STRENGTHENING EDUCATIONAL TIES: THE HOME-SCHOOL BRIDGE PLATFORM

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Abstract

Projek ini membentangkan pembangunan platform "Jambatan Rumah-Sekolah", yang direka untuk meningkatkan komunikasi dan kerjasama antara ibu bapa, guru, dan sekolah. Platform ini mengintegrasikan ciri utama seperti pengurusan kursus, penugasan kerja rumah, penjejakan gred, dan maklum balas masa nyata, membolehkan ibu bapa memantau kemajuan akademik anak-anak mereka, manakala guru dapat menguruskan penugasan dengan cekap dan berkomunikasi dengan ibu bapa. Dengan menggunakan teknologi terkini seperti Vue.js, Bootstrap, Java, dan MySQL, platform ini memastikan antaramuka pengguna yang responsif dan pengurusan data yang selamat. Sistem ini menangani cabaran komunikasi rumah-sekolah yang sedia ada, seperti kelewatan penyampaian maklumat dan saluran komunikasi yang tidak efisien, dengan menyediakan platform komunikasi yang berpusat dan masa nyata. Kelebihan sistem ini termasuk peningkatan aliran maklumat, pemberitahuan tepat pada masanya, dan peningkatan penglibatan ibu bapa dalam pendidikan anak-anak, seterusnya mewujudkan persekitaran pembelajaran yang lebih berkesan dan telus. Walau bagaimanapun, kebolehkembangannya mungkin menghadapi cabaran apabila bilangan pengguna semakin meningkat, dan penambahbaikan masa depan akan memberi tumpuan kepada pengoptimuman prestasi, meningkatkan pengalaman pengguna, dan mengembangkan ciri interaktif. Platform ini menawarkan pendekatan baharu untuk merapatkan jurang komunikasi antara rumah dan sekolah, menyokong perkembangan holistik pelajar.

Kata kunci : Platform Jambatan Rumah-Sekolah, fungsi interaktif, Java/Vue.js/MySQL

Abstract

This project emphasizes the development of the "Home-School Bridge" platform, which seeks

to enhance parents-teacher-school communication and collaboration. The platform integrates core features such as course management, posting assignments, tracking grades, and instant feedback, which allow parents to monitor their children's performance in school, while teachers are in a position to manage assignments and interact with parents. Employing advanced technologies like Vue.js, Bootstrap, Java, and MySQL, the website provides a responsive user interface and secure data management. The system addresses existing home-school

communication issues, such as the time-gap in information transfer and communication inefficiency, by providing a centralized real-time communication system. Advantages of the system involve improved information flow, punctual reminders, and active parental involvement in kids' education, hence ensuring a more efficient and transparent learning system. However, the system's scalability can be limited with more users, and its future will involve performance optimization, improved user experience, and interactive feature addition. The platform offers a new solution to bridging the communication gap between home and school in favor of the overall development of students.

Keywords： *Home-school bridge platform, interactive functions, Java/Vue.js/MySQL*

1.0 INTRODUCTION

Confronted with globalization and rapid development in information technology, the shape and mode of education are being transformed incessantly. Schools have been described as the backbone in education and thus bear a greater responsibility in the cultivation of the knowledge, skills, and values of students. While the family, as an important environment for students' growth, the support and cooperation of parents are crucial to the overall development of children (Wilder 2023). It is even more important in this context that communication and cooperation between home and school be fostered (Tanase 2023). Problems abound with traditional communication between home and school, and it is difficult to meet parents' and schools' needs for real-time interaction in the current era. Regular parent-teacher conference and issuance of paper notification slips are the major communicative tool between schools and parents.

While effective in the past, these tools are not efficient enough nowadays to catch up with today's rapid development in information technology. For instance, parent-teacher conferences usually happen only once every semester or school year; parents can never find out on time and in detail about their children's progress and performance.

Paper notifications are quite inefficient in relaying information; this usually brings about a discrepancy of information between the school and parents. Since notifications usually get lost because of poor storage by the students, parents do not get them on time. With the popularization of digital education, the need for interaction between schools and parents is growing (Liu et al. 2020). Parents and schools: Parents need to know what their children are studying in school, how homework is done, and how they perform at any time and any place. Teachers and schools want fast and efficient delivery of information in order to minimize unnecessary friction and misunderstandings in the process of communicating with parents. On the other hand, teachers are not only responsible for classroom teaching, but also spend a lot of

time and energy to deal with student management, especially communication with parents, which brings them a lot of work pressure(Creagh et al. 2023). To improve the quality of teaching while reducing the burden of teachers, and to enhance the participation and cooperation of parents, there is an urgent need for an informatized and systematic home-school interaction platform to solve the current problems. And because of COVID-19, many countries have implemented emergency plans, such as lockdowns and school closures (Tarkar & Technology 2020). This new situation has a significant impact on families in terms of supporting the participation needed for children to learn at home. Many parents supported their children during COVID-19 lockdowns and school closures in 2020 primarily by monitoring concentration and task completion in the classroom.

