Software Requirements Specification

<EduStar>

Version: 2.0

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Last Updated Time: October 24, 2024

Contents

1 Introduction

1.1 Purpose of Writing

This document confirms the requirements and features of the EduStar Web learning and teaching platform, enabling project development team members and customers to better understand the requirements of the product.

1.2 Definitions, Acronyms, and Abbreviations

Vue.js: A JavaScript framework for building user interfaces. It is built on top of standard HTML, CSS, and JavaScript, and provides a declarative, componentized programming model to help developers develop user interfaces efficiently.

JavaScript: A lightweight, interpretive, and just in time compilation programming language with function priority.

1.3 Project Background

With the rapid development of network technology, education is also constantly integrating the power of technology to change. In order to improve the learning efficiency and teaching quality of teachers and students in primary schools, we plan to develop a web-based learning platform called EduStar. EduStar is a web-based learning and teaching platform for primary school teachers and students. The platform aims to enhance students' interest in learning and teachers' teaching efficiency through rich learning resources, interactive tools and teaching management functions. The program will be developed using the Vue.js framework, with html+CSS+JS on the front end and MYSQL database on the back end, and eventually become a web platform.

1.4 Project Overview

Software Name: EduStar
Project Task Proposer: Yuanhao Xia
Project Developer: PathMakers
Overview: EduStar is envisioned as a comprehensive learning platform that addresses the needs of both students and teachers in a primary school setting. It is designed to provide a seamless educational experience through its student and teacher portals, leveraging modern web technologies to facilitate engaging and effective learning.

1.5 References

[1] Al-Fuqaha, A., Guizani, M., Mohammadi, M., Aledhari, M., & Ayyash, M. (2015). "Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications," IEEE Communications Surveys & Tutorials, vol. 17, no. 4, pp. 2347-2376, Fourthquarter 2015.

[2] Casilari, E., & Gañan, C. (2017). "A Framework for the Development of Interactive Learning Environments Using Web Technologies," IEEE Latin America Transactions, vol. 15, no. 12, pp. 2428-2435, Dec. 2017.

[3] Jiang, Y., & Liu, H. (2014). "Research on the Application of Cloud Computing in Educational Field Based on HTML5," 2014 IEEE International Conference on Cloud Computing and Intelligence Systems (CCIS), Beijing, China, pp. 311-315, 2014.

[4] Li, Y., & Zhang, J. (2018). "The Design and Implementation of a Web-Based Educational Platform Based on Cloud Computing," IEEE Access, vol. 6, pp. 30897-30904, 2018.

2 Overall Description

2.1 Objectives

2.1.1 Development Intention

Our vision is to create a comprehensive online learning platform that will not only stimulate primary school students' interest in learning through interactive and gamified learning styles, but also promote their all-round development in key subjects such as Chinese, Mathematics and English. Our mission is to break the limitations of traditional learning models through innovative educational technologies to provide students with a richer, more fun and personalized learning environment. At the same time, we are also committed to providing teachers with effective teaching support tools to simplify the teaching process, improve the quality of teaching, and jointly promote the innovation and development of education.

2.1.2 Application Goals and Scope

Goals:

(1) Through games and interactive learning, improve the students' learning motivation.

(2) According to the students' learning progress and ability, provide personalized learning resources and challenges.

(3) Provide teachers with class management, homework assignments and progress tracking tool.

(4) Cover the major disciplines such as Chinese, mathematics and English, to provide comprehensive learning support for students.

Scope:

(1) User groups: primary school students, teachers and parents.

(2) Course content: focus on Chinese, mathematics and English three major disciplines.

(3) Function modules: including learning resources, interactive exercises, homework assignments, progress tracking, error analysis, etc.

(4) Platforms: support web and mobile devices, to ensure that users can access anytime and anywhere.

2.1.3 Product Prospects

The EduStar project targets primary school teachers and students, aiming to improve teaching quality and learning efficiency. With growing national attention on education and policy support, education funding in 2022 increased by 5.97% compared to the previous year, reflecting strong market demand. Rapid technological

advancements have reduced development costs and made feature expansion easier. According to industry forecasts, the learning software market will reach $19.1 billion by 2028, with an annual compound growth rate of 15.7%. EduStar fills a gap in China's primary education platforms, optimizing traditional teaching methods, and holds promising market prospects and technical advantages.

