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WEB-BASED APPLICATION DEVELOPMENT FOR TRAINING DATA MANAGEMENT USING REACTJS

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ABSTRACT

This research was conducted to develop a web-based information system for training data management to improve training programs and business opportunities for companies. The management of training data includes training programs, participant data, invoice data, attendance numbers of participants, certificates and reports that have not been optimally carried out by the company. Based on these problems, the training manager was less effective and efficient. From these problems, this research is aimed at developing a system managing training data. The method used is scrum method. Web-based application design using ReactJS and MySQL as the database, with the Java and JavaScript programming languages. The development of this web-based information system aims to make it easier to manage training data that has been implemented according to the schedule and timeline of the training program. From the results of system integration test (SIT) and user acceptance test (UAT) it can be concluded that information systems developed with the addition of other features increase effectiveness by as much as 90.4%, efficiency is obtained by as much as 91.2%, then for user satisfaction by employees and admin as much as 92.6%. The evaluation results that have been carried out by the application are very feasible to use, namely 91.5%.

INTRODUCTION

The importance of training and developing human resources in the current era is to create good and quality human resources. With the existence of human resources that have good quality, will help the company to achieve the goals that have been set. With the utilization and development of information technology, it is hoped that it will assist companies in improving and facilitating the management of data and information related to the implementation of training and consulting. Data collections and management of training programs in companies are still not effective and efficient. The manager training section uses a platform that is rented through a technology services company, but this makes the allocation of funds considered quite high because the rental fee is relatively expensive for a standard platform. Without digital assistance, storing training data still in excel form will accumulate and be difficult to manage, training registration is also inefficient because it depends on the schedule provided in excel data which is also updated manually and the registration flow is difficult for participants to access. Therefore, for the development of the data collection process, a web-based system is needed. Recording reports on the results of training also takes a long time because the storage still uses local files. One of the applications of technology in the field of training is to develop a Training Delivery System platform for employees and trainees

with a system that stores data in a structured manner and can be managed and printed for recording training reports.

A Relational Database Management System (RDBMS) is a database system that is commonly used for system databases. NoSQL is a better database option if you need data storage because it has faster performance when handling large amounts of data, different from RDBMS which tends to have decreased performance when used to store large amounts of data (Ongo & Kusuma, 2018). This website uses Java programming to build the back-end web section. A program consists of more than a sequence of instructions or program instructions. Developers research test cases, documentation, variable names, program structure, version control repositories, and more (Ernst, 2017).

Previous research by Raveena (2019), examined the development of web-based applications, it stated that the existence of web-based application development helps individuals to easily have correspondence with existing frameworks. Then, research related to the development of web models with ReactJS has also been carried out by Aggarwal (2018). Referring to previous research by (Rawat et al., 2021), the main purpose of the database is to process data so that it can adjust information and data retrieval, deletion, and editing accurately. The method used for the development of information systems in research uses the scrum method where according to Andipradana and Hartomo (2021), the scrum method is used for system development carried out using the scrum method with the existing stages to produce a complete application. In research of Ayu and Manalu (2020) used the PHP programming method, as well as MySQL as the database. The problem that has occurred is that so far, data recording or storage at the Pekanbaru Community Training Center office is still in manual form and lies with each committee. Subsequent research by Sadiaha (2020) discusses Website Management Training and ICT Literacy Evaluation. The research method used consisted of three stages, namely website development planning, training website management, and evaluation. The use and management of e-Government websites is still considered low. This has implications for the level of online public services that are less than optimal. Based on data from the web evaluation that is good and in accordance with the needs of village officials, the data management ability of village officials has increased from 40% to 80%. This shows that the ability to manage data is already high, namely 80% which indicates that the web-based data management system in the village government is ready to be developed.

Table 1. Analysis of Similar Research and Application

No	Author	Title	Correlation
1	(Aggarwal, 2018)	Modern Web-Development using React JS	ReactJS has strong strengths and features to meet the requirements of current trends.
2	(Syahwal & Agustina, 2019)	Sistem Informasi Manajemen Administrasi Pelatihan pada PT. Disi Solusi Mandiri Bekasi	Conduct MySQL database to simplify management of training administration.

