Vol. 7 No. 2, 2026, pp. 115-129 **Jurnal Pepadun**
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Implementation UI/UX Design in the Development of an E-Reporting General Ledger System

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Abstract *- The General Ledger is a fundamental accounting record used to document all financial transactions within an organization, including assets, liabilities, equity, revenues, and expenses. At the Adhika Narama Block L Residents Association, financial management, transaction recording, and reporting are still performed manually at the beginning of each month. This manual process frequently results in discrepancies between recorded cash inflows and actual cash balances, thereby reducing the accuracy and efficiency of financial reporting. This study aims to utilize the Laravel Scheduler to automate the calculation of cash inflows and outflows and to generate electronic General Ledger reports at the beginning of each month. By automating the financial reporting process, the proposed system is expected to improve the accuracy, efficiency, and reliability of financial reporting. The research adopts UI/UX design principles to develop an intuitive and user-friendly interface while employing the PIECES framework to analyze the existing system and identify areas for improvement. The application is developed using Laravel Framework version 11 with MySQL as the database management system. Furthermore, the system is implemented as a web-based application, and its functionality is evaluated through black-box testing and User Acceptance Testing (UAT) to ensure that it meets both the functional requirements and user expectations.*

Keywords**:** *UI/UX Design; General Ledger; Scrum Methodology; PIECES.*

1. INTRODUCTION

The rapid advancement of technology has accelerated the emergence of innovative solutions, particularly in the field of information technology. Among these innovations, web-based information systems have become an essential component of the digital transformation, providing effective and efficient solutions for managing organizational information and business processes. In particular, web-based applications enable the automation of financial data management, thereby improving the accuracy, efficiency, and transparency of financial administration and reporting.

At the Adhika Narama Residents Association, particularly Block L, the processes of financial management, transaction recording, and financial reporting have traditionally been carried out manually at the beginning of each month. This manual approach has resulted in several operational challenges, including discrepancies between recorded cash expenditures and the actual cash received during the reporting period. Consequently, many residents have expressed concerns regarding the reliability of the monthly financial reports, as the reported cash balance frequently does not correspond with the actual expenditures incurred for community activities.

Based on these findings, the primary issue identified in this study is the absence of an integrated and automated financial management system capable of processing financial transactions comprehensively. Furthermore, the community does not maintain a General Ledger [1] that serves as the principal accounting record for preparing and presenting monthly financial reports. These limitations reduce the efficiency, transparency, and accountability of the existing financial management process and increase the likelihood of reporting inaccuracies.

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To address these challenges, this study proposes the development of a web-based financial information system that automates financial data processing and reporting. The proposed system is expected to facilitate accurate transaction recording, automatically generate General Ledger reports at the beginning of each month, and improve the efficiency, transparency, reliability, and accountability of financial reporting. Ultimately, the implementation of the proposed system is intended to support the financial reporting needs of all residents of Block L within the Adhika Narama Residents Association while enhancing the effectiveness of community financial management.

Several previous studies have investigated financial management information systems and UI/UX design [2][3][4]. Some studies also integrate Whatsapp Gateway for a more efficient process [5][6][7][8]. For instance, research [5] proposed a UI/UX design for a notification system integrated with a WhatsApp Engine to automatically deliver payment confirmation notifications to the parents of students at SMK Mamba'ul Ihsan Banyuurip. The study primarily focused on improving the user experience of the notification service and facilitating communication between the school and parents. In contrast, the present study utilizes the Laravel Scheduler to automate financial data processing with greater accuracy and efficiency. The automated process supports the generation and presentation of General Ledger records and is integrated into the monthly financial reporting system. Furthermore, this study emphasizes the application of UI/UX design principles to develop an intuitive, user-friendly interface that enables end users to operate the system easily and effectively.

Some research also utilizes Design Thinking methodology in developing system [9][10][11][12]. As an example, research [13] applied the Design Thinking methodology to develop a mobile-based financial management application with a strong emphasis on UI/UX design. In contrast, the present study adopts the PIECES framework as the primary methodology to identify existing system problems, opportunities for improvement, and system requirements. The PIECES framework provides a comprehensive analysis of system performance, information quality, economic feasibility, control mechanisms, operational efficiency, and service quality, thereby supporting the development of a more effective web-based financial information system.