2.2 User Scenario

2.2.1 Students

Log in with your account and password to join the class. Courses can be browsed and selected. View assignments and tasks assigned by your teacher. Submit assignments online and view assignment correction results. Check thier progress. Otherwise, they can review the mistakes. And they can play a two-player battle with other members of the class.

2.2.2 Teachers

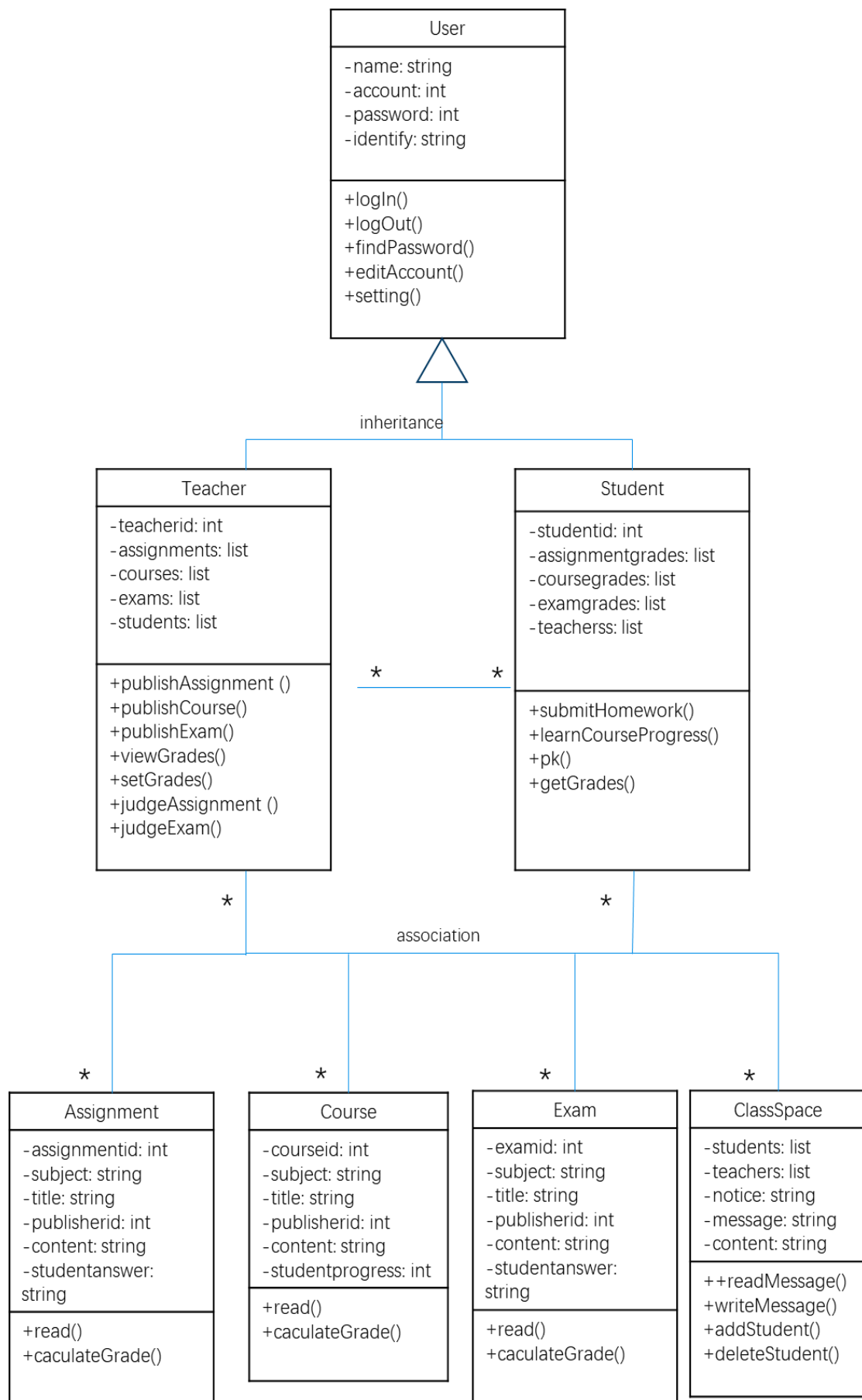Teachers can create the class and manage the members of the class, post homework to students and correct students' homework.

