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Design of a Web-Based Student Internship Application at PT Chlorine Digital Media Using the Waterfall Method

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Abstract

In the digital era, information systems play an important role in improving the efficiency of managing the internship program (PKL). PT Chlorine Digital Media faces various challenges in managing internship data, such as attendance recording, task assignment, and job vacancy recommendations. To address these issues, a web-based system has been developed using the Laravel framework. This system includes main features such as online attendance, task management, and job recommendations that can assist students in finding career opportunities that match their skills. The development method utilized is the SDLC (System Development Life Cycle) model, with a systematic approach in the design, implementation, and testing of the system. It is expected that this application design will improve efficiency, reduce human errors in data recording, and provide easier access for students and administrators.

Keywords: Information Systems, Internship, Attendance, Job Recommendations, Laravel.

1 INTRODUCTION

In today's digital era, information technology has brought significant changes across various sectors, including industry and education. The integration of technology in the education sector continues to evolve in response to the growing demand for efficiency and effectiveness in the learning process. One of the areas affected by this development is the Field Work Practice program (Praktik Kerja Lapangan, or PKL), which plays an important role in bridging the gap between educational institutions and industry.

According to research by (Nufriansyah1 et al., 2023), the implementation of web-based systems for managing PKL programs can enhance administrative efficiency and simplify the monitoring of students during their internships. Moreover, web-based information systems are considered more effective in maintaining data consistency compared to manual data entry (Samsudin & Januar, 2024). In line with these findings, various prior studies have also discussed the application of web-based information systems in the education sector. For example, an article published on eCampuz emphasizes that web-based academic information systems can improve administrative efficiency in higher education by providing more efficient, accessible, and secure academic data management (Trisandy Mahany, 2024). In addition, research by (Burhan et al., 2023) shows that the use of digital technology in student data management reduces administrative errors and increases transparency in the educational process.

Field Work Practice is commonly referred to as PKL (Praktik Kerja Lapangan) or PRAKERIN (Praktik Kerja Industri), is a component of vocational education. The PRAKERIN program is implemented based on the Regulation of the Minister of Industry No. 3 of 2017 concerning Guidelines for the Development and Promotion of Competency-Based Vocational High Schools, which align with industry needs. The main objective of this program is to strengthen the relationship between the educational and industrial sectors. Moreover, the program is also supported by the

e-ISSN: 2655-867X
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Volume 7 No. 2 August 2025

Decree of the Minister of Education and Culture No. 323/U/1997 and Law No. 20 of 2003 on the National Education System, both of which emphasize the importance of skill development in students to meet the needs of society, the nation, and the state (Admin, 2024) .

PT Chlorine Digital Media is a technology development company that offers various services, including social media management, website development, promotional video production, product photography, and TikTok account management. As a partner to various sectors, the company provides opportunities for students to undertake PKL or internship programs. However, the implementation of PKL at this company faces several challenges, such as manual attendance recording, limited monitoring of task completion by students, and the absence of a system for providing job recommendations to students who have completed their internships. Therefore, a web-based system is needed to facilitate PKL management for both students and administrators. This application is designed to monitor attendance, manage tasks, and provide job recommendations for students who have completed their PKL programs.

In developing this system, the author chose the Waterfall method due to its structured and sequential approach. The process begins with requirements analysis, followed by design, implementation, testing, and maintenance. This model is particularly suitable for the project, as the system requirements were clearly defined from the outset, minimizing the risk of mid-development changes. Additionally, the Waterfall method supports comprehensive documentation practices, ensuring that each phase is completed thoroughly before proceeding to the next—an essential factor in building a complex system such as a PKL management application.

2 LITERATURE REVIEW

In this research, the author developed a web-based software application using the Waterfall method within the Software Development Life Cycle (SDLC). The theoretical foundation used in this study includes the following:

2.1 Website

A website is a collection of interrelated web pages accessible via the internet, serving as a medium for information dissemination and user interaction. In web-based software development, a user-friendly and responsive interface is crucial for ensuring a positive user experience. Common technologies used in website development include HTML, CSS, JavaScript, and PHP for server-side scripting (Mianti et al., 2023).

