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Design of Training Cost Tracking Application at the Learning and Development Management Department of PT Bio Farma (Persero) Website Based

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Abstract

The advancement of digital technology is now a crucial factor in financial management, especially in the process of tracking employee training costs. This research aims to design and develop a website-based application that supports the Learning and Development Management Department of PT Bio Farma in monitoring training costs in real-time. The system development follows the Waterfall model which includes the stages of requirements analysis, system design, implementation, and testing. The application is equipped with key features, such as real-time cost monitoring, data integration for various Payment methods, including reimburse, transfer request, down Payment, down Payment liability, and Guarantee Letter. Testing was conducted using black-box testing to ensure the functionality of the application, as well as user evaluation to assess the effectiveness of the system in improving the efficiency of recording training costs. The test results show that this application can reduce the potential for recording errors, speed up the administrative process, and support data-based decision making more accurately and efficiently.

Keywords: Tracking cost, training, web-based application

1 INTRODUCTION

Advances in digital technology now play an increasingly important role in facilitating financial management in companies (Setyasih, et al., 2024), including in training activities at PT Bio Farma (Persero). PT Bio Farma, located in Bandung, is a state-owned pharmaceutical company engaged in vaccine production and distribution, with a mission to support public health through quality health products. As a large company that focuses on research and development, Bio Farma has several important departments, one of which is the Learning and Development Management Department. This department is responsible for the implementation of employee training and development activities, including the management of costs for various training activities.

However, in the implementation of training cost management, the Learning and Development Management Department often faces obstacles. One of the main issues is the difficulty in monitoring expenditure in real-time during activities, which often results in discrepancies between recorded and actual expenditure. In addition, the manual process of making reimbursements, transfer requests, advances, advance accountability, Guarantees is time consuming and prone to recording errors. These constraints indicate the need for a more integrated system so that the cost management process in training activities can run more efficiently, transparently, and accurately. Without a structured system, delays in recording and reporting costs can occur, hampering smooth administration and causing budget discrepancies. In addition, the lack of real-time visibility into expenditure can reduce the effectiveness of training evaluation and strategic decision-making. This could potentially result in sub-optimal resource allocation, difficulty in measuring the effectiveness of training investments, and delays in adjusting policies based on organizational needs.

As a solution, a web-based application was designed that has several key features to address these issues. The application includes a real-time cost monitoring feature to facilitate budget monitoring during training activities, ensuring that all expenses are recorded in a timely and accurate manner. In addition, this application is equipped with automatic reimbursement, transfer request, advance payment, Guarantee creation features that can simplify the cost submission process and reduce the risk of recording errors, approval and disbursement processes without the need for separate documents in Word or Excel. Thus, this application is expected to make the flow of cost management more efficient and structured.

In research conducted by Fendi Puji Atmiko et al who made a desktop application for controlling production costs which aims to keep costs incurred in accordance with the target and budget realization reports (Atmiko, et al., 2017). Leni Oktavia et al created a web-based application that aims to control production and operational costs and supervision of production costs, journals, ledgers, and income statements (Oktavia, et al., 2015). Arni Retno Mariana et al created a web-based application that aims to estimate products by changing the semi-manual system to an application that has a database-integrated system so that cost estimates can be better (Mariana, et al., 2021). Nurani & Syuryadi created a web and android-based application that aims to manage data and estimate the cost of food commodities on the market (Nurani & Syuryadi , 2022).

This research designs a tracking cost application to manage special costs in training activities at PT Bio Farma (Persero) to run more effectively and transparently. The system development uses the Waterfall model, which includes the stages of analysis, design, coding, and testing. This application is equipped with real-time monitoring features, reimbursement creation, transfer requests, advances, advance accountability, automatic guarantees, and training financing recapitulation reports to improve financial data accuracy. With this system, the expenditure monitoring process is more efficient, workflow is faster, and budget-related decisions can be made based on more accurate and relevant data. This application not only provides a practical solution in expense monitoring, but also speeds up workflow, allowing budget-related decisions to be made based on more accurate and relevant data.

2 LITERATURE REVIEW

2.1 Website

Website is a collection of HTML documents owned by a person or agency which contains data and information stored on a web server, and can be briefly defined as a collection of web pages stored in a domain / subdomain on the world wide web (Miftahuljannah & Suharso, 2023).

2.2 Application

The application is an applicable tool that functions specifically. The definition of an application in general is an applied tool that functions in an integrated and special way according to needs, it can also be interpreted as a device from a computer that can be functioned by users (Alfiansyah & Junianto, 2023).

2.3 Cost Management

Cost management practices are critical to achieving successful projects/jobs, minimizing cost overruns, and ensuring positive outcomes. Key practices such as efficient resource allocation, quality control, change management, and progress monitoring and control contribute to cost control and reduce cost overruns (Shah, et al., 2023).