2.0 LITERATURE REVIE

With the development of information technology, the way of home-school communication has experienced significant changes. The traditional way can no longer meet the modern education's demand for efficient home-school communication. Research has shown that home-school communication not only contributes to students' academic performance, but also promotes students' social and emotional development (Wilder, 2023). However, traditional home-school communication methods have problems such as delayed information transfer, single and scattered communication channels, which are particularly insufficient in the modern educational environment (Tanase, 2023).

In recent years, with the acceleration of education informatization, more and more educational platforms have attempted to improve home-school communication through digital technology. For example, platforms such as ClassDojo and Bloomz connect parents, teachers, and students through instant messaging, grade feedback, and multimedia sharing, and while these platforms provide real-time interaction, they still suffer from deficiencies such as incomplete functionality and insufficient data tracking (Don, 2019) (Bloomz, 2013). For example, ClassDojo, while providing behavioral feedback, does not allow for real-time assignment management and academic grade tracking (Barahona Mora, 2020), while ParentSquare and Bloomz, while allowing for notification sending and meeting scheduling, do not allow for real-time grade tracking (King, 2021) (Ni, 2021).

The inadequacy of these existing platforms in terms of functionality and user experience prompted the proposal of the Homeschool Bridge platform. Based on the integration of existing technologies, the platform proposes real-time notifications, homework management, and grade tracking, aiming to address the timeliness of information delivery and the lack of data

analysis (Al-Malah et al., 2021). By providing a more efficient flow of information and a stronger sense of parental engagement, the Home-School Bridge platform offers a new solution for home-school communication (Kraft et al., 2022).

Table 1 Comparison of the functions of different recipe sharing platforms

Application	Problem Solution	Advantage	Disadvantage
ClassDoJo	Use instantaneous message and student performance point to encourage students and parents to communicate.	Easy operation, can be used from kindergarten to primary school. Parents can keep track of their children's activities.	It does notinclude homework and coursemanagement functions; parents can't view homework affairs and classroom schedules.
ParentSquare	It provides an integrated communication platform to notify information, arrange activities, and book meetings.	Regular and timely messages to keep parents involved in school affairs.	No lengthy reports are required for the tracking of student performance in order to provide real-time information to parents regarding progress made by students.
Bloomz	Homeschool communication, calendar scheduling, volunteer management, integration, and the boosting of participation by parents.	Development and diversified functionalities, support announcement and event management for improving home-school communication	Lack of data analysis function is unable to provide detailed reports on students' academic progress with teachers an parents.
BrightWheel	Check-in and check-out photo sharing, daily report, and more in early childhood education	Real-time view of children's activities at school for better home- school trust.	Unable to support curriculum and homework management for higher classes, parents cannot view or follow up on homework assignments given to the students.

3.0 METHODOLOGY

This project adopts modern web development technologies, combining Vue.js framework for front-end development, Java Spring Boot framework to handle the back-end logic, and MySQL as the database management system. The design and development process of the platform began with a requirements analysis phase to clarify the functional requirements of the three main types of users: parents, teachers and school administrators. To ensure that the functionality of the platform meets the needs of all users, the project team collected feedback from parents, teachers and school administrators through questionnaires, interviews and focus group discussions. The main goal of this phase was to clarify the required functional features of the home-school communication platform and provide a clear basis for subsequent system design (Gan et al., 2022). For example, parents want to be able to view students' grades and homework completion in real time, while teachers need an easy way to post assignments, record grades, and provide feedback to parents (Wilder, 2023).

Based on the results of the requirements analysis, the system architecture and design of the platform was gradually developed. The platform is divided into several modules, including user module, notification module, student management module, and administrator module, each of which has independent functions and interacts effectively with other modules to ensure the efficiency and stability of the platform. The front-end uses the Vue.js framework, which is designed to improve the responsiveness and maintainability of the user interface and to ensure that the platform performs well on different devices. The backend uses the Java Spring Boot framework to handle all the business logic and database interactions to ensure the platform runs smoothly. MySQL was chosen as the database because of its high performance, stability, and extensive community support, which can support the storage of large amounts of data and efficient querying (Kazi et al., 2000).

