



# Training and implementation of a web-based data collection system to improve data processing

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## ARTICLE INFO:

Received: 2025-06-07  
Revised: 2025-07-01  
Accepted: 2025-08-02  
Published: 2025-08-28

## Keywords:

Administration,  
Innovation, Training,  
Web-based data  
collection system

## ABSTRACT

The member data collection process at the Institution for the Development and Empowerment of Women Heads of Household (PEKKA) of the Masjid Agung Palembang Foundation is still done manually using books and Excel. This causes difficulties in finding data, inaccurate data, and data may be lost. The purpose of this community service activity is to conduct socialization and training on the system that has been built, which can be accessed via the Internet. The target of the activity is the administrative section of the institution which has data over than 190 members. The system development uses a waterfall approach and discussions about the system that will be used later with a development method, which consists of planning, system design, implementation, evaluation, and ends with training. Laragon is used as a local server in the system development until hosting in its publication. The web-based system developed successfully addressed previous issues by speeding up data retrieval, making updates easier, and reducing the likelihood of data loss. After the system is published, the next step is socialization and training to facilitate users and website administrators in member data collection, so that data-related needs can be met well, and innovation can be realized by transitioning from manual to digital. Based on the results of the tests conducted, the average value obtained was 4.67 out of 5, which indicates that respondents were able to use the system effectively.

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**How to cite:** Mair, Z. R., Heriansyah, R., Nofiansyah, D., & Setyady, M. T. (2025). Training and implementation of a web-based data collection system to improve data processing. *Abdimas: Jurnal Pengabdian Masyarakat Universitas Merdeka Malang*, 10(3), 565-574. <https://doi.org/10.26905/abdimas.v10i3.15851>

## 1. INTRODUCTION

On September 20, 2019, the Palembang Grand Mosque Foundation (Yayasan Masjid Agung Palembang) officially established the Institution for the Development and Empowerment of Women Heads of Household (Lembaga Pembinaan & Pengembangan Perempuan Kepala Keluarga, abbreviated as LPP-PEKKA), located at Jalan Jenderal Sudirman No. 01, Kelurahan 19 Ilir, Palembang. LPP-PEKKA plays a strategic role in empowering women heads of families through various fields, including economic empowerment and entrepreneurship, education and training, legal aid and consultation, as well as social care and charity (Nurgina, 2023). The organization currently records more than 190 members, most of whom are women responsible for supporting and managing their households.

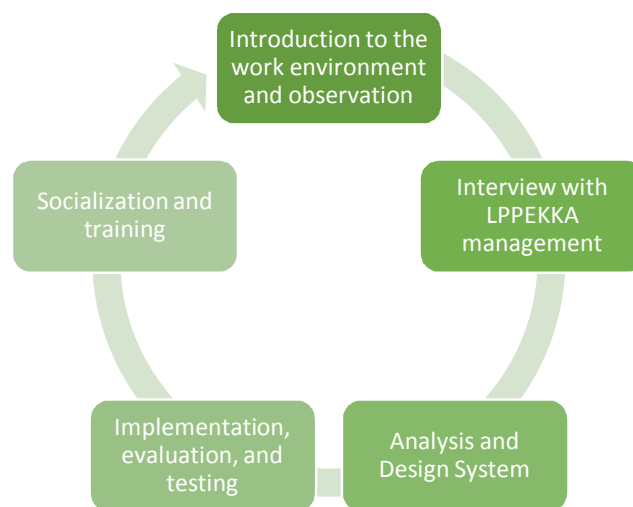
Despite its crucial role, member data management at LPP-PEKKA is still handled manually using notebooks and Microsoft Excel. This approach often causes challenges such as difficulty in finding specific information, overlapping or duplicate entries, incomplete or outdated updates, and even the risk of losing important records. These issues not only disrupt effective administration but also compromise fairness and accuracy in distributing training programs to members.