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2.4 Training

Training is an activity aimed at developing skills, experience, knowledge and changes in attitude. Job-related training is usually given to employees whose tenure has been long enough. Training is usually a set of individual activities that are useful for improving practical skills and knowledge so that the employee will have a more professional performance (Susilo, et al., 2022).

2.5 PHP

PHP (Personal Home Page) is a programming language used to manage databases and website content, making it possible to create a dynamic web. In addition, PHP can be combined with HTML to develop various features on a website (Arafat, et al., 2022).

2.6 MySQL

MySQL is a system for database management that has a function to connect PHP scripts through query commands, allowing to manage and manipulate data efficiently to develop the web (Wulandari & Nurmiati, 2022).

2.7 JavaScript

JavaScript is a script-based programming language that functions to increase interactivity in a web document. From this definition, it can be concluded that JavaScript is used to add dynamic features to HTML and enrich the appearance and functionality of a web page (S, et al., 2021).

3 RESEARCH METHODS

This research uses the Waterfall method, which consists of several sequential stages. The stages are described as follows, and an illustration of the Waterfall model can be seen in Figure 1.

3.1 Analysis

At this stage, identification of system requirements is carried out through several methods:

1. Observation: Directly observing the workflow of training cost management in the Learning and Development Management Department of PT Bio Farma (Persero) to understand the system requirements in detail.
2. Interview: Conducted to gather system requirements and information on the challenges faced in recording and monitoring training costs from the Manager and two staff from the Learning and Development Management Department of PT Bio Farma (Persero).
3. Literature Study: Reviewing various references related to information systems and training cost management methods to ensure that the system developed has a strong foundation and is in accordance with best practices.

3.2 Design

This stage aims to use UML diagrams (activity diagrams, use case diagrams and class diagrams) to describe the workflow and the corresponding system (Setiaji & Sastra, 2021):

1. Activity Diagram: Depicts the flow of user activity in the system, from SPRL creation to financial report monitoring.
2. Use Case Diagram: Shows the relationship of functions available in the application.

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3. Class Diagram: Describes the relationships between entities, methods and attributes used to support business processes in the application.

3.3 Coding

At this stage, the system is developed using various technologies, including:
1. Programming Languages: PHP and JavaScript, which are used to build the application logic and improve the interactivity of the interface.
2. Framework: Bootstrap is applied to design a responsive and user-friendly interface.
3. Database: MySQL is used as the database management system, which is designed to handle training fee transactions efficiently.

3.4 Testing

The system is tested using the Black-box Testing method, which focuses on testing the functionality of each feature without looking at the source code. This test aims to ensure that the application can run according to user needs, and all features have functioned properly according to the specifications set (Fikri & Voutama, 2023).

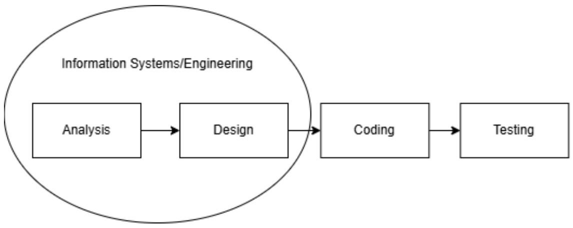

Figure 1. Waterfall Method (A.S & Shalahuddin, 2019)

4 RESULTS AND DISCUSSION

The results of the analysis based on interviews and observations of the Learning and Development Department show the main needs for the training cost tracking application, namely: real-time cost monitoring, management of payment methods (reimbursement, advance & advance liability, transfer request, Guarantee), automatic financial report generation.

4.1 System Design

The system design consists of designing activity diagrams, use case diagrams, activity diagrams and class diagrams. Figure 2 This diagram shows the Admin workflow in the system. Admins can login to access the Dashboard, SPRL, and Reports. Payment features include Advance, Advance Accountability, Reimburse, Transfer Request, and Guarantee Letter. The include relationship indicates the dependency between features, such as Advance Accountability which can only be done after an Advance is created. After completion, the Admin can log out of the system. While Figure 3 explains the activities carried out in the training monitoring process starting from inputting SPRL, making Payment, creating reports to find out the expenditure of training costs in a certain period. Then Figure 4 displays a class diagram that represents the structure of the SPRL system in managing training and financial administration. This diagram consists of several main classes, including SPRL, Users, Participant, Training Type, Payment, Report, and various payment methods such as Advance, Reimburse, Guarantee, and Transfer Request. Each class has a specific role and is interconnected to support the process of recording training data and payment transactions. SPRL as the main entity has a relationship with Users who can create SPRL, as well as with Participants to record training participants. TypeTraining is associated with SPRL to determine the

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type of training, such as Overseas, In-house, Internal, and Domestic Training, each with its own attributes and cost calculation methods. The system also includes financial management with the Payment class, which is associated with various payment methods, including Advance, Reimburse, Guarantee, and Transfer Request, ensuring that every transaction is properly recorded. In addition, the Report class allows the generation of reports based on specific timeframes.