3	(Mansoor & Abdullatif, 2017)	Design and Implementation Dynamic Website for Electronic Library	MySQL database which provides a mechanism to store, retrieve data and grant permissions to any user as planned by the system administrator, and provide flexibility.
4	(Andipradana & Hartomo, 2021)	Rancang Bangun Aplikasi Penjualan Online berbasis Web menggunakan Metode Scrum	Scrum is able to complete applications by relying on coordination between team members to achieve the goals of each of the features needed by the user properly.
5	(Wang et al., 2022)	Automatic Generation of Acceptance Test Cases From Use Case Specifications: An NLP-Based Approach	User acceptance testing (UAT) is a process of verifying a solution works for user.

METHOD

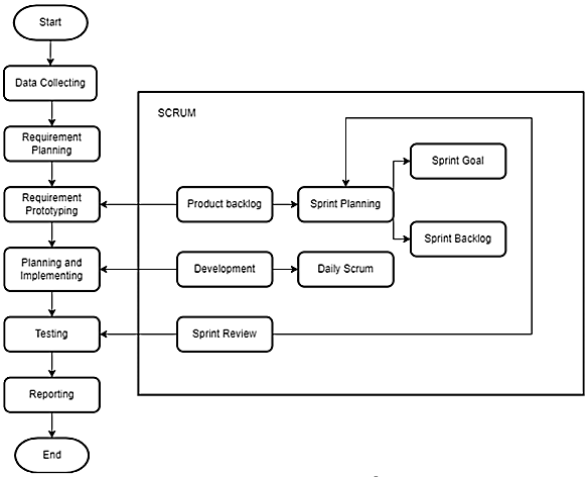

Figure 1. The Stage of Research

The development of a web-based information system begins with the data collection process to determine the needs analysis of the application users. The design of this information system uses the scrum method. Scrum, according to Schwaber and Sutherland (2017) is a software engineering method that uses agile principles that rely on the strength of team collaboration, incremental products and an iterative process to realize the final result. Scrum is the best method used in development for software development, research that requires a short time can be used also in other fields (Srivastava et al., 2017). The scrum approach method is applied in developing a web-based information system to be built, where a sprint mechanism is needed which starts with

several processes shown in Figure 1 The stage of research. In this study the analysis was carried out by collecting questionnaires. The purpose of the process is to find out the analysis of user needs so that requirements prototyping can be carried out. After the design has been completed, the features in the design will begin to be built. In research by Agustinna et al. (2014) the "sprint" method applied makes it easier for developers to discuss requirements that need to be developed, modified, repaired, or added based on the results of the step-by-step evaluation carried out. The results of this study are with the application, it is possible to arrange your tour visits without assistance, 28 out of 54 respondents (52%) answered that with this application it becomes easier.

Each feature segment designed is done in one sprint. At the end of the sprint, a demonstration of the development of existing applications is carried out. It can be found that the initial planning and development estimates are optimistic for estimating and planning improved from each sprint stage, and carried out each stage (Mahnic, 2011). The sprint plan for this research was made using a planning comparison table for each program segment made with the actual processing shown in Figure 2 Sprint Plan of Study.