2.2 Waterfall Method

The Waterfall method is a linear and sequential software development model in which each phase must be completed before moving on to the next. The phases typically include requirement analysis, system design, implementation, testing, and maintenance. This approach is best suited for projects with well-defined requirements, as it offers a structured workflow and supports comprehensive documentation.(Fachri & Rizal, 2024)

2.3 UML (Unified Modeling Language)

UML (Unified Modeling Language) is a standardized modeling language used to describe, visualize, and document object-oriented software systems. In web-based application development, UML aids in designing system architecture through various diagram types, including use case, activity, and class diagrams (Raynaldi & Somya, 2023).

e-ISSN: 2655-867X
p-ISSN: 2655-8611
Volume 7 No. 2 August 2025

2.4 Laragon

Laragon is a development environment for PHP-based applications that provides an integrated stack, including Apache, MySQL, PHP, and Node.js. It also features automatic virtual host configuration and SSL support, making the development process more streamlined for developers (Rajabovich, 2023).

2.5 MySql

MySQL is an open-source relational database management system commonly used in web application development. It is valued for its reliability, scalability, and flexibility in managing structured data, making it a preferred choice for many web-based systems (Jurnal Informatika dan Komputer et al., 2023).

2.6 Laravel Framework

Laravel is an open-source PHP framework that simplifies web application development by offering a structured, efficient, and maintainable codebase. It supports the Model-View-Controller (MVC) architectural pattern and includes features such as routing, authentication, and database management, which accelerate and streamline the development process (Sinlae et al., 2024).

2.7 PHP

PHP (Hypertext Preprocessor) is a widely used server-side scripting language for web development. It enables developers to build dynamic and interactive web pages and supports interaction with databases such as MySQL. One of PHP's key features is cURL, which allows communication with external servers and integration with third-party APIs and services (Kalmukov, 2024).

3 RESEARCH METHOD

3.1 Data Collection Method

This study employed interviews as the primary data collection method to gather system requirements directly from stakeholders, including the Director and IT staff. These interviews aimed to gain insights into the existing workflow, identify challenges, and understand expectations for the new system. In addition to interviews, direct observations were conducted during the student internship at the company. These observations offered additional perspectives on daily work patterns and operational issues that might not have been revealed during the interviews. All findings were documented and analyzed to ensure that the system design aligned with the company's needs.

3.2 System Development Method

Software development in this study follows the Waterfall method, a model within the Software Development Life Cycle (SDLC). The term "Waterfall" is derived from the analogy of a cascading flow, where each phase is completed sequentially from top to bottom (Albi Panatagama, 2023). The stages include requirement analysis, system design, implementation, testing, and maintenance. Figure 1 illustrates the stages involved in the Waterfall method (Agusdar, 2013).

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Volume 7 No. 2 August 2025

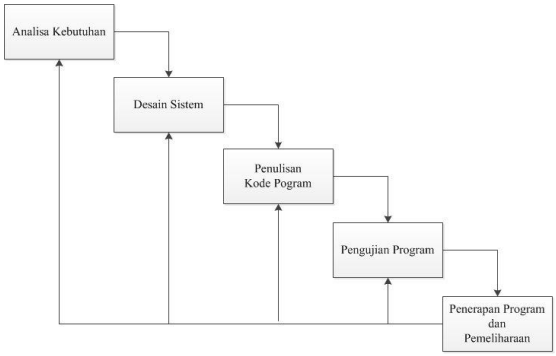

Figure 1. Waterfall Method

The stages are as follows:

1. **Requirement Analysis**, in this stage, system requirements were identified based on the key features to be developed—namely task management, job recommendation, and attendance tracking. The analysis involved collecting information on how students would manage their tasks, how job suggestions would be delivered, and how attendance data would be recorded.
2. **Design**, this stage involved designing the overall system architecture, including the database schema, use case diagrams, activity diagrams, and user interface (UI) layouts.
3. **Implementation (Coding)**, at this stage, the system was developed according to the previously designed specifications, using the Laravel framework for the backend and MySQL as the database system.
4. **Testing**, testing was conducted to ensure the system functioned correctly and fulfilled user requirements. The prototype was presented to the Director and IT staff to evaluate whether the implemented features effectively supported the PKL program.
5. **Maintenance**, the maintenance phase aims to ensure the system continues to operate smoothly by fixing bugs, optimizing performance, and adapting features in response to evolving user needs or operational requirements.