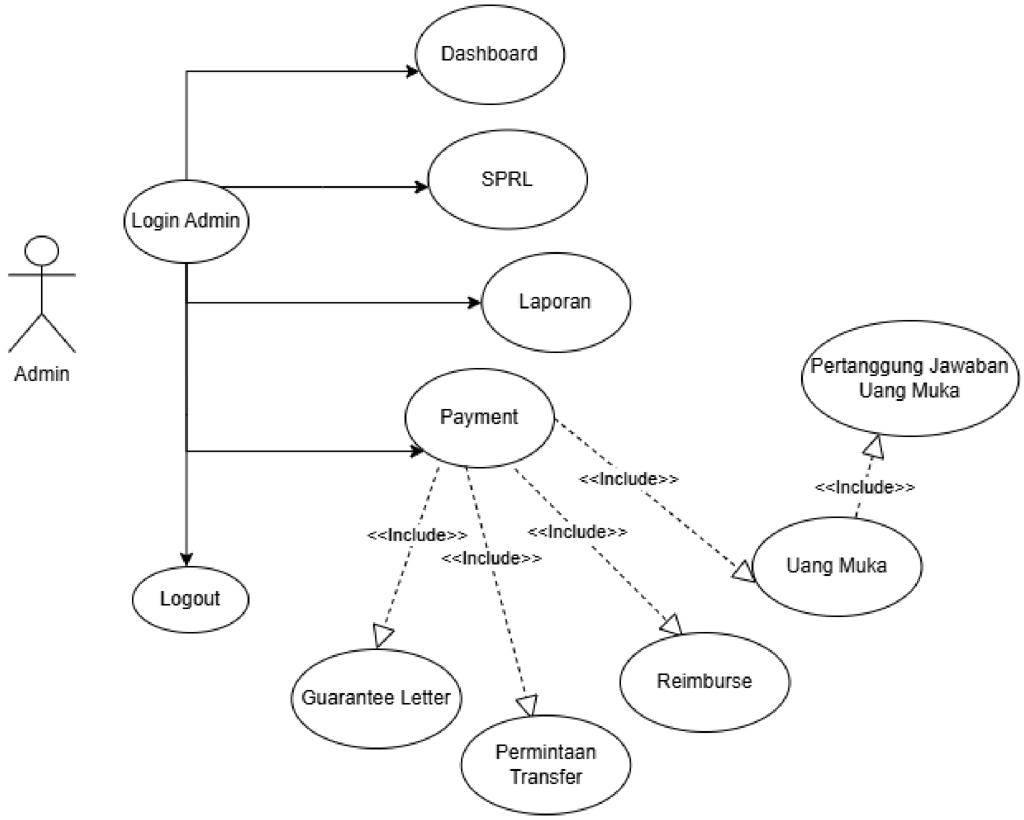

Figure 2. Use Case Diagram Tracking Cost

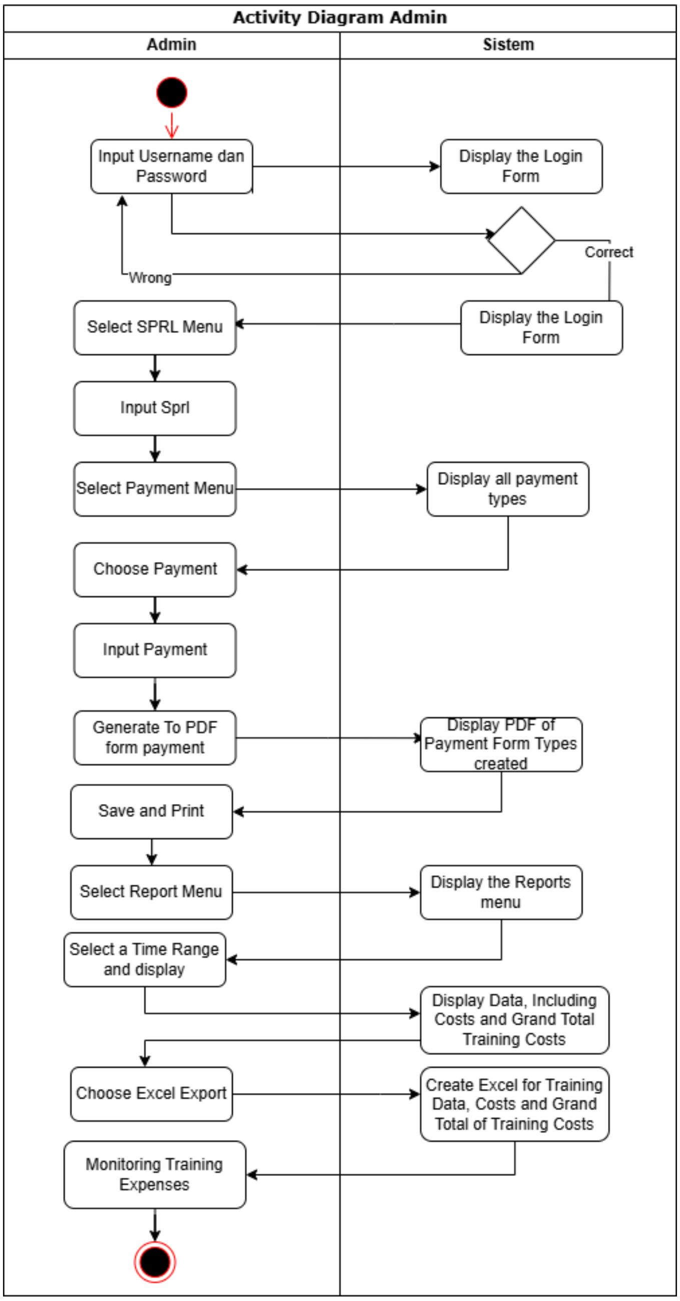