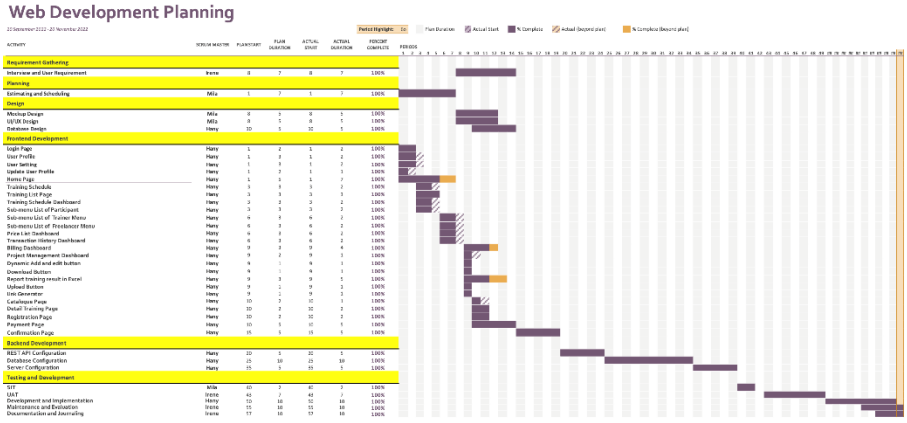

Figure 2. Sprint Plan of Study

Research was conducted to solve these problems in order to be able to provide better training in the future. Web applications are made to overcome problems that are still owned by several similar applications. In accordance with the problems that occur, a solution is created in the form of a website to manage training data and register training online. Website development using an object-oriented programming (OOP) approach. OOP is a method with object-oriented programming. The OOP method is formed from objects that are interrelated and arranged into a group called a class (Saha et al., 2021). On the front end, websites are built using react JS, react JS is a JavaScript library that is commonly used when building the User Interface of a website or web application (Haverbeke, 2018). Website development using OOP and a modern website appearance makes it easier for every user to use. It will also increase business and reduce costs for companies to rent platforms that are used to manage each training data. This website was developed using the UML method, the authors use use case diagrams and class diagrams as a web

design plan that fits the needs of the research. UML is a development modeling language used in the field of software engineering aimed at providing a method for visualizing system designs.

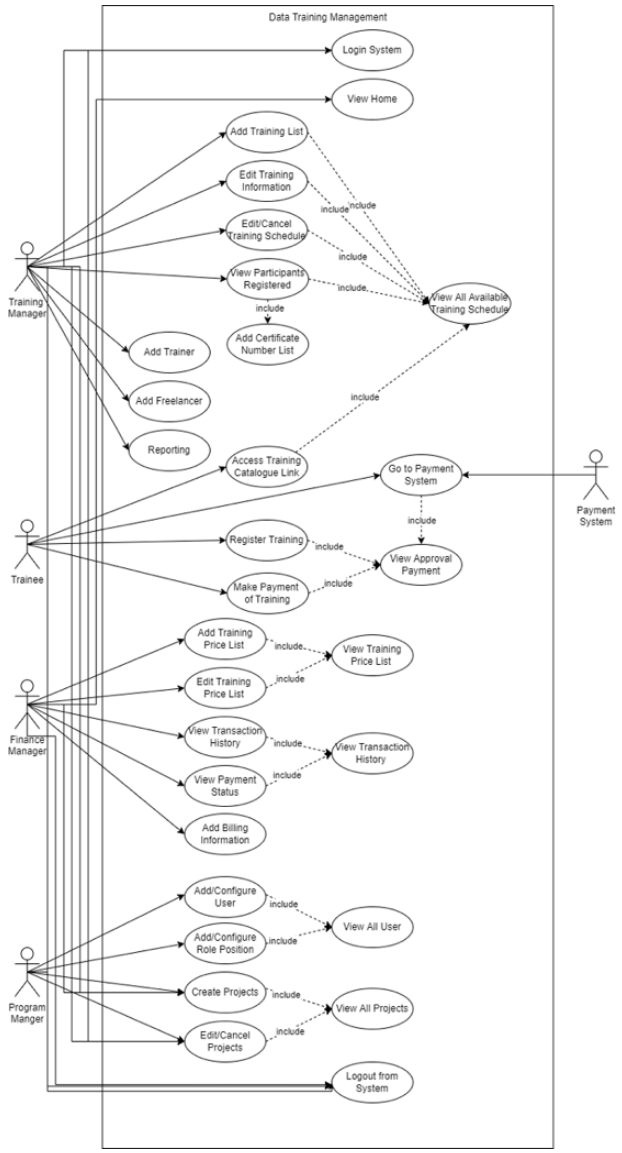

Figure 3. Use Case Diagram

The use case diagram describes the functional requirements of the software (Fauzan et al., 2021). Use case is an overview of system functions from the point of view of system users (Sualim et al., 2016). UML diagrams are described like class diagrams, UML is an important thing in web-based software development (Bian et al., 2019). Use case diagrams are an important part of the analysis and specification of system functional requirements. Use case diagrams represent a visual representation of possible interactions between system actors and their functions (Essebaa & Chantit, 2018).

