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Design of the Management Information System for Interns at the Communication and Information Service of East Kalimantan Province

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Abstract

This study aims to design an integrated, web-based Internship Management Information System specifically for the Department of Communication and Informatics of East Kalimantan Province. The background of this research lies in the existing manual internship administration process, including participant registration, document verification, daily attendance recording, performance evaluation, and certificate issuance, all of which are time-consuming and prone to errors. The research adopts the System Development Life Cycle (SDLC) with the Waterfall model, encompassing requirements analysis, system design, and the development of user interface mockups, without proceeding to actual system implementation. Requirements analysis was conducted through literature review, observation, and interviews with stakeholders to formulate the functional and non-functional needs of the system. The result is a comprehensive system blueprint, consisting of main process flowcharts, UML diagrams (use case, class, activity), and user interface designs for admins, participants, and supervisors. The system design enables online registration, digital data verification, daily reporting by participants, real-time monitoring by supervisors, automated evaluation based on specific criteria, as well as digital certificate generation and verification by the admin. This blueprint is expected not only to accelerate and simplify the internship process but also to enhance transparency, accountability, and efficiency in talent data management within the Department of Communication and Informatics of East Kalimantan Province. Furthermore, the system design can serve as a model for developing similar applications in other government agencies.

Keywords: *Geographic Information System, Tourist Destination, Tourism Office, WebGIS, Web-Based Application Development.*

1. Introduction

In the era of globalization and the rapid development of information technology, the world of higher education is faced with the challenge of creating graduates who not only master theory, but also have practical skills that are relevant to the needs of the world of work (Damanik et al., 2018; Pratama et al., 2022). One of the efforts made by educational institutions is through internship programs. The internship program is a bridge that brings students together with a real work environment, so that they can apply the knowledge gained in college directly, get to know the organization's culture, and build professional networks from an early age (Vidya Kusala et al., 2023).

However, the implementation of internship programs in various agencies, both government and private, still often faces various administrative and technical obstacles. One of the main problems that is often encountered is the manual registration process for interns, inaccurate attendance data collection, performance assessments that have not been standardized, and the process of making certificates that are still carried out conventionally. This not only makes it difficult for the organizers to monitor, but also has an impact on the lack of maximum benefits obtained by interns [1], [2].

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In addition, the data of interns who have completed the program is often not managed properly. In fact, the data has the potential to be used as a database of young talents that can be used by agencies for future recruitment needs. The lack of integration and automation in internship administration management leads to a high risk of human error, process delays, and lack of information transparency between participants, supervisors, and admins [3].

Seeing these problems, an innovative solution is needed in the form of a web-based internship program management system that is able to automate the entire administrative process, from registration, daily attendance recording, performance assessment, to digital certificate creation. This system is expected not only to facilitate the monitoring and evaluation of interns, but also to build a talent database that is structured and easily accessible by agencies. With the application of the latest technologies, such as the use of the Laravel framework for the backend and Vue.js for the frontend, the designed system can be an efficient, transparent, and highly competitive human resource development-oriented solution [3], [2], [4].

2. Research Methodology

In the era of globalization and the rapid development of information technology today, the world of higher education is faced with the challenge of creating graduates who not only master theory, but also have practical skills relevant to the needs of the world of work. One of the efforts made by educational institutions is through internship programs. The internship program is a bridge that brings students together with a real work environment, so that they can apply the knowledge gained in college directly, get to know the organizational culture, and build professional networks from an early age [5], [6].

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Seeing these problems, an innovative solution is needed in the form of a web-based internship program management system that is able to automate the entire administrative process, starting from registration, daily attendance recording, performance assessment, to digital certificate creation (Pratama et al., 2022). This system is expected not only to facilitate monitoring and evaluation of interns, but also to build a talent database that is structured and easily accessible by agencies (Rizki et al., 2021).

2.1. System

According to Pressman & Maxim, systems usually have the main characteristics, namely having a clear purpose, consisting of interconnected components, having boundaries, environment, inputs, processes, outputs, and control mechanisms and feedback to ensure that the system runs as expected. In the context of modern organizations, systems play an important role as a foundation in supporting operations and decision-making. The system helps integrate various activities and resources so as to

increase efficiency, productivity, and transparency in the implementation of business processes [7], [5].