Figure 3. Activity Diagram

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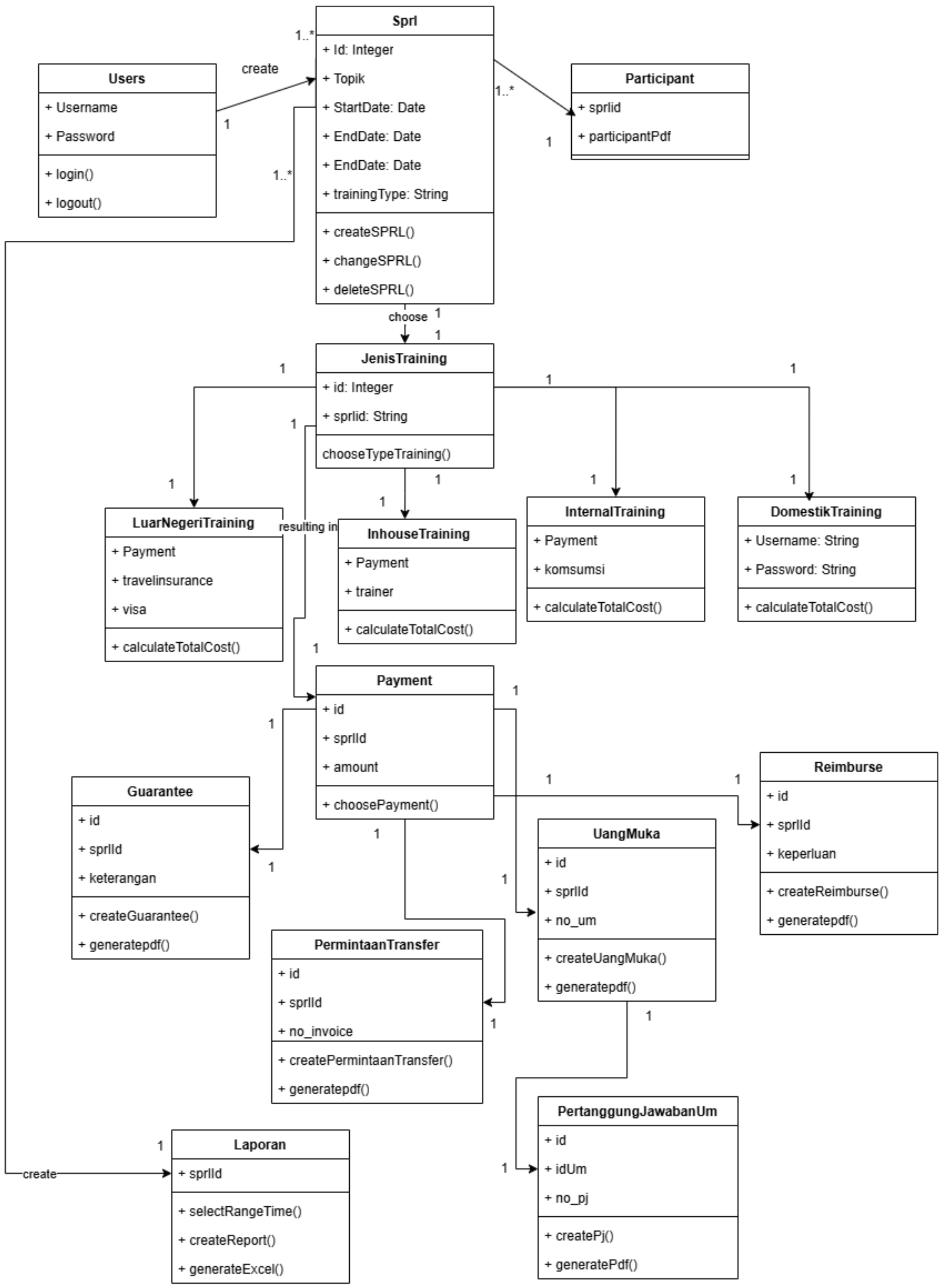

