ANALYSIS AND DESIGN OF WEB-BASED MSME CASHIER APPLICATION USING THE WATERFALL MODEL

Muhammad Irlansyah Putra[1)], Kevin Ronitua Silalahi[2)], Paskaria Sinabutar[3)] Okta Jaya Harmaja[*]
[1)2)]Universitas Prima Indonesia, Medan, Indonesia
oktajaya.h@unprimdn.ac.id*

ABSTRACTWA

Pojok UMKM is a special marketplace for UMKM products. Pojok UMKM is one of the marketplaces fostered by the Secretary of the Medan City Regional People's Representative Council. Currently, sales are so high that management has begun to experience problems, such as uncontrolled inventory, product supply from UMKM actors is not recorded properly, to unknown sales. Point of Sales Software (POS) is software that is important for sales businesses to facilitate the transaction process and management of sales data. With POS, every sales transaction will be recorded and inventory will also be controlled. However, not all POS software that is currently available on the market is not in accordance with the needs of UMKM. This is because each UMKM has a different process. After using a POS that is specifically made for Pojok UMKM, these problems can be solved. Every product sold is immediately recorded and product inventory is also maintained. In other words, this POS software can solve the problems that have been in Pojok UMKM Sekwan.

Keywords : web cashier application, POS, waterfall method, SMEs

INTRODUCTION

Information technology is experiencing rapid development in Indonesia. This brings many benefits, such as increased work efficiency, expanded access to information, and improved connectivity. Technology also opens up new opportunities for businesses and jobs. However, in addition to the benefits, there are also several challenges that need to be faced, such as the digital divide, cybercrime, and social impacts[1]. The manual transaction system has many drawbacks when there are many orders so that the orders are not recorded, even making it difficult to calculate what products are selling best, it is because they are still writing sales transactions one by one. Therefore, a cashier application is needed to make all transactions easier, such as payments, purchases, sales, payroll, stock of operational goods, and so on. One of the components of the system made to facilitate transactions is Point of Sale (POS) [2].

Currently, there are many Point of Sales (POS) applications available on the market, but they are still not in accordance with the needs of certain MSMEs and even the price is relatively expensive, so many MSME actors are reluctant to buy the application. Based on observations and interviews conducted by MSME actors, the POS application is needed to find something else that suits the needs of certain MSMEs and that is cheap (affordable) for MSMEs. So far, many MSME actors have written manually their sellers per day based on the product items sold, even operational costs are also recorded manually, making it very difficult when making reports and even often making errors during recording. This causes inaccurate profit and loss. From the observations made, the author intends to analyze and design in terms of goods reports, input of goods data, to products entering into a website-based application, so the author takes the title "Analysis and Design of a web-based cashier application using the waterfall model".

LITERATURE REVIEW

According to previous research with the Waterfall Method, this method demonstrates a systematic and sequential approach to software development. This method starts by specifying the user's requirements, then goes through the stages of planning, modeling, construction, and delivering the system to the user, and ends with support for the software that has been fully built [13].

In the second study, a web-based payroll information system was developed for CVs. XYZ, which previously used a semi-computerized system that did not have a standard standard. Requirements analysis, system design, program code writing, testing, and implementation are the five stages of this new system design process. The tool used for modeling is Unified Modeling Language (UML), which consists of use case diagrams, activity diagrams, class diagrams, and sequence diagrams.The results create a new system analysis with UML modeling and nine tables to support the application. The system was tested with black box testing in the localhost environment and successfully assisted in the creation of reports and the printing of payslips that could be checked by leaders online[14]

The third study addresses the problems faced by large companies that continue to use manual note-taking with basic Microsoft Excel. This causes the data to become invalid and the input process to be slow. Misrecording of transaction data for ordering and selling goods is one of the most common problems and makes inventory control more difficult. The Waterfall System Development Life Cycle (SDLC) method, which is carried out regularly and measured at each stage, is used to design more efficient applications. This method is also referred to as the classical sequential or linear model of the life cycle. The system is expected to better manage the storage data related to the company's logistics operations after research and testing with the Waterfall method and UML design[15].

The fourth study on the Ministry of Religious Affairs of Klaten Regency shows that the work system must be improved, especially in terms of performance reporting. Currently, employees are still filling out the Daily Performance Achievement Report (LCKH) and Employee Work Goals (SKP) manually using Microsoft Excel. This means that employees cannot fill out reports from anywhere and at any time. To increase efficiency, the LAKON application was created using the Waterfall method. This method was chosen because the process is gradual and systematic, so that it can produce a system with good quality [16].

The next research discusses the Point of Sale (POS) Information System, which is an important component of business management to record transactions and collect data more efficiently and effectively. The system was built using the Waterfall method, which includes problem identification, design, implementation, and testing. Data for the problem identification stage are collected through observation and interviews to analyze the needs of the POS system. The system design uses Unified Modeling Language (UML), including the creation of use case diagrams, activity diagrams, class diagrams, interface design, and databases. Implementation is done by writing code using the PHP programming language and the Laravel framework [17].

The difference between this study and the previous research is that this study has designed and developed a web-based cashier application for the MSME Corner, so that it is easy to understand and use by MSME actors. This cashier application system is expected to help MSME Corner in making transactions, data input, and managing product categories, so that the transaction recording process is no longer done manually. This web-based cashier application was developed using the Waterfall method.