2.2.3 Admin

Responsible for managing student and teacher accounts to prevent theft, reviewing content posted by teachers or students, and maintaining the normal operation of the platform.

3 Specific Requirements

3.1 Class Diagram

User

-name: string
-account: int
-password: int
-identify: string

+logIn()
+logOut()
+findPassword()
+editAccount()
+setting()

inheritance

Teacher

-teacherid: int
-assignments: list
-courses: list
-exams: list
-students: list

+publishAssignment ()
+publishCourse()
+publishExam()
+viewGrades()
+setGrades()
+judgeAssignment ()
+judgeExam()

Student

-studentid: int
-assignmentgrades: list
-coursegrades: list
-examgrades: list
-teacherss: list

+submitHomework()
+learnCourseProgress()
+pk()
+getGrades()

*   *

*   *

association

Assignment

-assignmentid: int
-subject: string
-title: string
-publisherid: int
-content: string
-studentanswer:
string

+read()
+caculateGrade()

Course

-courseid: int
-subject: string
-title: string
-publisherid: int
-content: string
-studentprogress: int

+read()
+caculateGrade()

Exam

-examid: int
-subject: string
-title: string
-publisherid: int
-content: string
-studentanswer:
string

+read()
+caculateGrade()

ClassSpace

-students: list
-teachers: list
-notice: string
-message: string
-content: string

++readMessage()
+writeMessage()
+addStudent()
+deleteStudent()

3.2 Properties

3.2.1 Availability

(1) User-friendly: A simple, intuitive user interface ensures that students and teachers can quickly get started and become proficient with the platform.

(2) Response speed: Optimize server and database performance to ensure that the platform remains responsive under a variety of operations.

(3) Compatibility: Ensure that the platform works properly on all major browsers and operating systems, including those on mobile devices.

(4) Ease of use: Provide detailed help documentation and online support to answer questions that students and teachers may encounter during use.

(5) Stability: Ensure that the platform can operate stably under all conditions, without crashing or becoming inaccessible.

(6) Scalability: The platform is designed with future expansion needs in mind, such as adding new subject modules, functions, etc., so that it can quickly adapt when the requirements change.

(7) Fault tolerance: Friendly prompts for user input errors and provides a way to correct them. At the same time, properly handle server and database errors to avoid affecting the normal use of users.

(8) Personalized Settings: Allow students and teachers to customize according to their own preferences and needs, such as adjusting the interface theme, font size, etc.

3.2.2 Security

(1) User authentication: Ensure that only registered and verified teachers and students can access the appropriate features. For example, login using a username and password, or more advanced methods such as two-factor authentication.

(2) Data encryption: All sensitive data submitted by users (such as personal information, job content, etc.) is encrypted for storage and transmission to prevent data leakage.

(3) Prevent malicious attacks: Use security measures such as firewalls, intrusion detection systems (IDS), and intrusion prevention systems (IPS) to prevent attacks such as SQL injection and cross-site scripting (XSS).

(4) Permission management: Clearly distinguish between student and teacher permissions, ensuring that students cannot access the functions of the teacher side and vice versa. At the same time, different levels of authority are set for teachers with different roles, such as the head teacher can manage the class information, while the section teacher can only view and assign homework.

(5) Data backup and recovery: Periodically back up databases and file storage systems to ensure rapid recovery in the event of data loss or corruption.