The use case design for this system is shown as in Figure 3 This website is built into several role sections consisting of the management side and the customer side, where on the management side (company) has a website that is used to enter all training data lists, create training schedules, view the list of trainees, add a list of trainers who will teach the training. The training manager can also view reports on the results of the training that has been completed. Finance managers can recap all transaction history from training participant registration. Participants are easy to register for training registration. Participants are also able to view catalogue in a link containing various types of training available. Every time there is a change in schedule, it can also be seen directly in this application so there is no need for a registration and re-approval process from the developer and team leader side.

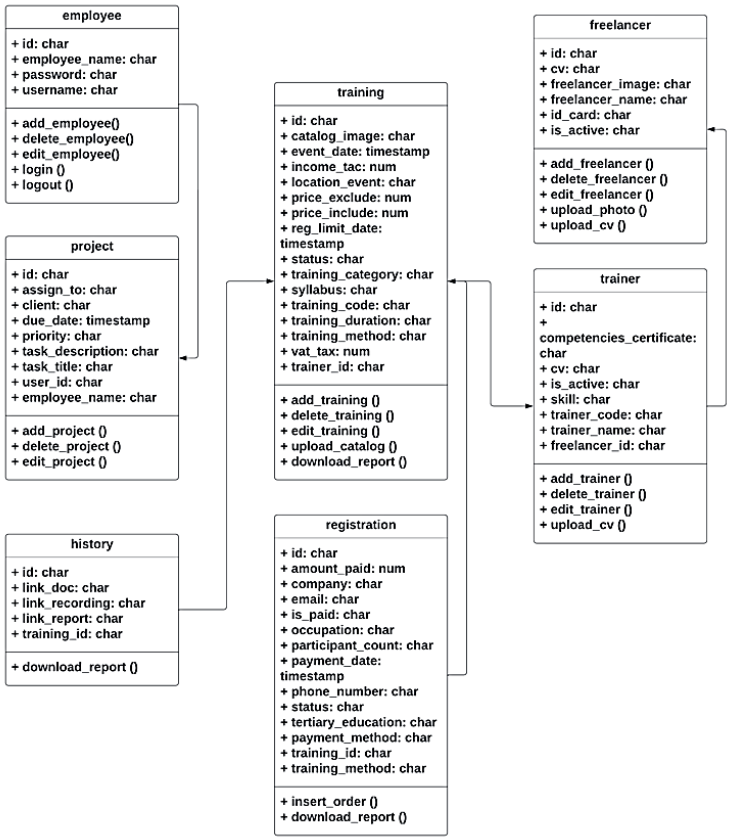

Figure 4. Class Diagram

Class diagrams are diagrams that describe classes and their relationships. Class diagrams describe the data found in a software system (Sualim et al., 2016). According to Serepia (2019), Class Diagram is a specification which, if instantiated, will produce an object and is the essence of development and object-oriented design. The class diagram design for the system being built can be seen in Figure 4 Class Diagrams. The class diagram contains objects such as employee objects, admin users who are users of the system, training, projects, freelancers, trainers which are

objects that contain criteria data, sub-criteria which are objects that contain sub-data criteria such as registration and history.

RESULT AND DISCUSSION

Interface Design

The implementation of the user interface system that has been built consists of several user interfaces. The interface in Figure 5 Dashboard, describes the menu display as well as overall information on the system, which consists of the number of trainings, the number of participants who have attended the training, the number of trainers, the number and number of freelancers. At the bottom there is also ongoing training with the status on going. There is a project table or whatever will be done and done in time for employee users to be able to manage training data management.

