachers and principals compose announcements 3. Teachers and principals enter information into the information boxes provided by the system 4. The system checks that the information entered by the principal and the teacher is correct 5. The system records to the system and sends notifications to parents and students via Email and on system
Alternatives	4.a. If the system checks the information fields filled in by the teacher that do not meet the requirements of the system and sends a notice requesting the teacher to correct.

Table 7: Send Announcement via Email use case specification

2.4.8 Use Case View Score Sheet

Use case ID	UC008
Use case Name	View Score Sheet
Primary Actor	Teacher, Principal, Parent, Student
Stakeholder and Interests	None
Summary	Function to help Teacher, Principal, Parent and Student view student's score sheet
Pre-Condition	- Teachers, Principals, Parent, Student must log in to the system - Principals must create successful classrooms
Trigger	- The teacher and principal clicks a student from the list of student - Student and Parent click the score sheet button
Post-condition	Teachers, Principals, Parent, Student successfully view the student's Score sheet
Relationships	Include: - View Score Sheet → Login
Main scenario	1.1. After the Teachers, Principals successfully logged into the system. The teacher and principal pressed the list student button. 1.2. The system displays the list of students in the class managed by the teacher 1.3. The teacher and principal clicks on a student from the list 1.4. The system displays the student's score sheet 2.1. After the Parent and Student successfully logged into the system. The Parent and Student pressed the score sheet button. 2.2. The system displays the student's score sheet
Alternatives	None

Table 8: View Score Sheet use case specification

2.4.9 Use Case View Schedule

Use case ID	UC009
Use case Name	View Schedule
Primary Actor	Teacher, Parent, Student
Stakeholder and Interests	Principal
Summary	Function to help Teacher, Principal, Parent and Student view schedule
Pre-Condition	<ul style="list-style-type: none">- Teachers, Principals, Parent, Student must log in to the system- Principals must create successfully classrooms- Principals must create successfully schedule
Trigger	<ul style="list-style-type: none">- The principal clicks a class from the list of classes- Teacher, Student and Parent click the schedule button
Post-condition	Teachers, Principals, Parent, Student successfully view the schedule
Relationships	Include: - View Schedule → Login
Main scenario	<ol style="list-style-type: none">1.1. After the principal successfully logged into the system.The principal pressed the list classes button.1.2. The system displays the list of classes1.3. The principal clicks on a class from the list1.4. The system displays the class's schedule2.1. After the Parent, Student and Teacher successfully logged into the system.The Parent, Student and Teacher pressed the schedule button.2.2. The system displays the class's schedule
Alternatives	None

Table 9: View Schedule use case specification

2.4.10 Use Case View Statistics

Use case ID	UC010
Use case Name	View Statistic
Primary Actor	Teacher
Stakeholder and Interests	Principal
Summary	Function to help Teacher, Principal view the statistics
Pre-Condition	- Teachers, Principals must log in to the system - Principals must create successful classrooms
Trigger	- The principal and teacher clicks the statistic button
Post-condition	Teachers, Principals successfully view the statistics
Relationships	Include: - View Student Statistic → Login
Main scenario	1. After the Teachers, Principals successfully logged into the system. They pressed the statistic button. 2. The system displays the class's statistic for teacher and grade's statistic for principal
Alternatives	None

Table 10: View Statistic use case specification

2.4.11 Use Case Modify Score Sheet

Use case ID	UC011
Use case Name	Modify Score Sheet
Primary Actor	Teacher
Stakeholder and Interests	Principal
Summary	Function to help Teacher, Principal Modify Score Sheet
Pre-Condition	- Teachers, Principals must log in to the system - Principals must create successful classrooms
Trigger	- The principal and teacher clicks the modify score sheet button
Post-condition	Teachers, Principals successfully modify the score sheet
Relationships	Include: - Modify Score Sheet → Login - Modify Score Sheet → Verify Score Extend: - Enter Score → Modify Score Sheet - Edit Score → Modify Score Sheet
Main scenario	1. After the Teachers, Principals successfully logged into the system. The teacher pressed the modify score sheet button. 2. The system displays the list of students in the class managed by the teacher 3. The teacher clicks on a student from the list 4. The system displays the student's score sheet 5. Teacher enter the new score or edit the old score and click the submit button 6. The system updates that score to the system and sends it to the principal for verification
Alternatives	None

Table 11: Modify Score Sheet use case specification

2.4.12 Use Case Verify Score

Use case ID	UC012
Use case Name	Verify Score
Primary Actor	Principal
Stakeholder and Interests	None
Summary	Function to help Principal Verify Score
Pre-Condition	- Principals must log in to the system
Trigger	- The principal clicks the verify score button
Post-condition	Teachers, Principals successfully verify the score sheet
Relationships	Include:- Verify Score → Login
Main scenario	<ol style="list-style-type: none">1. After the Principals successfully logged into the system.The teacher pressed the verify button.2. The system displays the list of students3. The principal clicks on a student from the list4. The system displays the student's score sheet5. The principal checks and accepts the grade given by the teacher. Principal clicks submit button6. system to record and update the status of the scoreboard
Alternatives	<ol style="list-style-type: none">5.a. Principal checks and does not accept grades graded by teachers. Principal presses deny button5.b. system to record and update the status of the scoreboard

Table 12: Verify Score use case specification

2.4.13 Use Case Create Class

Use case ID	UC013
Use case Name	Create Class
Primary Actor	Principal
Stakeholder and Interests	None
Summary	Function to help Principal Create Class
Pre-Condition	- Principals must log in to the system
Trigger	- The principal clicks the create class button
Post-condition	Principals successfully create a new class
Relationships	Include: - Create Class → Login - Create Class → Appointment of teachers - Create Class → Add Student
Main scenario	<ol style="list-style-type: none">1. After the Principals successfully logged into the system. The teacher pressed the create class button.2. The system displays the information boxes of the class and the list of teachers and students in the school3. The principal enters the class information and adds teachers and students to the classroom. Principal presses the create button4. The system checks that the principal enters all the information that the system requires. the system instantiates a new class on the system5. The system sends a successful initialization message
Alternatives	<ol style="list-style-type: none">4.a. If the system checks that the principal enters missing or incorrect information that the system requires. The system sends a notification to the principal to adjust.

Table 13: Create Class use case specification

2.4.14 Use Case Modify Schedule

Use case ID	UC014
Use case Name	Modify Schedule
Primary Actor	Principal
Stakeholder and Interests	None
Summary	Function to help Principal Modify Schedule
Pre-Condition	- Principals must log in to the system
Trigger	- The principal clicks the modify schedule button
Post-condition	Principals successfully modify schedule
Relationships	Include:- Modify Schedule → Login
Main scenario	<ol style="list-style-type: none"> 1. After the Principals successfully logged into the system.The teacher pressed the modify schedule button. 2. The system displays the list of classes 3. The principal clicks on a class from the list 4. The system displays the class's schedule 5. The principal click the modify button 6. The system displays the information boxes of the schedule of the class 7. The principal enter the new schedule 8. The system checks that the principal enters all the information that the system requires and update the information into the system
Alternatives	8.a. If the system checks that the principal enters missing or incorrect information that the system requires. The system sends a notification to the principal to adjust.

Table 14: Modify Schedule use case specification

2.4.15 Use Case View Teacher Information

Use case ID	UC015
Use case Name	View Teacher Information
Primary Actor	Parent
Stakeholder and Interests	Principal
Summary	Function to help parent and principals view teacher information
Pre-Condition	<ul style="list-style-type: none"> - Parent, Principals must log in to the system - Principals must create successful classrooms
Trigger	The teacher clicks the teacher information button
Post-condition	Parent and Principal successfully the teacher information
Relationships	Include: - View Teacher Information → Login
Main scenario	<ol style="list-style-type: none"> 1. After the teacher successfully logged into the system and pressed the teacher information button. 2. The system displays the teacher's information
Alternatives	None

Table 15: View Teacher Information use case specification

2.4.16 Use Case Modify Student Information

Use case ID	UC016
Use case Name	Modify Student Information
Primary Actor	Parent
Stakeholder and Interests	Student
Summary	Function to help parent edit student's information and help student see that information
Pre-Condition	Parent, Student must log in to the system
Trigger	The parent clicks the modify button
Post-condition	Parent successfully modify student's information
Relationships	Include: - Modify Student Information → Login
Main scenario	<ol style="list-style-type: none">1. After the parent successfully logged into the system and pressed the modify button.2. The system displays the student's information boxes for the parent to enter new information3. The parent fills in the information boxes that need to be changed4. The system checks that the information fields filled in by the parent are correct5. The system updates that information to the system
Alternatives	<ol style="list-style-type: none">4.a. The system checks the information fields filled in by the parent that do not meet the requirements of the system and sends a notice requesting the teacher to correct.

Table 16: Modify Student Information use case specification

2.5 Entity-Relationship Diagram

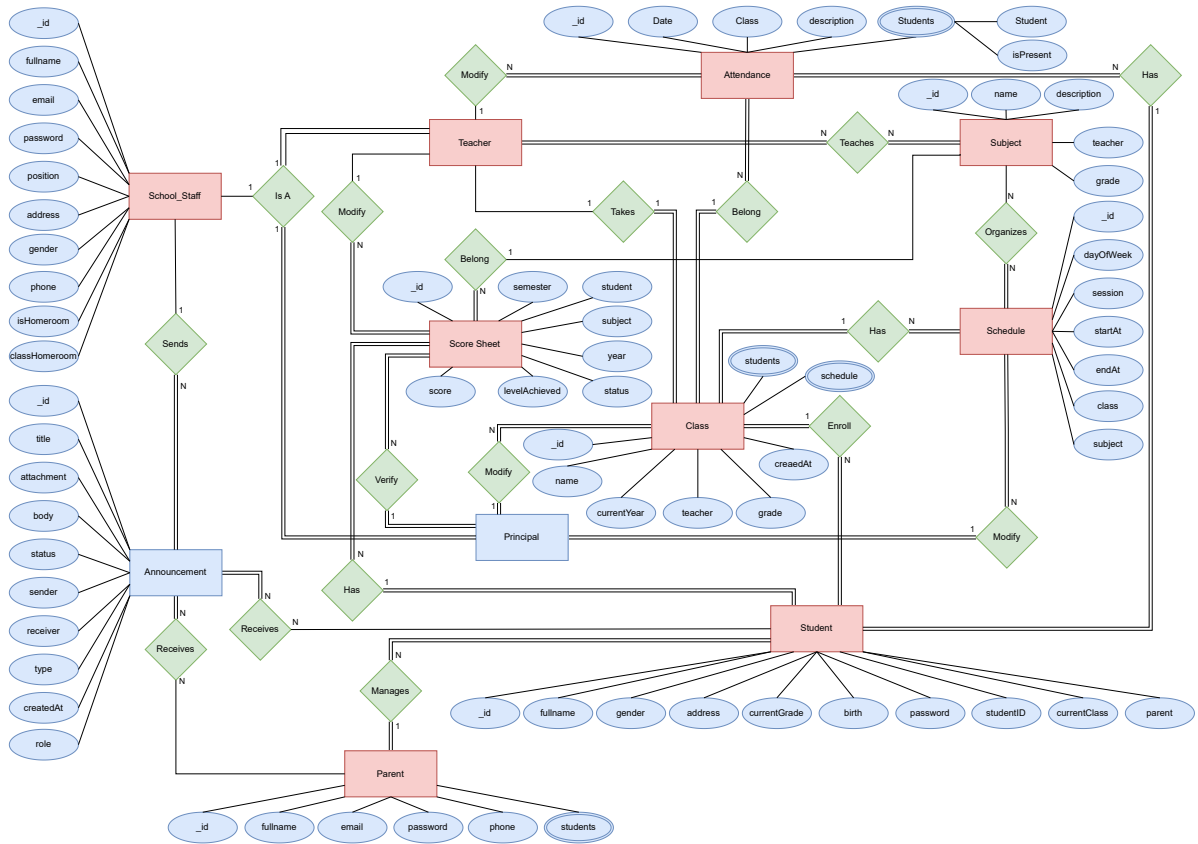


Figure 2: Entity-Relationship Diagram of Primary School Classroom Management Module