2.2. Information Systems

Information systems are a combination of technology, procedures, and humans that manage data into useful information to support business processes and decision-making. Information systems accelerate data flow and improve the efficiency of organizational processes [8].

2.3. Internship

Sihombing & Fitriani explained that an internship is a job training program that is carried out over a certain period of time to increase participants' skills, insights, and knowledge about the actual work environment. In the context of higher education, internships are also often one of the graduation requirements, because they are considered effective in equipping students with professional work skills and attitudes before actually entering the workforce [1]. Meanwhile, according to others, or often called Field Work Practice (PKL), is a learning program that allows Vocational High School (SMK) students or students to practice and gain hands-on experience in the work environment. The program is designed as a systematic and integrated implementation of the educational curriculum in academic institutions with the acquisition of practical skills through real work experience [9].

2.3. Diskominfo Prov. East Kalimantan

The Communication and Information Service (Diskominfo) of East Kalimantan Province is a regional apparatus formed to carry out government duties in the fields of communication, informatics, cryptography, and statistics. Initially, communication and informatics affairs in East Kalimantan Province were carried out by the Transportation, Communication, and Informatics Office. Based on the Regional Regulation of East Kalimantan Province No. 8 of 2016 concerning the Establishment and Composition of the Regional Apparatus of East Kalimantan Province, Diskominfo was then designated as a separate agency. The East Kalimantan Provincial Diskominfo is tasked with organizing local government affairs based on the principle of autonomy and assisting tasks in the fields of communication, informatics, cryptography, and statistics, as well as supporting the vision of realizing a transparent, accountable, and information technology-based government [10].

2.4. UML

UML (Unified Modeling Language) is an international standard developed by the Object Management Group (OMG) to model software systems visually and in a structured way. According to Sommerville, the use of UML in the software development process can help developers visualize system architecture, analyze needs, and document designs before implementation. UML offers standard notation that is widely understood by the development team and stakeholders, minimizing misunderstandings in the system design process. In addition, the use of UML allows for consistency between software design and implementation, as well as facilitating future system maintenance processes [11], [7].

Rachmawati & Darmawan emphasized that UML diagrams not only facilitate documentation and communication between teams, but also clarify the structure and relationships between system components throughout the software development lifecycle. Thus, the application of UML in information system development projects is highly recommended to achieve complete documentation, standardized design, and quality system final results [12].

2.5. Software Development Life Cycle (SDLC)

Software Development Life Cycle (SDLC) is the process of developing or changing software systems using models and methodologies used by developers to develop software systems.

2.6. Waterfall

The Waterfall model is a development model that provides SDLC schemas in a sequential manner and usually begins with analysis, design, implementation, preview, and other supporting stages. The waterfall model provides a sequential or sequential approach to the software lifecycle starting from analysis, design, coding, testing and [13] *support* stages [14].

2.7. Research Framework

This research was conducted at the East Kalimantan Provincial Communication and Information Office, an agency responsible for the management and development of information and communication technology within the provincial government. The main objective of this research is to design a Management Information System (SIM) for internship programs that are tailored to the operational needs and workflows in the agency.

By focusing research on this agency, it is hoped that it can produce systematic and structured solutions to support the process of administration, monitoring, and evaluation of internship activities. This study uses a qualitative approach, with the interview method as the main data collection technique.

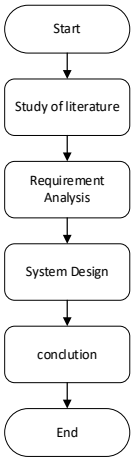

Figure 1. Model Waterfall

This study uses *the System Development Life Cycle* (SDLC) with *the Waterfall* model as a framework in designing an internship management system. *The Waterfall* model is the most classic and structured method of system development, where each stage is carried out sequentially from start to finish. Each stage must be completed thoroughly before moving on to the next stage, and the results of each stage will be input for the next stage (Rakhmah & Devi, 2021).