Figure 4. Class Diagram

4.2 Implementation

At this stage of system implementation, it contains the results of the implementation of designs and needs in the Development and Learning Management Department of PT Bio Farma (Persero).

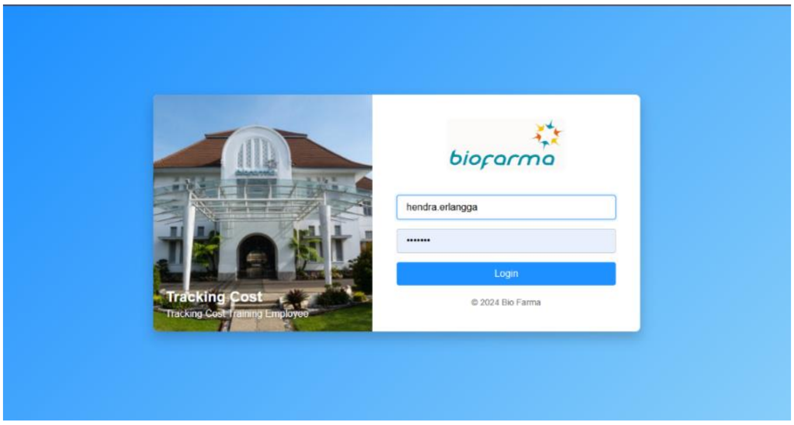

Figure 5. Login

Figure 5 accesses the cost tracking application. On this page, the admin is required to enter a username and password that has been registered previously. This login process aims to ensure that only users who have valid credentials can enter the system, so that data and information security is maintained.

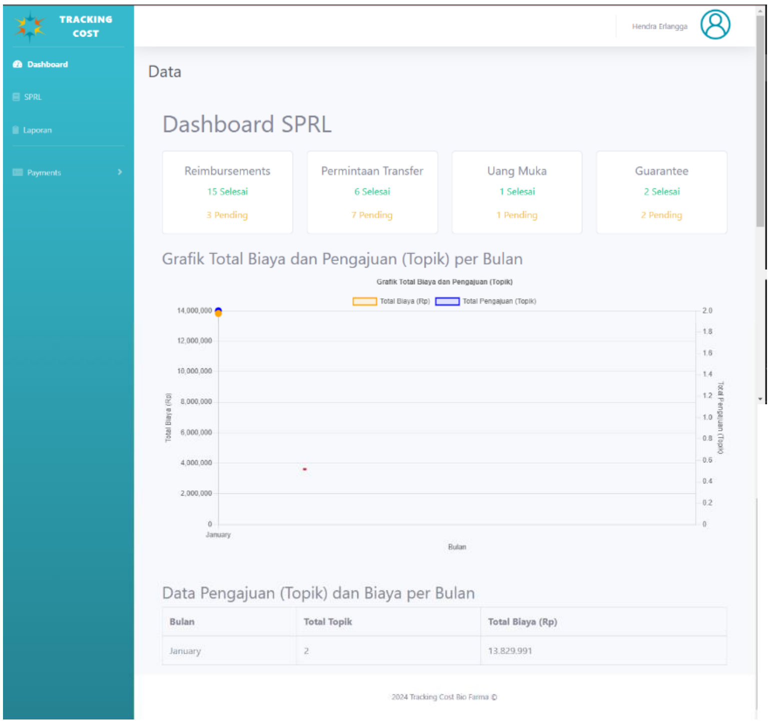

Figure 6. Dashboard

Figure 6 is a view of the dashboard that displays cost data from SPRL input in real-time. The dashboard can also be used for monitoring, the admin can immediately see when he first logs in, in the Dashboard view, information is provided regarding the graph of total costs and submissions (topics) per month, submission data tables (topics) and costs per month, but here the admin can only monitor all cost data per month. Admins can monitor the status of payments related to training activities. This includes payments that are still pending or have not been made, as well as payments that have been successfully completed. With this feature, admins can easily find out the number of

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payments that still need to be processed and use it as a reminder to follow up on transactions that have not yet been made.