(6) Prevent content tampering: Ensure that the content on the platform (such as ancient poetry, idioms, compositions, etc.) is not maliciously tampered with, and maintain its accuracy and authority.
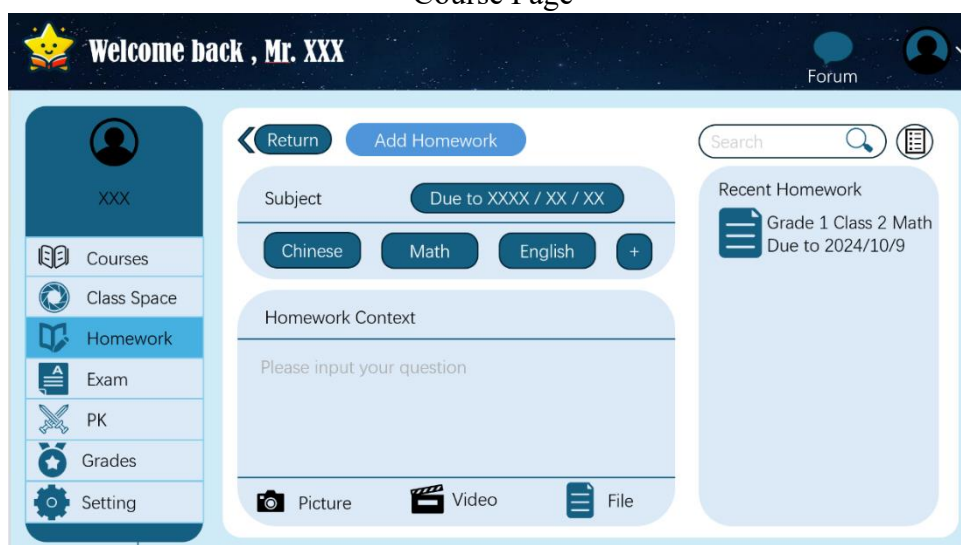
4 Interface Prototype
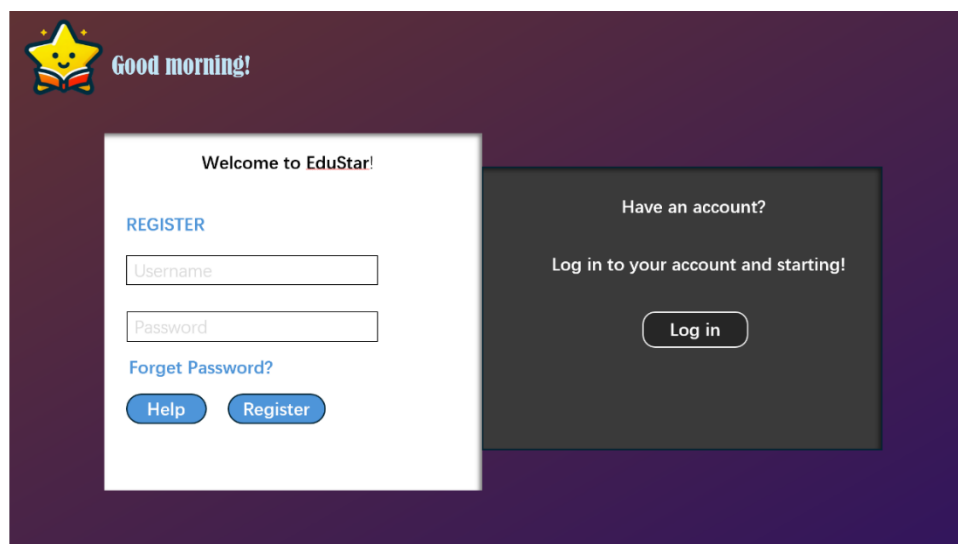
Login and Registration Page
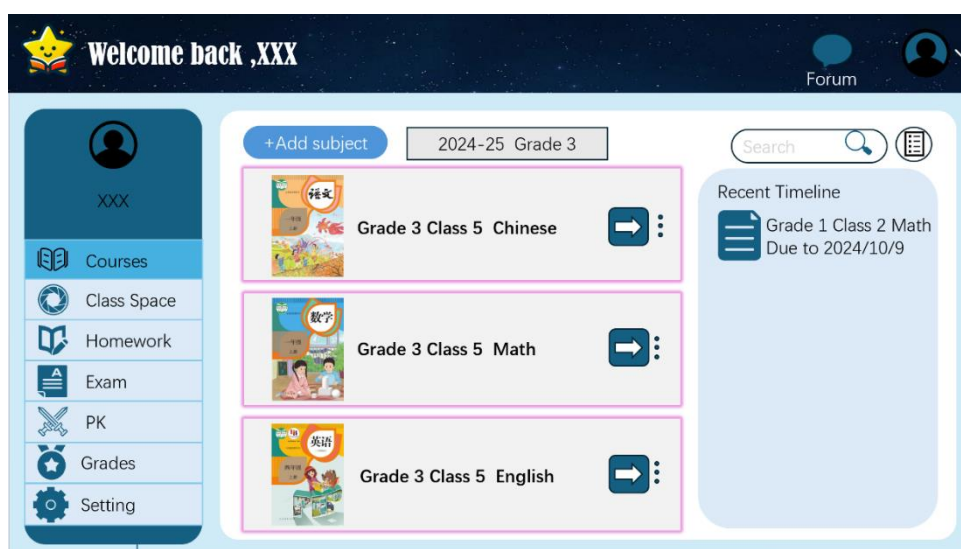
Course Page