2.8. Needs Analysis

At the needs analysis stage, based on the results of interviews and observations conducted on staff at the East Kalimantan Provincial Communication and Information Office, information was obtained about the expected features and functionality in the internship management system. This system is expected to provide a UMTA page or home menu, intern registration and placement features, daily attendance and activity reporting,

access to assessments from supervisors, document and certificate management, the ability to view and edit participant profiles, and notifications related to the internship process. In addition, the system must also support automatic certificate generation and allow verification by administrators, as well as provide automatic notifications to participants and supervisors during the internship program.

2.9. System Design

At the system design stage, the results of the needs analysis are translated into a blueprint and detailed models that describe the structure and workflow of the apprenticeship management system. This design includes creating system flowcharts, use case diagrams, activity diagrams, and class diagrams using standard

2.10. Unified Modeling Language (UML)

In addition, a *mockup* of the user interface is also designed to provide a clear picture of how the system looks and how to use the system by various actors, such as interns, supervisors, and administrators. The design of this system serves as a comprehensive reference that will be a guide in the next stage of development and implementation, so that all system needs can be met and in line with the needs of the Communication and Information Service of East Kalimantan Province

2.11. Implementation and Testing

In this study, the implementation and testing stages were not carried out. This research is limited only to the stage of needs analysis and system design. The *resulting system* blueprint and mockup design are expected to be a reference for future development and implementation. The implementation of the system implementation, including the *coding*, integration, and functionality testing process, will be carried out at the next stage of research or development.

3. Results and Discussion

3.1. Needs Analysis

Based on the results of interviews and observations conducted on staff and participants involved in the internship program at the Communication and Information Service of East Kalimantan Province, a number of obstacles were found in the process that is currently underway. Existing systems still rely heavily on manual data collection and dispersed communication channels, leading to inefficiencies and the risk of data loss. Some of the problems identified include:

a. Registration of interns is still done manually using a physical form.
b. Verification of participant data and documents is done manually, which often causes delays and requires the physical presence of participants.
c. Daily attendance and activity reporting are managed separately, making it difficult to monitor and evaluate participant performance in *real time*.
d. The delivery of important information, such as the results of placement or issuance of certificates, is not integrated in the system, so there are often delays in the delivery of information.
e. There is no centralized system for creating, verifying, and distributing internship certificates, causing inconsistencies, delays, and increasing administrative workload.

Based on these findings, the following are the functional and non-functional needs identified for the apprenticeship management system

3.2. Functional Needs Analysis

The functional needs analysis aims to identify the main features and services that must be provided by the system in order to meet the needs of all interns (participants) in the

internship management process. This need is designed based on the main roles, namely interns, administrators (*admins*), and supervisors (*supervisors*). With the formulation of clear functional needs, system development can be more targeted and in line with expectations.

a. Intern

Interns are parties who undergo internship programs and interact directly with the system for various administrative and reporting purposes. Functional needs for participants include:

a) The system allows participants to register online.
b) The system allows participants to upload personal data and photo passes.
c) The system allows participants to fill out daily attendance and activity reports.
d) The system allows participants to view and update personal profiles.
e) The system allows participants to receive notifications regarding placement, evaluation, and certificate information.
f) The system allows participants to download a verified internship certificate.

b. Administrator

The administrator is responsible for data management, verification, and monitoring all activities of participants and supervisors in the system. Functional needs for admins include:

a) The system allows admins to verify participant data and documents.
b) The system allows admins to manage participant placement and division into work units/departments.
c) The system allows admins to send notifications to participants and supervisors.
d) The system allows admins to create and verify internship certificates.
e) The system allows admins to view, edit, or delete participant data if needed.

c. Supervisor

The supervisor plays a role in monitoring and evaluating the interns. The functional needs that the system must provide for the supervisor include:

a) The system allows the instructor to monitor attendees and activity reports.
b) The system allows the supervisor to evaluate the participant's performance at the end of the internship period.
c) The system allows the instructor to provide comments and scores on each participant.