The core functional modules of the platform include assignment management, grade tracking and real-time feedback mechanism. Teachers can post assignments and track students' completion of assignments in real time; parents can check students' grades, attendance and classroom performance at any time; and administrators can manage teachers' and students' information to ensure the smooth operation of the platform. In addition, the platform also integrates a notification module to send real-time notifications to parents and teachers to ensure timely delivery of information. To ensure data security, the platform employs SSL/TLS protocol to encrypt data transmission and SHA-256 algorithm to encrypt user passwords to ensure that users' personal information and academic records are safe (Suryadevara &

Innovations, 2022) (Hobson, 2024). Through the implementation of these designs and technical solutions, the project aims to create an efficient, stable and easy-to-use platform for home-school communication (Alrikabi et al., 2021).

Users authenticate themselves by entering their user name and password through the login interface. After successful login, they enter the main interface and can choose to browse the recommended recipes, search for recipes or upload new recipes. Users can perform interactive operations such as liking and favoriting on the recipe details page. Users can fill in the title, ingredients, steps and pictures of the recipe on the upload page and submit it, and then store it after system verification. Users can log out or cancel their accounts at any time. The Figure 1 is the User Interaction Flowchart.

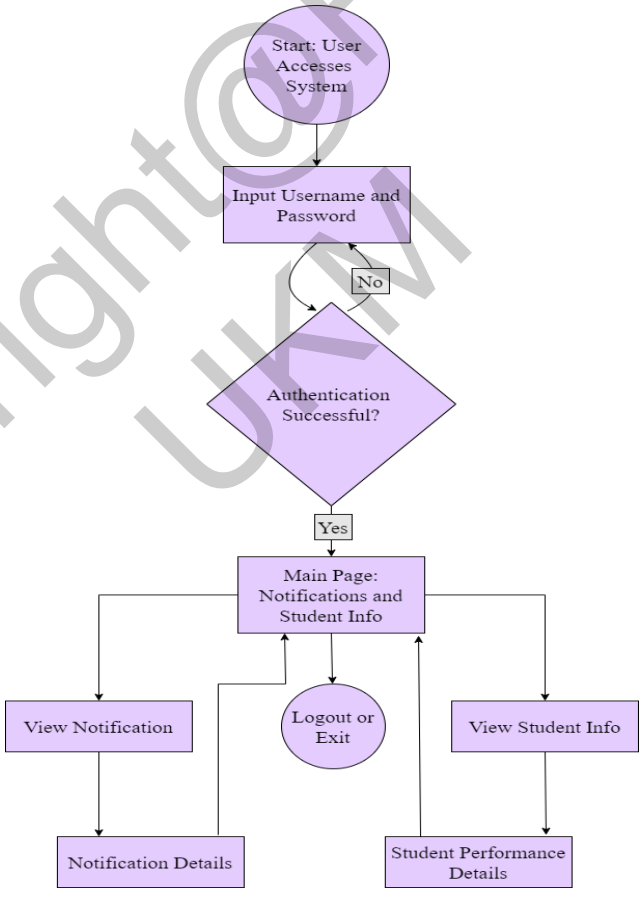
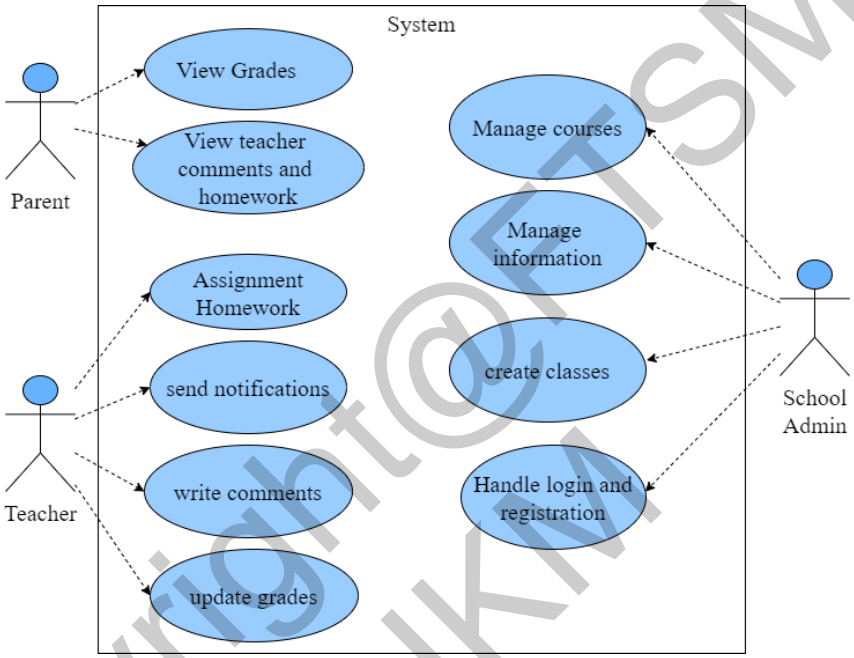