Research [14] developed an electronic report card (e-Report) application using the Prototype software development methodology, Laravel Framework, and MySQL as the database management system. The application provides several core features, including student data management, grade entry, grade calculation, and report card generation. Unlike the previous study, the present research focuses on utilizing the Laravel Scheduler to automate financial data processing for the preparation of monthly General Ledger reports. In addition, the developed system is evaluated using Black-box testing [15][16] to verify its functional correctness, while User Acceptance Testing (UAT) [17][18] is employed to measure system usability and user satisfaction. These evaluation methods ensure that the proposed system satisfies both functional requirements and end-user expectations.

2. RESEARCH METHODOLOGY

The development of the electronic General Ledger reporting (e-Reporting) system adopts a UI/UX design approach to provide a visual and functional representation of the proposed system. This approach facilitates the collection of timely and accurate user feedback regarding both the functional and non-functional aspects of the application, thereby ensuring that the developed system meets user requirements and enhances the overall user experience [19][20].

The system analysis and design are conducted using the PIECES framework, which is employed to identify existing problems, evaluate system performance, and determine improvement requirements. The application is developed using the Laravel Framework with MySQL as the database management system. In addition, the Laravel Scheduler is utilized to automate monthly financial data processing and report generation, thereby improving the efficiency, accuracy, and reliability of the financial reporting process. To evaluate the functionality of the proposed system, black-box testing is conducted to verify that all system functions operate in accordance with the specified functional requirements. The proposed e-Reporting General Ledger system is expected to assist treasury staff in preparing accurate and timely monthly financial reports while reducing

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manual processing and reporting errors. The overall system development process and research stages adopted in this study are presented in the following Figure 1.