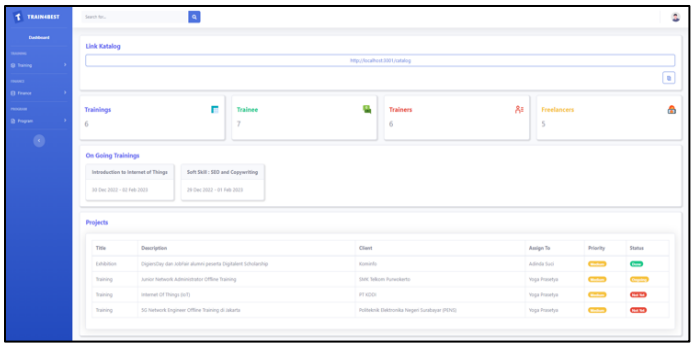

Figure 5. Dashboard

The interface in Figure 6 Trainer List, contains a table list of trainers registered with training instructors according to their respective skills and abilities. Each trainer has a different Trainer ID and a different code according to the skills and type of training being taught. The trainer is also equipped with CV data and certificates owned by the trainer. In the table there is an edit and delete action menu for each trainer. The list of trainers can also be added by using the Add button to add trainers to the list. The Add menu will then be directed to the form field to complete the required trainer data.

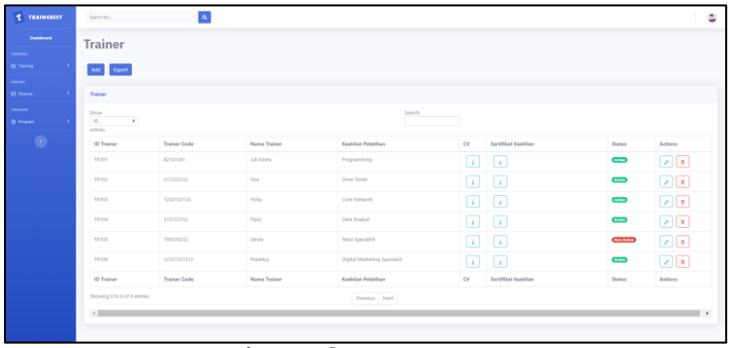

Figure 6. Trainer List

The interface in Figure 7 Training List, contains a complete training information table and also detailed training information with the status of whether the training has been completed or a training that will be scheduled soon. Admin can change the training status according to the training schedule that has been set in the training schedule. The training list view also shows the ongoing, completed, and next scheduled training. For training that has been completed, the admin can reschedule and reopen the training.

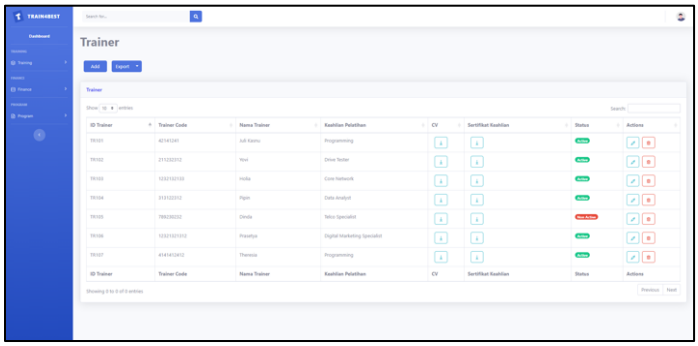

Figure 7. Training List

The interface in Figure 8 Trainings Catalogue, shows a list of training in the form of cards that will be marketed to customers or clients. Customers or clients who will later become training participants can view the various types of training available. This training catalog is designed with an attractive user interface and shows clear information, clear explanations about the training. Before customers register for training, customers can choose training according to the skills or background of the trainees. This page is also equipped with a search feature that is used to find the desired training.

