Design and Implementation of custom Point of Sales using Waterfall Method for Corner Shop 70

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Abstract

With globalization, technological growth in various parts of the world is rushing. Likewise, every year, the use of ICT always increases in Indonesia. We can feel the world starting to digitalize every aspect of people's lives, such as education, health, etc. Digitalization in business sectors helps minimize problems experienced mainly by small and micro-scale, such as stock-opname errors. The same situation occurred in one of the micro-businesses, Toko Pojok 70, which runs the business process manually. This research is conducted due to unintegrated data and complicated stock recording processes. The owner tends to lose the item, and sometimes miscalculates the total transaction which leads to business loss. The solution to the owners' problem is by technology known as point of sales (POS). By adopting the Waterfall method business owners can determine what features on POS are needed to adopt their business processes which involve managing goods, reporting, transactions, and return processes also may help run business processes faster, more precisely, and organized. Based on the requirement analysis, implementation, and testing result. The point of sales that has been created can be implemented on Toko Pojok 70 to handle the problems that occurred in the business.

Keywords: Point of sales, Laravel, PHP, MySQL, Kid's Fashion

1. Introduction

With globalization, technology is developing rapidly. People developed various technologies to help themselves run and facilitate their lives in every aspect of life. Likewise, every year, the use of ICT always increases in Indonesia (Lestari, 2020). Slowly but surely, technology is changing all process activities originally done traditionally to digital. Business sectors are also transitioning their business processes from traditional to digital, which minimizes the problems experienced, especially in small and micro-scale businesses which are caused by manual recording, such as stock recording errors, transaction recording errors, unintegrated data, etc.

Toko Pojok 70 is a micro business that sells baby equipment, shoes, and children's fashion outfits. All processes are still carried out manually in this business, so sometimes, there are still calculation errors during transactions and lost items (Dewi et al., 2021). The business also has complicated stock recording processes due to unintegrated data. Hence, the owner must recap the stocks many times on different files. The owner can overcome these problems with point-of-sale technology. A point-of-sale system is generally used to record transactions, manage inventory, reporting, procurement, and customer management. The point of sales helps people to run their business faster, precisely, and organized. Based on the problem stated above, the researchers are interested in conducting research with the title "Design and Development Web-Based Point of Sales Application for Toko Pojok 70".

The first research is regarding the development of point of sales for Distro management system to solve difficulties in recording transactions and product management (Wiguna et al., 2019). This
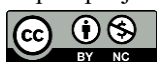
research uses the PHP framework Laravel and React Native and MySql as the database. The relationship between this previous research and the research that has been conducted is similar in business fields, clothing sector, problem-solving using point of sales applications, and the usage of PHP and MySQL.

The second study is about developing point of sales specifically for Khalil's stores in the Philippines (Nagar, R. ., Furagganan, C. ., Martinez, C. J. ., Ricohermoso, S. M. ., & Buena, A. J. . (2020). The researchers created this application because all business processes still run manually, so errors still occur regarding recording the number of items and transaction computing problems. This research also uses one of SDLC's methods, the waterfall method. The relationship between this previous research and the research that has been conducted is the same problem. This application development method also uses the same SDLC method, the waterfall method.

The third research is about developing a point of sales system at ARM's food and delicacies restaurants (Mendoza, 2019). This point of sales application's purpose is to solve several problems in existing business processes, especially in the inventory management section. This restaurant often experiences stock recording errors, and stock recaps are still complicated and overlapping due to unintegrated and non-real-time data. The relevance of this research with the research to be carried out is the similarity in problems and the use of point of sales technology to solve existing problems.

2. Research Methodology

The development of this web-based point of sales application is using one of the Software Development Life Cycle's methods, the waterfall method. The waterfall method has several steps, which start from requirement analysis and information gathering, then system design and implementation. The app later needs to be integrated and tested. Once the testing is successful, we can deploy the app. Since the app needs to keep up with the customer needs, the last development step is maintenance, such as repairing issues, improving app quality and performance, etc. These steps must be executed step by step and stream downwards just like a waterfall shape (Naga Malleswari et al., 2018).

