The Design of Website-Based Mosque Information System: A Case Study of Al-Muhajirin Mosque in Balongsari Using The Method of Rapid Application Development

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Abstract.

The Al-Muhajirin Balongsari Mosque in Surabaya still faces obstacles in managing information and finances because administrative processes are carried out manually, which can potentially lead to recording errors, loss of archives, delays in information delivery, and limited access for worshippers to activity and financial data. This study intends to design and develop a web-based Mosque Management Information System to facilitate integrated data management. The system development employs the Rapid Application Development (RAD) methodology to ensure a swift, iterative process aligned with user requirements. The proposed system includes management of agendas/activities, income, expenses, donations/transfers, transaction categories, galleries, and reporting, with access rights based on user roles: admin, officer, and congregation. The system architecture is depicted using Data Flow Diagrams (DFDs), Entity-Relationship Diagrams (ERDs), Conceptual Data Models (CDMs), and Physical Data Models (PDMs) to ensure data connectivity and transaction fidelity. The implementation results indicate that administrators can oversee officer and category data and generate reports; officers can enter transactions, verify transfers, manage agendas and galleries, and compile reports; while congregants can access activity information, prayer schedules, financial data, and donation services online. Based on functional testing of the administrator, officer, and user modules, the main features run as expected and produce valid outputs, indicating the system is capable of improving the efficiency, transparency, accountability, and accessibility of administrative management and the delivery of mosque information to congregants.

Keywords: *Mosque Information System; Mosque Financial Management; Rapid Application Development (RAD); Website; Transparency and Accountability.*

I. INTRODUCTION

The mosques serve not only as places of worship but also as hubs for social, economic, and educational activities within Muslim communities [1]. There are many programs held in mosques, including communication among congregations, studies, education, economic empowerment, fundraising, cash management, and more [1]. Research conducted by Wirapraja et al. (2024) confirms that the optimisation of information management in community-based organisations, including mosques, is greatly influenced by the use of integrated web-based information systems[2]. Such a broad role requires accurate and transparent information management. However, many mosques still record finances and activity agendas manually in books or worksheets, making them prone to errors, loss of archives, and delays in information dissemination [3]. Basatha (2021) in his research states that manual data management in social organisations has the potential to reduce work efficiency and increase the risk of data inconsistency[4]. Research by Chaniago et al. (2024) found that human resource competence and digital technology integration significantly improve transparency and accountability in religious institutions such as mosques, particularly in the management of congregational funds[5].The Al Muhajirin Mosque in Balongsari, Surabaya, is a good example of this; the mosque's administrators continue to use paper to record income and expenditures, while information on activities, such as the schedules for Friday prayers, is communicated through loudspeakers.

This approach is inefficient because the data obtained through it is easily dispersed, and worshippers are unable to access it at any time. A similar set of findings was also reported by Sutjiadi (2022), who stated that one of the most significant challenges in the management of community service-based organizations is the limited access to information that is generally available.By providing structured procedures for

collecting, storing, and presenting information, a computer-based management information system enables users to avoid these situations. The findings of a study by Putra and colleagues (2024) indicate that a mosque's financial management information system, implemented on a website, has the potential to improve transaction management effectiveness, accelerate report presentation, and enhance transparency [3]. According to a study by Sukya and Nurfarida (2024), a web-based mosque financial management portal enhances the congregation's ability to access financial information in real time. It strengthens community involvement in mosque activities [7].Trianto's (2023) research at IKADO also shows that implementing a web-based information system can improve administrative order and reporting quality in public service institutions [8]. These findings demonstrate that integrating information systems in mosques enhances financial accountability and facilitates data accessibility. Moreover, advancements in information technology prompt organizations to utilize digital platforms for information management, thereby improving decision-making and communication efficacy.