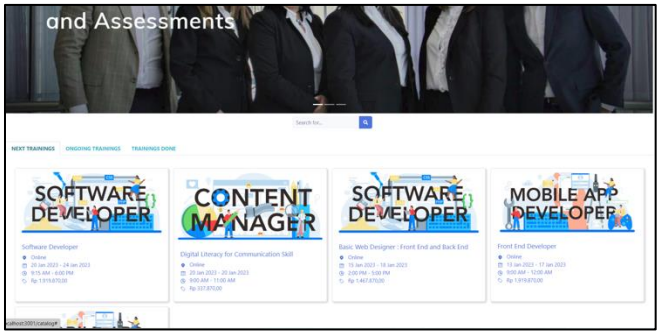

Figure 8. Training Catalogue

The interface in Figure 9 Information Detail, shows detailed training information. Participants can read the description of the training, what will be taught during the training, and what conditions must be met before the training takes place. If the participant is sure to choose the training to be attended, then the participant can press the Register for Training button to register for the training. Participants will fill in complete personal data as a condition for participating in

the training. Make sure all the data filled in is correct and in accordance with the participant's personal data

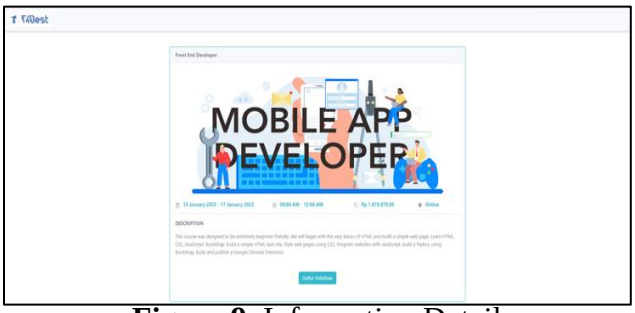

Figure 9. Information Detail

The interface in Figure 10 Registration Page, is a page that contains the participant registration form. Participants can fill out the required form to register for the training. All registration forms must be filled with valid data. Participants can also choose a payment method according to what the participant has. Participants can process training payments until the final process.

Figure 10. Registration Page

The interface display in Figure 11 Registration Confirmation, contains confirmation of training registration and the training payment process. After the detailed information is correct and the training payment has been completed in accordance with the chosen payment method, the registration process is complete and participants can view detailed training information.

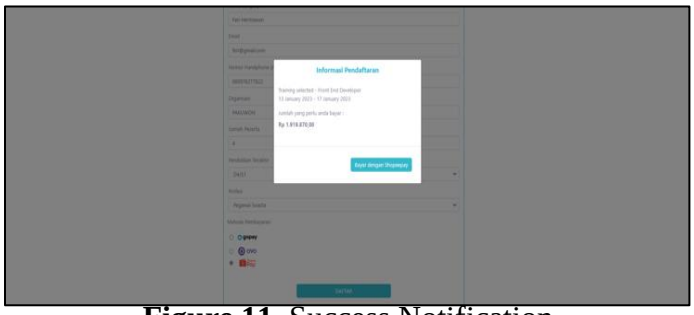

Figure 11. Success Notification

The interface in Figure 12 Successful Registration, is a page that indicates if the participant has successfully registered for the training, participants can see successful registration and detailed training information.

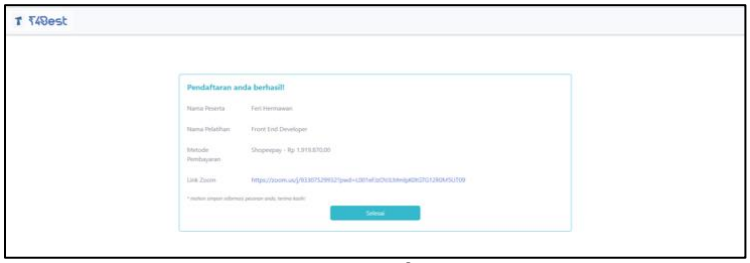

Figure 12. Successful Registration

Following is the sidebar menu interface shown in Figure 13. Sidebar is a form of additional menu that is at the edge of a web page or application, sidebar is also used as a menu form for navigation on desktop pages (Islam et al., 2022). Sidebars are usually located to the right or left of site content which contains menu navigation, menu information, icons and shortcuts (Parviainen, 2017). The usage and number of sidebars on the site should consider the usage apart from the various controls and widget options to maintain the balance of each menu. There are 3 main menu that are Training, Finance, and Program.