In the earliest phase, the researcher conducted an interview with the owner to gather some issues in the store. Then proposed design solution according to specific need. The store specific needs would be a stock opname process and recorded sales transaction. This solution might be the solution we can differentiate from previous research. The development of the point of sales uses several technologies, such as the PHP programming language, which usually be embedded in HTML and used to develop dynamic web programs (Wirawan & Santosa, 2019). PHP will be the primary programming language for this POS development, alongside HTML, JavaScript, and CSS. The POS also uses Laravel as the PHP framework with an MVC software design that is created by Taylor Otwell which offer various features to enhance precision and performance of website development (Candra & Tanamal, 2019). Laravel is also equipped with a command-line tool called "Artisan" to help install available bundles (Kambivi et al., 2020). For the relational database management system, the POS development used MySQL because of the ease of use, simplicity, high performance, and more than one user can connect to the server at the same time. There are multiple databases that can be used simultaneously, making MySQL widely used by application developers (Nugraha, 2021). MySQL cannot run alone, but requires a connecting application such as PHP, Delphi, Visual Basic, etc (Chandra et al., 2017).

In this research the development will stop at testing process, due to limited time of execution the researchers could not continue towards the deployment and maintenance process. In addition, based on the requirement analysis, the features in the point of sales are limited in scope which includes the following features:

1. Create, read, update, and delete (CRUD) features for product category, supplier, payment method, product and stock opname features.
2. Dashboard features to monitor total sales transaction, total profit, total items, items that need a restock and the most seller categories.
3. Sales transaction features
4. Sales and Procurement report features.

Besides all the feature's limitation, the web-based app is only available on a local server instead of being deployed to a server.

3. Results and Discussion

a. System Requirement Analysis

The business owner needs to solve inventory monitoring and recording problems. The owner usually must recap the stock in the sales report book, the stock book, and the price tag to let them know that the size isn't available anymore. The owner needs a system that can integrate the data mutation into one system, so they don't have to do the recaps on those several files. Besides the stock monitoring and recording, the owner also tends to miscalculate the total transaction due to misreading the price tag or inputting the incorrect price in the calculator. Based on the requirement analysis, the development of the point of sales is focused on inventory management features and sales transaction features.
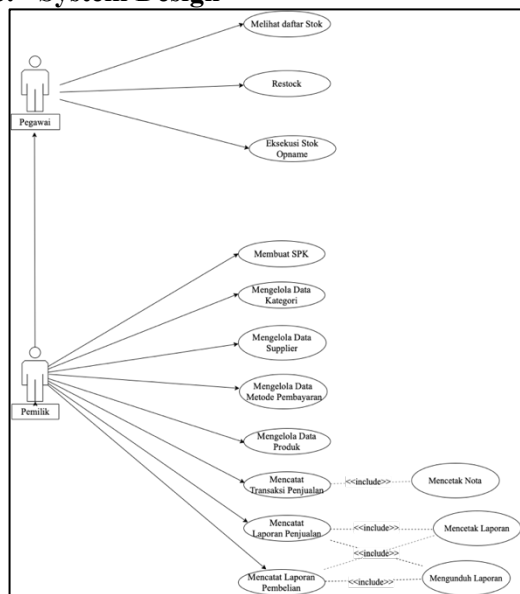
b. System Design

Figure 1. Use Case Diagram

According to the use case diagram, there will be two user roles in the application. The admin or owner role can access the full features, such as creating, reading, updating, and deleting master data. Besides the master data, the owner can also make a new sales transaction record and view the report. The other role is for the employee who can only access the stock page, restock, and the stock opname assigned to the employee. The employee has a limited role due to the business process that the owner runs most, and usually, the employee's job description is mainly to clean the retail store.