4 RESULTS AND DISCUSSION

4.1 System Design

The system design for this application incorporates a Use Case Diagram and several Activity Diagrams. Figure 2 illustrates the Use Case Diagram that outlines the interactions between users and the system during the development process.

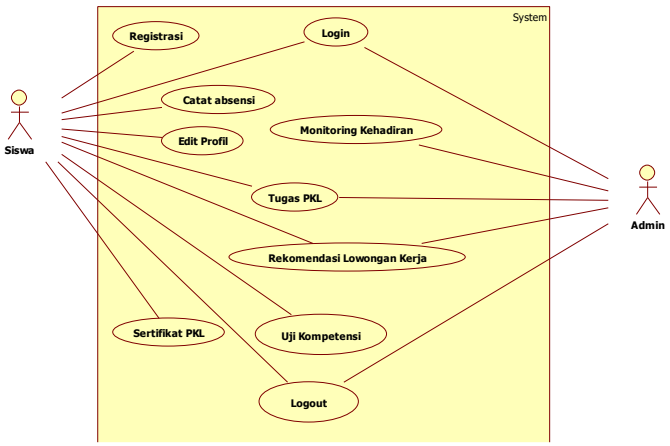

Figure 2. Use case diagram

e-ISSN: 2655-867X
p-ISSN: 2655-8611
Volume 7 No. 2 August 2025

Figures 3, 4, and 5 depict the Activity Diagrams for the Attendance, Task Management, and Job Recommendation features, respectively. Figure 6 presents the database schema utilized in developing the application.