Padmasari (2024) asserts that digital transformation via web-based systems significantly enhances the transparency and effectiveness of organizational communication.In software development, the Rapid Application Development (RAD) approach offers an iterative model that enables rapid changes in response to user needs.RAD emphasises rapid prototyping and involves users from the early stages through *Joint Application Design* (JAD) workshops. This approach aims to produce high-quality systems with short development times and low costs. Research by Kurniawati et al. (2022) from IKADO shows that iterative and participatory system development methods can improve the suitability of systems to end-user needs[10]. Compared to the linear waterfall model, RAD is more flexible and adaptable to changing needs, making it suitable for developing mosque information systems that require the participation of administrators and congregations and that feature adjustments during the design process.This analysis reveals a disparity between the requirements of contemporary mosque information management and the operational conditions at Al Muhajirin Mosque, which continues to employ a manual system. This study intends to develop a web-based mosque information system utilizing the Rapid Application Development methodology, enabling administrators and congregants to access activity and financial information at any time. Wirapraja (2025) asserts that the deployment of an information system tailored to user requirements can enhance service efficacy and user confidence in the system[11]. The system aims to improve the efficiency, accuracy, and transparency of mosque management while providing a scientific foundation for implementing the RAD method in this sector.

This research was conducted using several studies as a reference for comparison with previous research. The following is a review of several studies used:The first study is "Digitalisation of Modern Mosque Management Information Systems" by Sutono et al. (2023). This study was conducted to optimise mosque management by improving the monitoring of mosque activities and the dissemination of information to congregations, thereby helping achieve organisational goals related to suboptimal mosque management and the slow dissemination of information received by congregations [12]. The second study is "Designing a Web-Based Online Information and Shodaqoh System at the Al-Huda Mosque using the *Waterfall* Method" by Achmad and Sinta (2024). This study examines problems at the Al-Huda mosque, namely the use of manual methods in the transaction system, which makes stored data prone to loss and inaccuracy during transactions, thereby reducing efficiency. To overcome these problems, an online information system was designed to record and report almsgiving, facilitating [13].The third study, entitled "Designing a Web-Based Mosque Management Information System Using Laravel at Al Akbar Mosque," was published by Akbar et al. in 2022. This study shows that data management at DKM Al-Akbar still relies on manual methods, which carry the risk of data corruption and loss. The purpose of this study is to develop a web-based information system to support data management and improve the welfare of the Al-Akbar mosque, using descriptive qualitative methods and SDLC to enhance the mosque management information system, thereby helping DKM manage data [14].

The subsequent study is titled "Designing a Web-Based Mosque Management Information System Using the Laravel Framework" by Rezky et al., 2024. They disclosed that data management at Al-Jihad Mosque is still conducted manually, using handwritten notebooks, resulting in data and activity information

being recorded by hand. To facilitate community access to mosque management data and activity schedules, a web-based application is intended to be developed. The application will assist administrators in presenting the call to prayer timetable, offering Al-Qur'an recitations, and accepting donations through QRIS online. Furthermore, administrators can oversee financial reports directly, while worshippers can conveniently access information about mosque activities at any time via the website. The system development process adheres to the Waterfall model of SDLC, comprising phases such as planning, analysis, design, coding, testing, and implementation. To evaluate usability, measurements were conducted using the System Usability Scale (SUS) via questionnaires completed by respondents after their interaction with the web application; the mean score was 86.5 [15].

II. METHODS

The research methodology used was UAT (*User Acceptance Testing*), often referred to as the "final test" before this mosque information system was launched to the public. It is not simply a technical functionality assessment, but an extensive validation to confirm that the developed software genuinely met the expectations and requirements of the Al-Muhajirin Mosque, as well as the practical workflow of end users. User Acceptance Testing (UAT) is a pivotal phase in which developers hand over control of their product to prospective users, soliciting their validation that all functionalities operate as intended and, crucially, meet the requirements of the Al-Muhajirin mosque. The development method used for this research is *Rapid Application Development*, which emphasises accelerating the application development process by dividing the project into several small components that are completed in a short time. This method enables iterative and collaborative system development by actively involving users at every stage[8].

