
Design And Build A Website-Based Accounting Information System With Extreme Programming Methods

Noor Alamsyah^{1)*}, Santi Ika Murpratiwi²⁾, Moh Ali Albar³⁾, Andy Hidayat Jatmika⁴⁾, Raphael Bianco Huwae⁵⁾, Agil Trieanto⁶⁾

^{1,2,3,4,5,6)} Dept Informatics Engineering, Mataram University, Lombok NTB, INDONESIA

¹⁾nooralamsah@unram.ac.id, ²⁾santiika@staff.unram.ac.id, ³⁾mohalialbar@unram.ac.id, ⁴⁾andy@unram.ac.id,

⁵⁾raphaelbiancohuwae@unram.ac.id, ⁶⁾dedenogie@gmail.com

ABSTRACT

The need to use information systems in the digital world is absolutely necessary for a company. With an information system, it will be easier for companies to process data, store data and make decisions. One of the information system implementations that companies need is an accounting information system that regulates cash receipts and disbursements. However, currently there are still many companies that still store their transaction data traditionally using Microsoft Excel and are not yet computerized. Based on data obtained from interviews conducted with a company accountant, it is known that errors occurred when processing data which had an impact on financial reports, namely when inputting data into Microsoft Excel there was still data that was missed, resulting in incorrect financial reports. balance due to errors in recording transactions. By implementing a website-based cash accounting information system, it makes it easier for accountants to collect data in the cash book. This information system was created using the PHP programming language with Laravel as the framework and Extreme Programming as the development method. Extreme Programming was chosen because it requires good and regular communication with the client to adjust system needs. This information system consists of 3 iterations which have a processing time of 32 days. System testing was carried out using User Acceptance Testing with an average percentage obtained of 86.8%. These results can be indicated that the system is running properly and can be understood well by the client or user.

Keywords: Information Systems, Accounting, Extreme Programming

INTRODUCTION

A. Research Background

A contracting company is a business in the economic sector that is related to the planning, implementation, and supervision of construction activities in constructing a building. When implementing construction in the field, of course, you need a contractor who can carry out the work of a supervisor so that the work can be carried out as planned. A contractor is a person or body that accepts work and carries out the implementation of the work based on the plans, regulations, and conditions that have been determined (Rani, 2016). PT Bangun Bale Lombok Utama Lombok is a Contractor company operating in the construction sector with more than ten years of experience. PT Bangun Bale Lombok Utama has worked on various building construction projects, electricity networks, drainage, landscaping, and road construction. In particular, PT Bangun Bale Lombok Utama is mostly engaged in the construction of villas, bungalows, resorts, and hotels (Lombok, n.d.). PT Bangun Bale Lombok Utama, in its business activities in the construction sector, is required to implement an accounting system that is appropriate to the company's conditions.

One of the systems that companies are required to use is an accounting information system in the form of cash receipts and disbursements (Devitra & Kamilah, 2017). Basically, an accounting information system is a subsystem of a management information system that is tasked with managing transaction data for all existing activities so that the data will be managed and used as information for all levels of management in making decisions and facilitating the management of a company (Juniari et al., 2020; Kristeria et al., 2020; Mulyani, 2020; Tanjung, 2021).

The development of technology and information science, as well as rapid growth, can be one of the driving factors and has an important role in the development of the world economy. The existence of increasingly sophisticated technology allows PT Bangun Bale Lombok Utama to utilize technology effectively, one of which is using information systems. Currently, the process of managing and recording transaction data at PT Bangun Bale Lombok Utama still

* Corresponding author



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uses Microsoft Excel and is not yet computerized, namely by recording transaction data using a daily journal, then the data is entered into Microsoft Excel. Based on data obtained from interviews conducted with PT Bangun Bale Lombok Utama accountants, it is known that errors occurred when processing data, which had an impact on financial reports; namely, when inputting data into Microsoft Excel, there was still data that was not input. This can cause unbalanced financial reports due to errors in recording transactions and searching for data, which takes a long time because you have to search for and check cash book files and financial reports one by one on the device used.