3.3. Non-Functional Integrity Analysis

Secure user authentication means that the system must ensure that only users with valid credentials (username and password) can log in. And role-based access control (RBAC) means that each user can only access features or data that fit their role. Like admins can manage all the data, while regular users can only see their own data.

3.4. System Design

At the system design stage, the workflow and system structure are described in detail using flowcharts and UML (Unified Modeling Language) diagrams. Flowchart provides a visual representation of the main processes in the internship management system, showing the sequence of activities from participant registration, verification by admin, placement to department, daily attendance reporting, evaluation by supervisors, issuance of certificates, to final verification. The use of flowcharts helps stakeholders to more easily understand the logic and sequence of each process in the system.

a) Flowchart

The agency internship management process as seen in figure 2 begins with online participant registration through the system. Interns fill out the registration form and upload all the necessary documents as administrative requirements. After the registration process is complete, the incoming data will be verified by the admin. Admins play an important role in ensuring that all documents and data entered are complete and correct. If there are any deficiencies or errors in the uploaded data, the system will notify the participants to immediately make corrections or complete the data. This process can take place repeatedly until the participant's data is declared valid by the admin.

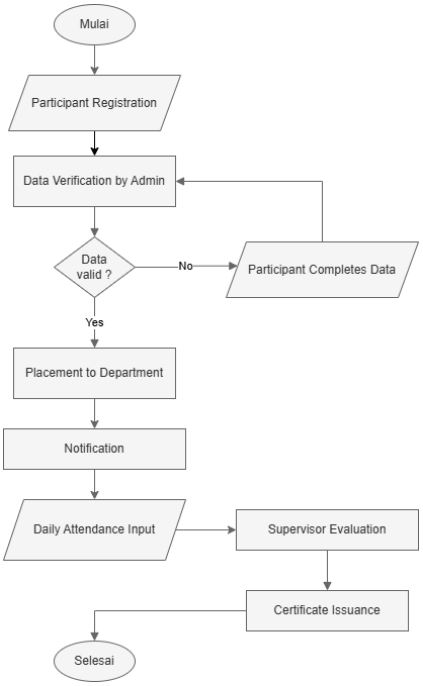

Figure 2. Flowchart (Flow diagram) of the system designed

After all participant data is declared valid, participants will be placed in a department or work unit that matches their educational background and organizational needs. This placement information is sent to participants through automated notifications from the system, so that participants can clearly know where they will undergo the internship program. During the internship period, participants are required to *input* daily attendance and fill out activity reports through the system. This activity facilitates *monitoring* by supervisors and admins to ensure that each participant is active and carrying out their duties properly. After the internship period is over, the supervisor will conduct a final evaluation of the participant's performance based on the attendance report and activities that have been recorded. This assessment forms the basis for the system to process the issuance of internship certificates.

The final stage of this process is the issuance of an internship certificate for participants who have completed the entire series of activities and are declared to have passed the evaluation by the supervisor. The certificate that has been issued is then verified by the admin, and participants can download the certificate as official proof of participation in the internship program. With this structured and automated flow, the internship administration process becomes more efficient, transparent, and accountable, both for participants, supervisors, and organizing agencies.

b) **Usecase diagram**

In a *use case diagram* for an apprenticeship management system, each actor is associated with a set of roles and interactions that reflect their responsibilities within the system.