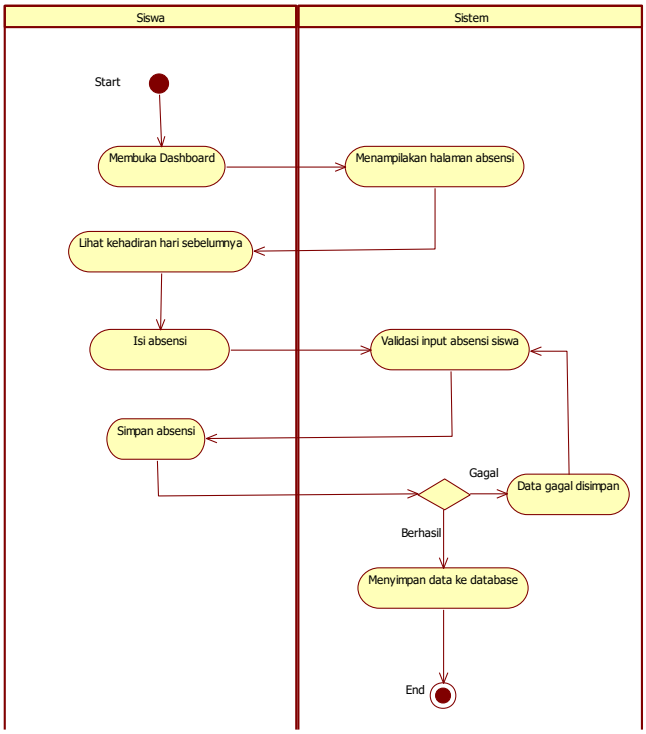

Figure 3. Attendance Activity diagram

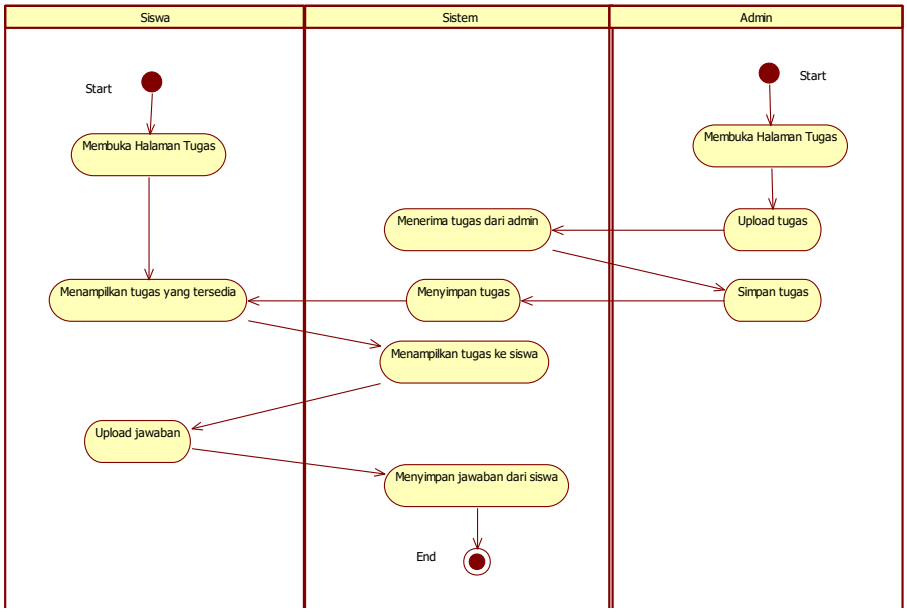

Figure 4. Task Activity diagram

e-ISSN: 2655-867X
p-ISSN: 2655-8611
Volume 7 No. 2 August 2025

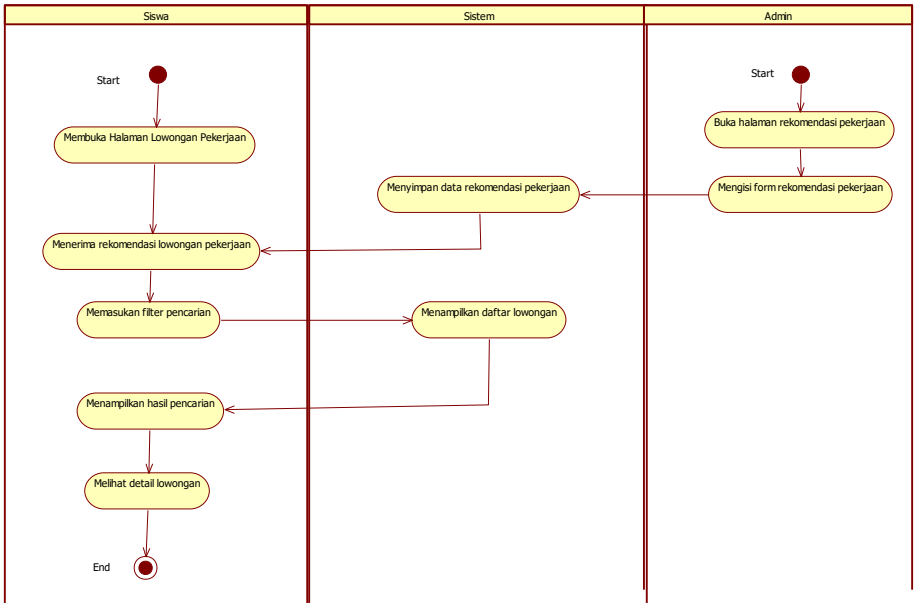

Figure 5. Job Recommendation Activity diagram

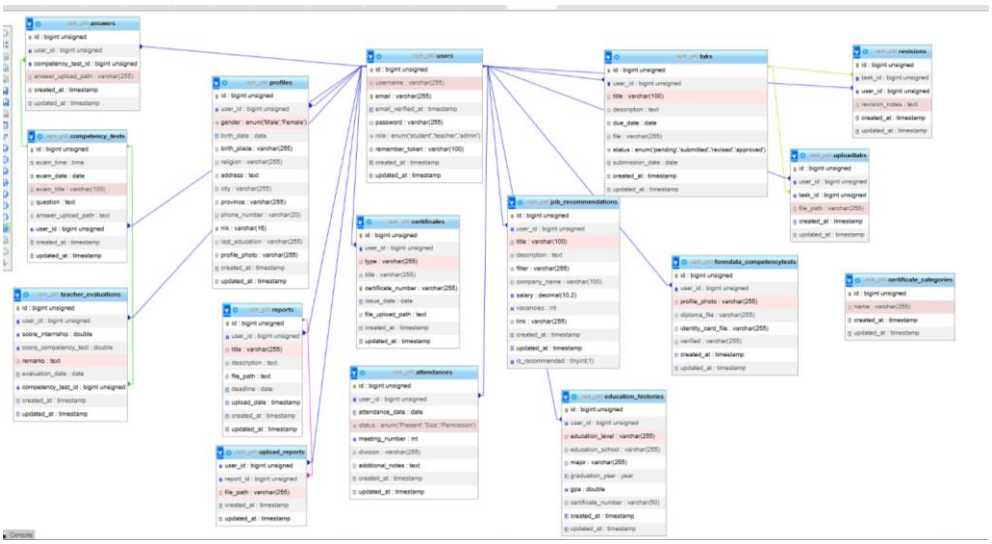

Figure 6. Database Schema

The database in this application does not separate data between student and teacher internships, resulting in a larger number of managed tables. This integration was implemented to ensure that all information can be accessed within a single system without requiring cross-database integration. However, this approach leads to a more complex database structure, as it must accommodate the differing data types, features, and access privileges associated with both students and teachers.