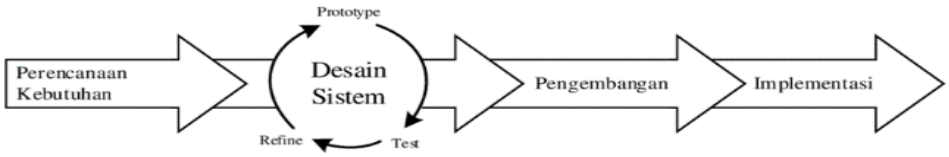

Fig 1. *Rapid Application Development* Method

The RAD method consists of four main phases, namely:

1. Requ*irements Planning*

In this phase, users and developers interact to analyse and resolve existing issues and identify essential requirements for building the application system. This stage is crucial to the project's success and prevents miscommunication among the parties involved.

2. *User* Design

The next phase is to design the proposed system to meet requirements, run according to plan, and be expected to overcome existing problems. In this study, the system design is represented using *Unified Modeling Language* (UML).

3. Construction

Construction is the phase of creating the system according to the plan. It involves writing program code (*coding*) to convert the system design into a functional and ready-to-use application.

4. Cutover

The *cutover* phase involves comprehensive testing of the entire system that has been built. All components are comprehensively tested using the Black-Box Testing method to minimise the risk of system defects. Black-Box Testing is a software testing technique that focuses on software's functional specifications.

III. RESULT AND DISCUSSION

3.1 Data Flow Diagram

The management process at Al-Muhajirin Mosque is still carried out manually. The following is a Data Flow Diagram of the current process and the proposed system, as shown in the figure below.

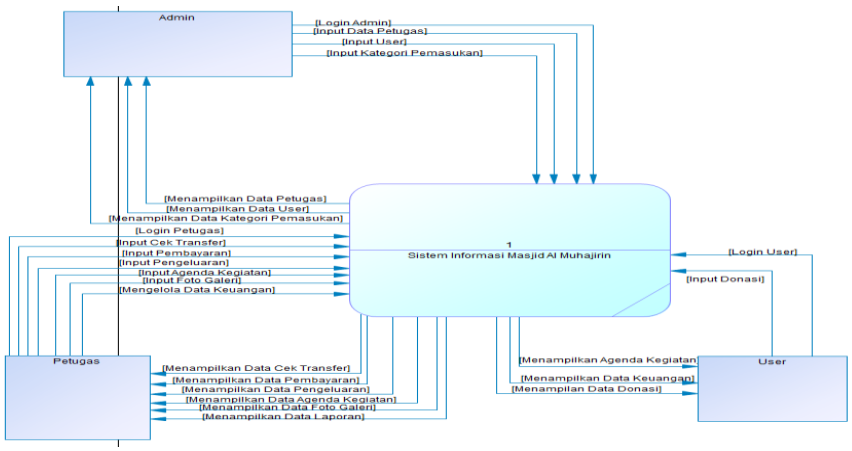

Fig 3.1. Data Flow Diagram

The data flow diagram of the system currently participating in the mosque information management process is depicted in the figure above. At the beginning of the process, that signifies the beginning of system activity. It is during the start stage. In the first step of the process, a mosque information system will be developed. This system will be used to manage data and activities associated with the mosque's operations. The next stage is recording in the ledger, where all critical data, such as financial transactions, worship activities, and administrative information, are systematically recorded for easy tracing. The collected data is then processed into reports. These reports serve as a medium for evaluating and holding the mosque administrators accountable for the mosque's activities and overall condition.Once the reports are complete, relevant information is announced to the congregation through the mosque information system. This information includes announcements of activities, financial reports, worship schedules, and other essential matters. The process then ends at the end stage, marking the completion of the information system cycle.