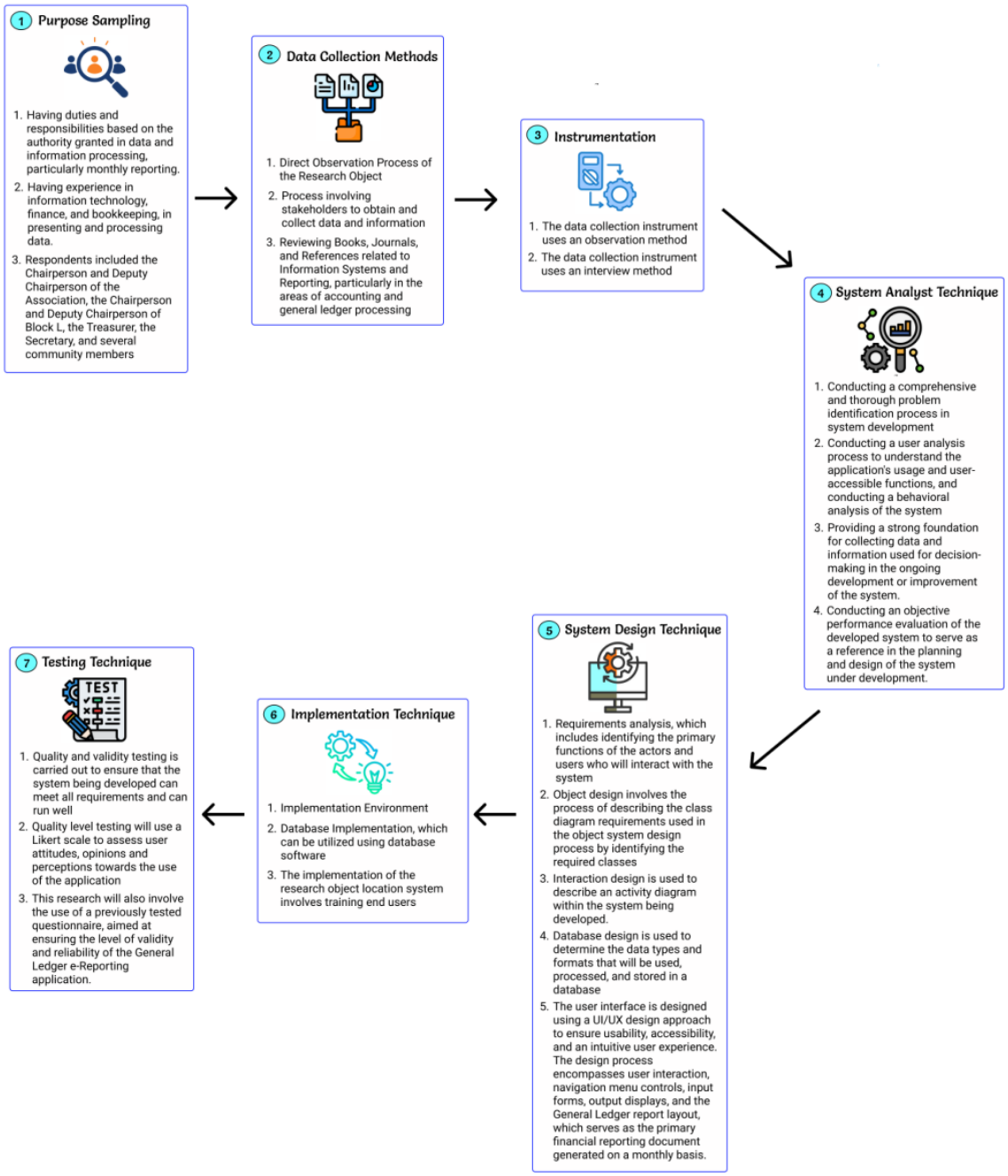


Figure 1. Research method.

3. RESULTS AND DISCUSSION

3.1. Software Specification

This part provides a general overview of the specifications of the hardware, software and network that will be used, starting from scheduling, testing of quality and system validation, and the following are the specifications of the software and network that will be used in the testing process.

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Table 1. Software specification.

System Components	Configuration Details
Operating System	Linux
Programming Language	Laravel 11 C
PHP Version	8.3
Disk Space	5 GB
Database	MySQL
Scheduler Time	Every 25th of the month

3.2. Package Diagram

This part helps users to understand the menus that will be developed in the General Ledger e-reporting system [24]. The following Figure 2 shows the package diagram of the e-reporting General Ledger.

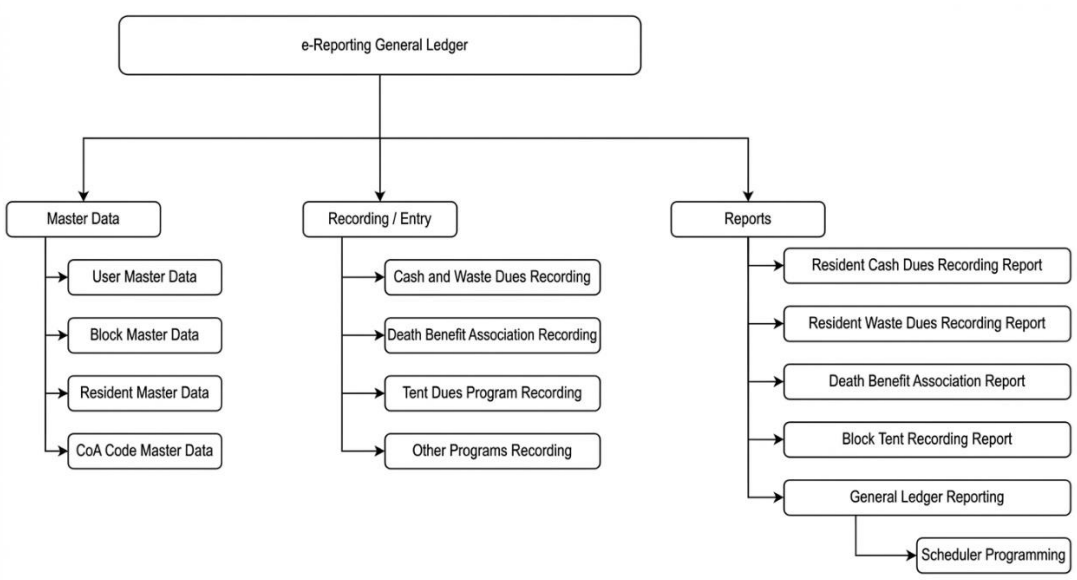


Figure 2. Package diagram of e-reporting General Ledger.

3.3. UI/UX Design

This section helps users understand the interface design that will be used in the General Ledger e-Reporting system and also makes it easier for users to interpret how to use the system [21][22].

3.3.1. Block Master Data

The Block Master Data interface is designed to enable the Block L Treasurer to manage and maintain the identity records of residents within Block L. This module provides functionalities for creating, updating, and deleting block-related data. To ensure data integrity and system security, access to these functions is restricted exclusively to the Block L Treasurer through role-based access control as shown in Figure 3.