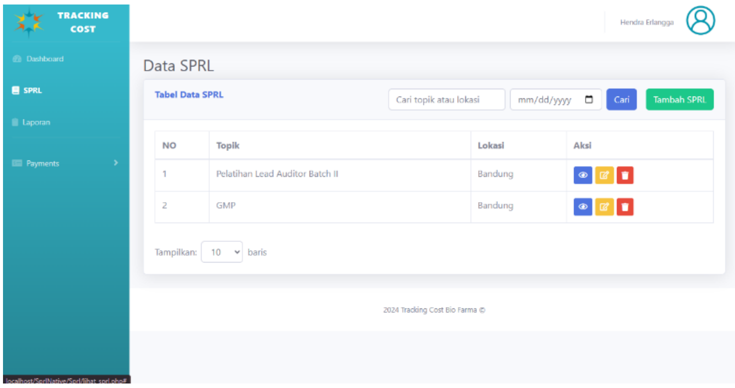

Figure 7. SPRL Menu

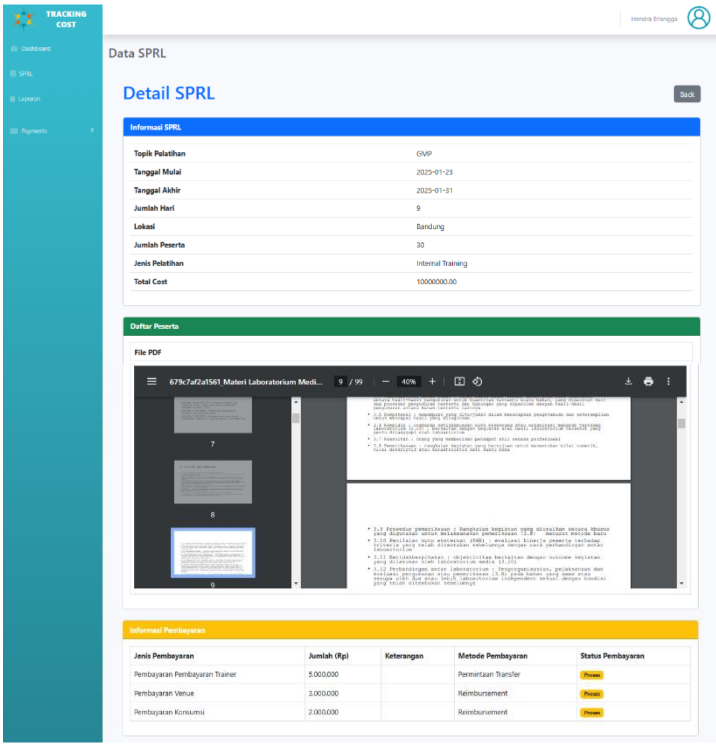

Figure 8. SPRL Detail

Figure 7 displays the SPRL (Surat Pengajuan Realisasi Learning) feature which is used to manage the submission of each training, starting with the process of inputting data such as training topics, start and end dates, number of days (auto-filled), location, number of participants and participant list in pdf form. The admin also selects the type of training, which determines the available payment methods and types: Public Training - Domestic (Training, Venue, Transportation, SPPD), Public Training - Overseas (Training, Venue, Transportation, Visa, Travel Insurance, SPPD), Inhouse Training (Trainer, Venue, Consumption, Others), Internal Training (Trainer, Venue, Consumption). After that, the admin fills in the payment amount, description (optional), and chooses one of the four payment methods then save.

Figure 8 displays the SPRL data that has been saved, the admin can search and view the SPRL details again which contains the training topic, date, number of participants, total cost, list of participants, as well as payment details such as training type, amount, payment method and payment status, the payment status is divided into “Process” and “Done”, if a payment has been made, the status automatically changes to “Done”, while if it has not been made then the status will remain in “Process”, this aims to allow the admin to monitor the progress of training payments.