Based on the problems that have been explained, it is important for PT Bangun Bale Lombok Utama to implement a website-based cash accounting information system that can make it easier for accountants to collect data in the cash book. The information system that will be designed can add, change, delete, and display data on cash receipts and disbursements and data on projects that are currently or have been completed. This system can also create, delete, change, and view financial reports according to the desired date; then, there is an approval system from superiors for the financial reports that have been created. The financial reports in this system consist of the total value of each type of cash book, the total value of income, and the sum of the initial and final balances for each month entered. Software development is divided into various methods, one of which is Extreme Programming (XP) (Muslim & Retno, 2014). In the system that the author is designing, he will use the Extreme Programming (XP) method because when creating this system, feedback from the client is needed because the system is created. There are features that must be adapted to the client. The customized feature is the division of cash book types, which are divided into six sections, namely the MEP book, natural materials book, shop materials book, asset book, wages book, and operational book. Then, there is a financial report feature that has its own calculations, such as adding up tax values and adding values of each total type of cash book

B. Problem Formulation

Based on the background description above, the problem formulation that can be taken is: "How to design and build a cash accounting information system for PT Bangun Bale Lombok Utama that can make it easier for accountants to collect data on cash out and cash in and make financial reports according to the date that will be made by implementing the Extreme Programming (XP) method?"

C. Research Objectives

The expected objectives of this research are as follows:

1. Design and build a cash accounting information system for PT Bangun Bale Lombok Utama to make it easier for accountants to collect data on outgoing and incoming cash, record available projects, and create financial reports for PT Bangun Bale Lombok Utama using a web-based platform.
2. Designed and built a cash accounting information system for PT Bangun Bale Lombok Utama by implementing the Extreme Programming (XP) method.

LITERATURE REVIEW

A. PT Bangun Bale Lombok Utama Lombok

PT Bangun Bale Lombok Utama Lombok is a contractor company operating in the construction sector with more than ten years of experience. PT Bangun Bale Lombok Utama has worked on various building construction projects, electricity networks, drainage, landscaping, and road construction. In particular, PT Bangun Bale Lombok Utama is mostly engaged in the construction of villas, bungalows, resorts, and hotels (Lombok, n.d.).

B. PHP

PHP (Hypertext Preprocessor) is a programming language specifically designed for web development or web development, as well as a script programming language designed for building web applications. Programs written in PHP will be parsed on the web server by the PHP interpreter and translated into HTML documents, which will then be displayed back to the web browser (Sabaruddin & Jayanti, 2019).

C. Laravel

Laravel is a web framework that is PHP-based and open-source and intended for web application development using the MVC pattern. The structure of the MVC pattern in Laravel is different from MVC in general, where in Laravel, there is routing, which is used as a bridge between requests from the user and the controller. So that the controller does not immediately receive the request (Bin Tahir et al., 2019). The Laravel framework has several

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advantages, namely, faster performance, more stable data reloading, data security, use of advanced features such as blade using the HMVC (Hierarchical Model View Controller) concept, the availability of libraries that are ready to be used, and a migration management feature for creating table schemas in databases (Bin Tahir et al., 2019).

D. Visual Studio Code

Visual Studio Code is a code editor application that is available not only for Windows but also for Linux and Mac OS operating systems. Like other code editor applications such as Sublime or Atom, Visual Studio Code supports various types of programming languages. Starting from JavaScript, Java, PHP, C++, C#, Go, JSON, and others. This editor application even automatically identifies the type of programming language used and provides color variations according to each function in the code series. An interesting feature in Visual Studio Code is the ability to add extensions. Developers can add extensions to use features that are not in Visual Studio Code. For example, the React Native Tools extension provides support for the React Framework in Visual Studio Code. To date, Microsoft claims there are more than 1,000 extensions that have been created for Visual Studio Code. You can see all these extensions. Those of you who are interested can download the Visual Studio Code. The size of this application is less than 40MB and supports up to nine additional languages besides English (Solichin, 2010).

E. Extreme Programming (XP)

Extreme Programming (XP) is an approach that focuses on coding, which is the main activity at all stages of system development cycles. XP is aimed at small and medium teams; team size is limited to between three and a maximum of twenty project members, and pair programming (two programmers coding on one computer) is a characteristic of XP. XP has advantages in its stages, namely that it takes a short time and can be repeated in different parts according to the focus of the system development objectives. In addition, the XP method is more adaptive and flexible.

RESEARCH METHOD

The flow diagram of this research is used as a guide for the author in carrying out this research so that the results achieved do not deviate from previously determined objectives. This information system uses an agile system development method that focuses on the Extreme Programming (XP) methodology and consists of 4 stages: planning, design, coding, and testing. The stages of development of the system to be built are illustrated in a flowchart, which can be seen in Figure 1.

