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Designing a Web-Based Inventory System Using the Rapid Application Development (RAD) Method at HKBP Simpang Marindal Church

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Abstract

Gereja HKBP Simpang Marindal has has traditionally managed its inventory manually using word processing software such as Excel and Word, which makes it prone to recording errors, data loss, and inefficiencies in information retrieval. To address these issues, this study aims to design a web-based inventory system using the Rapid Application Development (RAD) method. RAD was chosen for its ability to accelerate system development through intensive prototyping and high user involvement throughout the design process. The developed system includes features for recording incoming and outgoing goods, as well as real-time inventory reporting. The design results show that this system can improve the accuracy and efficiency of inventory management within the church environment.

Keywords: *Inventory System, Church, Web, RAD, Rapid Application Development, System Design*

1. Introduction

Currently, inventory management at HKBP Simpang Marindal Church is still carried out manually using word processing tools like Microsoft Excel and Word. This method often leads to issues such as data entry errors, data loss risks, and inefficiency in retrieving information. To address these challenges, this study aims to design a web-based inventory system using the Rapid Application Development (RAD) approach. RAD was chosen for its ability to accelerate development through iterative prototyping and active user involvement in each stage of the design process. The system includes core features such as recording incoming and outgoing items and generating real-time inventory reports. The design results show improved accuracy and efficiency in inventory management within the church environment [1]. HKBP Simpang Marindal Church, located in Simpang Marindal, is committed to providing excellent service to its congregation. As activities and service needs increase, the church faces challenges in maintaining efficient and organized inventory management [2]. Currently, inventory records are handled manually by several sub-units responsible for asset management, without computerized systems to manage the data optimally. Thus, the development of a digital inventory system is expected to facilitate data handling and improve overall management efficiency.Rapid Application Development (RAD) is a software development methodology that emphasizes speed and flexibility [3]. It allows developers to quickly build prototypes and iterate frequently to shorten development cycles and accelerate time to release. A key feature of RAD is continuous user involvement through regular feedback, ensuring the final product meets user needs effectively. This approach is well-suited for modern software development, offering effective solutions in a rapidly evolving technological environment. Additionally, RAD provides a strong foundation for research and project-based software development [4]. Based on the analysis, HKBP Simpang Marindal Church requires an information system that supports efficient inventory management. The system should ensure data accuracy, correct item quantities, and timely updates. With automation, inventory updates can be streamlined, and data can be better structured and securely stored [5]. Through this web-based inventory system, church asset management is expected to become more organized, integrated, and accessible for stakeholders. Therefore, this study is titled: "Designing a Web-Based Inventory System Using the Rapid Application Development (RAD) Method at HKBP Simpang Marindal Church."

2. Research methods

2.1. Analysis

Analysis is a process to evaluate and understand the system or method applied in the recording, management, and monitoring of assets and inventory belonging to the church. This process aims to understand how the inventory system works, so that it can be designed or improved to be more effective and efficient.

2.2. Running System Analysis

The design analysis of the purpose of the system is to design and develop the inventory system at the HKBP Simpang Marindal Church. There are various types of data that are managed, such as church asset data, as well as worship activities in the Church to be more structured and efficient. There are different types of data types, namely:

1. Register for the Opportunity Online. Here is the inventory list information with the system running.

2.3. Process analysis

After the analysis of the running system was carried out, based on the data collected, it was found that several difficulties were experienced in the inventory system currently used at the HKBP Simpang Marindal Church, including:

1. Inventory Data Recording Is Still Manual Church inventory data is still recorded manually using Microsoft Word, Excel, and notebooks, so there is a risk of data loss, recording errors, and difficulties in finding and monitoring church assets.
2. Lack of a Centralized System for Inventory Management Currently, churches do not have a system that can manage inventory in real-time and integrated, making it difficult for administrators to track the status of assets, as well as inventory maintenance needs.
3. Inefficiencies in Resource and Cost Management Because recording and inventory management are still done manually, churches face obstacles in resource allocation, both in terms of time, effort, and operational costs for more optimal inventory maintenance and procurement.