4.2 System Implementation

System implementation relies heavily on a well-designed user interface, as it significantly affects user experience and satisfaction. At this stage, the Laravel framework was used to develop the system's codebase. The following are screenshots of the Design of a Web-Based Student Internship Application at PT Chlorine Digital Media Using the Waterfall Method

e-ISSN: 2655-867X
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Volume 7 No. 2 August 2025

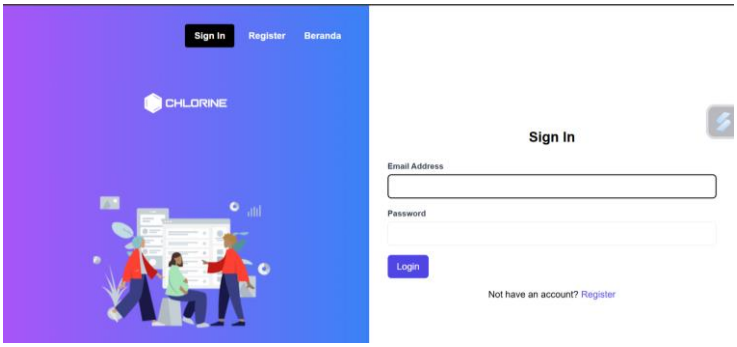

Figure 7. Login Page

Figure 7 login page. Users must enter a valid email and password to gain access to the dashboard.

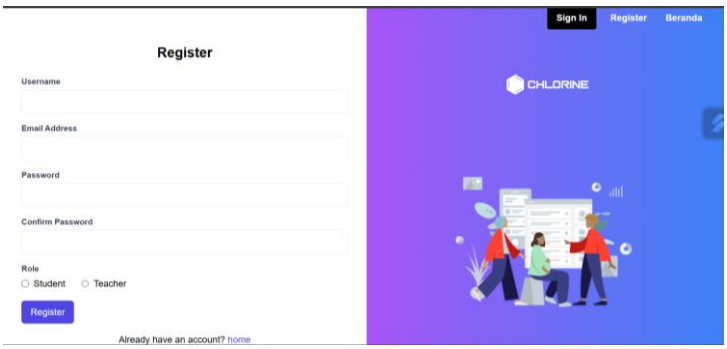

Figure 8. Register Page

Figure 8. New users can create accounts by providing their name, email, password, password confirmation, and user role.