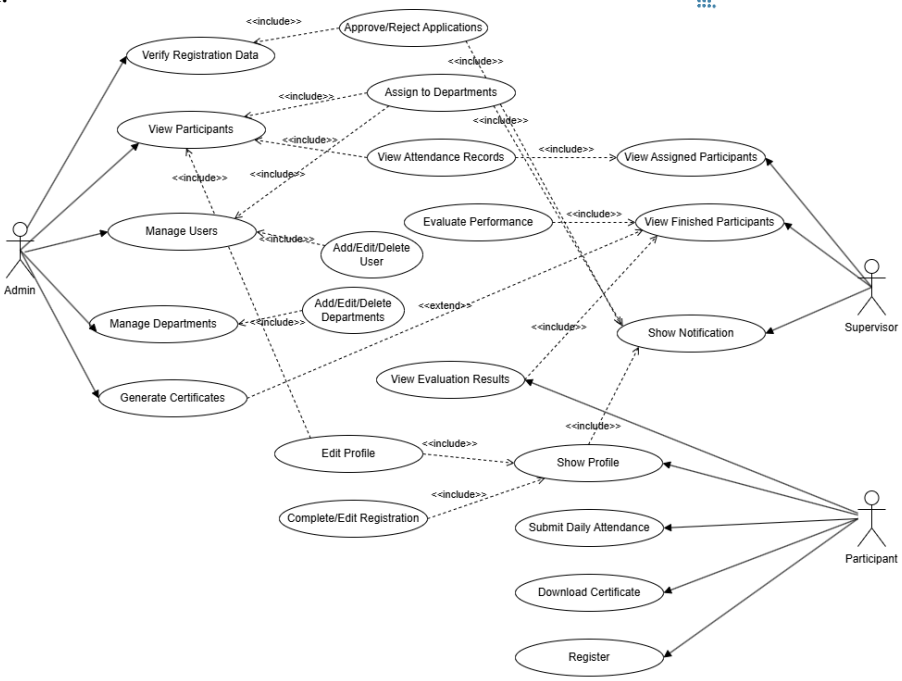

Figure 3. *Use Case Diagram* Designed system

1. Participants

Participants are responsible for registering into the system, completing personal data, and applying for an internship. After successful registration, participants can log in to the system, view notifications regarding the status of their application and placement, and update their personal profile if needed. During the internship period, participants are required to fill out daily attendance and activity reports through the system. After the internship period is over, participants can access the results of the performance evaluation and download the internship certificate after it has been verified by the admin.

2. Admin

Admin manages the entire internship program through the system. Admin duties include verifying registrations and documents submitted by participants, placement of participants to the appropriate departments, and managing user accounts. The admin is also responsible for sending notifications to participants and supervisors regarding the status of registration, placement, and issuance of certificates. In addition, admins verify and approve certificates before they can be downloaded by participants.

3. Supervisor

The supervisor is in charge of supervising and guiding the participants during the internship period. In the system, the supervisor can monitor daily attendance and activity reports submitted by participants. At the end of the internship period, the supervisor provides performance appraisals and comments on participants. This evaluation is the basis for the process of issuing an internship certificate.

c) Class Diagram

The Class Diagram illustrates the structure of an internship management system through key data entities and interentity relationships. Each class represents the components of the system along with its attributes and functions. These diagrams help visualize interactions between entities and support the design of systems and databases. The complete can be seen in Figure 4.

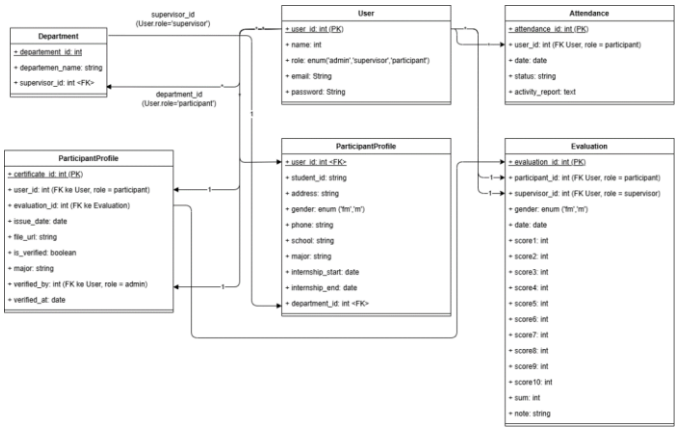

Figure 4. Diagram Class

Figure 4 Class diagram provides a structural overview of data entities and the relationships between entities in an apprenticeship management system. Each class in this diagram represents a core component or entity that has a specific role in the system. At the core of the class diagram there is a User class that is the parent entity for all system users, including participants, supervisors, and admins. User classes typically have attributes such as user ID, name, email, password, and role. For interns, additional information such as NIM/NIS, school or university origin, major, address, phone number, gender, and internship period is recorded in the ParticipantProfile class associated with the User.