Homework Page

5 Function Description and Acceptance Verification Standards

5.1 Detailed Function Description

5.1.1 Function Description of Student End

(1) Registration & Login Interface

Registration: Register an account by setting the user name and password through the mobile phone number, and take the phone number as account ID

Login: Log in to the app with a username and password

(2) Class System

Class group: Students can join the class group, which is convenient for teachers to issue notices, share resources and conduct class discussions.

Homework submission: including homework viewing, submission and feedback viewing. Teachers can publish homework in the class.Students can view and submit homework online, and teachers can correct and feedback to improve learning efficiency.

(3) Chinese Module

Ancient poetry thesaurus: Contains a wealth of ancient poetry, and provides translations and textbook annotations, classified by grade in the syllabus.It is convenient for students to find and learn.

Ancient poetry filling: The students are trained to understand and memorize ancient poetry by filling in the missing words. The thesaurus is optional.

Choice of synonyms and antonyms: to help students consolidate vocabulary knowledge in and out of class through the form of multiple choice questions.

Composition beauty library: You can view the beautiful articles classified by different subjects, and students can upload their own compositions.After review, share it with the whole class to promote the improvement of writing ability.

(4) Mathematics Module

Oral arithmetic exercises: Various forms of oral arithmetic exercises are provided to help students improve their oral and mental arithmetic abilities.

Size comparison: Through the form of figures and numbers, students learn how to compare sizes and grasp basic mathematical concepts.

(5) English Module

Chinese and English word matching: thesaurus to this primary school English syllabus vocabulary, through the Chinese and English vocabulary matching game.Help students to learn Chinese and English words and enlarge their English vocabulary.

Multiple choice questions: Provide a variety of multiple choice questions to help students consolidate their knowledge of grammar and vocabulary.

English reading material bank: It contains reading materials of different levels of difficulty and records students' learning progress.It is convenient for teachers to track the development of students' reading ability.

(5) Two-Player Battle Function

Students can interact with their classmates in real time, and enhance the interest and competition consciousness of learning through competition.The method for jud that victory or defeat is the amount of tasks complete within the specified time. Matches

can be selected to match in the same grade or in the senior grade.

5.1.2 Function Description of Teacher End

(1) Class Management

Class creation: Teachers can easily create classes and import student information for easy management and communication.

Check learning progress: Teachers can check each student's learning progress and homework completion in real time, and give timely feedback and guidance.

(2) Topic Customization

Teachers can customize topics according to teaching needs, covering all modules of Chinese, Mathematics and English.To meet the learning needs of different students.

(3) Homework Management

Teachers can set regular homework for students in the class, and the system will automatically remind students to submit it.Ensure that students complete their learning tasks on time.

5.2 Input and Output Format

Client	Module	Function	Input	Output
Register & Login	Register & Login	Registration	1. Mobile phone number 2. User name 3. Password	1. Prompt for successful account registration 2. Jump to the login interface
		Sign in	1. Mobile phone number 2. Password	1.An error message is displayed after a login failure 2. Jump to the home page of the application after successful login
Student Side	Class Group	Join the class group	Class group ID	Prompt for successful joining
		Homework submission	Homework content (text or file upload)	1. Prompt of successful submission 2. Operation status (submitted, to be corrected, after correction, the status is changed to corrected, and the corrected content is displayed)
	Language Module	Ancient poetry	Classified selection (in-class and out-	List of ancient poems