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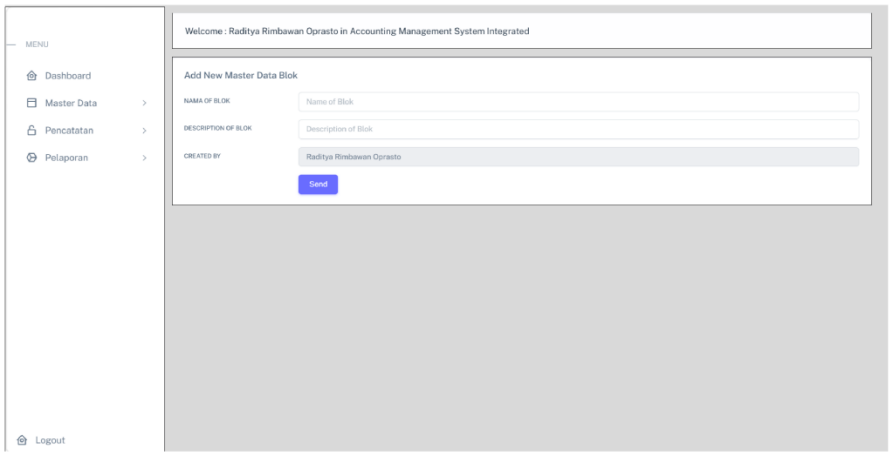


Figure 3. Block master data.

3.3.2. Resident Master Data

The Resident Master Data interface is designed to enable the Block L Treasurer to manage and maintain the identity records of residents within Block L of the Adhika Narama Residents Association. This module provides functionalities for creating, updating, and deleting resident information. To ensure data integrity, confidentiality, and system security, access to these administrative functions is restricted exclusively to the Block L Treasurer through role-based access control as shown in Figure 4.

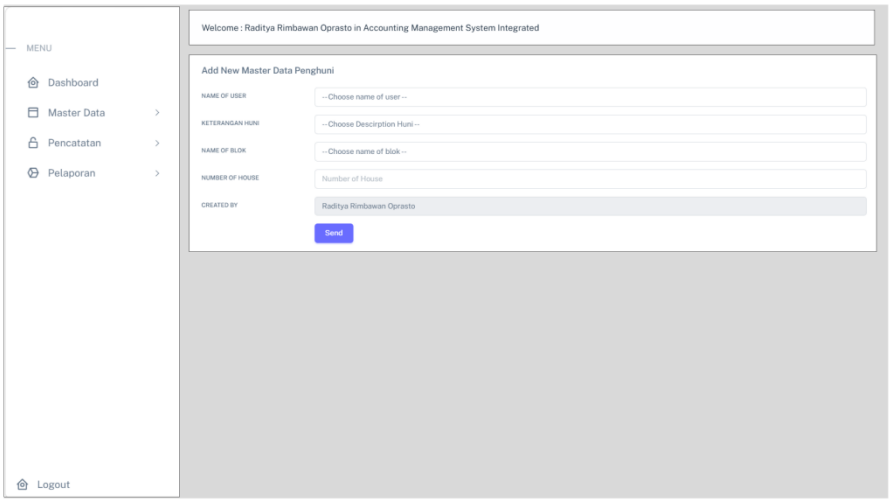


Figure 4. Resident master data.

3.3.3. Master Data of CoA (Chart of Account)

The Chart of Accounts (CoA) Master Data interface is designed to enable the Block L Treasurer to manage and classify financial accounts based on debit and credit categories for each transaction type. This module plays a critical role in the operation of the proposed system, as the account classifications are utilized by the Laravel Scheduler to automate monthly financial data processing and the generation of General Ledger reports. Consequently, the accuracy of the Chart of Accounts directly influences the reliability and consistency of the monthly financial reporting process. The module provides functionalities for creating, updating, and deleting Chart of Accounts (CoA) records. To ensure data integrity, consistency, and system security, these administrative functions are accessible exclusively to the Block L Treasurer through role-based access control as shown in Figure 5.

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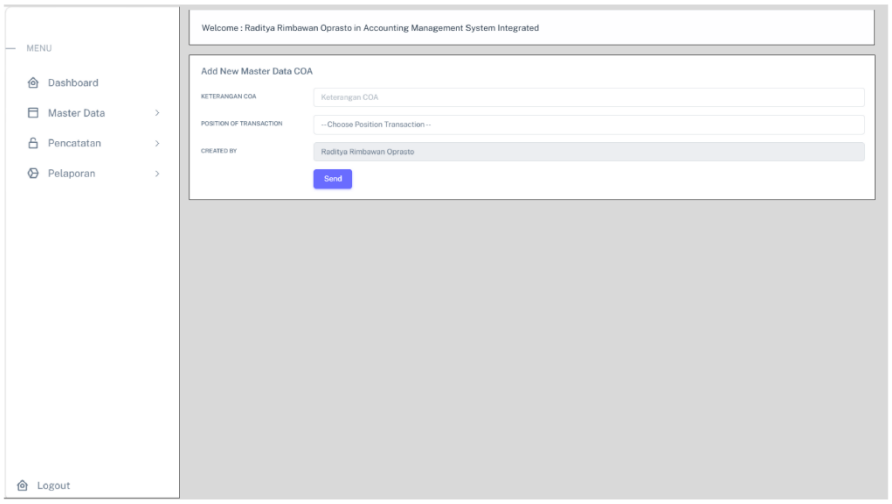


Figure 4. Master data of CoA (Chart of Account).