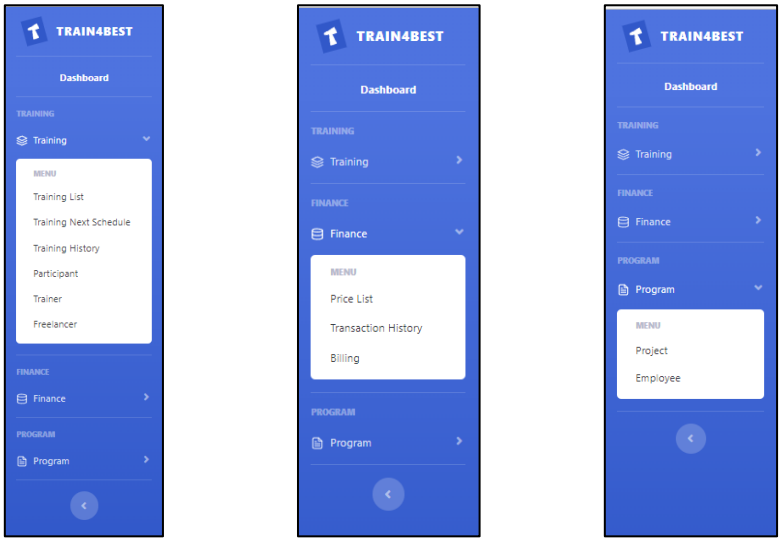

Figure 13. Side Bar Menu

Evaluation

The Acceptance Test Driven Development (ATDD) method is a method that focuses on capturing the requirements in The method used is Acceptance Test Driven Development (AATD), a method that focuses on acceptance test requirements to drive system development (Sualim et al., 2016). ATDD is a software development technique that combines requirements definition with automated backtest execution (Ramler & Klammer, 2019). The author conducted two evaluations of the system, namely User Interface Evaluation and User Satisfaction Evaluation. Results of the user interface evaluation of this system have been fulfilled according to Ben Schneiderman's Eight Golden Rules. Then an evaluation of user satisfaction is carried out by filling out a questionnaire involving users, admins and trainees or customers. Evaluation of a system, product or service that can be used by certain users to achieve certain goals with three critical measurements of usability, namely effectiveness, efficiency and user satisfaction (Barnum, 2020). Evaluate the effectiveness and efficiency of the network that supports user needs to achieve goals accurately, quickly and more cost-effectively. In addition to efficiency and effectiveness, however, satisfaction criteria are very important. Users are satisfied with displaying information pages and web function menus. The rating measures the percentage of user satisfaction and the main objective of creating a training data management system. As well as knowing the level of web usage according to user needs and a solution to the problem.

Table 2. Efficiency Evaluation

No	Statement	Score				
		Strongly Disagree	***Do not Disagree***	***Just Agree***	***Agree***	***Strongly Agree***
1	The training data management website helps the admin and training manager work				8	15
2	The training data management website is more efficient than filling out the registration form manually				8	15
3	The training data management website reduces costs in leasing platforms with the same function				12	10
4	The training data management website makes all training data recorded clearly and neatly				12	10
5	The use of the training data management website is better than the current way in which the user works				8	15
	Total Score	0	0	0	48	65
	Total All Score			113		
	Percentage			90.4%		

Table 3. Effectiveness Evaluation

No	Statement	Score				
		Strongly Disagree	***Do not Disagree***	***Just Agree***	***Agree***	***Strongly Agree***
1	The training data management website increases the effectiveness of employee and admin performance				8	15
2	The training data management website is easy for customers to use as trainees in registering for training				8	15
3	The training data management website improves sales marketing and training dissemination through training catalogue			3	8	10

4	The training data management website increases effectiveness in managing training data				4	15
5	The training data management website facilitates monitoring of training participants, their status and training schedule				4	20
	Total Score	0	0	3	48	60
	Total All Score			114		
	Percentage			91.2%		