Class Departments represent every department or division within the organization and are connected to supervisors (Users with supervisor roles) as well as many participants. Class Attendance records daily attendance data and activity reports filled out by each participant, including dates, attendance status, and activity descriptions. After the internship period is over, the supervisor provides an assessment of the participant's performance recorded in the Evaluation class. This assessment contains grades, comments, and connects directly with the relevant participants and supervisors. Based on this assessment, the system generates a Certificate that records the details of the certificate, the relationship to the evaluation, the verification status, the date of issue, and the verifying admin. All classes are interconnected through clear relationships. For example, a single participant (User) can have multiple attendance records, connect to one department, receive one assessment, and earn one certificate. With this class diagram, data integrity can be maintained, data management becomes efficient, and becomes a strong reference for database development and system application logic.

d) Activity diagram

The process in the activity diagram in figure 5 begins when participants fill out the registration form through the system. Once the data is submitted, the system automatically stores the registration data and sends a notification to the admin to carry out the verification process. The admin then checks the completeness and accuracy of the data submitted by the participant. If invalid, incomplete, or incorrect data is found, the admin will activate the revision notification sent to the participant. Participants are asked to correct the data and re-upload the information in question. If the data has been verified

and validated, the admin continues the process by assigning participants to the appropriate department based on certain criteria. Once the placement is done, the system automatically sends a placement notification to the participant as a sign that the process is complete.

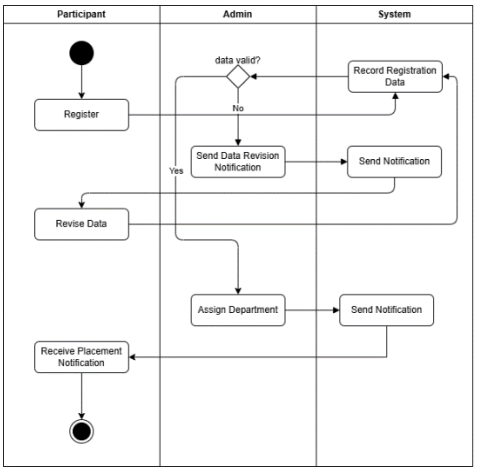

Figure 5. *Activity Diagram* Register Participants

Figure 6 illustrates the flow of activities related to the filling and monitoring of daily reports during the internship period. Every day, participants are required to fill out daily attendance and activity reports through the system. The system automatically saves the daily report data into the database. Supervisors can monitor these reports in *real-time* through the system interface. In this process, the role of the supervisor is limited to the monitoring function only; There is no obligation to verify or approve any reports submitted by participants. This flow of activities emphasizes the principles of transparency, monitoring efficiency, and simplicity of the process for participants and supervisors, so that all attendance records and daily activities are well documented and can be reviewed at any time if necessary.

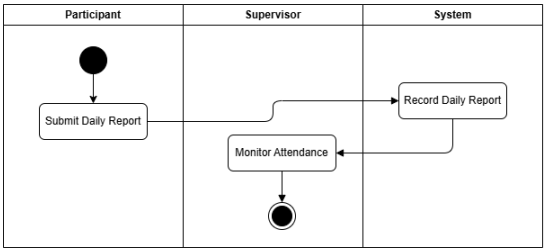

Figure 6. *Activity Diagram* Daily Report

Figure 7 illustrates the final evaluation flow, certificate issuance, and verification process in the apprenticeship system. The process begins when the system sends a notification to the supervisor that the participant has completed the internship. The supervisor then conducts a final evaluation, which is immediately recorded by the system. Based on the results of the evaluation, the system automatically generates participant certificates. Before it can be accessed, the certificate must be verified by the admin. After the verification is complete, the system sends a notification to the participants regarding the results of the evaluation and the availability of the certificate. Participants can then download a verified certificate, marking the completion of the internship process.