		thesaurus	of-class, grade, subject matter)	
		Ancient poetry fills in	Ancient poetry texts (missing words)	1. Fill in the results 2. Correct answer
		Choice of synonym and antonym	Choice of words	1. Select the result 2. Correct answer
		Composition beauty library	1. Classification and selection (composition subject matter) 2. Composition content upload (text or file)	1. List of beautiful articles (title, author) 2. Prompt of successful upload 3. Review status (to be reviewed, approved, failed)
	Mathematics Module	Oral arithmetic exercises	1. Type of exercise (addition, subtraction, multiplication and division) 2. Results of the topic	1. Randomly generated list of oral arithmetic questions 2. Calculation results and answers
		Size comparison	Greater than or less than or equal to select	Comparison results and answers
	English Module	Chinese and English word matching	Match selection	1. Match List 2. Matching results and answers
		Multiple choice questions	Option selection	1. List of topics 2. Select results and answers
		English reading material bank	Subject/difficulty selection	Reading List
		Learning progress tracking	Learning activities (reading, practicing)	Learning progress statistics
	Two-Man Battle	Pair match battle	Match request	1. Opponent ID 2. Battle status and results
Teacher Side	Student Management	Create a class	Group name	1. Prompt of successful group creation

			2. Automatically generated group number 3. Jump to group page 4. Group Page Student List
	Check learning progress	Student's name	1. Learning progress report 2. Homework completion
	Homework Management	1. Subjects 2. Upload the homework content 3. Homework feedback (upload) 4. Deadline	1. Prompt for successful job release 2. Assignments submitted by students

5.3 Interface Acceptance Criteria

5.3.1 User Registration and Login Interface

(1) When the registration box is displayed, input according to the prompt of the input box, click the registration button below to complete the registration, and then jump to the login interface. There is a login button on the right side of the registration box. If you have an account, click to jump to the login box.

(2) When the login box is displayed, input according to the input box prompt, click the login button below to complete the login, and then jump to the home page of the application. There is a registration button on the left side of the login box. If there is no account, click to jump to the registration box.

5.3.2 Student End

(1) Class Group Function

Add group button, after clicking it, the class ID appears, and after confirmation, the student ID is added to the student list of the group. There is a job view button in the group, click it to jump to the job list, the list can be clicked, and the specific content of the job will appear after clicking. Comes with a submit box to type and upload files. After the teacher's feedback, the homework content becomes the feedback content.

(2) Chinese Module

There are four buttons in the screen, the first row of ancient poems are filled with Synonym, and click them to jump to the corresponding page. When the title appears on the page, you can enter the text or select the option, and click to confirm whether it is correct or not. If it is correct, the next question will appear. If it is wrong, the input or selection will be cleared. In the second row, after clicking on the ancient poetry thesaurus and the beauty library, there will be a list classified by grade, and after clicking on it, there will be a list of ancient poetry or beauty. Click again to see the details.

(3) Mathematics Module

There are two buttons on the page for oral arithmetic practice and size comparison. After clicking, the page appears with questions. You can enter text or select options. Click to confirm whether the pop-up prompt is correct or not. If it is correct, the next question will appear. If it is wrong, the input or selection will be cleared.

(4) English Module

There are four buttons on the page, Chinese and English word matching and single selection. After clicking, the title appears on the page, and you can enter text or select options. Click to confirm whether the pop-up prompt is correct or not. If it is correct, the next question will appear. If it is wrong, the input or selection will be cleared. After clicking on the English reading material library, there will be a list classified by grade, and after clicking on it, there will be a list of reading materials. Click again to see the details. After clicking on the learning progress, you can set the daily learning plan, how many questions to do in a day, how many materials to read, and the task progress will be displayed.

(5) Pair Match

There are three subjects to choose on the page, Chinese, Mathematics and English. After choosing, choose the matching grade again. Match to the opponent after the battle, finish a certain number of questions with the least time to win, after the end of the battle results are displayed.

5.3.3 Teacher End

(1) Class Group Function

Click the Create Group button to enter the group name, and the group ID will be displayed after the group is created successfully. Show the list of students who join the class, and the teacher can join the class successfully after approval. There is an assignment release channel in the group, and a student submission list appears below it after the student submits. Click to view details and make corrections and feedback.

(2) Check the Students' Learning Progress.

The list of students is displayed in the group, click to view the student information, and there is a button below to view the learning progress. After clicking, the submission of students' homework and the progress of learning tasks will pop up.

5.4 Functional Acceptance Criteria

Implement all functions introduced in the interface.