In the digital era, developing a web-based data collection system has become essential to enhance the effectiveness and efficiency of organizational management. According to Badan Pusat Statistik (BPS), PEKKA programs require training and outreach on the use of digital platforms to support data updates and accessibility. Previous studies have shown that web-based information systems significantly improve accuracy, speed, and transparency in data management (Fadilla et al., 2025). Therefore, adopting a digital system is highly relevant and urgent for LPP-PEKKA to maintain data integrity and provide better services to its members.

This community service program aims to develop and implement a web-based data collection system for LPP-PEKKA. The program includes training and socialization for administrators and members, enabling them to operate the system effectively. Through this initiative, LPP-PEKKA is expected to improve its administrative efficiency, ensure more equitable access to training opportunities, and minimize the risk of data loss.

## 2. METHODS

This community service activity was conducted at the Institution for the Development and Empowerment of Women Heads of Household (PEKKA) under the Palembang Grand Mosque Foundation. The partner location is at Jl. Jenderal Sudirman No.1, 17 Ilir, Ilir Timur I District, Palembang City, South Sumatra. The activity took place on Tuesday, June 24, 2025, starting at 09:00. Figure 1 presents the stages of the activity.



**Figure 1.** Stage of activity

Figure 1 shows the sequential stages of the community service activity, starting with the introduction to the work environment and observation stage, where the team familiarized themselves with the partner's operational setting and reviewed the existing manual data collection process to identify issues and limitations. This is followed by interviews with LPP-PEKKA management to obtain detailed information about data management needs, operational challenges, and expectations for the

## Training and implementation of a web-based data collection system to improve data processing

Zaid Romegar Mair, Rudi Heriansyah, Doly Nofiansyah, Muhamad Tedy Setyady

proposed system. The analysis and design system stage involves determining functional and technical requirements, designing use case and activity diagrams, and developing the database schema. The implementation, evaluation, and testing stage includes developing the web-based data collection system, deploying it to a hosting environment, and performing functionality checks through the black box testing method to ensure accuracy, usability, and reliability. Finally, the socialization and training stage introduces the system to administrators and users, providing practical training to ensure effective system operation. This cyclical process ensures that the final system is user-oriented, thoroughly tested, and supported by proper user capacity building.

### 3. RESULTS AND DISCUSSION

#### Results

The implementation method of this activity is divided into three main stages: preparation, implementation, and evaluation. The preparation stage includes an introduction to the work environment, observation of the manual data collection system, and direct interviews with the institution's administration to identify the problems encountered.



Figure 2. Interviews with the institution's administration

Interview stage with management discussing the effectiveness and efficiency of the use and processing of data that is fast and easy (Figure 2). This stage includes system needs analysis and design of a website-based data collection information system. The design includes use case diagrams, activity diagrams, and database designs. After that, the system is developed and implemented using the PHP programming language and MySQL database, with Laragon as a local server and Visual Studio Code as an editor which is then hosted as the institution's website (Figure 3).

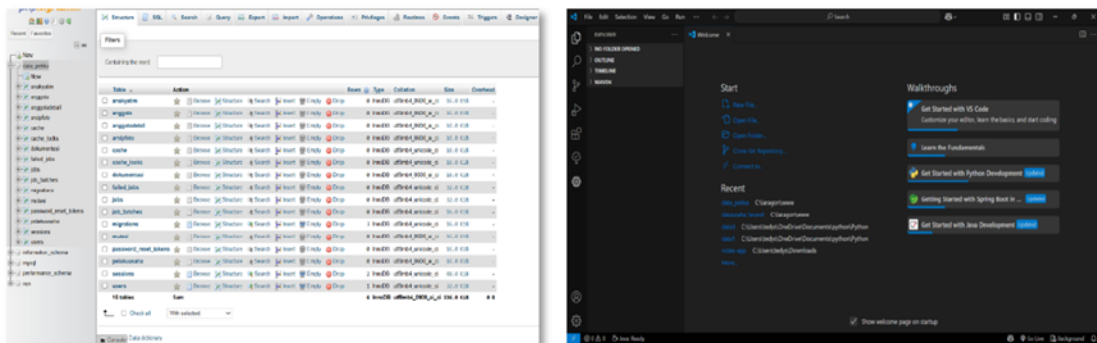


Figure 3. Implementation of using database, laragon, and visual studio code editor

The implementation, testing, and evaluation stages were conducted by directly involving users, namely the system administrator and representatives from the partner institution. The evaluation focused on testing feature functionality, ease of use, and efficiency in recording and retrieving data through black-box testing.