Thus, this workflow shows that the mosque information system supports structured administrative management, increases transparency, and facilitates the delivery of information to congregants. The business process for the mosque management information system involves four key actors: the administrator, mosque staff, the system, and users. The administrator accesses the web via the login page to manage staff and category data and to print reports for accountability. Mosque officers are responsible for entering financial and mosque activity data into the system after logging in, and for receiving reports on the results of data processing. The system then stores the data in a database and processes it into accurate and structured information in the form of financial reports and mosque activities. Meanwhile, users or congregants can access the website to view processed mosque management information, including financial data, activities, and relevant agendas. This workflow demonstrates that the mosque management information system supports efficiency, transparency, and accountability in administrative operations and in the delivery of information to congregants.

3.2 Entity Relationship Diagram

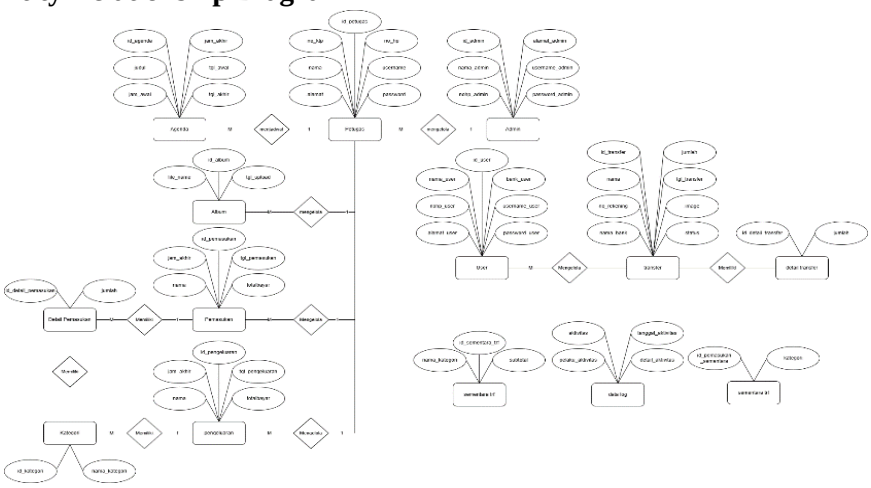

Fig 3.2. Entity Relationship Diagram

The Entity Relationship Diagram (ERD) in the figure above illustrates the relationships among entities involved in managing administrative, financial, and mosque activity data. The admin and officer entities serve as the primary data managers, connected to tables such as agenda, album, income, and expenditure to record activity and transaction information. Financial data is managed through the income, income details, expenditure, transfer, and transfer details entities, which are grouped by transaction type. In addition, there are fund entities for recording total funds, as well as the data_log, which stores user activity in the system. Temporary and temporary transfers facilitate the temporary input mechanism before the data are processed into the primary data. This ERD shows that the system is designed to ensure data integrity, support financial transparency, and manage mosque activities in an integrated, structured manner.