3.3.4. Entry Cash and Trash Contributions

This module is designed to record monthly cash contributions and waste collection fees paid by residents of Block L. The recorded transaction data serve as the primary input for the Laravel Scheduler, which automatically processes financial data and generates monthly financial reports, including the General Ledger. Access to this module is restricted exclusively to the Block L Treasurer through role-based access control. To preserve the integrity, consistency, and auditability of financial records, the module supports entry-only operations, allowing authorized users to record new transactions without the ability to modify or delete previously recorded data as shown in Figure 5.

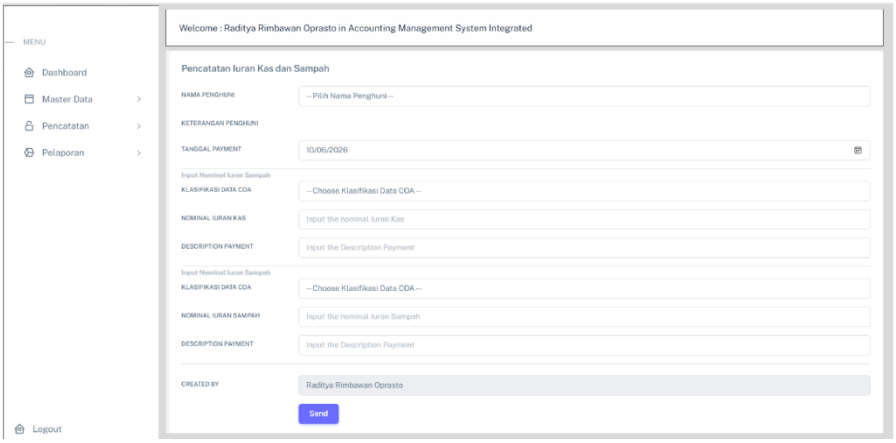


Figure 5. Entry cash and trash contributions.

3.3.5. Flow Scheduler Laravel Programming Running

The following workflow illustrates the operational process of the Laravel Scheduler in processing and generating financial data for the General Ledger reporting system. The scheduler operates automatically on a monthly basis without requiring manual intervention and is executed within the application's backend environment. The scheduler is triggered automatically on the last day of each month, where it retrieves all financial transaction data previously entered by the Block L Treasurer. The collected data are then processed to calculate financial balances, classify transactions based on the predefined Chart of Accounts (CoA), and generate the monthly General Ledger report. This automated process enhances the accuracy, consistency, and efficiency of financial reporting while minimizing the risk of human error associated with manual data processing. The illustration of the flow is available on Figure 6.

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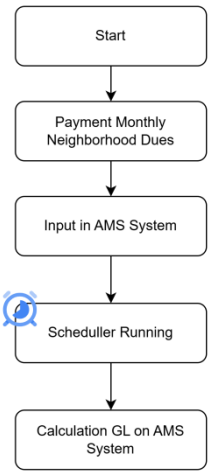


Figure 6. Flow scheduler Laravel programming running.

3.3.6. General Ledger

The Financial Reporting module provides comprehensive reports of cash inflows and cash outflows within the Block L community. The financial reports are generated automatically by the system on a monthly basis through the Laravel Scheduler, eliminating the need for manual report preparation and ensuring the accuracy and consistency of financial reporting. To promote transparency and accountability in community financial management, the generated financial reports are accessible to all residents of Block L without any special access requirements. This feature enables residents to review monthly financial activities and supports an open and transparent financial reporting process.