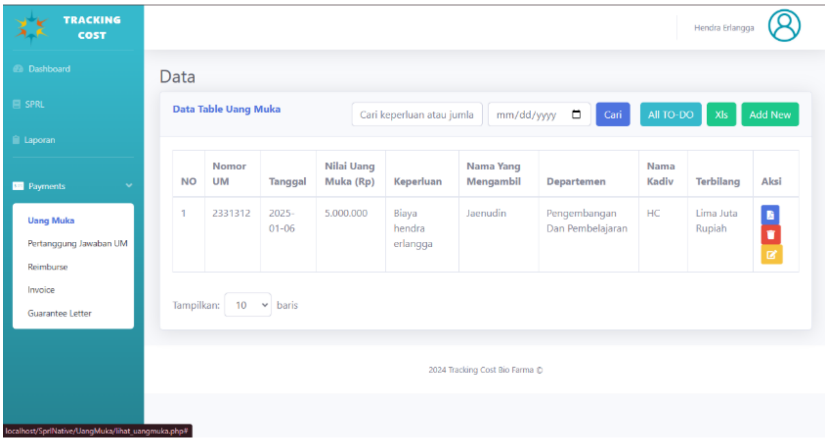

Image 9. Advance Payment

Figure 9 shows an example of the payment system used to manage transactions, including reimburse requests, advances, advance liability, transfer requests, and guarantees. Data is automatically retrieved from SPRL. Each menu in the Payment feature-such as Advance, Advance Liability, Reimburse, Invoice, and Guarantee Letter-allows admins to create payments according to the inputted SPRL. There is a “To Do” feature, which helps admins view unprocessed transactions and instantly create payments with the selected method. However, Advance Accountability can only be created based on completed Advance data. The table in this menu displays all available Advance data, so admin can select and input the accountability according to the available form, after the transaction is created, admin needs to click “Done” in “To Do” for the payment status in SPRL Details to change.

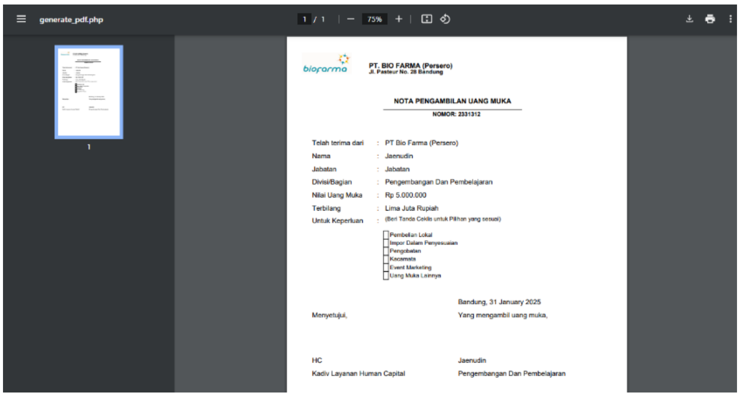

Figure 10. Result Generate PDF Payment Advance

Figure 10 displays the Down Payment PDF Generate, here the admin can Generate PDF, where each payment method has a different PDF format. Although the input flow is similar, each method has different inputs and outputs. Admins can also edit or delete incorrect payment data without affecting the original SPRL data. If required, all payment data can be exported to Excel.

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4.3 System Testing

Testing was carried out using the Blackbox method, this test can be seen in Table 1.

Table 1. System Testing

Feature Tested	Scenario	Result	Remarks
Login	Enter username and password	Valid	Successfully displays the dashboard page
Add SPRL Data	Click "Add SPRL" button and fill in all SPRL data	Valid	Successfully added SPRL data
Search SPRL Data	Enter SPRL name in the search field and click "Search"	Valid	Successfully displayed the searched SPRL
Edit SPRL Data	Click the pencil icon and edit the data	Valid	Successfully updated SPRL data
Delete SPRL Data	Click the trash bin icon to delete the data	Valid	Successfully deleted SPRL data
View SPRL Details	Click the eye icon to view details	Valid	Successfully displayed SPRL detail
Add Advance Payment Data	Click "Add New" and create an advance payment	Valid	Successfully added advance payment data
Edit and View Advance Payment Data	Click the pencil icon and modify advance payment	Valid	Successfully viewed and updated advance payment data
Delete Advance Payment Data	Click the trash bin icon to delete advance payment	Valid	Successfully deleted advance payment data
Generate Advance Payment PDF Form	Click the document icon to auto-generate the form	Valid	Successfully auto-generated the advance payment form
Export to Excel	Click the "XLS" button	Valid	Successfully exported advance payment data to Excel
View Advance Payment To-Do List	Click "All To Do" to view the full To-Do list	Valid	Successfully displayed all To-Do items
Create Advance Payment from To-Do	Click "Create" button to make an advance payment	Valid	Successfully created and added advance payment data
Mark To-Do as Done	Click "Done" to remove item from To-Do list	Valid	Successfully removed item from To-Do list
Add Reimbursement Payment Data	Click "Add New" and create a reimbursement	Valid	Successfully added reimbursement data
Edit and View Reimbursement Payment Data	Click the pencil icon and modify reimbursement	Valid	Successfully viewed and updated reimbursement data
Delete Reimbursement Payment Data	Click the trash bin icon to delete reimbursement	Valid	Successfully deleted reimbursement data
Generate Reimbursement PDF Form	Click the document icon to auto-generate the reimbursement form	Valid	Successfully auto-generated the reimbursement form