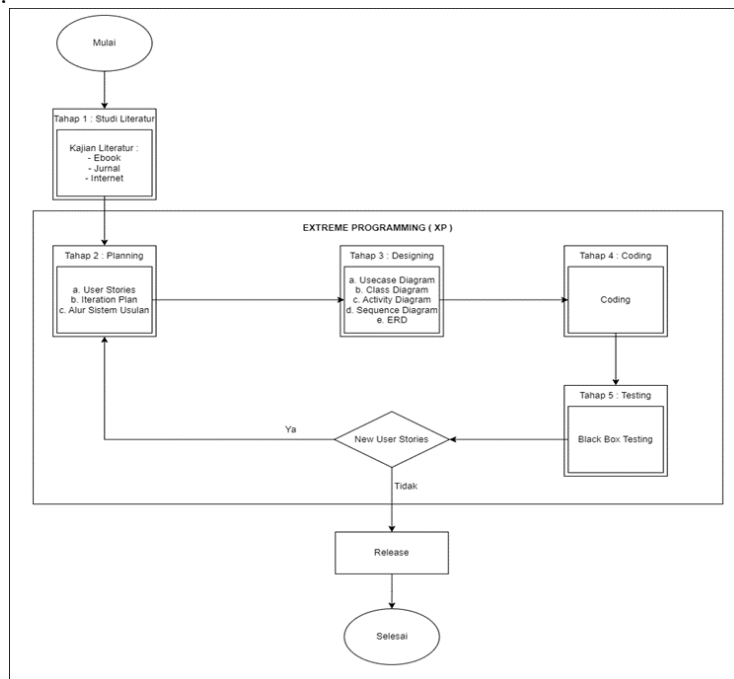


Fig. 1 System design flowchart

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A. Literature Study

A literature study is the first stage that will be carried out in this research. The literature study aims to obtain data and basic theories related to the information system that will be created. The data and basic theory used as a reference are obtained from understanding the contents of journals and theses relating to the information system to be created and books that explain system creation using the extreme programming system development method.

B. Planning

At this stage, it is an analysis of the needs in developing a system that will be created in the form of information data covering the process of managing a project for a contractor. Data will be filled in by accountants when obtaining cash and project data as they plan to get an overview of the features and functions of the system that will be created. This system is aimed more at accountants who record cash data and projects that are currently occurring or have occurred. In this final assignment research, the author determines the requirements, which are written in the form of a user story, and uses several methods to gather requirements, namely through interviews and direct observation.

C. Design

System design is the design stage of how the system being developed will work. In this final project research, the system is designed with an object-oriented concept using UML (Dharwiyanti & Wahono, 2003) to determine interactions between objects in the system.

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a. Use Case Diagram

In the use case diagram, the behavior of each user can be seen. The following is a use case diagram of the cash accounting information system in Figure 2.