The system development method applied in this activity was the waterfall model, consisting of the stages of planning, analysis, design, implementation, testing, as well as additional socialization and training. The outputs of this activity were documented in the form of reports and system manuals, which serve as follow-up materials for managing membership data. The waterfall model provides a sequential software development life cycle, starting from analysis, design, coding, testing, and continuing to the support stage (Hartati & Sintawati, 2020). This model is widely used in system development because of its structured approach. According to Sommerville, the waterfall model follows a linear process, beginning with system planning and progressing to the maintenance phase. Each stage must be completed before moving on to the next, and previous stages cannot be revisited once completed (Wayahdi & Ruziq, 2023). The implementation activities were carried out at the LPP-PEKKA office by inviting representatives of group leaders from each sub-district (Figure 4). The stages of the waterfall model are illustrated in Figure 5.



Figure 4. Documentation of socialization and training of website-based data collection

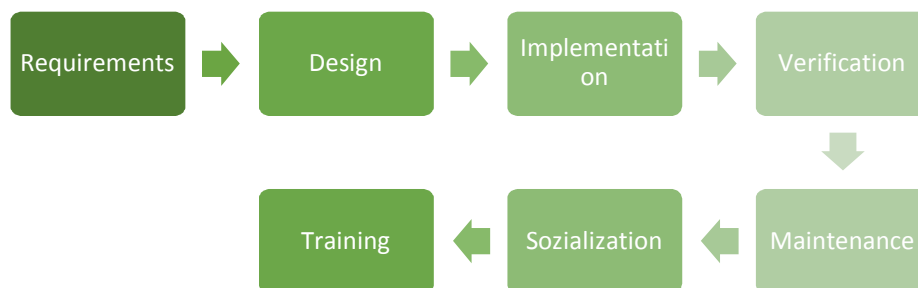


Figure 5. Waterfall model with additional socialization and training

The evaluation phase of the program was conducted systematically through the distribution of structured questionnaires to measure user perceptions of the developed web-based data collection system. Figure 6 illustrates the evaluation instrument, which consisted of thirty items designed to assess the quality, functionality, and usability of the PEKKA data collection application. The questionnaire items specifically addressed the system's ability to record and manage data related to members, business actors, and orphans, which represent the core focus of LPP-PEKKA's programs. The evaluation was also

## Training and implementation of a web-based data collection system to improve data processing

Zaid Romegar Mair, Rudi Heriansyah, Doly Nofiansyah, Muhamad Tedy Setyady

intended to capture the level of user understanding, ease of interaction with the system, and the overall satisfaction of the participants after using the application.

The assessment employed a five-point Likert scale, where respondents rated each item as follows: (1) Very unsatisfactory; (2) Unsatisfactory; (3) Fair; (4) Satisfactory; and (5) Very satisfactory. Prior to the evaluation, socialization and hands-on training sessions were conducted for female members of LPP-PEKKA to ensure that participants had sufficient knowledge and exposure to the system's features. After completing the training, 18 respondents representing different member groups participated in the evaluation by filling out the questionnaires.