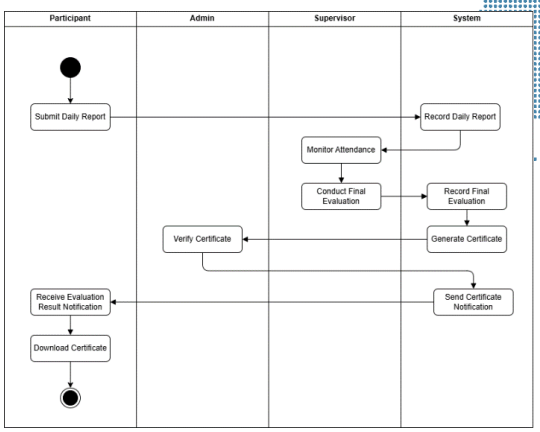

Figure 7. *Activity Diagram* create a Certificate

e) User Design

The user interface (UI) design of the Internship Program Management System is focused on simplicity, clarity, and ease of use for all users—participants, supervisors, and admins.

1) Login and Register Page

Figure 8 The login page shows a clean and simple interface, with the agency logo, login form for email/username and password, and buttons for new participant registration.

Figure **8.** Yard

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2) User Page

Participants can view and edit profile data, view placement details, and supervisor information. This page also provides an overview of the registration status and progress of participants during the internship. And also Participants can see the status of the internship certificate, whether it is still in process or has been verified. If it has been verified, a download button will appear so that participants can get their official certificate. Participants fill out attendance and report daily activity on this page. Easy-to-use forms and report history tables are available, so participants can monitor their internship progress.

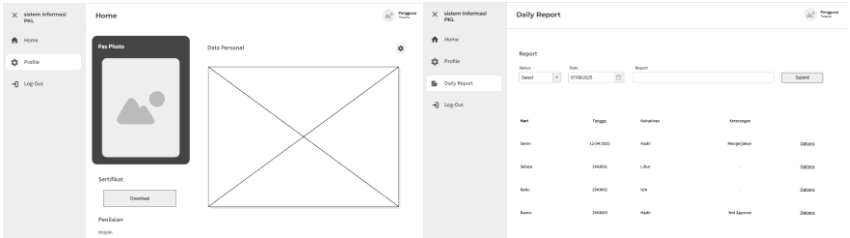

Figure **9.** User Page

3) Supervisor Page

Figure 10 is the Attendance page for the supervisor to provide a summary of the attendance report and daily activities input by all interns under his guidance. On this page, supervisors can view a list of participants, review each participant's attendance history, and access details of their daily activities. Important information such as the date of attendance, status (attendance/absenteeism), and activity description are clearly displayed. With this feature, supervisors can easily monitor intern participation, identify trends, and address attendee attendance or engagement issues during the internship period.

The Evaluation page allows the supervisor to give a final assessment to each intern he or she supervises. On this page, supervisors can select participants who have completed the internship and fill out an evaluation form, which usually consists of several assessment criteria (e.g., discipline, performance, cooperation, communication), a score column, and a section for comments or suggestions. After the assessment is saved, the results of the evaluation will be recorded in the system and used as the basis for the issuance of the internship certificate. This page simplifies the final assessment process and guarantees each participant a fair and documented evaluation.

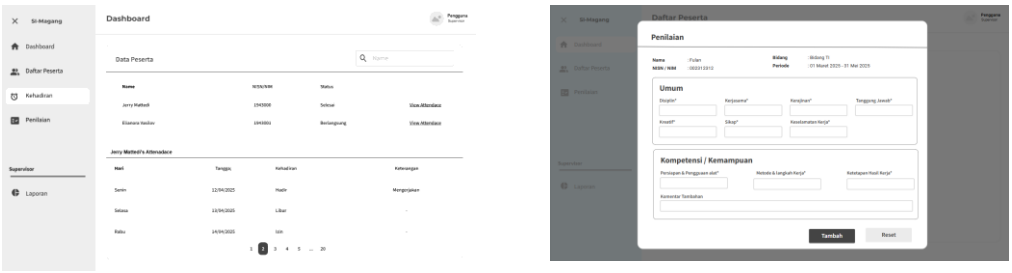

Figure **10.** Supervisor Page

4) Dashboard Page

The Admin Dashboard displays attendee statistics, data verification notifications, and certificate approvals. Admins can manage participants, fields, and certificates and monitor recent participant activity. This dashboard ensures that all important tasks can be accessed quickly and efficiently. It can be seen in Figure 10. For the supervisor dashboard , there is a difference in data, the data is displayed only on participants in their department.