Table 4. User Satisfaction Evaluation

No	Statement	Score				
		Strongly Disagree	***Do not Disagree***	***Just Agree***	***Agree***	***Strongly Agree***
1	The training data management web application is able to provide easy-to-understand information				8	15
2	The training data management web application is able to present data well				4	20
3	The training data management web application can be used easily				8	15
4	The training data management web application is clear and easy to understand				8	15
5	The training data management web application is easy to manage and use				12	10
6	The training data management web application specially training catalogue provides content that is suitable				8	15
7	Reports or data reports on the training data management web application can be easily obtained and as needed				16	5
	Total Score	0	0	0	64	95
	Total All Score			162		
	Percentage			92.6%		

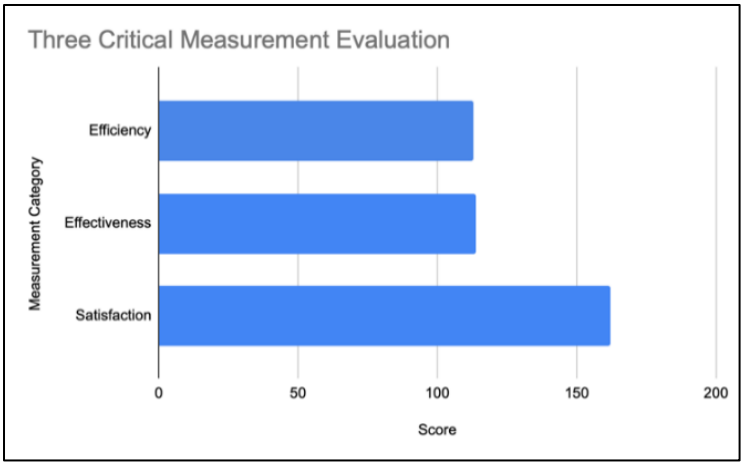

Figure 14. Three Critical Measurement Evaluation

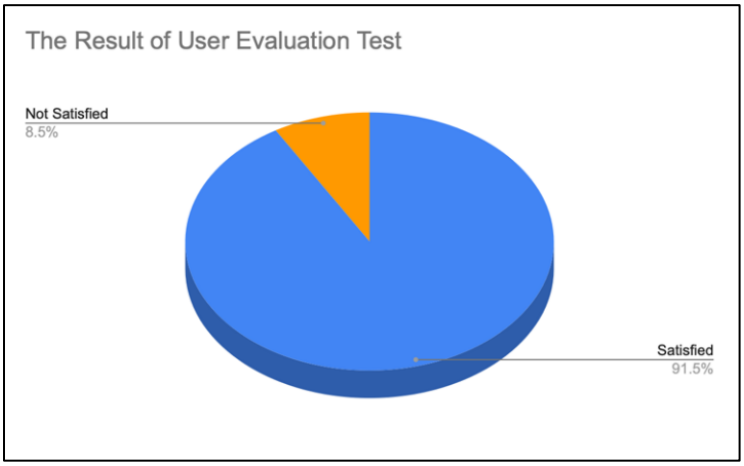

Figure 15. User Evaluation Test

The evaluation results that have been carried out are included in the very feasible category, namely 91.5%.

CONCLUSION

Based on the results of the design and analysis, a web-based training data management information system designed and developed using the Scrum method using ReactJS and MySQL as a database server are the right choice of method to implement. Only a few people in charge of the company can access data or information systems for training data management, namely Admin, Program Manager, Finance Manager, and Training Manager. From the results of system integration test (SIT) and user acceptance test (UAT) it can be concluded that information systems or dashboards developed with the addition of other features increase effectiveness by as much as 90.4%. The company has experienced a significant reduction in the cost of renting a platform so that efficiency is obtained by as much as 91.2%, then for user satisfaction by employees and admin as much as 92.6%. When compared to the previous conditions, where a training data management

web application had not been built, the effectiveness and efficiency of the work carried out by the admin only reached a percentage of 62%, and the cost required to rent a registration platform was 8% of the company's costs. Currently there is no need to rent a registration platform anymore so no costs are incurred for platform rentals by the company. The evaluation results that have been carried out are included in the very feasible category, namely 91.5%.

The researchers are aware of the blank spots in this study. Hence, hopefully, future research can fulfill the spots by delving deeper into the gaps such as how web-based application can improve other management activities or the use of other web-based application in data management or other public activities.

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