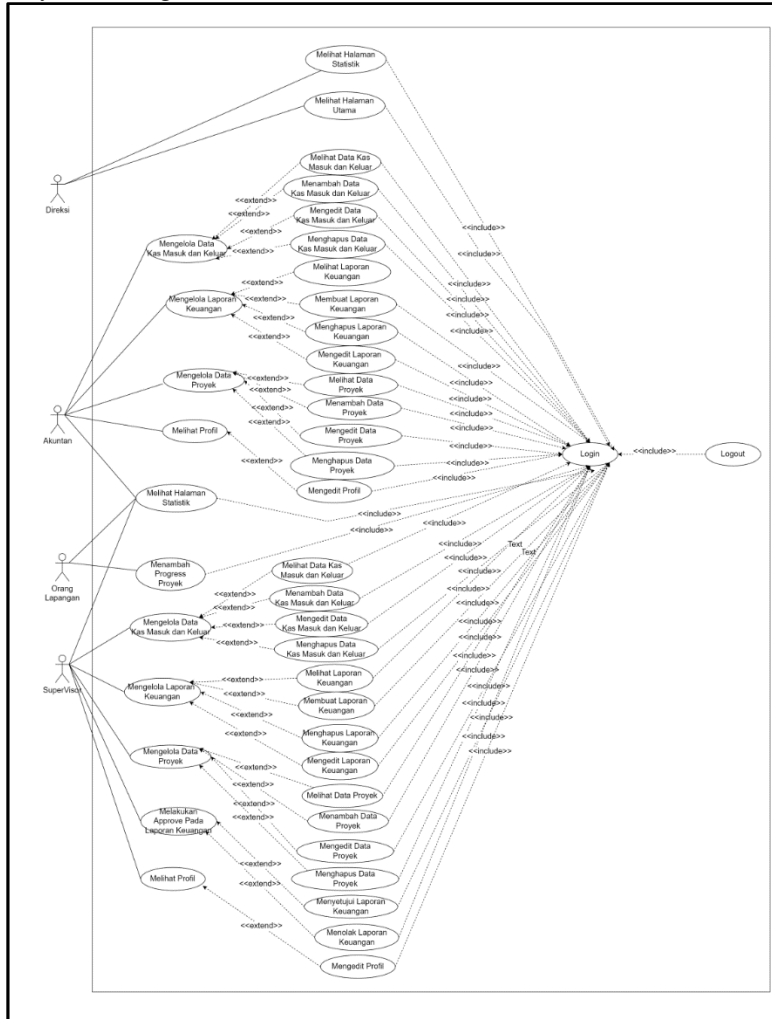


Fig 2. Use case diagram of cash accounting information system

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b. Class Diagram

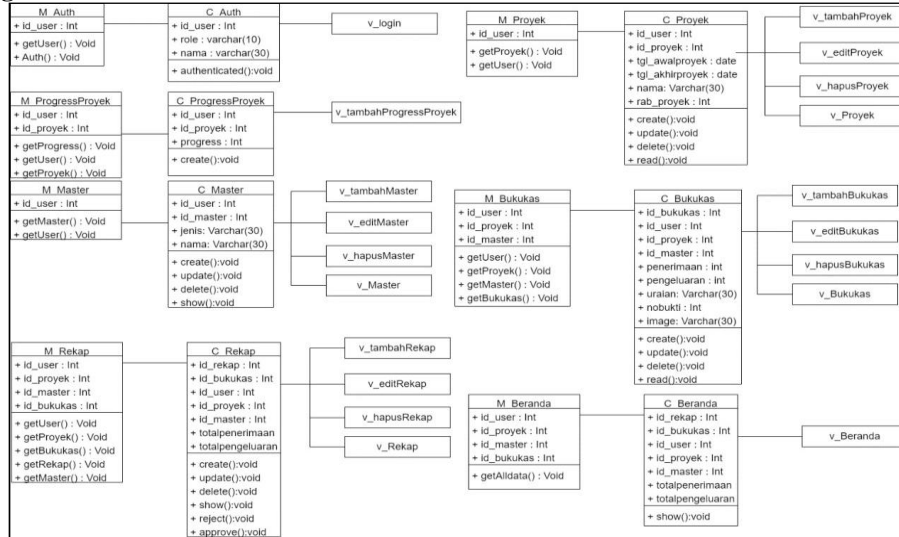


Fig 3. Class diagram of financial accounting information system

Figure 3 is a class diagram of PT Bangun Bale Lombok Utama's financial accounting information system. The concept built to design class diagrams is the architectural pattern in the form of MVC (Model, View, Controller) because this concept is suitable for developing website-based applications. This MVC concept divides a model that manages data with a display in the form of a view which will later be controlled and managed by the controller based on the data model, making it easier for researchers to configure logic coding in the controller, which is connected to the view component that handles the system display and the model that handles the data. The advantage of using MVC is that it separates various types of code cleanly and makes it easy to make changes in the future.

c. Entity Relationship Diagram

The following is the Entity Relationship Diagram of PT Bangun Bale Lombok Utama's financial accounting information system (Edi & Stevalin, 2009), which can be seen in Figure 4.

D. Coding

The system creation stage is the product creation stage. This stage is carried out using PHP as the programming language and MySQL as the database, then Laravel is used as a framework for building dynamic PHP applications. PHP is a script programming language designed for building web applications, while MySQL itself is a DBMS (Database Management System) using SQL (Structured Query Language) commands to manage data in the database. At this stage, the client provides a review, and if the client agrees with the system to be created, then proceed to the next stage.