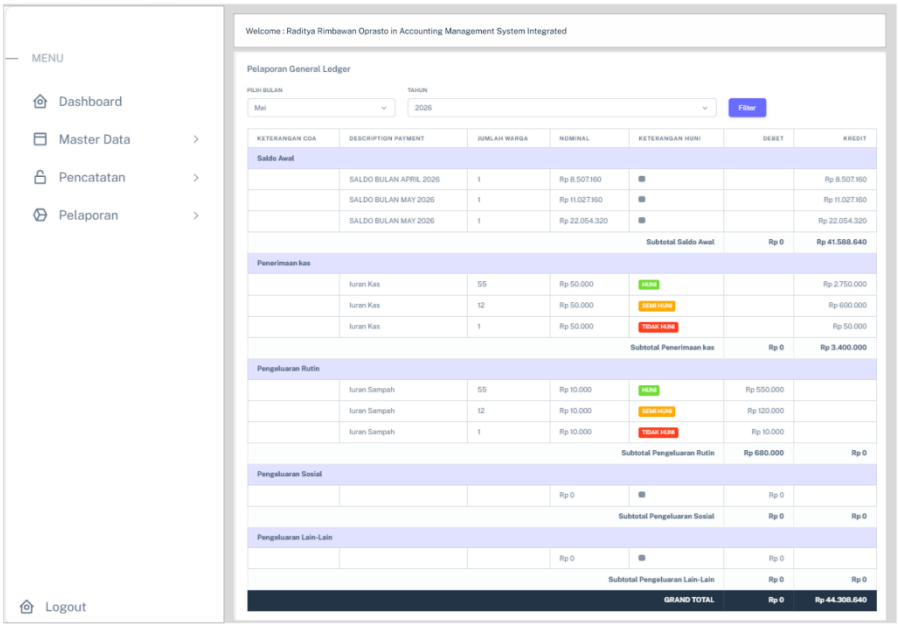


Figure 7. General Ledger.

3.4. Testing

3.4.1. Black-box Testing

Black-box testing is a software testing method used to identify defects within a system and to verify the functionality of an application during its operation. This testing approach evaluates whether the system correctly accepts user inputs, processes the data as intended, displays appropriate notification messages, and

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produces outputs that conform to the expected results. By focusing on the functional behavior of the system without examining its internal implementation, black-box testing ensures that each feature operates in accordance with the specified functional requirements [23][24]. The following Table 2 presents the testing scope, including the system modules and their corresponding access rights, which are evaluated using the black-box testing approach.

Table 2. Black-box testing scope.

Modul Item	Access Modul						
	Login	View	Add	Edit	Delete	Running	Reporting
Login	V						
Master Data:		V	V	V	V		
a. User Master Data							
b. Block Master Data							
c. Resident Master Data							
d. COA Code Master Data							
Recording Data:		V	V				
a. Recording of Cash and Garbage Fees							
b. Recording of Members' Death Contributions							
c. Recording of Tent Fee Program							
d. Recording of Other Program Fees							
Running Scheduler						V	
E-Reporting Data:							V
a. Reporting and Recording of Resident Cash Contributions							
b. Reporting and Recording of Resident Garbage Fees							
c. Reporting on Members' Death Contributions							
d. Reporting and Recording of Block Tents							
e. General Ledger Reporting							

Based on the information presented in Table 2, which outlines the scope of the black-box testing, the following Table 3 provides a detailed presentation of the black-box testing results obtained during the evaluation of the proposed system.

Table 3. Black-box testing result.

Testing Item	Testing Detail	Testing Type	Expected Result	Actual Result	Status
Login	Email	Black-box	Users can not log in if their email address is incorrect.	The login process should fail if the user's account is not registered in the AMS application.	Expected
	Password	Black-box	Users can not log in if their password is incorrect.	The login process should fail if the user's account is not registered in the AMS application.	Expected
Master Data	View	Black-box	This system will display data in each menu, including: a. User Master Data b. Block Master Data c. Resident Master Data d. COA Code Master Data	The system shall display data accurately based on the performed input and update operations while ensuring that records successfully deleted are no longer displayed within the system.	Expected

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Testing Item	Testing Detail	Testing Type	Expected Result	Actual Result	Status
	Add	Black-box	Users can add new records to the Master Data: User Master Data Block Master Data Resident Master Data COA Code Master Data	The system shall allow the Block L Treasurer to successfully add new data records.	Expected
			After a user successfully adds a new record in the AMS System, the AMS System displays a notification that reads Data Saved	The system shall successfully display a notification message confirming that the data have been added successfully.	Expected
	Edit	Black-box	Users can Edit new records to the Master Data: a. User Master Data b. Block Master Data c. Resident Master Data d. COA Code Master Data Before the user clicks the "Send" button during the editing process, a notification like this will appear: "Are You Sure?"	The system shall successfully update the data modified by the Block L Treasurer.	Expected
			If the user clicks "OK", a notification such as Data has been updated will appear.	The system shall display a success notification after the data have been updated successfully.	Expected
	Delete	Black-box	If the user clicks the "Delete Data" button on the Display Form, a warning message will appear asking, "Do you want to delete it?"	The system shall successfully delete data identified as invalid or no longer required.	Expected
			If the user can click on the notification when it is displayed, a message saying "Data has been deleted" will appear when the notification is deleted.	The system shall display a success notification after the data have been deleted successfully.	Expected
Recording Data	View	Black-box	This app will display data in each menu, including: a. Recording of Cash and Garbage Fees b. Recording of Members' Death Contributions c. Recording of Tent Fee Program d. Recording of Other Program Fees	The system shall display data accurately according to the performed input operation.	Expected