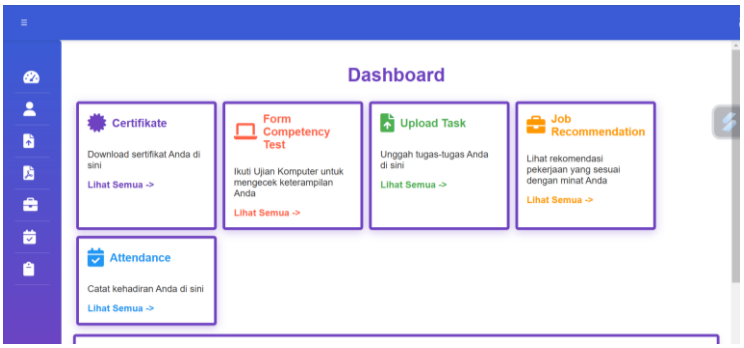

Figure 9. Dashboard Page

Figure 9. The main interface that displays system features based on user permissions.

e-ISSN: 2655-867X
p-ISSN: 2655-8611
Volume 7 No. 2 August 2025

Figure 10. Task Page

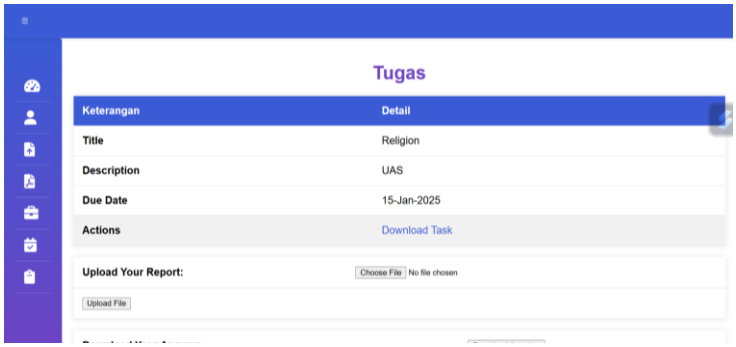

Figure 11. Task Page

Figure 10 and Figure 11. Show assigned internship tasks along with related details and deadlines.

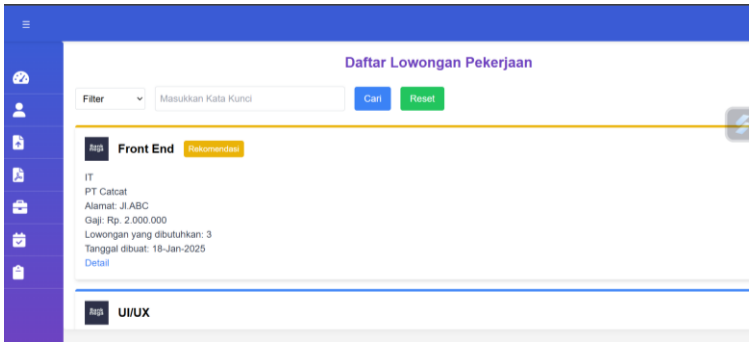

Figure 12. Job Recommendation Page

Figure 12. Displays job opportunities submitted by the admin. Students can filter and search for relevant positions.

e-ISSN: 2655-867X
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Volume 7 No. 2 August 2025

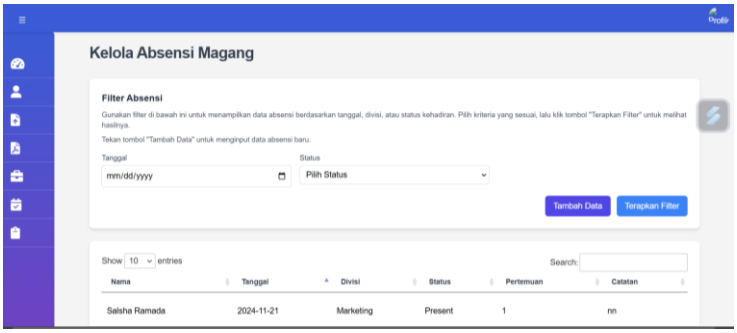

Figure 13. Attendance Page

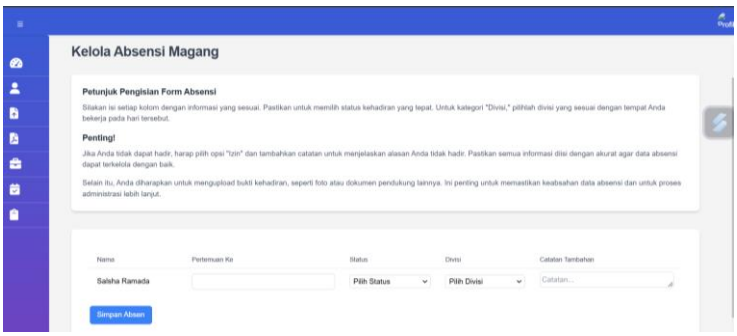

Figure 14. Attendance Page

Figure 13 and figure 14. Allow students to submit daily attendance, including status (present, sick, permission) and division.