The class diagram describes the class system along with its attributes, methods and the relationship between objects.

c. Implementation

The development of web-based point of sales uses the Laravel PHP framework and uses MySQL as the relational database management system. The researchers used the AdminLTE template to build the app view. Here are several views of the features.
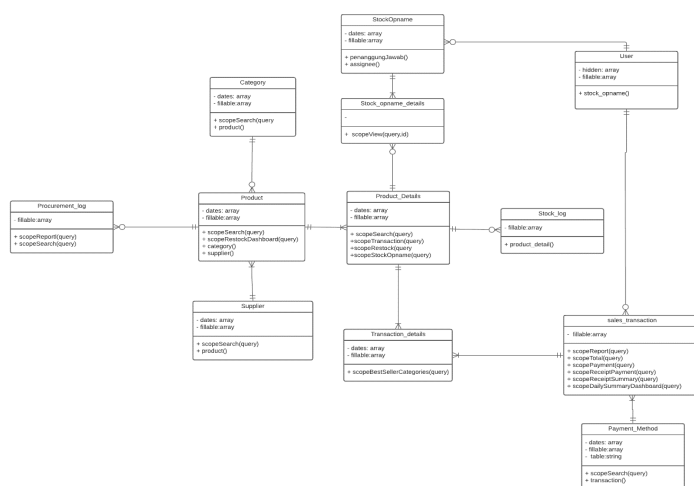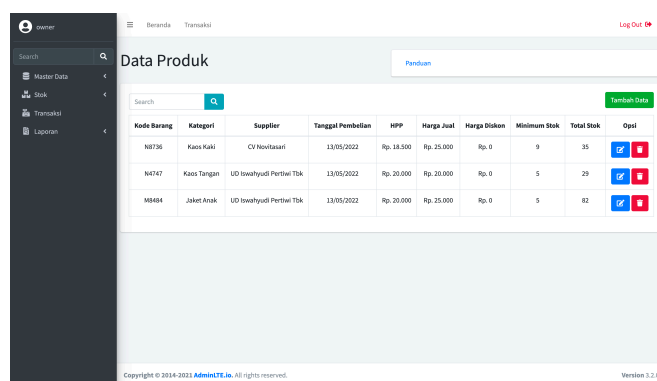

Figure 2. Class Diagram

Figure 3. Product Page View

The owner can see the product description on the product page, such as the product code, category, supplier, and price, and the owner can also set the minimum stock. If the owner wants to add more products, the app will direct the owner to the add product page. The app will show a modal to edit the existing data if the owner wants to edit it.
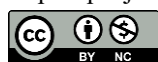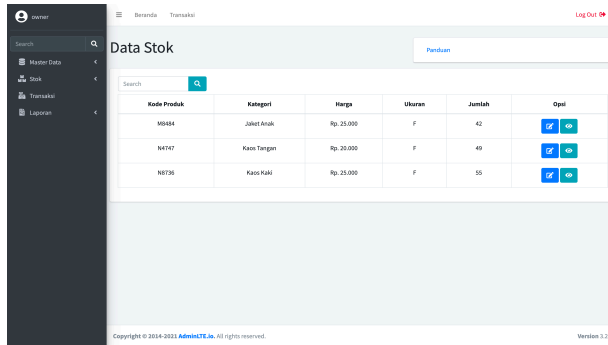
Figure 4. Stock List Page View

In the stock list page view, the owner can change the size variant and the stock history of each size variant. Meanwhile, the employee can only see the stock history.
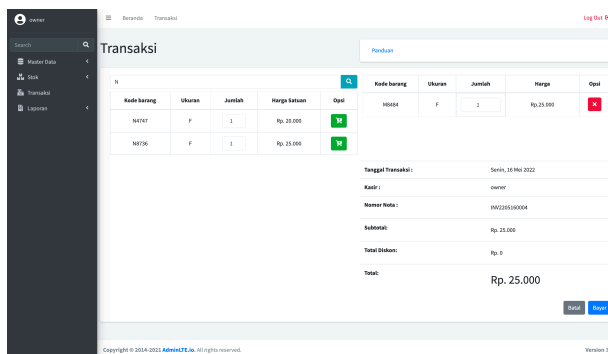