E. Testing

The system testing stage is the stage that carries out trials on the system that have been completed from the previous stage, namely system implementation. Testing uses the UAT (User Acceptance Testing) method by testing employees from PT Bangun Bale Lombok Utama who are responsible.

F. Release

After carrying out the existing stages, the final stage, which will be implementing the system in everyday life, is carried out. This research was limited to the testing stage only.

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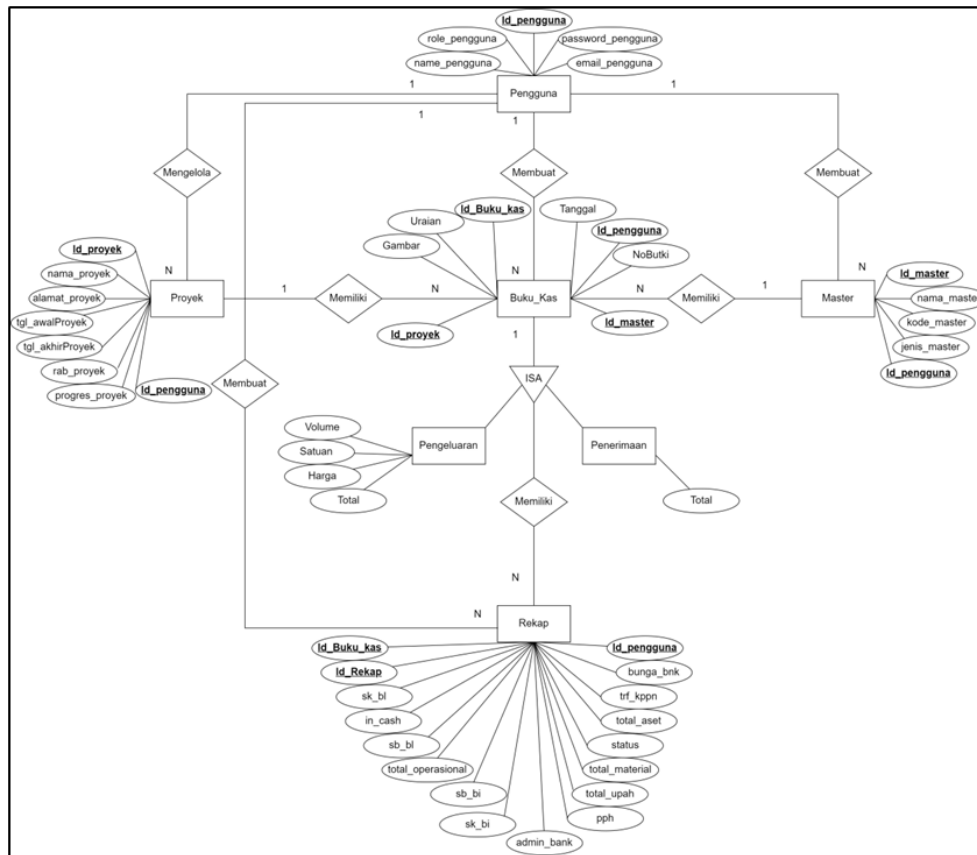


Fig 4. Entity Relationship Diagram

RESULT

A. Database Implementation

#	Nama	Jenis	Penyortiran	Atribut	Tak Terilai	Bawaan	Komentar	Ekstra	Tindakan
1	id	int(1)		UNSIGNED	Tidak	Tidak ada			Ubah Hapus Lainnya
2	name	varchar(30)	utf8mb4_unicode_ci		Tidak	Tidak ada			Ubah Hapus Lainnya
3	email	varchar(30)	utf8mb4_unicode_ci		Tidak	Tidak ada			Ubah Hapus Lainnya
4	password	varchar(60)	utf8mb4_unicode_ci		Tidak	Tidak ada			Ubah Hapus Lainnya
5	level	varchar(11)	utf8mb4_unicode_ci		Ya	NULL			Ubah Hapus Lainnya
6	created_at	timestamp			Ya	NULL			Ubah Hapus Lainnya
7	updated_at	timestamp			Ya	NULL			Ubah Hapus Lainnya

Fig 5. Design of Table User

Figure 5 is the implementation of the database in the PT Bangun Bale Lombok Utama accounting system, where there are six tables, namely book_kas, users, masters, book_master, projects, and recaps (Hidayati, 2019).