2.6 Physical Database Model

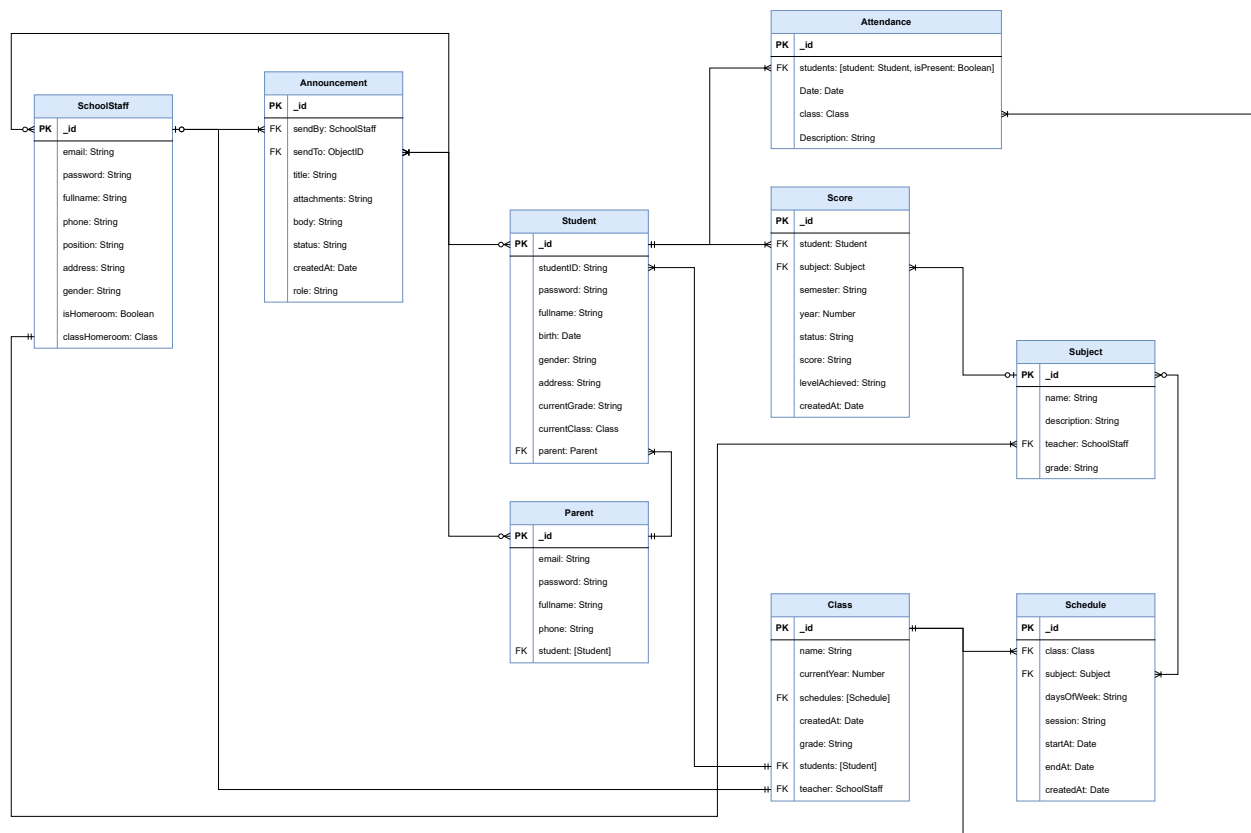


Figure 3: Physical Database Model of Primary School Classroom Management Module

3 System Implementation

3.1 Technology Used and The Reasons for Use

3.1.1 Front-end - HTML,CSS,Javascript

- Basic easy to use with support for many libraries and frameworks

3.1.2 Back-end - ExpressJS

- **Rapid server development:** Expressjs provides many features in the form of functions for easy use anywhere in the program. This eliminated the need to write code thereby saving time.
- **Routing:** Express js provides a routing mechanism that maintains the state of the website with the help of URLs.
- **Templating:** The templating tools provided by Express.js allow developers to build dynamic content on websites by building HTML templates on the server side.
- **Debugging:** For successful development of web applications, debugging is not necessary. Now with Expressjs debugging has become easier thanks to the ability to pinpoint the parts of the web application that have errors.
- **Middleware:** This is middleware that has access to databases, client requests, and other middleware. This middleware is primarily responsible for the systematic organization of Expressjs functionality.

3.1.3 Database - MongoDB

- Document oriented
- High performance
- High Scalability – Sharding
- Flexible – add/remove fields with little or no impact on the application
- Data is not consistent
- No joins
- Distributable
- Representing data in JSON or BSON

3.2 Project APIs

3.2.1 Announcement APIs

```
1 // [GET] All Sent Announcements -> /api/ancm/list/sent
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output: [
6   {
7     "_id": "644620cd6797253c70c801aa",
8     "sendBy": "6444fb7fe14137d2c1586b02",
9     "sendTo": [
10      "6445427c934b44c3693c49da",
11      "6445602896858bdf4d8313db"
12    ],
13     "type": "announcement",
14     "role": "all",
15     "title": "Test 1",
16     "body": "hello day la thong bao",
17     "status": "created",
18     "createdAt": "2023-04-24T06:25:17.291Z",
19     "updatedAt": "2023-04-24T06:25:17.291Z",
20     "__v": 0
21   }
22 ]
```

Listing 1: All Sent Announcements

```
1 // [GET] All Announcement Received -> /api/ancm/list/receive
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output: [
6   {
7     "_id": "644620cd6797253c70c801aa",
8     "sendBy": "6444fb7fe14137d2c1586b02",
9     "sendTo": [
10      "6445427c934b44c3693c49da",
11      "6445602896858bdf4d8313db"
12    ],
13     "type": "announcement",
14     "role": "all",
15     "title": "Test 1",
16     "body": "hello day la thong bao",
17     "status": "created",
18     "createdAt": "2023-04-24T06:25:17.291Z",
19     "updatedAt": "2023-04-24T06:25:17.291Z",
20     "__v": 0
21   }
22 ]
```

Listing 2: All Announcement Received

```
1 // [GET] Announcement Detail by ID -> /api/ancm/:id
2 - Input:
3   Params: {:id = 644620cd6797253c70c801aa}
4   Body: {null}
5 - Output:{
6   "_id": "644620cd6797253c70c801aa",
7   "sendBy": "6444fb7fe14137d2c1586b02",
8   "sendTo": [
9     "6445427c934b44c3693c49da",
10    "6445602896858bdf4d8313db"
11  ],
12  "type": "announcement",
13  "role": "all",
14  "title": "Test 1",
15  "body": "hello day la thong bao",
16  "status": "created",
17  "createdAt": "2023-04-24T06:25:17.291Z",
18  "updatedAt": "2023-04-24T06:25:17.291Z",
19  "__v": 0
20 }
```

Listing 3: Announcement Detail by ID

```
1 // [POST] Create a New Announcement -> /api/ancm/create
2 - Input:
3   Params: {null}
4   Body: {
5     "sendTo"="6445427c934b44c3693c49da,6445602896858bdf4d8313db",
6     "title"="Test 1",
7     "type"="announcement",
8     "body"="hello day la thong bao",
9     "sendBy"="6444fb7fe14137d2c1586b02",
10    "role"="all"
11    "status"="created"
12  }
13 - Output:{"message": "New announcement has been created successfully"}
```

Listing 4: Create a New Announcement

3.2.2 Attendance APIs

```
1 // [GET] All Attendance -> /api/attend/list
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output: [
6   {
7     "_id": "6446c08c7ca3afa5098c305d",
8     "student": {
9       "_id": "64468a7cd87974dbbae0fb1e",
10      "studentID": "STU238992",
11      "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq"
12    },
13    "fullname": "Do Thi Tram Anh",
14    "birth": "2016-07-18T17:00:00.000Z",
15    "gender": "female",
16    "address": "Long Xuyen",
17    "currentGrade": "1st",
18    "parent": "64468a7cd87974dbbae0fb1c",
19    "__v": 0,
20    "currentClass": "64468b09d87974dbbae0fb2b"
21  },
22  "currentDate": "2023-04-24T17:00:00.000Z",
23  "isPresent": true,
24  "description": "...",
25  "createdAt": "2023-04-24T17:46:52.583Z",
26  "updatedAt": "2023-04-24T17:46:52.583Z",
27  "__v": 0
28 ]
```

Listing 5: All Attendance

```
1 // [GET] List by Student ID -> /api/attend/list/:studentID
2 - Input:
3   Params: {:studentID=6446c08c7ca3afa5098c305d}
4   Body: {null}
5 - Output:
6   {
7     "_id": "6446c08c7ca3afa5098c305d",
8     "student": {
9       "_id": "64468a7cd87974dbbae0fb1e",
10      "studentID": "STU238992",
11      "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq"
12    },
13    "fullname": "Do Thi Tram Anh",
14    "birth": "2016-07-18T17:00:00.000Z",
15    "gender": "female",
16    "address": "Long Xuyen",
17    "currentGrade": "1st",
18    "parent": "64468a7cd87974dbbae0fb1c",
19    "__v": 0,
20    "currentClass": "64468b09d87974dbbae0fb2b"
21  },
22  "currentDate": "2023-04-24T17:00:00.000Z",
23  "isPresent": true,
24  "description": "...",
25  "createdAt": "2023-04-24T17:46:52.583Z",
26  "updatedAt": "2023-04-24T17:46:52.583Z",
27  "__v": 0
28 ]
```

Listing 6: List by Student ID

```
1 // [GET] List by Class ID and date -> /api/attend/list/:classID/:date
2 - Input:
3   Params: {
4     :classID = 64468b09d87974dbbae0fb2b,
5     :date = 04-25-2023
6   }
7   Body: {null}
8 - Output:[
9   {
10    "_id": "6446c08c7ca3afa5098c305d",
11    "student": {
12      "_id": "64468a7cd87974dbbae0fb1e",
13      "studentID": "STU238992",
14      "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq"
15    },
16    "fullname": "Do Thi Tram Anh",
17    "birth": "2016-07-18T17:00:00.000Z",
18    "gender": "female",
19    "address": "Long Xuyen",
20    "currentGrade": "1st",
21    "parent": "64468a7cd87974dbbae0fb1c",
22    "__v": 0,
23    "currentClass": "64468b09d87974dbbae0fb2b"
24  },
25  "currentDate": "2023-04-24T17:00:00.000Z",
26  "isPresent": true,
27  "description": "...",
28  "createdAt": "2023-04-24T17:46:52.583Z",
29  "updatedAt": "2023-04-24T17:46:52.583Z",
30  "__v": 0
31 ]
```

Listing 7: List by Class ID and date

```
1 // [POST] Create a New Attendance Card -> /api/attend/create
2 - Input:
3   Params: {null}
4   Body: {
5     "student"="64468a7cd87974dbbae0fb1e"
6     "currentDate"="4-25-2023"
7     "isPresent"="true"
8     "description"="..."
9   }
10 - Output:[
11   {
12     "_id": "6446c08c7ca3afa5098c305d",
13     "student": {
14       "_id": "64468a7cd87974dbbae0fb1e",
15       "studentID": "STU238992",
16       "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq"
17     },
18     "fullname": "Do Thi Tram Anh",
19     "birth": "2016-07-18T17:00:00.000Z",
20     "gender": "female",
21     "address": "Long Xuyen",
22     "currentGrade": "1st",
23     "parent": "64468a7cd87974dbbae0fb1c",
24     "__v": 0,
25     "currentClass": "64468b09d87974dbbae0fb2b"
26   },
27   "currentDate": "2023-04-24T17:00:00.000Z",
28   "isPresent": true,
29   "description": "...",
30   "createdAt": "2023-04-24T17:46:52.583Z",
31   "updatedAt": "2023-04-24T17:46:52.583Z",
32   "__v": 0
33 ]
```