2.4. Analysis of the proposed method

1. Analysis of the RAD Method in System
   Design The RAD method consists of several main stages that are interrelated. The following is an analysis of the implementation of the RAD method in designing a web-based inventory system at the HKBP Simpang Marindal Church:
   A. Planning and Identification of Needs At this initial stage, identification was carried out of the need for the existing inventory system in the church. Some of the aspects analyzed include:
      1) Types of items managed in inventory
      2) Entry and exit entry
      3) Recording system Inventory
      4) Reporting and monitoring mechanism Web-based

accessibility needs By involving the church as the main user, this stage ensure that the system developed will be relevant and appropriate with the operational needs of the church.

   B. Prototype Design At this stage, the initial prototype of the system was developed which includes:
      1) User interface (UI/UX) for easy access and management of inventory
      2) Entry and exit entry
      3) Recording module Inventory data search and filter features Reporting
      4) Dashboard that provides information related to the stock

of goods This prototype will be tested and evaluated by the user, so that the input from users can be immediately applied in subsequent development.

   C. Rapid Development and Implementation
      Based on the results of the prototype evaluation, the system was further developed with appropriate web-based technology. Development carried out with an iterative principle, which means that any changes can be immediate implemented without having to wait for the entire system to be built. Technologies that can be used include:
      1) Frontend: PHP, HTML, CSS
      2) Database: MySQ
      2. Advantages of Using the RAD

Method The application of the RAD method in designing a web-based inventory system at the HKBP Simpang Marindal Church has several advantages, including:

   a. Rapid development, iterative cycles allow systems to be developed in a short period of time.
   b. High flexibility, Changes can be applied immediately based on feedback from users.
   c. Active user involvement ensures the system is in line with the operational needs of the church.

d. The results of the more suitable prototype are tested directly by the user before the final system is developed.

2.5. Analysis of the proposed system

To carry out the proposed system modeling process, it will be Use case diagrams are used as a tool

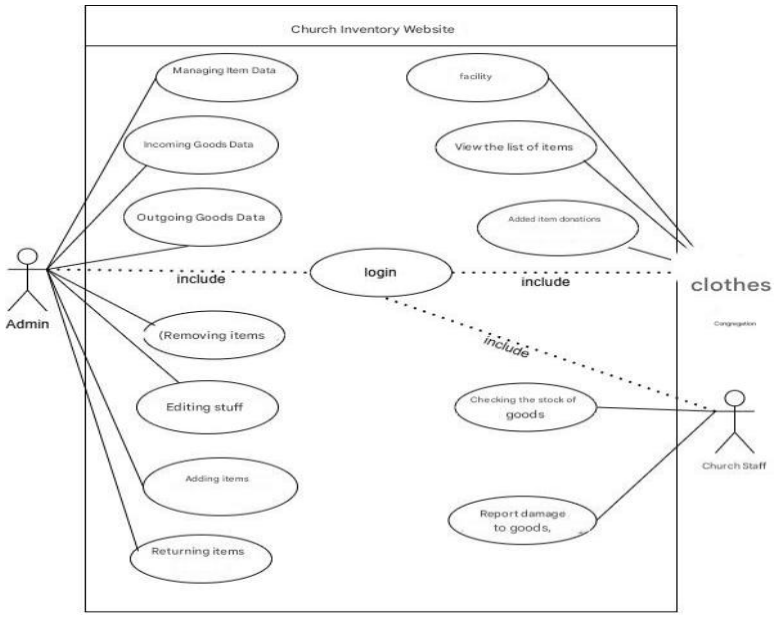

Fig. 1: Use Case Diagram

3. Result and discussion

3.1. Website display result

The results of this research produced a web-based inventory system specifically designed to meet the needs of goods management in the HKBP Simpang Marindal Church. This system allows users, admins, staff and congregations to update goods data, goods damage data, and goods donation data effectively and efficiently.