B. Class Implementation

The classes in this system contain a programming language created to implement the system according to the design carried out in the form of source code (coding). The results of the coding process will produce an interface that will interact directly with system users. The following is a class implementation carried out in system development.

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C. Iteration Implementation

After implementing the coding system based on planning from user stories and testing all features, several iterations of improvements to several features were needed from the test results. The following is an implementation of system iterations that have been created based on user stories and previously planned iterations:

a. Iteration 1

In the first iteration of the iteration plan table, there are three pages of user stories developed by the developer, namely the login page, the page for managing project data, and the page for managing master data (items).

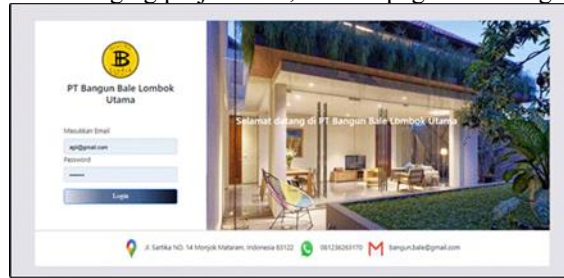


Fig 6. Login Page

Figure 7 is the page implementation login. After implementation, testing is carried out on the login system. The testing stages are explained in the following table.

Table 1
Login system login testing

Testing Scenarios	Expected results	Test Result	Conclusion
The email and password forms are filled in with incorrect data, and if one of the forms is not filled in.	Login fails, and the system will refuse to log in and redirect to the login page.	Appropriate	Accepted
Fill in the email and password forms with the correct data	Login is successful and the user is directed to the dashboard page	Appropriate	Accepted

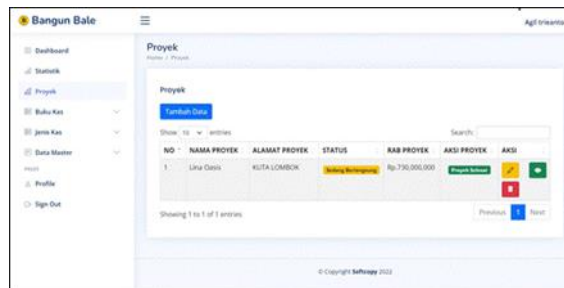


Fig 7. Project data page

Figure 7 is the implementation of the project page. On this page, there is a table containing project data, starting from the name of the project to its RAB.



Fig 8. Add project data page

Figure 8 shows the implementation of the add project data page. This page contains a form that can be filled in

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with the project data that will be added.

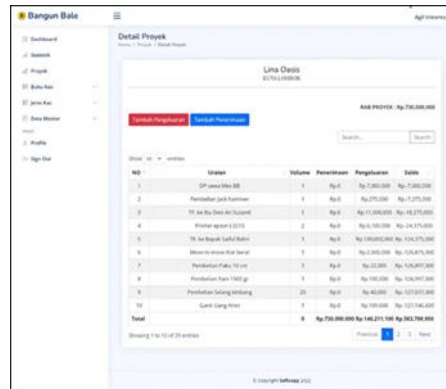


Fig 9. Project details page

Figure 9 is the implementation of the project details page. This page contains all data related to the project, starting from cash data for natural materials to cash data for wages. After implementation, testing of the project data management system is carried out. The testing stages are explained in the following table.

Table 2
System Testing Managing Projects

Testing Scenarios	Expected results	Test Result	Conclusion
The user presses the add data button	Users will be directed to the add data page, which contains a form for adding project data.	Appropriate	Accepted
The user fills the form with large project data and presses the add button	The user will be directed to the project page, and the newly added project data will appear	Appropriate	Accepted
The user presses the detail button	Users will be directed to the project details page, which will display all project data.	Appropriate	Accepted
The user presses the change project button	Users will be directed to a different project page and will display a form that functions to change project data.	Appropriate	Accepted
The user presses the delete project button	The user will return to the project page, and the selected data will be lost.	Appropriate	Accepted

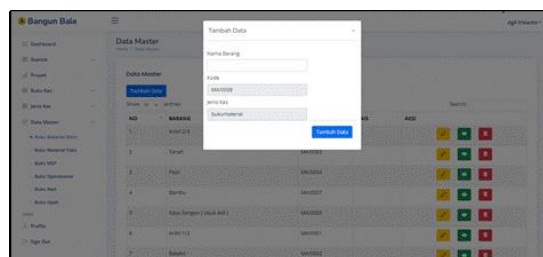


Fig 10. Master data page

Figure 10 shows the implementation of the master data page. On this page, there is data grouping the types of goods used in the project. The example in the image is master data on shop materials, namely bolts and threads. On this page, there is also a form that functions to add master data.