3.3. Conceptual Data Model

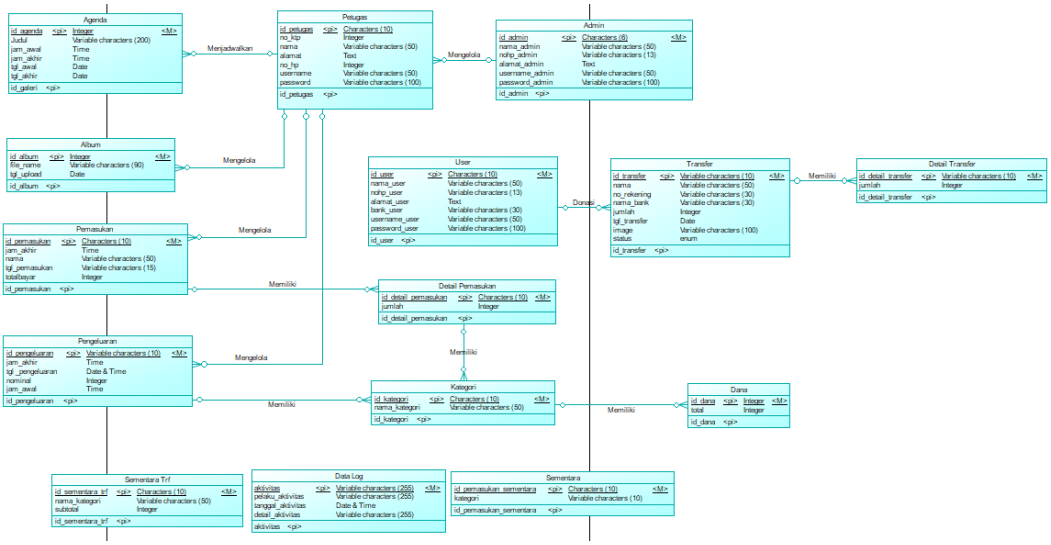

Fig 3.3. Conceptual Data Model

A Conceptual Data Model (CDM) compiled from the Data Flow Diagram is displayed in the image above. In its capacity as a conceptual overview, the CDM illustrates the structured interconnections among the data contained within the system. All recorded data can support each other in the processes of transactions, payments, expenditures, agendas, and albums, and in the preparation of financial reports, thanks to this model, which bridges the gap between needs analysis and the design of technical databases.

3.4. Physical Data Model

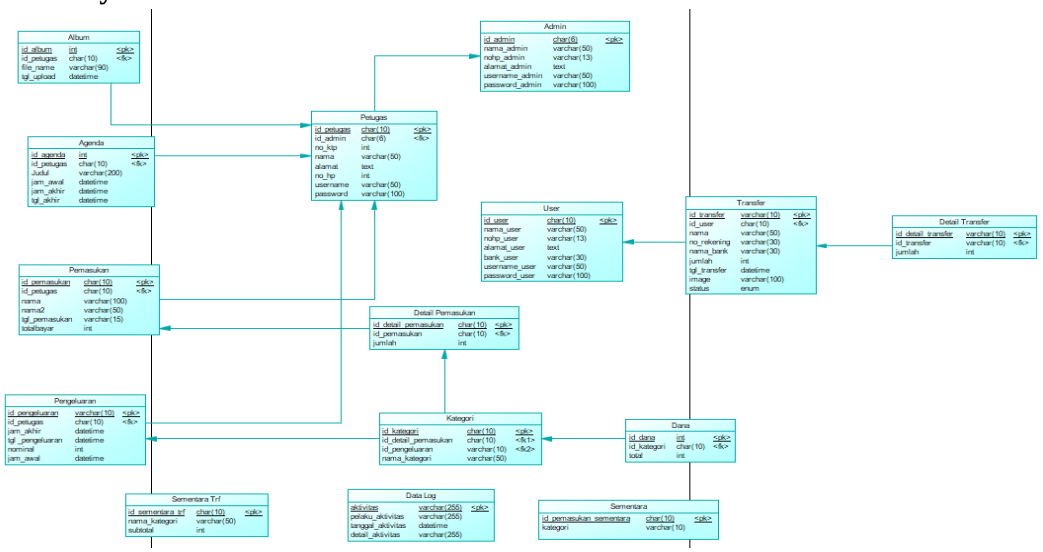

Fig 3.4. Physical Data Model

The image above shows *the Physical Data Model* (PDM), a detailed representation of the database design in physical terms. This model contains table structures, attributes, relations, and primary and foreign keys used in database implementation. The PDM serves as a direct reference during system development because it provides the technical details required for actual data storage and processing.