FIgure 1 User Interaction Flowchart

Use Case Diagram is a use case diagram describing the different functions allocated for users in the School Management System. Parents, teachers, and

administrators are all users of this system. View student grades as well as comments/homework given by teachers: Parents. Homework to be given, notices sent, comments to be written, and grades updating Teachers. Class management, creation of classes: school administrators, handling of log-in/registrations. Each function is connected to the corresponding user through the arrow, showing the interaction between the user and the system.



FIigure 2 Use Case Diagram

4.0 RESULTS

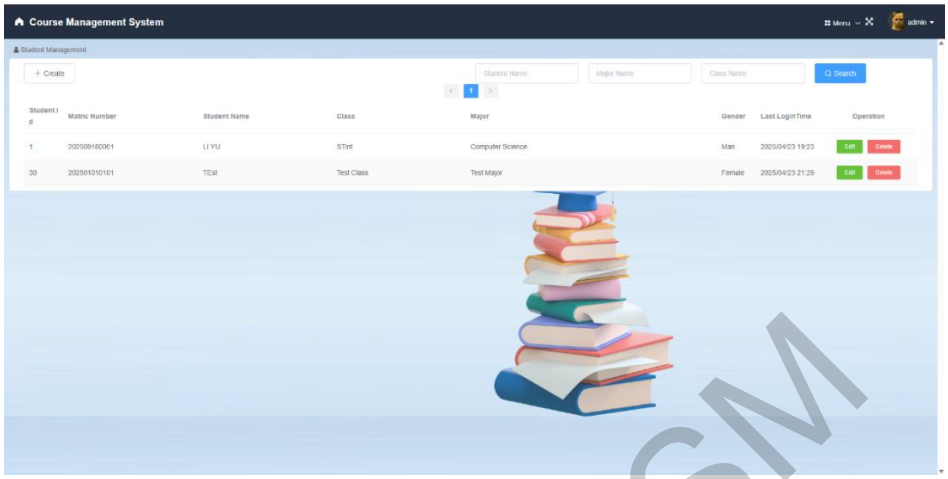
The Home-School Bridge platform was successfully developed and realized the expected functions. Through the integration of user interface design, data management and interactive communication modules, the platform is able to efficiently deliver real-time information and ensure more transparent and timely communication among parents, teachers and schools. During the testing phase, the platform shows superior performance, with response time and database query efficiency meeting the expected requirements. The scalability of the platform was verified and it can continue to operate stably with an increase in the number of users. User testing showed that both teachers and parents found the platform to be easy to use and effective in increasing their engagement and understanding of their child's learning progress (Richards & Ford, 2020).

The system is able to improve parent engagement and the quality of teacher-parent interactions through data tracking and real-time feedback, helping parents identify academic problems and work with teachers to find solutions (Al-Malah et al., 2021). Overall, the Home-School Bridge platform has achieved significant results in improving the efficiency of home-school communication, enhancing parental involvement, and facilitating students' learning progress.

Users select their identity (parent/student, teacher or administrator) through the login screen and enter their username and password for authentication. The upper part of the interface displays the system logo and name “HOME-SCHOOL BRIDGE” to reinforce the brand identity of the system, and the lower part of the interface is designed to enhance the user experience through role-based login.