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Testing Item	Testing Detail	Testing Type	Expected Result	Actual Result	Status
	Add	Black-box	Users can add new entries to the Log: a. Recording of Cash and Garbage Fees b. Recording of Members' Death Contributions c. Recording of Tent Fee Program d. Recording of Other Program Fees	The system shall successfully add new transaction records.	Expected
			After a user successfully adds a new record in the AMS System, the AMS System displays a notification that reads data has been save.	The system shall display a success notification after the data have been saved successfully.	Expected
Scheduler Engine	Start Running	Black-box	The scheduling engine will process transaction data on the 25th of each month, and the processed data will be summarized in the General Ledger Report, which will be used for decision-making and reporting purposes.	The Laravel Scheduler shall execute successfully, as evidenced by the successful generation and display of data in the General Ledger module.	Expected
Reporting Data	Report	Black-box	This system can generate the reports required by the association, including: a. Reporting and Recording of Resident Cash Contributions b. Reporting and Recording of Resident Garbage Fees c. Reporting on Members' Death Contributions d. Reporting and Recording of Block Tents e. General Ledger Reporting	The system shall generate and display financial reporting information that satisfies the reporting requirements of the Block L residents and supports the financial analysis performed by the Block L Treasurer.	Expected

Based on the results presented in Table 3, it can be concluded that the proposed system satisfies the functional requirements and meets the expectations of the Block L community, as evaluated by the 15 respondents who participated in the system testing. Overall, the developed system performed successfully across all tested functional modules. However, the evaluation identified one aspect that requires further improvement. The Laravel Scheduler currently requires approximately 10 minutes to complete the automated data processing task, whereas the expected processing time is 5 minutes. Despite this limitation, the generated financial data and General Ledger reports were found to be accurate and consistent with the expectations of all 15 respondents. Therefore, although optimization of the scheduler's execution time is recommended, the proposed system has demonstrated satisfactory functionality and is considered suitable for supporting the monthly financial reporting process. Furthermore, this study demonstrates an advancement over previous research by incorporating the Laravel Scheduler to automate the processing and presentation of financial data, a feature that was not implemented in earlier studies.

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3.4.2. User Acceptance Testing

The respondents in this study completed a questionnaire regarding the testing and implementation of the e-Reporting General Ledger. Feedback from the respondents regarding their level of acceptance of this information system was obtained based on their answers [25]. These answers were then measured using Formula 1.

$$Total\ Score = \frac{Actual\ Score}{Ideal\ Score} \times 100\% \quad (1)$$

This system testing process use the User Acceptance Test (UAT) method where respondents in this study completed a predetermined questionnaire regarding the testing and implementation of the e-Reporting General Ledger. Feedback from respondents regarding their level of acceptance of this information system was obtained based on their answers. These answers are then measured using the criteria as in Table 4 [26].

Table 4. UAT criteria.

Score (%)	Criteria
20.00 - 36.00	Poor
36.01 - 52.00	Fair
52.01 - 68.00	Satisfactory
68.01 - 84.00	Good
84.01 - 100	Excellent

This testing process conducted with 12 questions that is asked to 15 respondents as they answer the questions in the provided questionnaire. The purpose of this process is to gather feedback from the respondents regarding the e-Reporting General Ledger that will be implemented and maintained. The answers to these questions are weighted as in Table 5 [26][27].

Table 5. Rating weight.

Score	Category
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Based on the results of an analysis using a 12-question questionnaire that was distributed to and completed by users of the AMS System, the following Table 6 presents a list of the questions included in the questionnaire. Table 7 and 8 presents the results and final calculation regarding to the feedback from the respondents.

Table 6. UAT questions.

No	Question
1	Is the information provided by this system easy to understand?