3.5. Implementation of the Mosque Management Information System Programme for the Administration Section

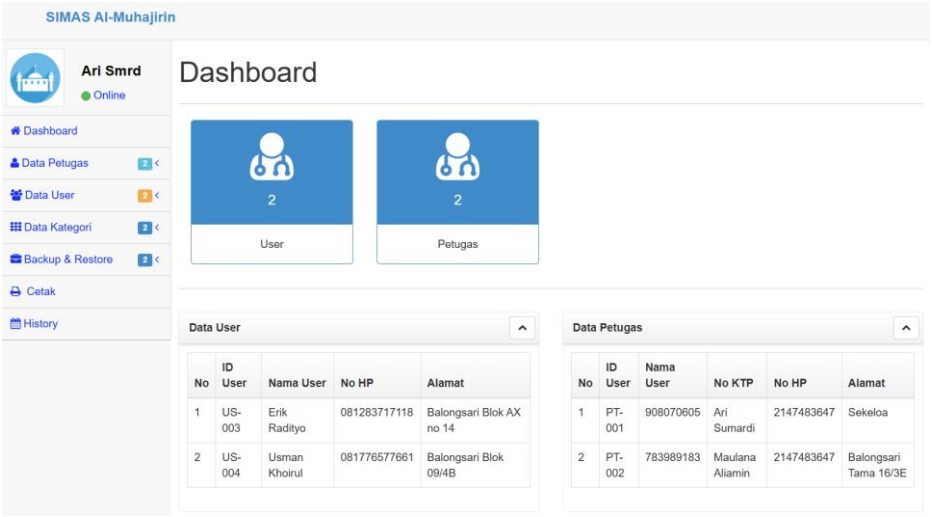

Fig 3.5. Admin Dashboard Display

Figure 3.5 shows the admin login page, where the admin can log into the system using a username and password to access the website. The dashboard will appear if the login details entered match those stored in the database. After successfully logging in, the administrator has access to several main menus, namely: (1) Dashboard, which displays the data of officers registered in the system; (2) Officer Data, which is used to create, edit, and delete mosque officer data; (3) Category Data, which is used to manage the types of donations or alms; (4) Backup and Restore, allowing the administrator to back up and restore SIM Masjid data; (5) Print, for printing staff data; (6) History, displaying the history of activities performed by the administrator; and (7) Logout, used to exit the application.