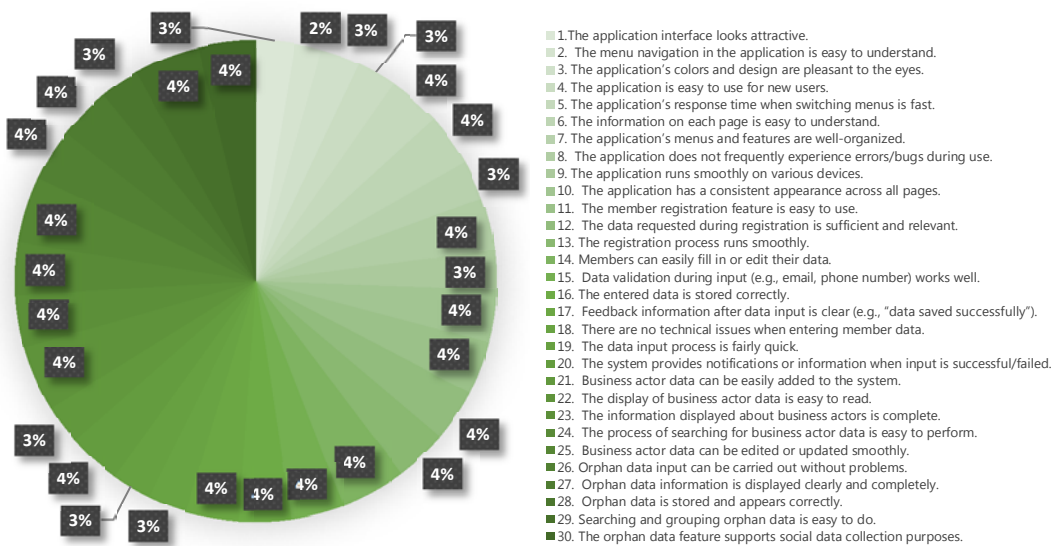


Figure 6. Graph of percentage of questionnaire responses

The results showed an average score of 4.67 across all questionnaire items, which is categorized as very satisfactory (Figure 6). This indicates that, from the users' perspective, the system successfully met their expectations in terms of reliability, ease of use, and efficiency in recording and retrieving data. Furthermore, the high score demonstrates that the application is perceived as a useful tool for supporting organizational administration and program distribution. These findings suggest that the implemented web-based data collection system is not only functional but also well-accepted by its users, providing a strong foundation for sustainable digital transformation within LPP-PEKKA.

## DISCUSSION

### Survey and analysis desain system

After analyzing the limitations of the previous manual system, which was unable to support effective membership data management, the author decided to develop a web-based member data system. This system is designed to improve efficiency in processing member data, accelerate data searches, and reduce the risk of data loss or damage. In developing the system, the author used the Unified Modeling Language (UML) diagram approach as a tool to describe the structure and flow of the system (Niqotaini et al., 2023). UML was chosen because it provides a comprehensive representation of

how the system works, both in terms of user interaction and data management. The diagrams used at this stage include Use Case Diagrams.

### **System**

A system is a network of interconnected elements, forming a unity to carry out the main objective of the system (Susanto et al., 2023). A system, surrounded and affected by its environment, is described by its boundaries, structure, and purpose, and expressed in its functioning. A system is a group of interacting or interrelated elements that act according to a set of rules to form a unified whole. The identity and behavior of a system are characterized by its boundaries, which distinguish it from its surroundings; its structure, which defines the arrangement and relationships among its components; and its purpose or function, which gives meaning to its existence and guides its operation.

### **Website**

A website is information displayed via the internet, either static or dynamic, containing text information, still or moving images, sound, and a combination of all of them and connected to other information pages via (hyperlinks) and usually using a Web Browser to open it (Afrilia et al., 2021). A website is a collection of related web pages, documents, photos, videos, or other digital content that are housed on a web server and accessible online. Websites can be used for a variety of reasons, such as e-commerce, business, education, entertainment, and communication. Generally, they are made to give users access to information, services, or interactive elements.

### **Efficiency**

According to Mair (2024) efficiency means doing a job properly and correctly. In simpler terms, efficiency shows the organization's ability to use resources properly and without waste. Furthermore, Hutahaean (2023) defines efficiency as the ability to minimize the use of resources in achieving organizational goals. States that a person who acts efficiently can minimize the cost of the resources needed (Lau, 2023).