Listing 8: Create a New Attendance Card

3.2.3 Class APIs

```
1 // [GET] List All of Classes -> /api/class/list
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output: [
6   {
7     "_id": "64468b09d87974dbbae0fb2b",
8     "name": "1A",
9     "currentYear": 2023,
10    "teacher": {
11      "_id": "644689177661a30b6942f653",
12      "email": "thanh@gmail.com",
13      "password": "$2a$10$BUa4iXspSkMU/5GHaBtDA0rdLc720C//7m7gVTZPut2xpCh54u0QK"
14    },
15    "fullname": "Hoai Thanh",
16    "phone": "18001234",
17    "position": "teacher",
18    "address": "Binh Dinh",
19    "gender": "male",
20    "isHomeroom": true,
21    "__v": 0,
22    "classHomeroom": "64468b09d87974dbbae0fb2b"
23  },
24  "grade": "1st",
25  "schedules": [],
26  "students": [
27    "64468a7cd87974dbbae0fb1e",
28    "64468aa7d87974dbbae0fb23",
29    "64468adad87974dbbae0fb28"
30  ],
31  "createdAt": "2023-04-24T13:58:33.066Z",
32  "updatedAt": "2023-04-24T13:59:58.050Z",
33  "__v": 3
34 ]
```

Listing 9: List All of Classes

```
1 // [GET] List of Class by Grade -> /api/class/list/:grade
2 - Input:
3   Params: {:grade=1st}
4   Body: {null}
5 - Output:
6   {
7     "_id": "64468b09d87974dbbae0fb2b",
8     "name": "1A",
9     "currentYear": 2023,
10    "teacher": {
11      "_id": "644689177661a30b6942f653",
12      "email": "thanh@gmail.com",
13      "password": "$2a$10$BUa4iXspSkMU/5GHaBtDA0rdLc720C//7m7gVTZPut2xpCh54u0QK"
14    },
15    "fullname": "Hoai Thanh",
16    "phone": "18001234",
17    "position": "teacher",
18    "address": "Binh Dinh",
19    "gender": "male",
20    "isHomeroom": true,
21    "__v": 0,
22    "classHomeroom": "64468b09d87974dbbae0fb2b"
23  },
24  "grade": "1st",
25  "schedules": [],
26  "students": [
27    "64468a7cd87974dbbae0fb1e",
28    "64468aa7d87974dbbae0fb23",
29    "64468adad87974dbbae0fb28"
30  ],
31  "createdAt": "2023-04-24T13:58:33.066Z",
32  "updatedAt": "2023-04-24T13:59:58.050Z",
33  "__v": 3
34 }
```

Listing 10: List of Class by Grade


```
1 // [GET] Class Detail by ID -> /api/class/:id
2 - Input:
3   Params: {:id=64468b09d87974dbbae0fb2b}
4   Body: {null}
5 - Output:{
6   "_id": "64468b09d87974dbbae0fb2b",
7   "name": "1A",
8   "currentYear": 2023,
9   "teacher": "644689177661a30b6942f653",
10  "grade": "1st",
11  "schedules": [],
12  "students": [
13    "64468a7cd87974dbbae0fb1e",
14    "64468aa7d87974dbbae0fb23",
15    "64468adad87974dbbae0fb28"
16  ],
17  "createdAt": "2023-04-24T13:58:33.066Z",
18  "updatedAt": "2023-04-24T13:59:58.050Z",
19  "__v": 3
20 }
```

Listing 11: Class Detail by ID

```
1 // [POST] Create a New Class -> /api/class/create
2 - Input:
3   Params: {null}
4   Body: {
5     "name"="1A",
6     "currentYear"="2023",
7     "teacher"="644689177661a30b6942f653",
8     "grade"="1st"
9   }
10 - Output:{"message": "New class has been created successfully"}
```

Listing 12: Create a New Class

```
1 // [PUT] Add Student to Class -> /api/class/addStudent/:classID/:studentID
2 - Input:
3   Params: {
4     :classID = 64468b09d87974dbbae0fb2b
5     :studentID = 64468adad87974dbbae0fb28
6   }
7   Body: {null}
8 - Output: {"message": "Add Student Successfully"}
```

Listing 13: Add Student to Class

3.2.4 Parent APIs

```
1 // [GET] List All of Parents -> /api/parent/list
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output:[
6   {
7     "_id": "64468a7cd87974dbbae0fb1c",
8     "email": "dohungdung@gmail.com",
9     "password": "$2a$10$h8oK.krf9BZHIYqIgC0vK0lGuJX/TVMfQDgxm4dKJV5T2d6S00d1W",
10    "fullname": "Do Hung Dung",
11    "address": "Long Xuyen",
12    "phone": "0925312312",
13    "__v": 0,
14    "student": {
15      "_id": "64468a7cd87974dbbae0fb1e",
16      "studentID": "STU238992",
17      "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq"
18    },
19    "fullname": "Do Thi Tram Anh",
20    "birth": "2016-07-18T17:00:00.000Z",
21    "gender": "female",
22    "address": "Long Xuyen",
23    "currentGrade": "1st",
24    "parent": "64468a7cd87974dbbae0fb1c",
25    "__v": 0,
26    "currentClass": "64468b09d87974dbbae0fb2b"
27  }, {
28    "_id": "64468aa6d87974dbbae0fb21",
29    "email": "info.trankhaihoang@gmail.com",
30    "password": "$2a$10$eeNEoqq.GOPslBBMZN4NyezssLcZjzFHnwrrQQg..u36hr00jawjW",
31    "fullname": "Tran Khai Hoang",
32    "address": "Long Xuyen",
33    "phone": "0378807854",
34    "__v": 0,
35    "student": {
36      "_id": "64468aa7d87974dbbae0fb23",
37      "studentID": "STU233576",
38      "password": "$2a$10$n8fJ.ln6dt.hkMpCPVyvg.7Uih5Ued2xuDg91cb2W6CVngy/UW9Vy"
39    },
40    "fullname": "Tran Minh Tri",
41    "birth": "2016-07-14T17:00:00.000Z",
42    "gender": "male",
43    "address": "Long Xuyen",
44    "currentGrade": "1st",
45    "parent": "64468aa6d87974dbbae0fb21",
46    "__v": 0,
47    "currentClass": "64468b09d87974dbbae0fb2b"
48  }
49 ]
```

Listing 14: List All of Parents

```
1 // [GET] List Parents by ClassID -> /api/parent/list/:classID
2 - Input:
3   Params: {:classID=6445252374c5fbcd83bd661b}
4   Body: {null}
5 - Output:[
6   {
7     "_id": "6445427c934b44c3693c49da",
8     "email": "kyn@gmail.com",
9     "password": "$2a$10$cocIhjfgNdZs745PSDoZ801VAnli0NKmU6nS4rkoSWcF6UswGjn/S",
10    "fullname": "Khuu Yen Ngoc",
11    "address": "Dinh My",
12    "phone": "0372360506",
13    "__v": 0,
14    "student": {
15      "_id": "6445427c934b44c3693c49dc",
16      "studentID": "STU232242",
17      "password": "$2a$10$vDnWJjdpVki01/x6t0ga70xt/Xmhd7FKlGealisAP/KpDeezklHAW"
18    },
19    "fullname": "Tran Trong Dao",
20    "birth": "2030-12-11T17:00:00.000Z",
21    "gender": "male",
22    "address": "Dinh My",
23    "currentGrade": "1st",
24    "parent": "6445427c934b44c3693c49da",
25    "__v": 0,
26    "currentClass": "6445252374c5fbcd83bd661b"
27  }
28 ]
```

Listing 15: List Parents by ClassID

```
1 // [GET] Detail by ID -> /api/parent/:id
2 - Input:
3   Params: {:id=64468a7cd87974dbbbae0fb1c}
4   Body: {null}
5 - Output:{
6   "_id": "64468a7cd87974dbbbae0fb1c",
7   "email": "dohungdung@gmail.com",
8   "password": "$2a$10$h8oK.krf9BZHIYqIgC0vK0lGuJX/TVMfQDgxm4dKJV5T2d6S00d1W",
9   "fullname": "Do Hung Dung",
10  "address": "Long Xuyen",
11  "phone": "0925312312",
12  "__v": 0,
13  "student": {
14    "_id": "64468a7cd87974dbbbae0fb1e",
15    "studentID": "STU238992",
16    "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq",
17    "fullname": "Do Thi Tram Anh",
18    "birth": "2016-07-18T17:00:00.000Z",
19    "gender": "female",
20    "address": "Long Xuyen",
21    "currentGrade": "1st",
22    "parent": "64468a7cd87974dbbbae0fb1c",
23    "__v": 0,
24    "currentClass": "64468b09d87974dbbbae0fb2b"
25  }
26 }
```

Listing 16: Detail by ID

```
1 // [GET] Detail by Student ID -> /api/parent/detail/:studentID
2 - Input:
3   Params: {:studentID=64468adad87974dbbae0fb28}
4   Body: {null}
5 - Output:{
6   "_id": "64468adad87974dbbae0fb26",
7   "email": "nhatthong33333@gmail.com",
8   "password": "$2a$10$0qH5xhGCS2syxdTEyYkMj.8YB/EoTdj0bx7hh9B/gokUHbhd1D/G",
9   "fullname": "Nguyen Nhat Thong",
10  "address": "TP HCM",
11  "phone": "0333333333",
12  "__v": 0,
13  "student": {
14    "_id": "64468adad87974dbbae0fb28",
15    "studentID": "STU230150",
16    "password": "$2a$10$Mr9fA0obpuFG0bpOXbs12eMtE0eNUT/v/jKq4jFKvyUL.4F6Jnfem",
17    "fullname": "Nguyen Nhat He",
18    "birth": "2016-12-14T17:00:00.000Z",
19    "gender": "male",
20    "address": "TP HCM",
21    "currentGrade": "1st",
22    "parent": "64468adad87974dbbae0fb26",
23    "__v": 0,
24    "currentClass": "64468b09d87974dbbae0fb2b"
25  }
26 }
```

Listing 17: Detail by Student ID

```
1 // [POST] Create a new Parent and new a Student -> /api/parent/create
2 - Input:
3   Params: {null}
4   Body: {
5     "email"="nhatthong33333@gmail.com",
6     "fullname"="Nguyen Nhat Thong",
7     "phone"="0333333333",
8     "address"="TP HCM",
9     "stu_fullname"="Nguyen Nhat He",
10    "birth"="12-15-2016",
11    "gender"="male",
12    "currentGrade"="1st"
13  }
14 - Output:{"message": "New student has been created successfully"}
```

Listing 18: Create a new Parent and new a Student

3.2.5 Subject APIs

```
1 // [POST] Get list all subject -> /api/subject/list
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Ouput:[
6   {
7     "_id": "6449f1c46a6a7e9b533daee",
8     "name": "Tieng Viet",
9     "description": "....",
10    "teacher": {
11      "_id": "6444fb42e14137d2c1586aff",
12      "email": "it.trankhaihoang@gmail.com",
13      "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksev10CgIogbbWxFexa9YHHa1R/6Cv60wi"
14    },
15    "fullname": "Tran Khai Hoang",
16    "phone": 378807854,
17    "position": "teacher",
18    "address": "Thoai Son",
19    "gender": "male",
20    "__v": 0,
21    "isHomeroom": true,
22    "classHomeroom": "6447975b1f2ec28f4f7b199d"
23  },
24  {
25    {
26      "_id": "6449f2526a6a7e9b533daeb0",
27      "name": "Toan",
28      "description": "....",
29      "teacher": {
30        "_id": "6444fb42e14137d2c1586aff",
31        "email": "it.trankhaihoang@gmail.com",
32        "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksev10CgIogbbWxFexa9YHHa1R/6Cv60wi"
33      },
34      "fullname": "Tran Khai Hoang",
35      "phone": 378807854,
36      "position": "teacher",
37      "address": "Thoai Son",
38      "gender": "male",
39      "__v": 0,
40      "isHomeroom": true,
41      "classHomeroom": "6447975b1f2ec28f4f7b199d"
42    },
43    "grade": "1st"
44  ]
```