a. login page display

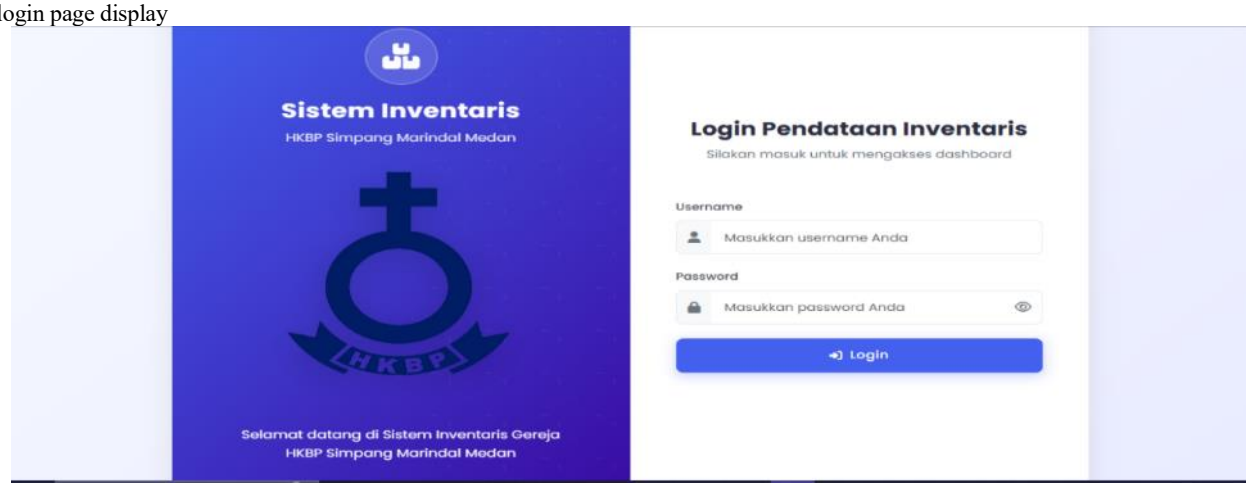

Fig. 2: Results of the login page display

b. Admin Home Page

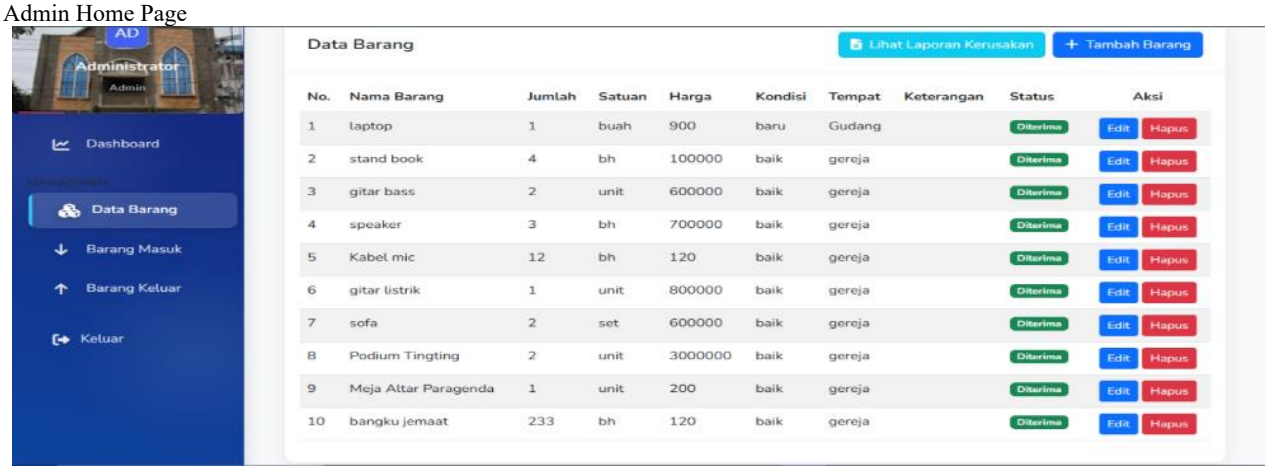

Fig. 3: Results of the Admin Home Page

c. Staff Damage Report

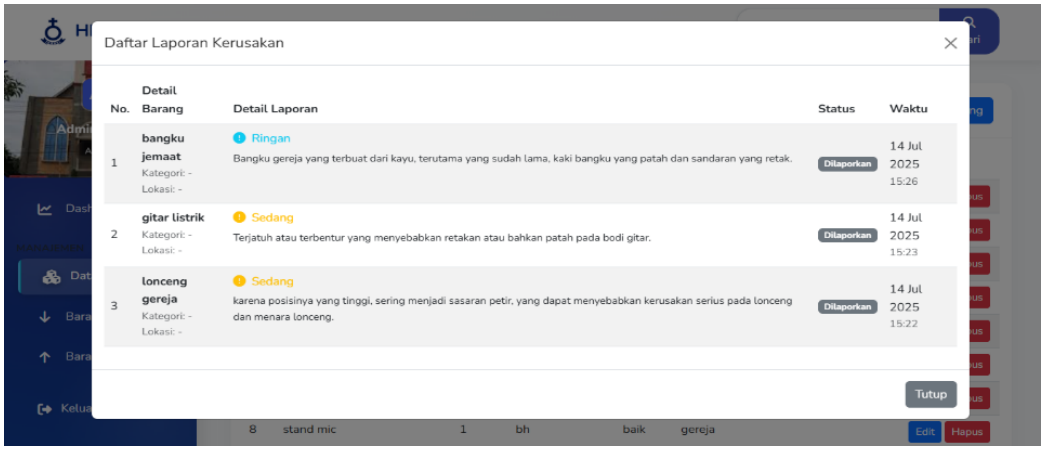

Fig.4: Display of Certificate Data Generation

d. Donation of Church Goods

Fig.5: Visitor Landing Page Result

4. Conclusion

Based on the results of the design and analysis that has been carried out, this conclusion is the closing part of the research process as well as providing a comprehensive overview of the results and achievements that have been achieved during the implementation of this research as follows:

1. This system provides a variety of conveniences, more structured management of goods, and increased accuracy in recording inventory data. However, there are several obstacles such as dependence on the internet network, system maintenance costs, and training needs for users who are not familiar with technology.
2. Overall, the system designed is considered to be able to support church administrative activities in terms of inventory management in a more modern, efficient, and controlled manner.

5. Suggestions

To ensure the proposed system can run effectively and as expected, here are some suggestions that can be considered:

1. training is needed for system users so that they are able to operate the system properly and make the most of all available features.