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Fig 11. Master data details page

Figure 11 shows the implementation of the master data detail page. On this page, there is data from the form filled out by the user. This data is data on items needed during the project. After implementation, testing of the project data management system is carried out. The testing stages are explained in the following table:

Table 3. System Testing Manages Master Data

Testing Scenarios	Expected results	Test Result	Conclusion
The user presses the add data button	Users will be directed to the add data page, which contains a form for adding master data	Appropriate	Accepted
The user fills in the form with the correct master data and presses the add button.	The user will be directed to the master data page, and the newly added master data will be displayed.	Appropriate	Accepted
The user presses the detail button	The user will be directed to the master data details page, which will display all the master data.	Appropriate	Accepted
The user presses the change master data button	The user will be directed to the change master data page, which will display a form that functions to change the master data.	Appropriate	Accepted
The user presses the delete master data button	The user will return to the master data page, and the selected data will be lost.	Appropriate	Accepted

b. Iteration 2

In the second iteration section of the iteration plan table, there are three pages of user stories developed by the developer, namely the home page, adding project progress, and managing cash data.

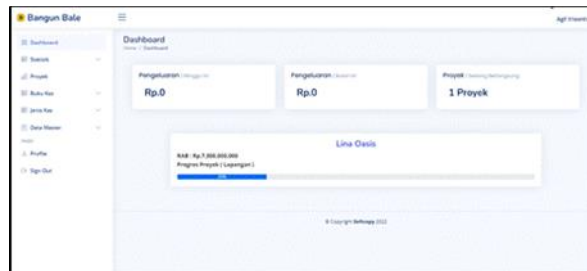


Fig 12. Home Page

Figure 12 is the implementation of the home page, where there is information such as projects, receipts, and expenditures within a week. After implementation, testing is carried out on the home page. The testing stages are explained in Table 4 below.

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Table 4. Homepage Testing

Testing Scenarios	Expected results	Test Result	Conclusion
The user presses the navigation button called a dashboard	Users will be directed to the home page, and it will display all relevant data, starting from project data to receipts and expenses	Appropriate	Accepted

c. Iteration 3

In the third iteration of the iteration plan table, there are four pages of user stories developed by the developer, namely managing cash recaps, project graph pages, changing profile data, and approving recap pages.



Fig 13. Recapitulation page

Figure 13 shows the implementation of the recap page. On this page, there is a table containing data on the date and status of the recap that has been made.

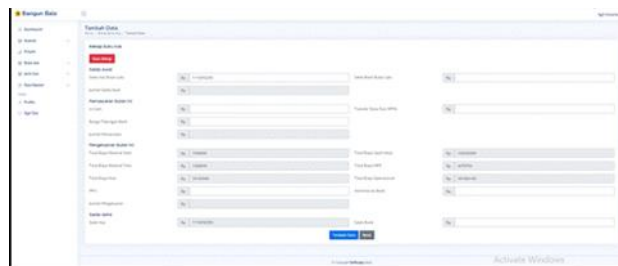


Fig 14. Added recap page

Figure 14 is an implementation of the added recap page. On this page, there is a form or columns filled with data on the project.



Fig 15. Recap detail page

Figure 15 is an implementation of the recap detail page. On this page, there is a table that displays the types

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of data that have been calculated previously.

D. Testing

The next stage is testing the application or system created, where the testing process for this application uses the User Acceptance Testing method; testing is carried out subjectively through User Acceptance Testing involving the participation of 10 respondents with the aim of finding whether there are errors in the system or not so that the system is built to run according to user expectations.

User Acceptance Testing is the next stage that will be carried out. The process of software testing is conducted by end users or potential customers to ensure that a system or application meets business requirements and is functionally acceptable to users. UAT aims to test the system in an environment similar to actual production and validate whether the system is ready for use by end users. The results of the UAT will influence the final decision regarding acceptance and delivery of the system to users in this questionnaire test using quantitative methods, where the results of the test will be shown in units Score. Testing was carried out by distributing questionnaires to respondents from PT Bangun Bale Lombok Utama. The following are the contents of the questions asked:

1. What is the appearance of the information system being built? Easy to understand?
2. Is the information system built user-friendly (user-friendly)?
3. Does the information system built help manage existing activities at pt Bangun Bale Lombok utama?
4. Are the features in the information system being built adequate to what is needed?
5. Is the information system being built running well?
6. Whether in running the information system or not, is there a problem?
7. Are any features or menus not working when running the information system?