Listing 19: Get list all subject

```
1 // [POST] list subjects by grade -> /api/subject/list/:grade
2 - Input:
3   Params: {:grade=1st}
4   Body: {null}
5 - Output:[
6   {
7     "_id": "6449f1c46a6a7e9b533daee",
8     "name": "Tieng Viet",
9     "description": "....",
10    "teacher": {
11      "_id": "6444fb42e14137d2c1586aff",
12      "email": "it.trankhaihoang@gmail.com",
13      "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksevl0CgIogbbWxFexa9YHHa1R/6Cv60wi"
14    },
15    "fullname": "Tran Khai Hoang",
16    "phone": 378807854,
17    "position": "teacher",
18    "address": "Thoai Son",
19    "gender": "male",
20    "__v": 0,
21    "isHomeroom": true,
22    "classHomeroom": "6447975b1f2ec28f4f7b199d"
23  },
24  {
25    "_id": "6449f2526a6a7e9b533daeb0",
26    "name": "Toan",
27    "description": "....",
28    "teacher": {
29      "_id": "6444fb42e14137d2c1586aff",
30      "email": "it.trankhaihoang@gmail.com",
31      "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksevl0CgIogbbWxFexa9YHHa1R/6Cv60wi"
32    },
33    "fullname": "Tran Khai Hoang",
34    "phone": 378807854,
35    "position": "teacher",
36    "address": "Thoai Son",
37    "gender": "male",
38    "__v": 0,
39    "isHomeroom": true,
40    "classHomeroom": "6447975b1f2ec28f4f7b199d"
41  },
42  "grade": "1st"
43 }
44 ]
```

Listing 20: list subjects by grade

3.2.6 School Staff APIs

```
1 // [GET] List All of Teacher -> /api/SchoolStaff/teacher
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output:
6   {
7     "_id": "6444fb42e14137d2c1586aff",
8     "email": "it.trankhaihoang@gmail.com",
9     "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksevl0CgIogbbWxFexa9YHHa1R/6Cv60wi",
10    "fullname": "Tran Khai Hoang",
11    "phone": 378807854,
12    "position": "teacher",
13    "address": "Thoai Son",
14    "gender": "male",
15    "__v": 0,
16    "isHomeroom": true,
17    "classHomeroom": {
18      "_id": "6447975b1f2ec28f4f7b199d",
19      "name": "2a",
20      "currentYear": 2023,
21      "teacher": "6444fb42e14137d2c1586aff",
22      "grade": "2nd",
23      "schedules": [],
24      "students": [
25        "6448048165ae1a30b8822566",
26        "64478cc6b125341ed0501c61"
27      ],
28      "createdAt": "2023-04-25T09:03:23.717Z",
29      "updatedAt": "2023-04-25T17:00:49.550Z",
30      "__v": 2
31    },
32  },
33  {
34    "_id": "6447f4f372e8c9cecb8af073",
35    "email": "dung@gmail.com",
36    "password": "$2a$10$Pb/de3n8k8D8bjz50IgMg0/dIZWJ9aP7W9.NBeCEuYomFFIEP9NGy",
37    "fullname": "Nhan Dung",
38    "phone": "19006767",
39    "position": "teacher",
40    "address": "Long An",
41    "gender": "male",
42    "isHomeroom": false,
43    "__v": 0
44  }
45 ]
```

Listing 21: List All of Teacher


```
1 // [GET] Get Available Teachers -> /api/SchoolStaff/available
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Ouput:[
6   {
7     "_id": "6447f4d872e8c9cecb8af071",
8     "email": "khiem@gmail.com",
9     "password": "$2a$10$Kwthjvff0NCBEuaQawaed0DfkSxxM6vwu4n00YdjtHJS0rmbeDs3C",
10    "fullname": "Gia Khiem",
11    "phone": "18004321",
12    "position": "teacher",
13    "address": "Dong Nai",
14    "gender": "male",
15    "isHomeroom": false,
16    "__v": 0
17  },
18  {
19    "_id": "6447f4f372e8c9cecb8af073",
20    "email": "dung@gmail.com",
21    "password": "$2a$10$Pb/de3n8k8D8bjz50IgMg0/dIZWJ9aP7W9.NBeCEuYomFFIEP9NGy",
22    "fullname": "Nhan Dung",
23    "phone": "19006767",
24    "position": "teacher",
25    "address": "Long An",
26    "gender": "male",
27    "isHomeroom": false,
28    "__v": 0
29  }
30 ]
```

Listing 22: Get Available Teachers

```
1 // [GET] Detail by ID -> /api/SchoolStaff/:id
2 - Input:
3   Params: {:id=6444fb42e14137d2c1586aff}
4   Body: {null}
5 - Ouput:{
6   "_id": "6444fb42e14137d2c1586aff",
7   "email": "it.trankhaihoang@gmail.com",
8   "password": "$2a$10$Sv0xj5gfRMDWdV/xrj9ksevl0CgIogbbWxFexa9YHHa1R/6Cv60wi",
9   "fullname": "Tran Khai Hoang",
10  "phone": "378807854",
11  "position": "teacher",
12  "address": "Thoai Son",
13  "gender": "male",
14  "__v": 0,
15  "isHomeroom": true,
16  "classHomeroom": "6447975b1f2ec28f4f7b199d"
17 }
```

Listing 23: Detail by ID

```
1 // [POST] Create a New School Staff -> /api/SchoolStaff/create
2 - Input:
3   Params: {null}
4   Body: {
5     "email"="phule@gmail.com" ,
6     "fullname"="Phu Le" ,
7     "phone"="19006794" ,
8     "position"="teacher" ,
9     "address"="Ha Noi" ,
10    "gender"="male"
11  }
12 - Output:{"message": "New school staff has been created successfully"}
```

Listing 24: Create a New School Staff

3.2.7 Student APIs

```

1 // [GET] List All of Students -> /api/student/list
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Output: [{ "_id": "64468a7cd87974dbbae0fb1e",
6     "studentID": "STU238992",
7     "password": "$2a$10$ydFdkGGXfZS3YmrBNRrOgu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq",
8     "fullname": "Do Thi Tram Anh",
9     "birth": "2016-07-18T17:00:00.000Z",
10    "gender": "female",
11    "address": "Long Xuyen",
12    "currentGrade": "1st",
13    "parent": {
14      "_id": "64468a7cd87974dbbae0fb1c",
15      "email": "dohungdung@gmail.com",
16      "password": "$2a$10$h8oK.krf9BZHIYqIgC0vK0lGuJX/TVMfQDgxm4dKJV5T2d6S00d1W"
17    },
18    "fullname": "Do Hung Dung",
19    "address": "Long Xuyen",
20    "phone": "0925312312",
21    "__v": 0,
22    "student": "64468a7cd87974dbbae0fb1e"
23  }, {"_id": "64468b09d87974dbbae0fb2b",
24    "currentClass": {
25      "_id": "64468b09d87974dbbae0fb2b",
26      "name": "1A",
27      "currentYear": 2023,
28      "teacher": {
29        "_id": "644689177661a30b6942f653",
30        "email": "thanh@gmail.com",
31        "password": "$2a$10$BUa4iXspSkMU/5GHaBtDA0rdLc720C//7
32        m7gVTZPut2xpCh54u0QK",
33        "fullname": "Hoai Thanh",
34        "phone": "18001234",
35        "position": "teacher",
36        "address": "Binh Dinh",
37        "gender": "male",
38        "isHomeroom": true,
39        "__v": 0,
40        "classHomeroom": "64468b09d87974dbbae0fb2b"
41      },
42      "grade": "1st",
43      "schedules": [],
44      "students": [
45        "64468a7cd87974dbbae0fb1e",
46        "64468aa7d87974dbbae0fb23",
47        "64468adad87974dbbae0fb28"
48      ], "createdAt": "2023-04-24T13:58:33.066Z",
49      "updatedAt": "2023-04-24T13:59:58.050Z",
50      "__v": 3
51    }
52  }]

```

Listing 25: List All of Students

```

1 // [GET] List Students by Class ID -> /api/student/:classID
2 - Input:
3   Params: {:classID=6445427c934b44c3693c49dc}
4   Body: {null}
5 - Output:
6   {
7     "_id": "6445427c934b44c3693c49dc",
8     "studentID": "STU232242",
9     "password": "$2a$10$vDnWJjdpVki01/x6t0ga70xt/Xmhd7FKlGealisAP/KpDeezklHAW",
10    "fullname": "Tran Trong Dao",
11    "birth": "2030-12-11T17:00:00.000Z",
12    "gender": "male",
13    "address": "Dinh My",
14    "currentGrade": "1st",
15    "parent": {
16      "_id": "6445427c934b44c3693c49da",
17      "email": "kyn@gmail.com",
18      "password": "$2a$10$cocIhjfgNdZs745PSDoZ801VAnli0NKmU6nS4rkoSWcF6UswGjn/S"
19    },
20    "fullname": "Khuu Yen Ngoc",
21    "address": "Dinh My",
22    "phone": "0372360506",
23    "__v": 0,
24    "student": "6445427c934b44c3693c49dc"
25  }, "__v": 0,
26  "currentClass": {
27    "_id": "6445252374c5fbcd83bd661b",
28    "name": "1A",
29    "currentYear": 2023,
30    "teacher": {
31      "_id": "6444fb42e14137d2c1586aff",
32      "email": "info.trankhaihoang@gmail.com",
33      "password": "$2a$10$Sv0xj5gfrMDWdV/xrj9ksevl0CgIogbbWxFexa9YHHa1R/6Cv60wi",
34      "fullname": "Tran Khai Hoang",
35      "phone": 378807854,
36      "position": "teacher",
37      "address": "Thoai Son",
38      "gender": "male",
39      "__v": 0,
40      "isHomeroom": false
41    }, "grade": "1st",
42    "schedules": [],
43    "students": [
44      "6445427c934b44c3693c49dc"
45    ],
46    "createdAt": "2023-04-23T12:31:31.206Z",
47    "updatedAt": "2023-04-23T14:50:15.505Z",
48    "__v": 3
49  }
50 ]

```

Listing 26: List Students by Class ID

3.2.8 User APIs

```
1 // [POST] Login -> /api/user/login
2 - Input:
3   Params: {null}
4   Body: {
5     "email"="STU238992",
6     "password"="STU238992"
7   }
8 - Ouput:{
9   "message": "Login successful.",
10  "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJfaWQiOiI2NDQ2OGE3Y2Q4Nzk3NGRiYmF1MGZiMWUuLCJpYXQiOiJlMjE2ODIzNTkwNzZ9.L5MWCcvjbPh0wbAvvQbejb_QIi9kW3541lmVr_kAABA",
11  "user": {
12    "_id": "64468a7cd87974dbbae0fb1e",
13    "studentID": "STU238992",
14    "password": "$2a$10$ydFdkGGXfZS3YmrBNRr0gu5rABPdH5n7EWDa8JIJEtqLgDsNL63bq",
15    "fullname": "Do Thi Tram Anh",
16    "birth": "2016-07-18T17:00:00.000Z",
17    "gender": "female",
18    "address": "Long Xuyen",
19    "currentGrade": "1st",
20    "parent": "64468a7cd87974dbbae0fb1c",
21    "__v": 0,
22    "currentClass": "64468b09d87974dbbae0fb2b"
23  }
24 }
```