Figure 15. Add Task Form (Admin)

Figure 15. This form allows administrators to assign new tasks, which will then be displayed to internship students in their task dashboard.

Figure 16. Add Job Recommendation Form (admin)

e-ISSN: 2655-867X
p-ISSN: 2655-8611
Volume 7 No. 2 August 2025

Figure 16. Administrators can add job recommendations for internship students. Job postings marked as highly recommended by the company are prioritized and displayed at the top of the list.

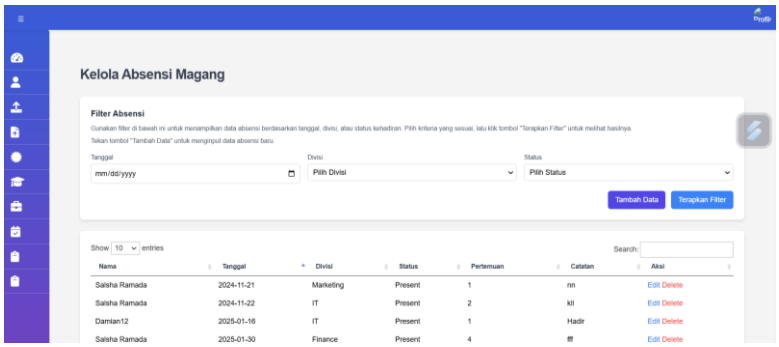

Figure 17. Attendance Page (admin)

Figure 17. This page enables administrators to edit or delete student attendance records to correct input errors or update information.

4.3 System Testing

Table 1. Student System Testing

No	Feature	Objective	Testing Steps	Expected Result
1	Login	Validate successful login	Enter valid email and password	User is redirected to the dashboard
2	Login	Validate failed login	Enter invalid credentials	Error message is displayed
3	Register	Validate account registration	Fill in all fields with valid data	User is registered and redirected to dashboard
4	Register	Handle invalid data input	Enter incomplete/invalid data	Error message is displayed
5	Task Submission	Ensure task upload functionality	Select a task and upload file	Task is submitted successfully
6	Job Recommendation	Validate job filter functionality	Select filter criteria and search	Filtered job list is displayed
7	Attendance	Record attendance entry	Select date, division, and attendance status, then save	Attendance data is saved

Table 2. Admin System Testing

No	Feature	Objective	Testing Steps	Expected Result
1	Login	Validate admin login	Enter valid credentials	Admin is redirected to admin dashboard
2	Task Upload	Ensure admin can upload tasks	Fill out task form and submit	Task is successfully added
3	Job Vacancy Upload	Validate job submission functionality	Input job details and submit	Job recommendation is added

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Volume 7 No. 2 August 2025

No	Feature	Objective	Testing Steps	Expected Result
4	Edit Attendance	Confirm attendance can be edited	Select record to edit, make changes, and save	Record is updated
5	Delete Attendance	Confirm record deletion works	Select record to delete and confirm	Record is deleted

5 CONCLUSION

The implementation of a web-based system for managing Field Work Practice at PT Chlorine Digital Media has facilitated student monitoring and ensured well-organized data management. The system also provides job vacancy recommendations for students who have completed their internships. By applying the Waterfall method in system development, each phase was executed in accordance with the company's requirements, making it an effective solution within the educational sector.

For future enhancements, the system could be further developed by optimizing mobile responsiveness to improve accessibility on smartphones and tablets. Integration with professional networking platforms such as LinkedIn or job portals may also serve as a strategic addition to increase students' employment opportunities after completing their internships.

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