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No	Question
2	Are the menus in this app easy to use?
3	Can this system, which predicts data needs, be used effectively?
4	Does the available information make it easy for you to find what you need?
5	Overall, regarding the e-Reporting System, is this e-Reporting system satisfactory and user-friendly for users?
6	Does this e-Reporting system app meet current operational needs?
7	Is this e-Reporting system app very easy for you to learn?
8	Regarding the information provided in the e-Reporting system, do the reports in e-Reporting help you obtain information regarding incoming and outgoing funds?
9	Does the e-Reporting system app minimize errors during use?
10	Is this app very useful in making it easier for treasurers in each block within the community to view the financial status of their respective blocks?
11	Is the menu interface easy to recognize?
12	Does this application have the expected capabilities and functions?

Table 7. UAT respondents' feedback.

Answer Criteria	Weight	UAT SCORE												
		1	2	3	4	5	6	7	8	9	10	11	12	Total
Strongly Agree	5	7	9	8	5	3	5	6	6	5	9	7	11	8
Agree	4	4	4	2	6	7	4	2	5	8	4	5	2	16
Neutral	3	2	2	5	4	5	6	7	4	2	2	2	2	18
Disagree	2	2	0	0	0	0	0	0	0	0	0	0	0	9
Strongly Disagree	1	0	0	0	0	0	0	0	0	0	0	1	0	6
Total Respondents		**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**180**
Actual Score		**61**	**67**	**63**	**61**	**58**	**59**	**59**	**62**	**63**	**67**	**62**	**69**	**751**
Ideal Score		**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**900**

Table 8. Testing result.

No	Question	Research Result		
		Actual Score	Ideal Score	Percentage
1	Is the information provided by this system easy to understand?	61	75	81.33
2	Is the menu in the app easy to use?	67	75	89.33
3	Can the system, which predicts data needs, be used effectively?	63	75	84.00
4	Does the available information make it easier for you to find what you need?	61	75	81.33

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No	Question	Research Result		
		Actual Score	Ideal Score	Percentage
5	Overall, regarding the e-Reporting application, is the e-Reporting system satisfactory and user-friendly for users?	58	75	77.33
6	Does the e-Reporting system application meet current operational needs?	59	75	78.67
7	Is the e-Reporting system application very easy for you to learn?	59	75	78.67
8	Regarding the information provided in the e-Reporting system, do the reports in e-Reporting help you obtain information regarding incoming and outgoing funds?	62	75	82.67
9	Does the e-Reporting System application minimize errors during use?	63	75	84.00
10	Is this application very useful in making it easier for the treasurer of each block within the community to view the financial status of their respective blocks?	67	75	89.33
11	Is the menu interface easy to recognize?	62	75	82.67
12	Does this application have the capabilities and functions expected?	69	75	92.00
	Total	**751**	**900**	**83.44**

Based on the results presented in Table 8, it can be concluded that the feasibility of the E-Reporting General Ledger system obtained a score of 83.44, which falls into the Good category, as indicated in Table 4. This result demonstrates that the developed system has fulfilled the required level of functionality based on the proposed User Acceptance Testing (UAT) process. Furthermore, the system provides substantial support for the monthly financial reporting process. In addition, this study demonstrates an advancement over previous research by integrating Laravel Scheduler to automate the processing and presentation of financial data, a feature that had not been implemented in previous studies.

4. CONCLUSIONS

Based on the identified research problems, the literature review, previous studies, and the research process model conducted by the researcher regarding the utilization of the Laravel Scheduler in the UI/UX design of the e-Reporting General Ledger System, the following conclusions can be drawn:

a) This study was conducted with the objective of developing an e-Reporting system by implementing the Laravel Scheduler to enhance the data processing and presentation processes within each reporting module, particularly the electronic General Ledger reporting module. Furthermore, this research serves as an extension of previous studies that addressed the same topic of financial reporting systems by introducing automated scheduling capabilities to improve the efficiency and effectiveness of data management.

b) The system was implemented on an online platform, enabling users to access it anytime and anywhere. Functional testing was conducted using the black-box testing method, and the results demonstrated that the system achieved a level of functionality that closely met the specified requirements. Furthermore, software quality was evaluated using the User Acceptance Test (UAT) approach, yielding a score of 83.44, which indicates a very good level of user acceptance. The UAT evaluation was carried out using a questionnaire-based assessment method.

c) Based on the identified research problems, literature review, related studies, the research process model employed in this study, and findings from previous research, it is recommended that future studies explore the integration of a WhatsApp notification engine to provide real-time notifications confirming that financial transactions submitted by residents of Block L have been successfully processed. This feature is expected to enhance user convenience, improve communication efficiency, and support the development

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of a more effective and user-friendly digital reporting system. Furthermore, the proposed enhancement reflects the expectations of the residents of Block L for a more integrated and accessible digitalized reporting system.

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