Listing 27: Login

```
1 // [POST] Logout -> /api/user/logout
2 - Input:
3   Params: {null}
4   Body: {null}
5 - Ouput:{"message": "Logout successful"}
```

Listing 28: Logout

```
1 // [POST] Change password -> /api/user/changePassword
2 - Input:
3   Params: {null}
4   Body: {
5     "Password"="hoang9999",
6     "NewPassword"="hoang"
7   }
8 - Ouput:{"message": "Password changed successfully"}
```

Listing 29: Change password

3.3 APIs documentation using Postman

Please follows this link for the complete Postman documentation: [Postman Documentation](#)

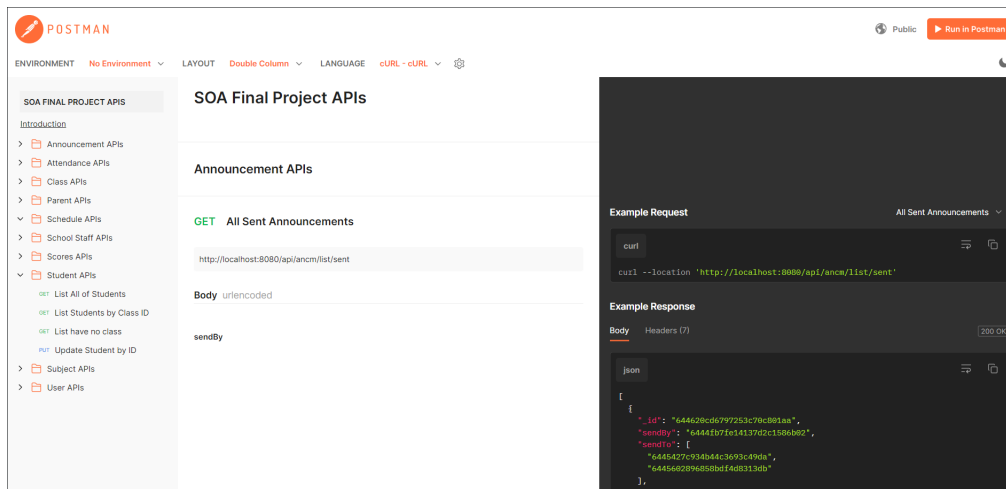


Figure 4: APIs documentation preview via Postman

4 System Demo

4.1 System Demo script

4.1.1 Principal Flow

Login → List of Classes → Detail of Class → Create Class → Add Student to Class → List of Teacher → Schedule → Create Announcement → History of Announcement

4.1.2 Teacher Flow

Login → Dash Board → List Students → Check Attendance → Scoreboard → Schedule → Inbox → Create Announcement → History of Announcement

4.1.3 Parent & Student Flow

Login → Dash Board → List Announcements → Schedule → Scoreboard

4.2 System Demo



Figure 5: Login Interface

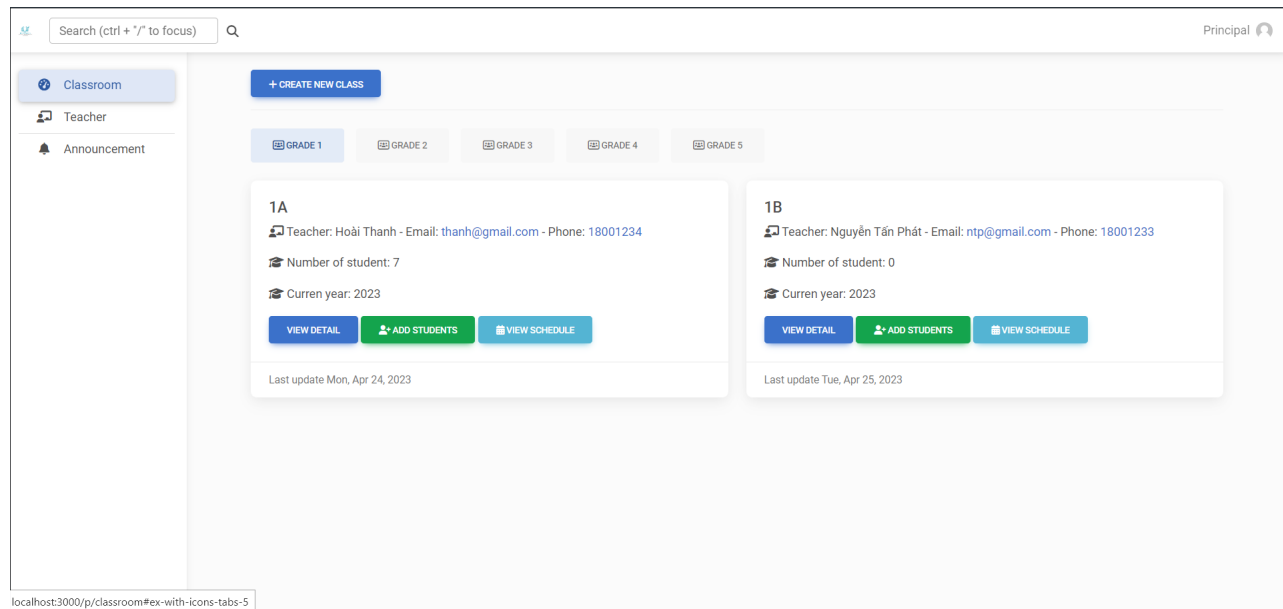
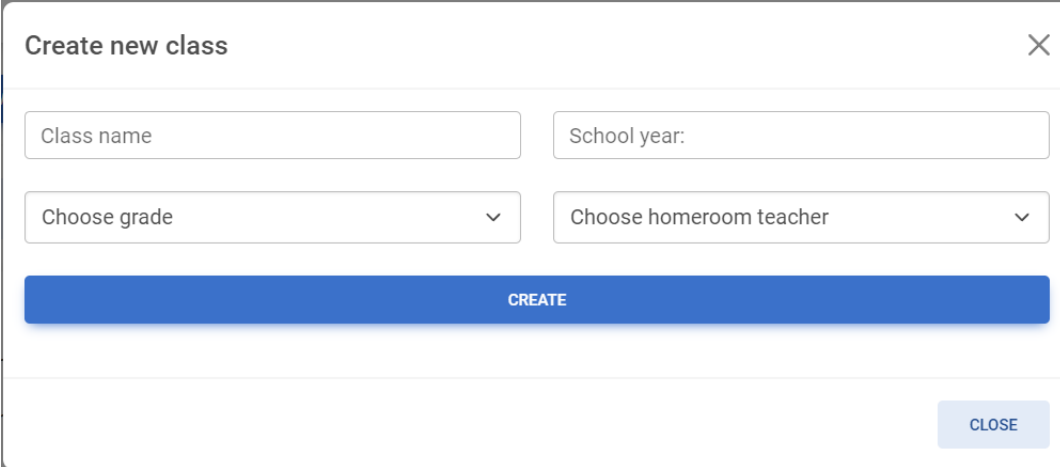


Figure 6: Principal List of Classes Interface

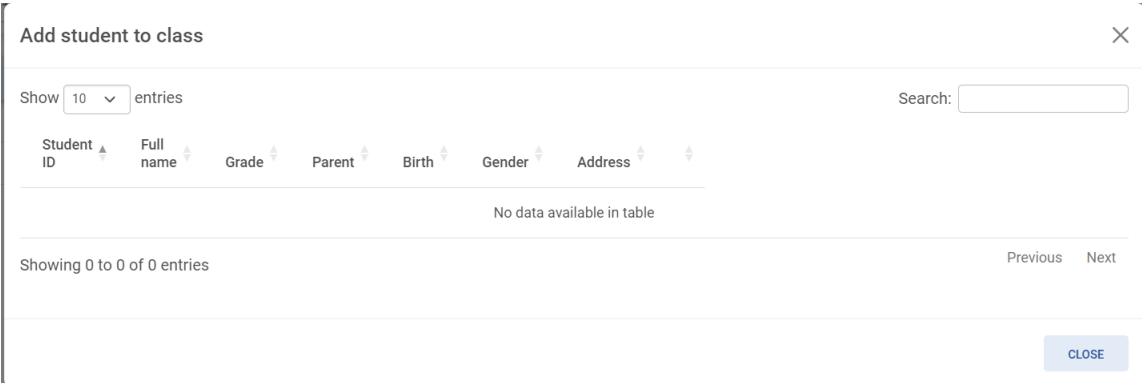
Detail							×
Show 10 entries		Search:					
Student ID	Full name	Parent	Birth	Gender	Address		
STU230150	Nguyễn Nhật Hệ		14th Dec 2016	male	Nguyễn Nhật Thống Email: nhatthong33333@gmail.com Phone: 0333333333		TP HCM
STU233576	Trần Minh Trí		14th Jul 2016	male	Trần Khải Hoàng Email: info.trankhaihoang@gmail.com Phone: 0378807854		Long Xuyên
STU233930	Nguyễn Văn C		14th Dec 2016	male	Nguyễn Văn D Email: vanDgmail.com Phone: 0333322222		TP HCM
STU237991	Nguyễn Văn Hòa		14th Dec 2016	male	Nguyễn Minh Thiện Email: it.trankhaihoang@gmail.com Phone: 03333212321		TP HCM
STU238496	Nguyễn Văn C		14th Dec 2016	male	Nguyễn Văn B Email: vanBgmail.com Phone: 0333322222		TP HCM
STU238860	Nguyễn Bò Viên		14th Dec 2016	male	Nguyễn Đình Quý Email: nguyndinhquy@gmail.com Phone: 0333322222		TP HCM

Figure 7: Principal Detail of Class Interface



The 'Create new class' interface is a modal window with a title bar containing the text 'Create new class' and a close button (X). The main content area contains four input fields arranged in a 2x2 grid: 'Class name', 'School year:', 'Choose grade' (with a dropdown arrow), and 'Choose homeroom teacher' (with a dropdown arrow). Below these fields is a large blue button labeled 'CREATE'. At the bottom right of the modal is a light blue button labeled 'CLOSE'.

Figure 8: Create Class Interface

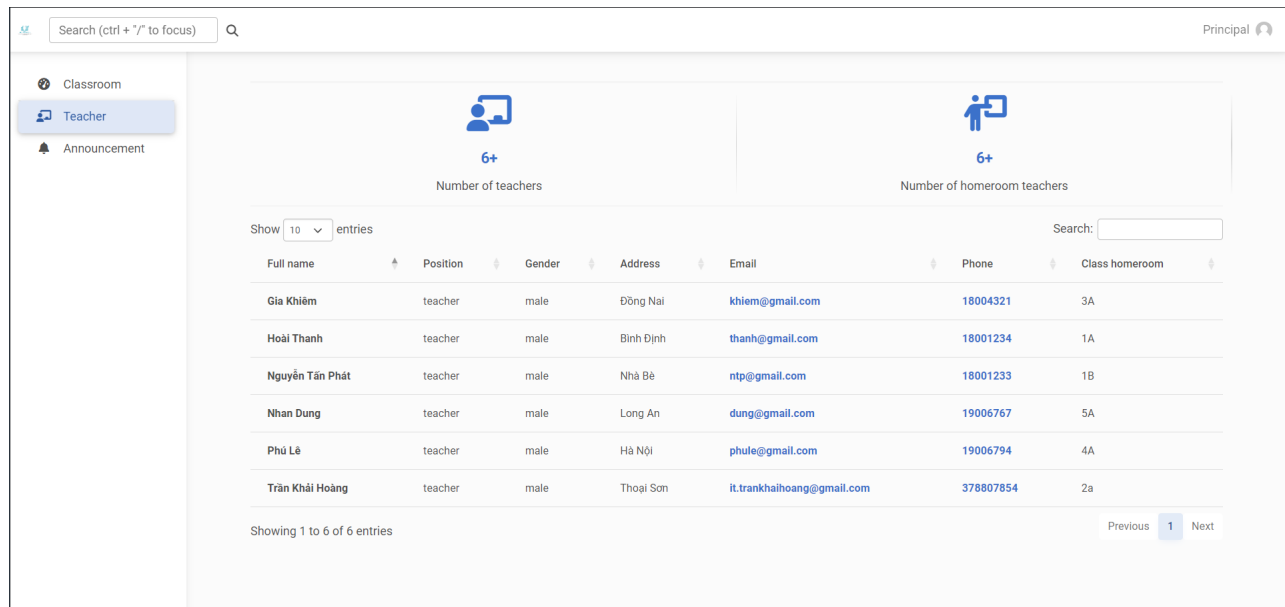


The 'Add student to class' interface is a modal window with a title bar containing the text 'Add student to class' and a close button (X). The main content area features a table with columns: 'Student ID', 'Full name', 'Grade', 'Parent', 'Birth', 'Gender', and 'Address'. Each column header has a small upward arrow icon. Above the table, there is a 'Show 10 entries' dropdown menu and a 'Search:' input field. Below the table, the text 'No data available in table' is displayed. At the bottom left, it says 'Showing 0 to 0 of 0 entries'. At the bottom right, there are 'Previous' and 'Next' navigation links. A light blue 'CLOSE' button is located at the bottom right of the modal.