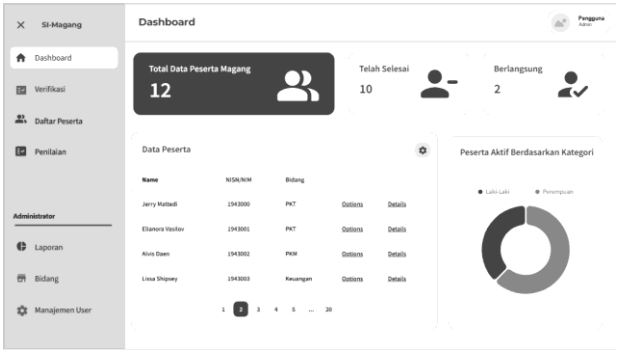

Figure **11.** Yard *Dashboard*

5) Verification and Certification Page

In Figure 11 the Verification Page is where the admin checks and approves the participant's documents as well as the internship certificate. On this page, admins can view a list of submissions awaiting verification, review the details of uploaded data or documents, and then approve or reject entries based on the results of the review. Once the document or certificate is verified, its status will be updated by the system and participants

will receive an automatic notification. This feature ensures that only valid and legitimate documents can be processed to the next stage.

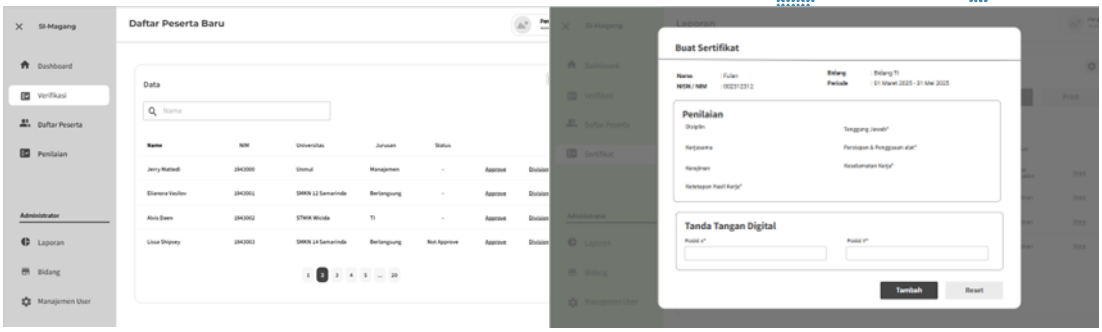

Figure **12.** Participant verification and Create certificate page

The certification page allows admins to check and approve internship certificates before they are awarded to participants. On this page, admins can see a list of certificates awaiting verification, complete with participant data and evaluation results. By clicking on any of the entries, admins can review the contents of the certificate, make sure all data and assessments are correct, and then choose to approve or reject the certificate. Once the certificate is approved, the status changes to "verified" and participants are automatically notified to download their official certificate.

4. Conclusion

This research has resulted in a comprehensive design for a web-based Internship Management Information System, intended for the Communication and Information Service of East Kalimantan Province. The proposed system design has covered the entire internship process, from participant registration, daily attendance reporting, evaluation by supervisors, to the issuance of certificates. By applying the SDLC Waterfall model, all system needs have been analyzed in detail and outlined in the form of a structured design, such as use case diagrams, class diagrams, activity diagrams, flowcharts, and user interface mockups. The resulting blueprint provides clear guidelines for the future development of the system and aims to improve the efficiency, transparency, and accountability of the management of the internship program.

It is recommended that the relevant agencies proceed to the next stage, which is the implementation and testing of the system that has been designed in a real environment. This step is important to validate the features of the system as well as identify the necessary improvements. Advanced research can focus on adding other modules, such as automated reporting, analytics dashboards, or integration with external academic systems. During the implementation process, regular user feedback is also highly recommended to keep the system in line with the organization's needs and goals

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