### **Laragon**

Laragon is open-source software that can support many operating systems where Laragon acts as a virtual server often referred to as localhost (Lau, 2023). Laragon itself usually uses a domain according to your wishes or is commonly referred to as pretty URLs. This application is very good for managing website-based applications. Laragon is also an application similar to XAMPP but is designed for the needs of PHP developers who use the Laravel framework. Services included in Laragon include: Apache, MySQL, PHP Server, Memcached, Redis, Composer, Xdebug, PhpMyAdmin, Cmdr, and others. This application is very suitable for use by a PHP developer who uses the Laravel framework because it will make it easier to develop applications (Putra et al., 2019).

### **My Structured Query Language (MySQL)**

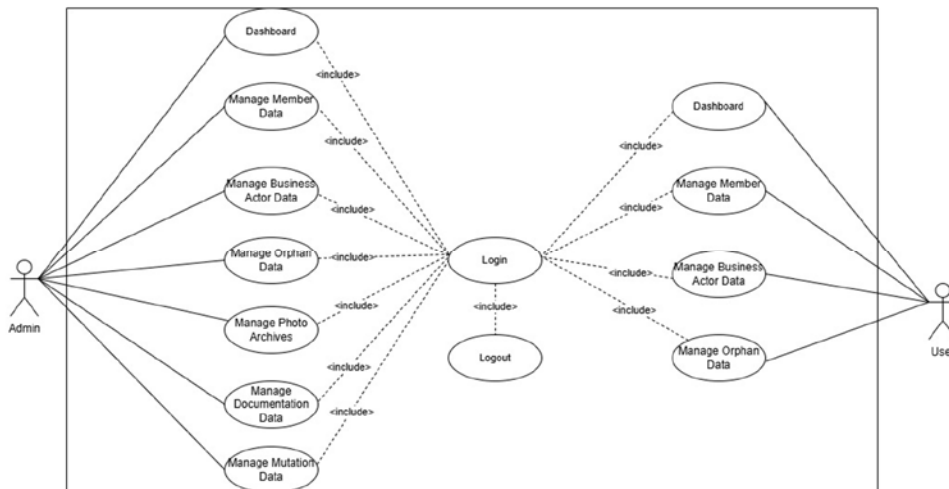
MySQL is a relational database software or Relational Database Management System (RDBMS) that is distributed free of charge under the GPL (General Public License). Where everyone is free to use MySQL, but it may not be used as a derivative product that is made closed source or commercial. Kadir (2002) stated that SQL has a well-structured syntax. Each SQL command consists of keywords and clauses that are used to describe the operations to be performed. SQL commands can be commands to retrieve data (SELECT), add new data (INSERT), update existing data (UPDATE), or delete data (DELETE) (Alia et al., 2023). PHP, Hypertext Preprocessor, is a server-side programming language that allows websites to

## Training and implementation of a web-based data collection system to improve data processing

Zaid Romegar Mair, Rudi Heriansyah, Doly Nofiansyah, Muhamad Tedy Setyady

interact with databases and generate dynamic content. PHP is a scripting language that is integrated with HTML and runs on the server side. This means that all the syntax we provide will be fully executed on the server while only the results are sent to the browser (Sinlae et al., 2024). Based on the results of the socialization and training on the website-based membership data system at the Institution for the Development and Empowerment of Women Heads of Household (PEKKA) of the Palembang Grand Mosque Foundation, Palembang City, several conclusions can be drawn.

The implementation of the new system has significantly improved the convenience and efficiency of managing membership data. Previously, data collection and administration relied on manual methods using notebooks and Microsoft Excel, which were prone to errors, duplication, and data loss. With the website-based system, administrators can now organize, update, and retrieve membership information more quickly and accurately, thereby enhancing the overall effectiveness of institutional data management.