Figure 9: Add Student to Class Interface



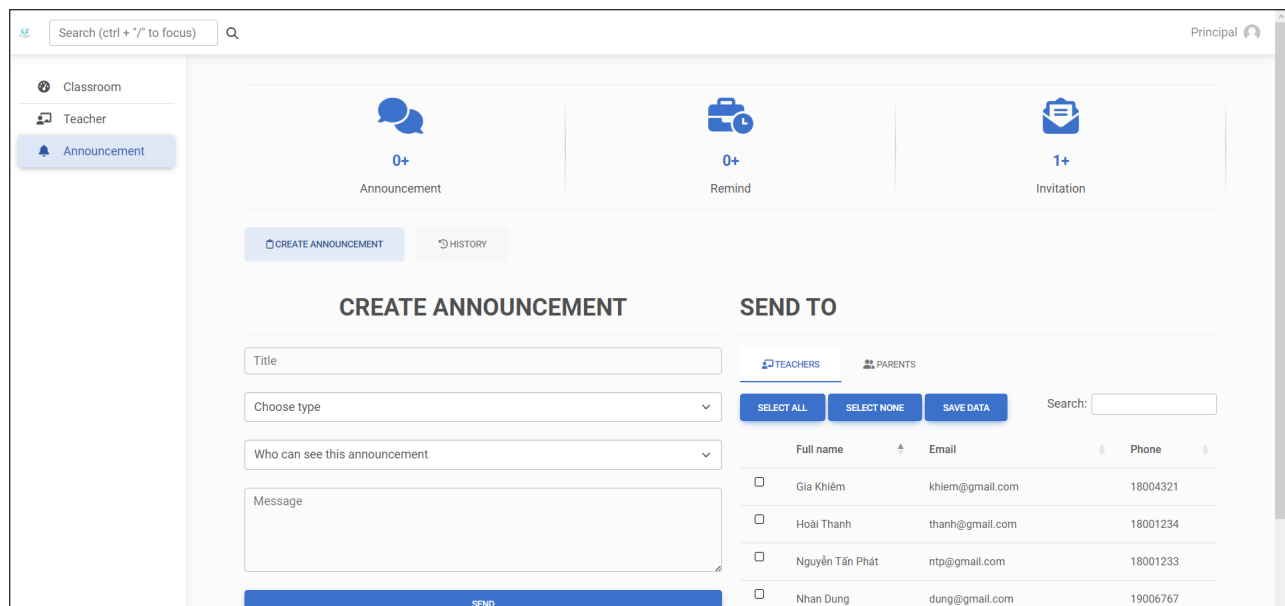
Figure 11: Principal Create Schedule of Class Interface



The interface shows a sidebar with 'Classroom', 'Teacher', and 'Announcement' options. The main area displays statistics for teachers and homeroom teachers, followed by a table of teachers with columns for full name, position, gender, address, email, phone, and class homeroom. The table lists 6 teachers, and pagination shows 'Showing 1 to 6 of 6 entries'.

Full name	Position	Gender	Address	Email	Phone	Class homeroom
Gia Khiêm	teacher	male	Đồng Nai	khiem@gmail.com	18004321	3A
Hoài Thanh	teacher	male	Bình Định	thanh@gmail.com	18001234	1A
Nguyễn Tấn Phát	teacher	male	Nhà Bè	ntp@gmail.com	18001233	1B
Nhan Dung	teacher	male	Long An	dung@gmail.com	19006767	5A
Phú Lê	teacher	male	Hà Nội	phule@gmail.com	19006794	4A
Trần Khải Hoàng	teacher	male	Thoại Sơn	it.trankhaihoang@gmail.com	378807854	2a

Figure 12: Principal List of Teacher Interface



The interface shows a sidebar with 'Classroom', 'Teacher', and 'Announcement' options. The main area displays statistics for announcements, reminders, and invitations. Below these are buttons for 'CREATE ANNOUNCEMENT' and 'HISTORY'. The 'CREATE ANNOUNCEMENT' section includes fields for Title, Choose type, Who can see this announcement, and Message. The 'SEND TO' section has tabs for 'TEACHERS' and 'PARENTS', with buttons for 'SELECT ALL', 'SELECT NONE', and 'SAVE DATA'. A table lists teachers with checkboxes for selection, and a 'SEND' button is at the bottom.

Full name	Email	Phone
<input type="checkbox"/> Gia Khiêm	khiem@gmail.com	18004321
<input type="checkbox"/> Hoài Thanh	thanh@gmail.com	18001234
<input type="checkbox"/> Nguyễn Tấn Phát	ntp@gmail.com	18001233
<input type="checkbox"/> Nhan Dung	dung@gmail.com	19006767

Figure 13: Principal Create Announcement Interface

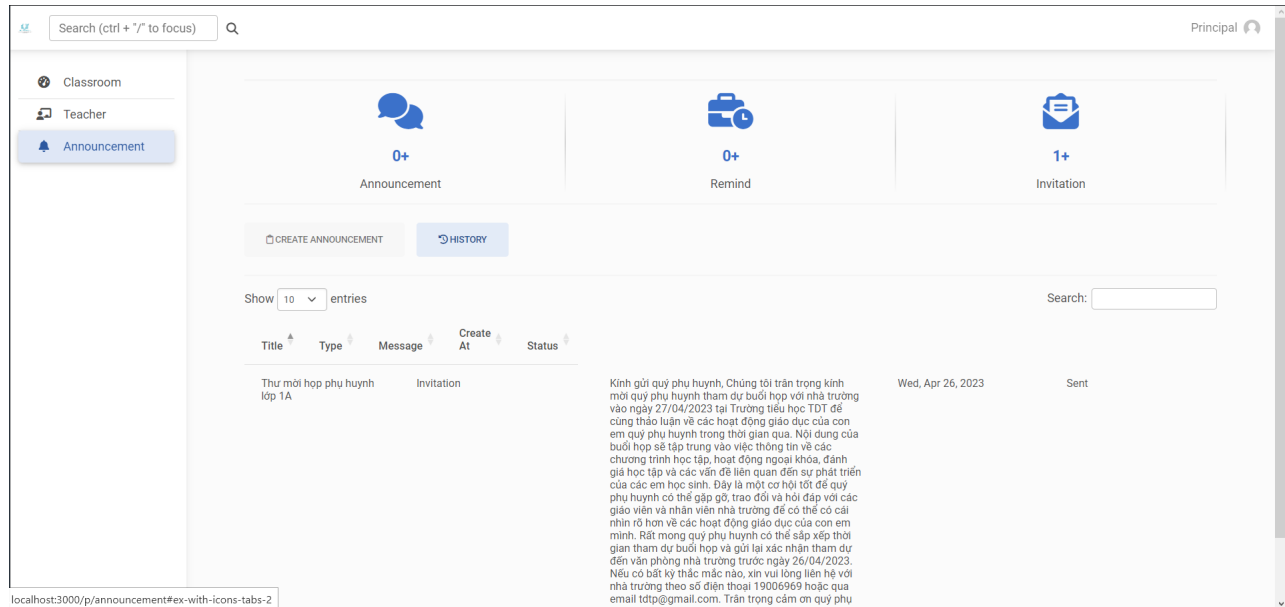


Figure 14: Principal Announcement History Interface

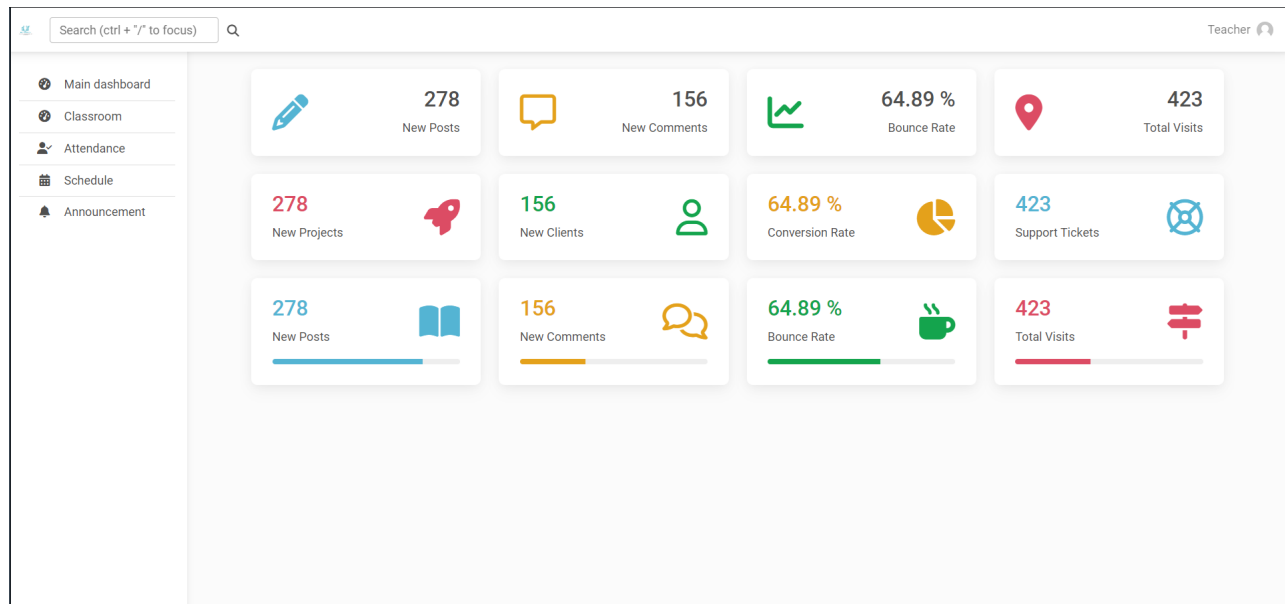
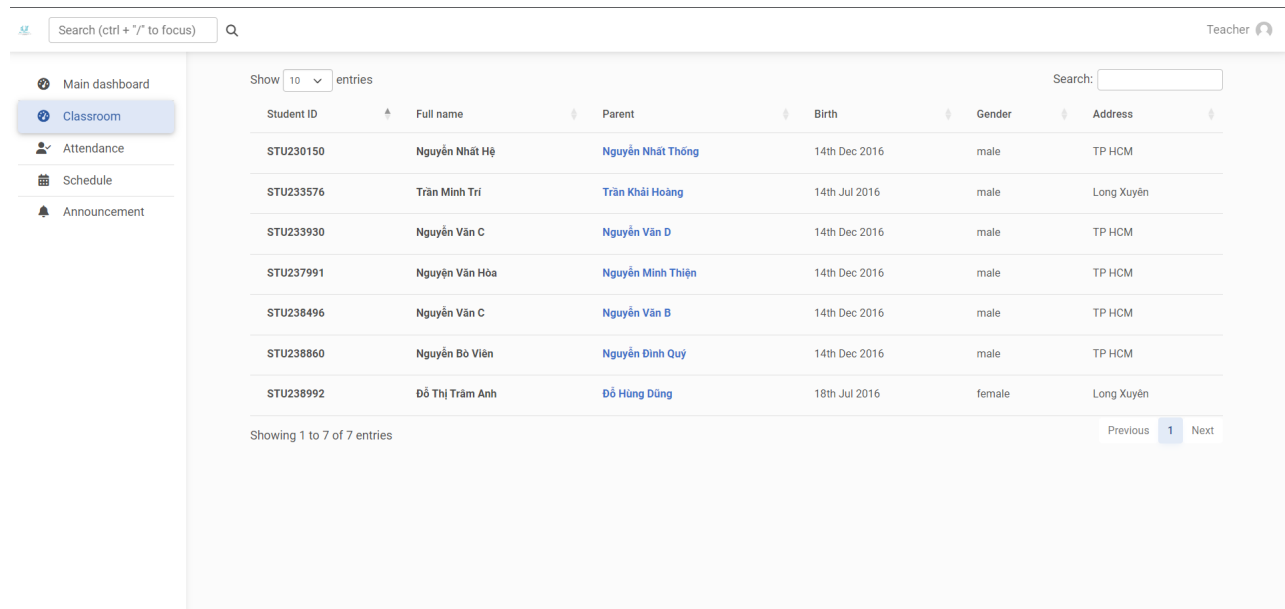