3.6 Implementation of the Mosque Management Information System Programme for Staff

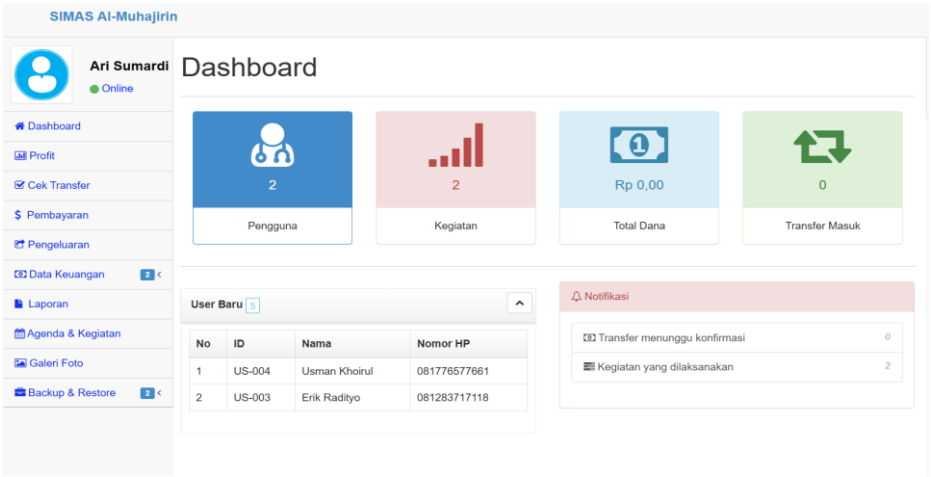

Fig 3.6. Staff Dashboard Display

Figure 3.6 displays the staff login page, where the menu opens, and staff can log in to the system using their username and password. To access the dashboard, staff must enter their username and password correctly, as per the database. After successfully logging in, various menus can be used by officers, namely: (1) Dashboard, displays transfer notifications that need to be confirmed as well as activities that will be or have been carried out; (2) Profit, displays the amount of mosque cash profit; (3) Check Transfer, used to view and confirm incoming transfers; (4) Income, functions to view and add mosque income data; (5) Expenditure, adding data on the mosque's expenditure; (6) Financial Data, displaying all income and expenditure data; (7) Reports, managing reports with features for printing income, expenditure, and cash based on the desired date; (8) Agenda & Activities, displays and adds activity agendas; (9) Photo Gallery, used to upload and delete photos; (10) Backup and Restore, performs backup and restoration of Mosque SIM data; and (11) Logout, used to exit the application.

3.7 Implementation of the Mosque Management Information System (SIM) User Section

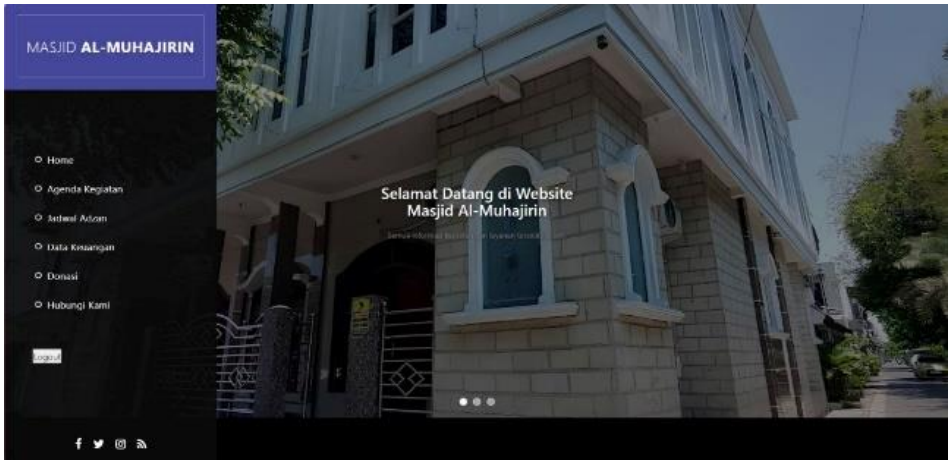

Fig 3.7. User Dashboard Display

Based on Figure 3.7, several menus are available for user interaction, namely: (1) Home, which presents the main page for users; (2) Activity Agenda, providing information regarding the mosque's activity schedule, including the activity name, time, date, and description; (3) Adhan Schedule, displaying the prayer timetable for the Sumbawa Besar area (GMT +8), with printing capabilities, options for city selection, and filters for day, month, and year. This menu also shows the times for Imsyak, Subuh, Terbit, Dhuha, Zuhur, Asar, Magrib, Isya, and the Qibla direction. (4) Financial Data, presenting the mosque's financial information, including incoming funds and outgoing funds derived from transactions, dates, and amounts; and (5) Donations/Alms, providing a donation or alms form for users to upload proof of their contributions, along with a list of individuals who have made donations or alms.

3.8 Testing of the Mosque Management Information System

Table 3.1. Test Results for the Admin Section

Module Tested	Testing Procedure	Input	Expected Output	Results
Admin Login	Enter Username & Password	Valid Username & Password	Admin redirected to Dashboard	Valid
Add Staff	Enter Staff Data.	Admin enters name, ID card number, address, and mobile number	Administrator Successfully Added and Displayed Staff Data	Valid
Add User	Entering User Data.	Admin Enter Name, ID Card Number, Address & Mobile Number	Administrator successfully added and displayed user data	Valid
Add Category	Entering Category Data	Admin has entered a new category	Admin Successfully Added and Displayed Category Data	Valid

Table 3.1 above shows the system testing results, which are as expected. Upon admin login, when the username and password are valid, the admin successfully accesses the dashboard. The add staff module allows the addition of new data that is stored. The add user module allows the addition of new data that is stored. The add category module allows the addition of new data that is stored.