2. It is recommended that churches perform regular maintenance and updates of the system to maintain stability and improve system performance according to the needs of users.

References

[1] M. Tuharyadi, T. Budiman, and D. Rolan, "Rancang Bangun Sistem Informasi Pengawasan Data Pemilih (Sepedah) Pada Bawaslu Kota Jakarta Timur," *J. Manajamen Inform. Jayakarta*, vol. 1, no. 2, p. 152, 2021.

[2] R. Wulandari and E. Sutrisna, "Perancangan Sistem Informasi Inventory Barang Jadi Berbasis Website Dengan Metode Rapid Application Development (Rad)(Studi …," *OKTAL J. Ilmu Komput. …*, vol. 2, no. 1, pp. 84–93, 2023.

[3] W. Novrian, Y. G. Nengsih, and D. Darmansah, "Pengembangan Aplikasi Inventaris Berbasis Website Menggunakan Metode Rapid Application Development," *J. Inf. Syst. Res.*, vol. 3, no. 4, pp. 425–430, 2022.

[4] E. F. Aryani, "Scientia Sacra : Jurnal Sains , Teknologi dan Masyarakat Perancangan Sistem Inventory Pada Proses Persediaan Barang Berbasis Web Menggunakan Metode Extreme Programming (Studi Kasus Pada LC Cell)," *Sci. Sacra J. Sains, Teknol. …*, vol. 2, no. 1, pp. 135–146, 2022.

[5] T. A. Kinaswara, N. R. Hidayati, and F. Nugrahanti, "Rancang Bangun Aplikasi Inventaris Berbasis Website Pada Kelurahan Bantengan | Kinaswara | Prosiding Seminar Nasional Teknologi Informasi dan Komunikasi (SENATIK)," *Pros. Semin. Nas. Teknol. Inf. dan Komun.*, vol. 2, no. 1, pp. 71–75, 2019.