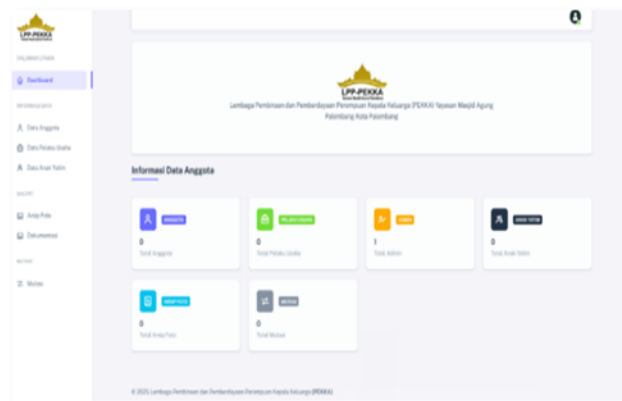
**Figure 7.** Use case of website-based data collection system at LPP-PEKKA

Based on Figure 7, the use case diagram illustrates the functions that can be accessed by both the Admin and the User within the website-based data collection system. The admin begins by logging in before entering the system, after which the dashboard can be accessed to view general information about membership. Furthermore, the admin is able to manage various types of data, including member data, business actor data, orphan data, photo archives, documentation data, and mutation data. In managing these data, the admin has the ability to add, change, delete, and, in certain cases, print information as needed. Specifically, member, business actor, and orphan data can be added, edited, deleted, and printed; photo archives can be viewed and deleted; documentation data can be added, changed, and deleted; and mutation data can also be added, changed, and deleted. Finally, once all tasks are completed, the admin can log out to exit the system securely.

The use case diagram also illustrates several functions that can be accessed by the User within the website-based data collection system. Similar to the admin, the User begins by logging in before entering the system, after which the dashboard can be accessed to view general information about membership. The User is able to manage member data, business actor data, and orphan data, with the ability to add, change, and delete information as needed. Once the required tasks are completed, the User can securely log out of the system.

Database design is used as a structured method of storing information. Through the website-based data collection system, all member data can be stored securely, consistently, and accessed easily. This provides a solution to the various obstacles faced when data management was still done manually. The following is the database design prepared for the development of a website-based data collection system to improve efficiency at the Women Heads of Household Development and Empowerment Institution (PEKKA) of the Palembang Grand Mosque Foundation, Palembang City. This system helps reduce the risk of data loss, which was previously a concern due to manual recording, so the newly developed system can now be categorized as a digital and centralized storage platform, ensuring safer data management.

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**Figure 8.** Admin dashboard page view

This system also supports a fair and more equal distribution of training programs to each member, preventing the potential injustices that may occur in the manual system. The success of this program is measured through socialization and training activities, followed by questionnaires as an indicator of user comfort and ease in interacting with the system. The website system minimizes overlapping data and ensures that the stored information is always up to date and relevant.

#### **4. CONCLUSION AND RECOMMENDATIONS**

The aim of this program is to develop a web-based data collection system to improve efficiency and administrative convenience at the Institution for the Development and Empowerment of Women Heads of Household (PEKKA) of the Palembang Grand Mosque Foundation. Before completing the questionnaire, PEKKA members received training on how to operate the developed website. After the system was completed, questionnaires were distributed using a 5-point scale. Based on the results and

discussion, it can be concluded that the training and implementation of the web-based data collection system helped reduce the risk of data loss, which was previously an issue due to manual membership data recording. Now, data is stored digitally and centrally, making member data recording easier. Testing the system and distributing questionnaires to participants showed an average score of 4.67 out of 5, indicating that respondents were able to use the system effectively. At present, all districts in the PEKKA area have internet access, and with mobile devices, PEKKA members can access and use the system efficiently.

Regarding the developed system, which represents the initial stage in institutional data collection development, it is recommended that its management be maintained and adapted to the institution's evolving needs. While the system has provided many benefits, there remain opportunities for improvement to optimize its functions. Direct observation and input from daily users are highly valuable in identifying areas that require enhancements or additional features. With ongoing development efforts, this system is expected to continue evolving and deliver greater benefits in supporting data collection and institutional operations as a whole.

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