Table 3.2. Test Results for the Staff Section

Module Tested	Test Procedure	Input	Expected Output	Results
Staff Login	Enter Username and Password	Valid Username & Password	Staff Member Redirected to Dashboard	Valid
Check Transfer	Confirm Transfer	Staff Confirm Transfer (Yes/No) Valid	Officer Successfully Adds and Displays Transfer Check Results	Valid
Income	Add Mosque Income	Officer Adds Mosque Income From Transaction List	Officer Adds and Displays Transaction List	Valid
Expenses	Add Mosque Expenses	Officials Add Mosque Income Expenses from Transaction List	Officer Adds and Displays List of Expenses	Valid
Agenda and Activities	Add Activity Agenda List	Officers Enter the Name of the Activity, Agenda, Time, Date, and Description	Add and Display Activity Agenda List	Valid
Photo Gallery	Add Photo Gallery	Staff Upload Photos	Display Photos	Valid

Table 3.2 above presents the system testing results, which align with expectations. Upon logging in with valid credentials, the administrator successfully accesses the dashboard. The staff transfer verification module validates transfers from donations and accurately presents their outcomes. The staff income module

effectively incorporates the income results into the transaction list. The staff expenditure module effectively incorporated mosque income expenditures from the transaction list and presented the expenditure list. The staff agenda and activities module effectively incorporated activity agendas. The staff photo gallery module effectively uploaded images and displayed the resulting photographs.

Table 3.3. User Section Test Results

Module Tested	Test Procedure	Input	Expected Output	Results
User Login	Input Username and Password	Valid Username & Password	User redirected to Dashboard	Valid
Activity Schedule	Access the Activity Agenda Menu	Select the Activity Agenda Menu	Display Activity Agenda	Valid
Financial Data	Access the Financial Data Menu	Select the Financial Data Menu	Displaying Financial Data for the Mosque's	Valid
Donations	Access the Donation Menu	User Makes Donation/Charity	Displaying Donation/Charity Transaction Results	Valid

Table 3.3 above shows system test results as expected. Upon user login, with a valid username and password, the administrator successfully accessed the dashboard. In the activity agenda module, selecting the activity agenda menu displays the activity agenda. In the financial data module, by selecting the financial data menu, the user successfully displayed the list of mosque income and expenditure. In the donation module, the user entered donation or charity data, and the transaction was successfully shown.

IV. CONCLUSION

Based on the discussion presented, it is possible to conclude that the Al-Muhajirin Balongsari Mosque in Surabaya continues to face difficulties in managing information and finances. This is because administrative processes are carried out manually, which increases the likelihood of errors in recording, the loss of archives, additional delays in information delivery, and restricted access for worshippers to activity and financial data.To address these issues, this study designed and developed a website-based Mosque Management Information System using the *Rapid Application Development* (RAD) approach, enabling rapid, iterative development aligned with user needs. The proposed system supports integrated data management for agendas/activities, income, expenses, donations/transfers, transaction categories, galleries, and reporting.

It provides different access levels based on user roles (admin, officer, and user/congregation). The results of system design through DFD, ERD, CDM, and PDM show that the system has been built with a connected data structure that supports transaction integrity and financial report preparation. At the implementation stage, administrators have features for managing officers and categories as well as printing reports. In contrast, officers are responsible for inputting transactions, confirming transfers, managing agendas, galleries, and reports. Meanwhile, congregants can access activity information, prayer schedules, financial data, and make donations/alms via the web.The functional testing results for the administrator, staff, and user modules indicated that all primary features operated as intended and yielded valid outputs. Consequently, the system was assessed as proficient in enhancing efficiency, transparency, accountability, and accessibility in administrative management and the dissemination of mosque information to congregants.

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