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Feature Tested	Scenario	Result	Remarks
Export to Excel (Reimbursement)	Click the "XLS" button	Valid	Successfully exported reimbursement data to Excel
View Reimbursement To-Do List	Click "All To Do" to view all To-Do items	Valid	Successfully displayed all reimbursement To-Do items
Create Reimbursement from To-Do	Click the "Create" button to make a reimbursement	Valid	Successfully created and added reimbursement data
Mark To-Do as Done (Reimbursement)	Click "Done" to remove the item from the To-Do list	Valid	Successfully removed item from reimbursement To-Do list
Add Transfer Request Payment Data	Click "Add New" and create a transfer request	Valid	Successfully added transfer request data
Edit and View Transfer Request Payment Data	Click the pencil icon and modify transfer request	Valid	Successfully viewed and updated transfer request data
Delete Transfer Request Payment Data	Click the trash bin icon to delete transfer request	Valid	Successfully deleted transfer request data
Generate Transfer Request PDF Form	Click the document icon to auto-generate the form	Valid	Successfully auto-generated the transfer request form
Export to Excel (Transfer Request)	Click the "XLS" button	Valid	Successfully exported transfer request data to Excel
View Transfer Request To-Do List	Click "All To Do" to view all To-Do items	Valid	Successfully displayed all transfer request To-Do items
Create Transfer Request from To-Do	Click the "Create" button to make a transfer request	Valid	Successfully created and added transfer request data
Mark To-Do as Done (Transfer Request)	Click "Done" to remove the item from the To-Do list	Valid	Successfully removed item from transfer request To-Do list
Add Guarantee Payment Data	Click "Add New" and create a guarantee	Valid	Successfully added guarantee data
Edit and View Guarantee Payment Data	Click the pencil icon and modify guarantee	Valid	Successfully viewed and updated guarantee data
Delete Guarantee Payment Data	Click the trash bin icon to delete guarantee	Valid	Successfully deleted guarantee data
Generate Guarantee PDF Form	Click the document icon to auto-generate the form	Valid	Successfully auto-generated the guarantee form
Export to Excel (Guarantee)	Click the "XLS" button	Valid	Successfully exported guarantee data to Excel
View Guarantee To-Do List	Click "All To Do" to view all To-Do items	Valid	Successfully displayed all guarantee To-Do items
Create Guarantee from To-Do	Click the "Create" button to make a guarantee	Valid	Successfully created and added guarantee data
Mark To-Do as Done (Guarantee)	Click "Done" to remove the item from the To-Do list	Valid	Successfully removed item from guarantee To-Do list

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Feature Tested	Scenario	Result	Remarks
Add Advance Payment PJ Data	Click the “Add” button and create a PJ Advance Payment	Valid	Successfully added PJ Advance Payment data
Edit and View PJ Advance Payment Data	Click the pencil icon and modify PJ Advance Payment	Valid	Successfully viewed and updated PJ Advance Payment data
Delete PJ Advance Payment Data	Click the trash bin icon to delete PJ Advance Payment	Valid	Successfully deleted PJ Advance Payment data
Generate PJ Advance Payment PDF Form	Click the document icon to auto-generate the form	Valid	Successfully auto-generated the PJ Advance Payment form
Export PJ Advance Payment to Excel	Click the “XLS” button	Valid	Successfully exported PJ Advance Payment data to Excel
Select Report Date Range	Click the “Start Date” and “End Date” buttons to select SPRL period	Valid	Successfully selected the report date range
Display Report Data	Click the “Display” button	Valid	Successfully displayed report data
Export Report Data to Excel	Click the “Export Excel” button	Valid	Successfully exported report data to Excel

5 CONCLUSION

The implementation of the website-based Cost Tracking Application has successfully integrated the overall management of training costs, including real-time cost monitoring, reimbursements, transfer requests, guarantees, advances, and accountability for advances. With this system, training financial data is recorded centrally, making it easier to manage administration and speeding up the process of recording and financial reporting. The efficiency of the system is reflected in the reduction of time required for recording transactions and the ease of tracking expenditure history. In addition, the real-time monitoring feature allows users to control the budget more effectively, avoid wasting costs, and ensure every transaction is well documented. Transparency in cost management is also increased as every expenditure can be monitored directly by relevant parties, reducing the risk of recording errors and increasing accountability in the financial management process. For further development, this system can be improved by adding an analytics module that serves to evaluate the effectiveness of training costs on improving employee competence. This module can present data-based analysis reports, such as budget comparison with training results, identification of spending patterns, and cost efficiency recommendations based on historical data. Thus, companies can make more data-driven strategic decisions in planning future training budgets.

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