Respondents will be asked to answer the questionnaire with the following answer choices and weights.

Table 5. Weight of Answers from the Questionnaire

Answer Choices	Weight
A. Strongly agree	5
B. Agree	4
C. Enough	3
D. Disagree	2
E. Strongly Disagree	1

The number of answers and percentage of respondents' answers can be seen in the table as follows:

Table 6. Number and presentation of respondents' answers

Question	Number of answers					Answer Percentage				
	A	B	C	D	E	A	B	C	D	E
Question 1	5	5	0	0	0	50%	50%	0%	0%	0%
Question 2	5	5	0	0	0	50%	50%	0%	0%	0%
Question 3	7	3	0	0	0	70%	30%	0%	0%	0%
Question 4	2	7	1	0	0	20%	70%	10%	0%	0%
Question 5	4	6	0	0	0	40%	60%	0%	0%	0%
Question 6	2	7	1	0	0	20%	70%	10%	0%	0%
Question 7	2	7	1	0	0	20%	70%	10%	0%	0%

The data obtained is then processed to find the weight of each question by multiplying each answer point by the weight that has been determined in the answer value weight table. Following are the results of these calculations.

Table 7. Value the weight of the question

Question	weight value					Count	Average
	Ax5	Bx4	Cx3	Dx2	Ex1		
Question 1	25	20	0	0	0	45	4.5
Question 2	25	20	0	0	0	45	4.5
Question 3	35	12	0	0	0	47	4.7

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Question 4	10	28	1	0	0	41	4.1
Question 5	20	24	0	0	0	44	4.4
Question 6	10	28	1	0	0	41	4.1
Question 7	10	28	1	0	0	41	4.1

After getting the average value, it is necessary to calculate the percentage of questions carried out to get system-quality results in order to determine the feasibility of the system.

$$\text{percentage} = \frac{\text{Average value}}{\text{minimum weight}} \times 100\% \quad (1)$$

The results of the question presentation can be seen in the following table

Table 8. UAT question percentage results

Question	Calculation	Percentage
Question 1	$\frac{4,5}{5} \times 100\%$	90%
Question 2	$\frac{4,5}{5} \times 100\%$	90%
Question 3	$\frac{4,7}{5} \times 100\%$	90%
Question 4	$\frac{4,1}{5} \times 100\%$	82%
Question 5	$\frac{4,4}{5} \times 100\%$	88%
Question 6	$\frac{4,1}{5} \times 100\%$	82%
Question 7	$\frac{4,1}{5} \times 100\%$	82%

Table 8 shows the results of questions from the User Acceptance Test, so it can be concluded that the average percentage obtained for the system built is 86.8%. With the explanation of the score interpretation criteria, it is very good. The system built is suitable for use.

E. Extreme Programming Evaluation

Using the Extreme Programming method also allows changes in the middle or at the end of the system development process so that replacement or addition of user stories can occur at any time in this research. Changes made include improvements to functionality and additions and deletions of features. It was found that the total work took 32 days, while the planning took 33 days.

CONCLUSION

Based on the description and discussion presented previously, the following conclusion that System development using the Extreme Programming method produces results that are in accordance with user needs because the Extreme Programming method iterates until the user's needs are met. There are also features that support the system in achieving the needs of users, namely, managing cash data, projects to recap data from the project, and statistics that function well to help user needs. Using the Extreme Programming method makes the system work clearer and more recorded, starting from the work time and priority of features that are built first, which can be done well and correctly. The development of this system also uses the Laravel and MySQL frameworks as databases and Bootstrap to implement the user interface. And based on the results of system testing, it was concluded that this system can help collect data on outgoing and incoming cash, collect project data, and make monthly recaps as well as projects that have been carried out by implementing a website. This is based on testing carried out with User Acceptance Testing, which has an average percentage of 86.8%, which can indicate that the system is running properly and can meet the needs of users.

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* Corresponding author



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* Corresponding author



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