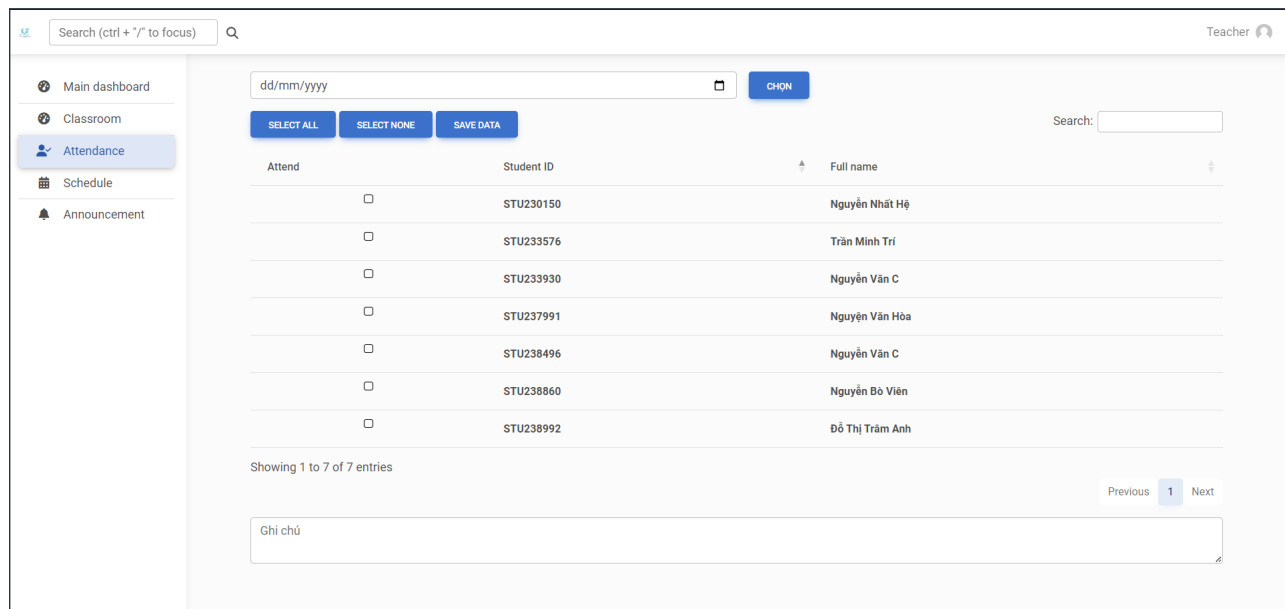
Figure 15: Teacher Dashboard Interface



The interface shows a sidebar with navigation links: Main dashboard, Classroom (selected), Attendance, Schedule, and Announcement. The main content area has a search bar and a table of students. The table has columns for Student ID, Full name, Parent, Birth, Gender, and Address. There are 7 entries displayed, showing details for students like Nguyễn Nhật Hề, Trần Minh Trí, and Nguyễn Văn C. A pagination bar at the bottom indicates 'Showing 1 to 7 of 7 entries' with 'Previous' and 'Next' buttons.

Student ID	Full name	Parent	Birth	Gender	Address
STU230150	Nguyễn Nhật Hề	Nguyễn Nhật Thống	14th Dec 2016	male	TP HCM
STU233576	Trần Minh Trí	Trần Khải Hoàng	14th Jul 2016	male	Long Xuyên
STU233930	Nguyễn Văn C	Nguyễn Văn D	14th Dec 2016	male	TP HCM
STU237991	Nguyễn Văn Hòa	Nguyễn Minh Thiện	14th Dec 2016	male	TP HCM
STU238496	Nguyễn Văn C	Nguyễn Văn B	14th Dec 2016	male	TP HCM
STU238860	Nguyễn Bò Viên	Nguyễn Đình Quý	14th Dec 2016	male	TP HCM
STU238992	Đỗ Thị Trâm Anh	Đỗ Hùng Dũng	18th Jul 2016	female	Long Xuyên

Figure 16: Teacher List of Students Interface



The interface shows a sidebar with navigation links: Main dashboard, Classroom, Attendance (selected), Schedule, and Announcement. The main content area has a date input field (dd/mm/yyyy) and a 'CHỌN' button. Below are buttons for 'SELECT ALL', 'SELECT NONE', and 'SAVE DATA'. A table lists students with checkboxes for attendance. The table has columns for Attend, Student ID, and Full name. There are 7 entries displayed. A pagination bar at the bottom indicates 'Showing 1 to 7 of 7 entries' with 'Previous' and 'Next' buttons. At the bottom, there is a text area labeled 'Ghi chú'.

Attend	Student ID	Full name
<input type="checkbox"/>	STU230150	Nguyễn Nhật Hề
<input type="checkbox"/>	STU233576	Trần Minh Trí
<input type="checkbox"/>	STU233930	Nguyễn Văn C
<input type="checkbox"/>	STU237991	Nguyễn Văn Hòa
<input type="checkbox"/>	STU238496	Nguyễn Văn C
<input type="checkbox"/>	STU238860	Nguyễn Bò Viên
<input type="checkbox"/>	STU238992	Đỗ Thị Trâm Anh

Figure 17: Teacher Attendance Interface

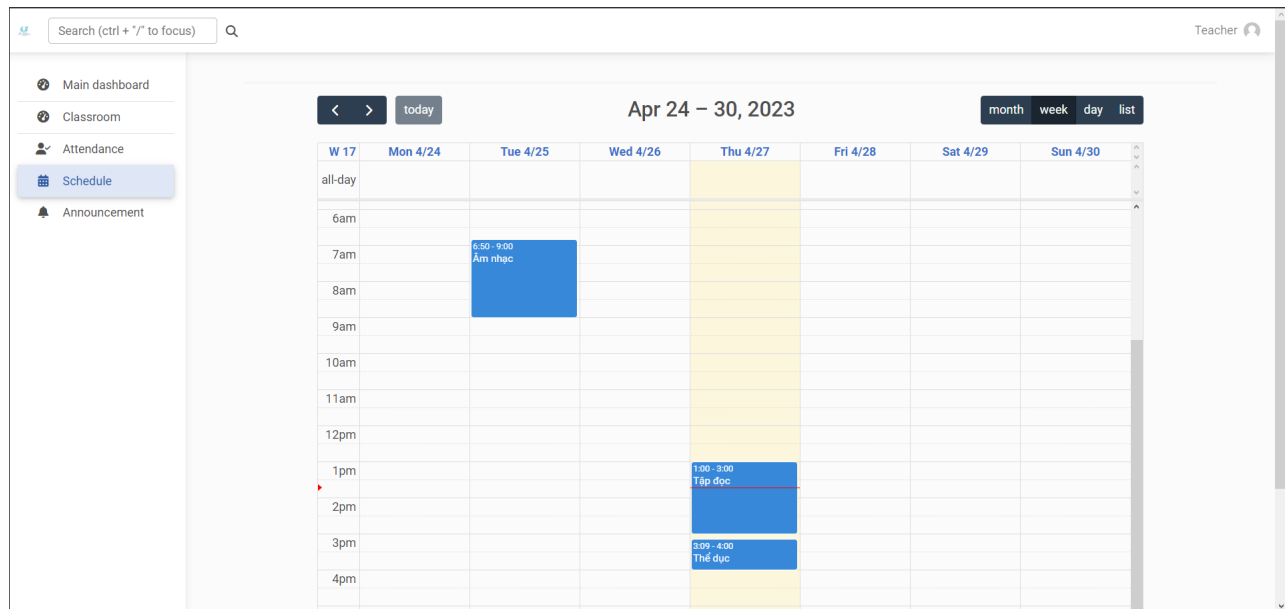


Figure 18: Teacher Schedule Interface

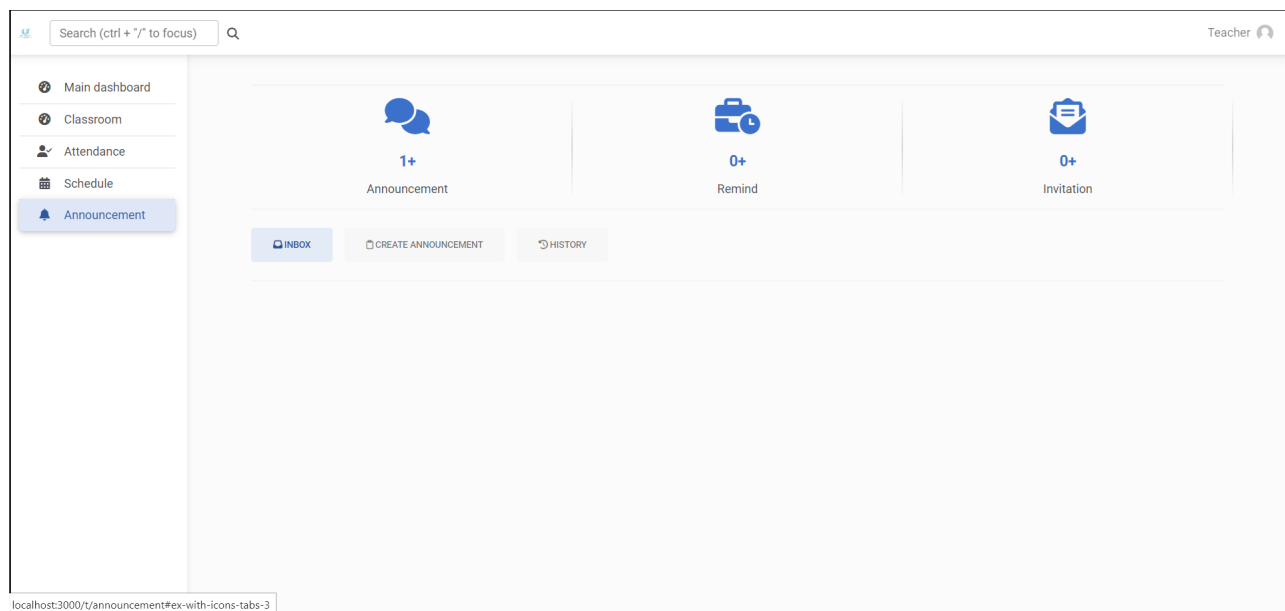


Figure 19: Teacher Inbox Interface

Search (ctrl + "/" to focus) Q Teacher

Main dashboard
Classroom
Attendance
Schedule
Announcement

1+ Announcement
0+ Remind
0+ Invitation

INBOX CREATE ANNOUNCEMENT HISTORY

CREATE ANNOUNCEMENT

Title
Choose type
Who can see this announcement
Message

SEND TO

STUDENTS PARENTS
SELECT ALL SELECT NONE SAVE DATA Search:

Full name	Gender	Birth
<input type="checkbox"/> Nguyễn Bô Viên	Male	Thu, Dec 15, 2016
<input type="checkbox"/> Nguyễn Nhất Hề	Male	Thu, Dec 15, 2016
<input type="checkbox"/> Nguyễn Văn C	Male	Thu, Dec 15, 2016
<input type="checkbox"/> Nguyễn Văn C	Male	Thu, Dec 15, 2016

localhost:3000/t/announcement#ex-with-icons-tabs-1 SEND

Figure 20: Teacher Create Announcement Interface

Search (ctrl + "/" to focus) Q Teacher

Main dashboard
Classroom
Attendance
Schedule
Announcement

1+ Announcement
0+ Remind
0+ Invitation

INBOX CREATE ANNOUNCEMENT HISTORY

Show 10 entries Search:

Title	Type	Message	Create At	Status
Nội dung học tuần sau	Announcement	Nội dung lý thuyết:..... Căn chuẩn bi:.....	Thu, Apr 27, 2023	Sent

Showing 1 to 1 of 1 entries Previous 1 Next

localhost:3000/t/announcement#ex-with-icons-tabs-2

Figure 21: Teacher Announcement History Interface

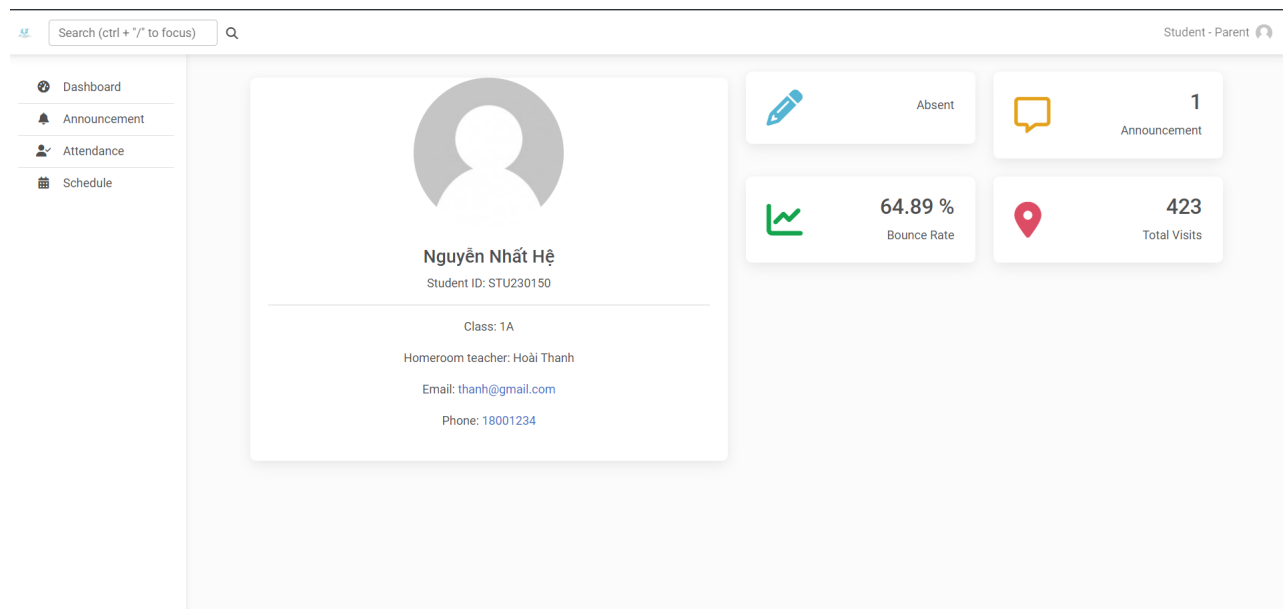


Figure 22: Parent & Student Dashboard Interface

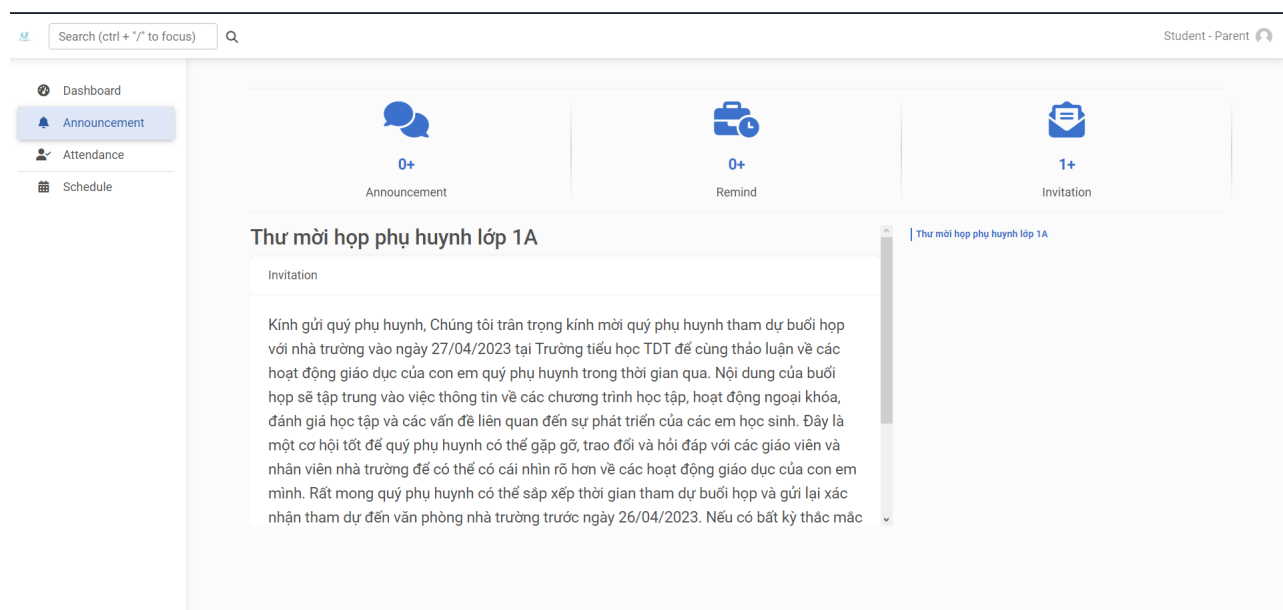


Figure 23: Parent & Student Inbox Interface

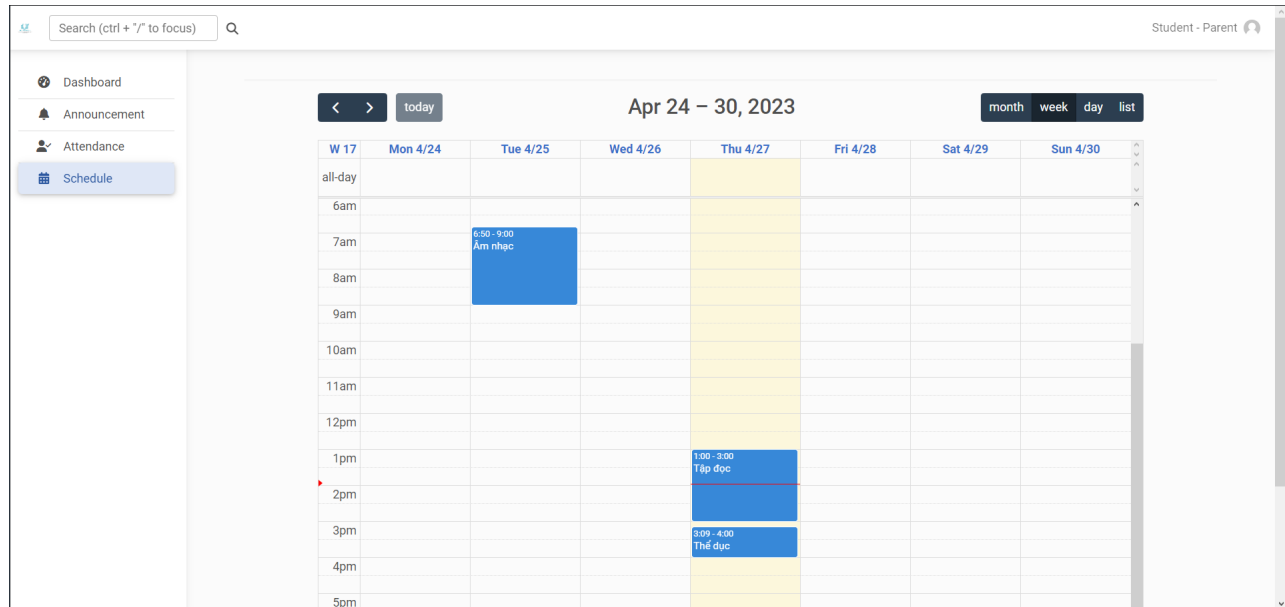


Figure 24: Parent & Student Schedule Interface

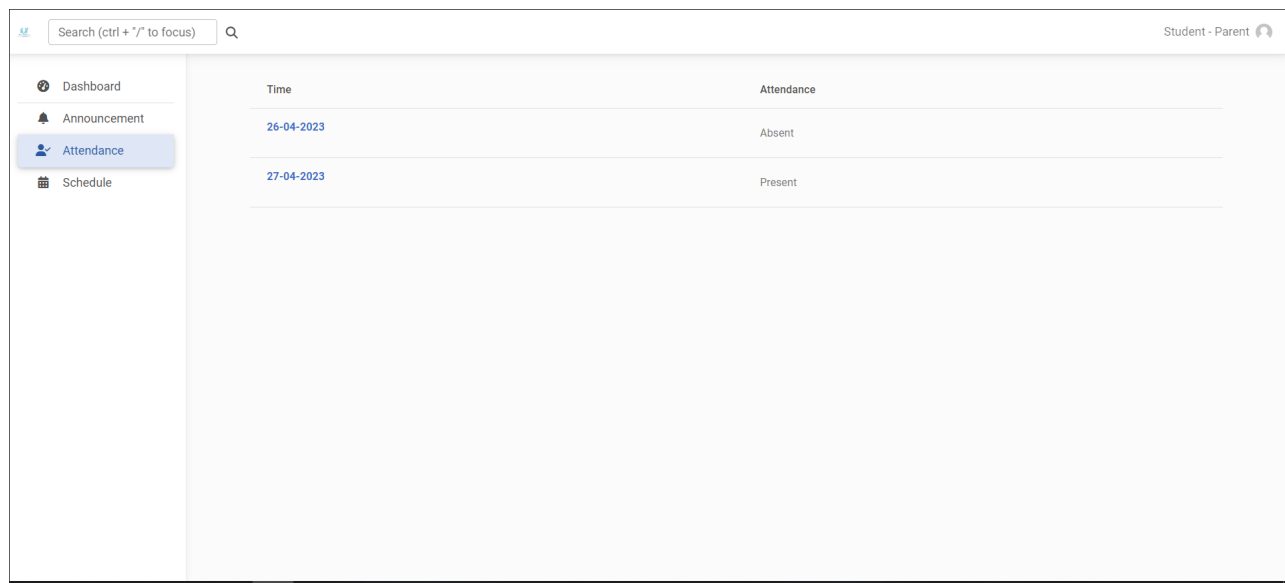


Figure 25: Parent & Student Attendance Interface

References

- [1] Phuc H.Duong, M.Sc. **Requirement Determination & Use-Case Analysis.** Ton Duc Thang University. 2022
- [2] Phuc H.Duong, M.Sc. **Process Modeling & Data Modeling.** Ton Duc Thang University. 2022