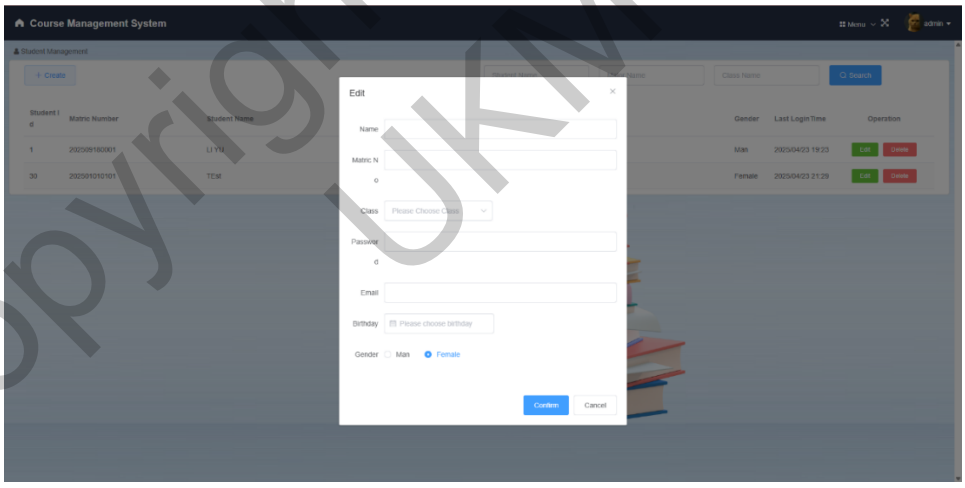
FIigure 3 Homepage

This page is the interface for administrators to manage student user information, with a functional menu bar on the left and a list of specific information on the right. Administrators can create, edit and delete student information, and support searching and filtering by name, major, class and other fields to improve data management efficiency.



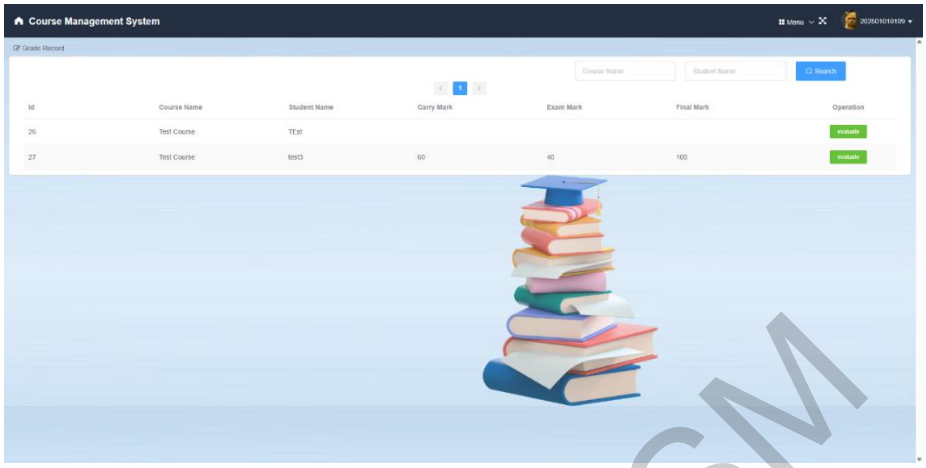
FIigure 4 Student information management interface

This interface is used to add a new course. Administrators can fill in fields such as course name, instructor, year, class time, location, credits, maximum capacity, etc. It supports flexible configuration of basic course information. This module is the foundation of the whole course information system, which helps the system to manage teaching resources in a structured way.



FIigure 5 Create course information pop-up screen

Teachers can enter and modify course grades through this interface, including usual grades, examination grades and overall assessment grades, and click the “evaluate” button to enter the detailed editing page. This function module ensures that teachers have precise control over students' grades and is an important part of the system.



FIigure 6 Teacher Performance Grading Screen

The development of "Home-School Bridge" adopts a modularized design, which ensures that each role (students, teachers, administrators) has its own responsibilities. With a reasonable front-end and back-end separation architecture and clear data structure, core functions such as class selection, grading and student information management were successfully realized. Although some technical problems were encountered during the development process, they were successfully solved and the overall system functions have reached the expected goals.

5.0 CONCLUSION

After comprehensive testing of functionality, performance, usability, and security, the "Family-School Bridge System" performed well and met the design requirements. The core functions of the system, such as user registration, login, course management, and grade viewing, all passed the tests smoothly. The system was stable in the condition of high concurrency, and security was upheld well. The interface of the system was determined to be simple, and the operation flow was smooth through user acceptance testing, which met the demands of different users.

Several of the problems encountered during testing, for example, unlogged users not being automatically redirected when they view the grades page and long delays for course notification updates, have been resolved.

In summary, the system is ready to be deployed and will present a strong and effective user experience for parents, teachers, and administrators.

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