Figure 5. Sales Transaction Page View

In the transaction view, the owner can make a new transaction by selecting the product code and choosing the size variant. The table on the right side of the image is the table consisting of available items that can be selected. Meanwhile, on the right side is the list of items that will be sold. After all the items have been inserted, the owner can click on the pay button and pick the payment method. The app will direct the owner to the print preview page with the receipt of the transaction, as shown below.

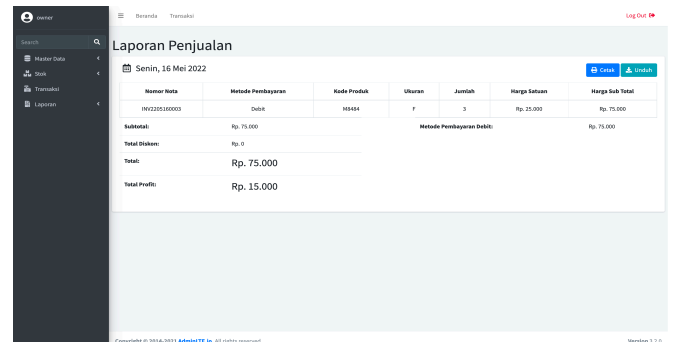**Figure 6.** Receipt example

Figure 7. Sales Report Page View

On the sales report page, the owner can see the daily sales report. The page will show a table consisting of the list of sold items and the receipt numbers. Below the table, the page also offers today's sales summary, such as total sales, total profit, total discount, and the total amount of transactions being paid that are grouped based on the payment method.
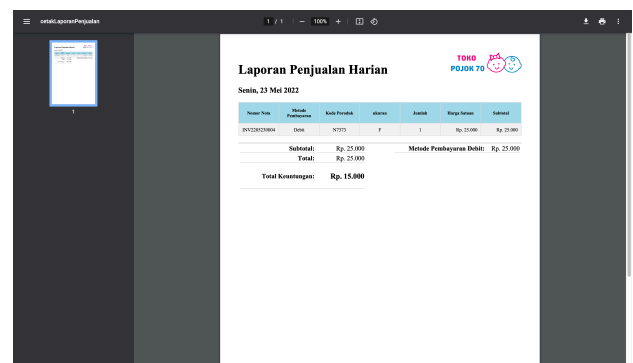

Figure 8. Sales Report Document

The owner can also download or print the report by clicking the download button or print button. The download button will make the app create a pdf file and download the file through the browser. Meanwhile, the print button will direct the owner to the print preview page with the sales report pdf, as shown above.

d. Testing

The application is tested using the user acceptance test method. Since currently, there's no employee in the business, and the testing is only done with the owner. The testing process was carried out on the MacBook Pro 2019. Before the testing process was carried out, the researchers had prepared the device in a powered state, MAMP was active, and the application was activated via the terminal by running the PHP artisan serve command. Then the browser used is Google Chrome with Windows incognito mode. During the testing process, users faced some difficulties adapting to the use of the device and understanding the concept of stock opname because, previously, the owner rarely did stock opname. Apart from that, the overall testing process went smoothly. The owner can complete all the test scenarios, which means that the application can be implemented to solve the owner's problem regarding the stock monitoring and recording and transaction recording.

4. Conclusion

Based on the research process, starting from the analysis to the implementation. A list of features in the research scope has been developed. The testing results also show that all features successfully work, and the resulting output is as expected. The researchers can conclude that the application and the features that have been developed can be used and applied to overcome the problem of managing goods and recording transactions.

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