METHOD
System Development Methods
The author uses the Waterfall model to make this application easy to use. Figure 1 shows the steps of research and development.
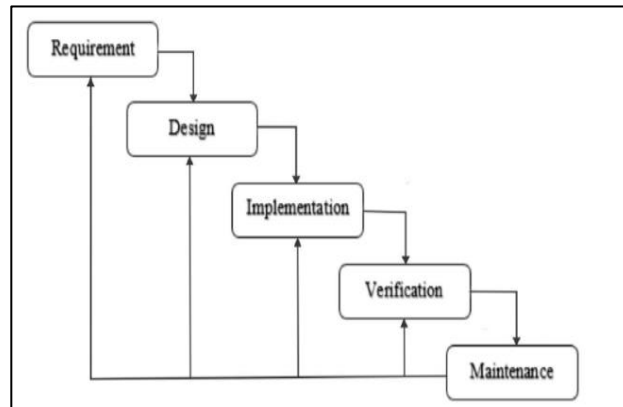
Figure 1. Waterfall Models

A.   Requirement Analysis Stage

In this stage of analysis, the researcher analyzed the standard procedures for purchase and sale transactions in the MSME Corner. Some of the activities carried out at this stage are as follows:

- Collecting information about the MSME Corner includes:
- Collecting Data Information about Goods in the MSME Corner.
- Collecting Data Information about the transaction flow, Supplier

B.   Design Stage

To make the design process in this study more structured, they used a variety of tools, including Star UML software, to start with activity diagrams, use cases, classes, and sequence diagrams [5]. At this point, several activities occurred:

- Flowchart creation

  The creation of this flowchart was made to know the flow for making a cashier application.
- Designing a Usecase

  The creation of this usecase aims to draw the application from the user's side and describe the part so that it helps the use to use the cashier application
- Designing a Database

  The database is designed so that there are no errors in data storage, and there is no repetitive data storage so that the data is more structured and more efficient
- Designing UI/UX design

  UI/UX is designed to make the appearance of the application more attractive, by using the laravel programming language, PHP framework, and the type of database you want to use.

C.   Implementation Stage

The next stage is the system implementation stage, which is the stage where the system is placed in a state of readiness for operation[6]. The system implementation stage begins with the creation of a database using the MySQL DBMS, using the Laravel framework that can be accessed through a browser, and supported by Laragon which is integrated with MySQL and Apache. Some of the stages carried out include:

- Combining data provided by the MSME corner.
- The creation of the cashier design determines the initial design, the developed features.
- programming languages, frameworks and databases used.
- The flow of the application system knows the process of inputting data from suppliers, product data, product categories, and transactions so that there are no mistakes in making cashiers.
- The implementation of usecases and databases, between users and databases is made in one cashier application into one programming language, front-end or backend.
  D.   Testing Stage

Once the web application is created, the final stage is the testing stage. a process carried out by the software system to ensure that everything goes well[7].

E.   Maintenance Stage (Maintance)

At this stage, it involves fixing errors (bugs) that are found after use. Maintenance includes repairs, updates to the app and device upgrades.

a   The data collection method is carried out in the following way:

- Observation: The researcher observed the activities of MSME coaches to record the availability of goods, stock of goods, prices of goods, as well as purchase and sale transactions. This aims to facilitate MSME actors in making transactions more effectively.
- Interview: The researcher interacts directly with coaches and MSME actors to obtain the necessary data. Through this question and answer process, relevant information can be obtained from one of the MSMEs in charge.

System Design Methods

UML (Unified Modeling Language) is a commonly used system design method for designing object-oriented systems and has become the standard in the visualization, design, and documentation of software systems [9]. UML allows software developers to communicate and provide software design details through a consistent set of graphical notation.
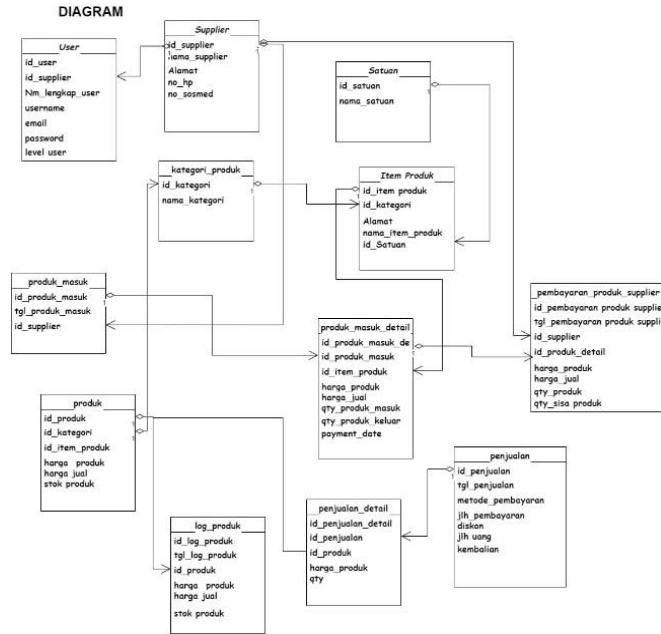
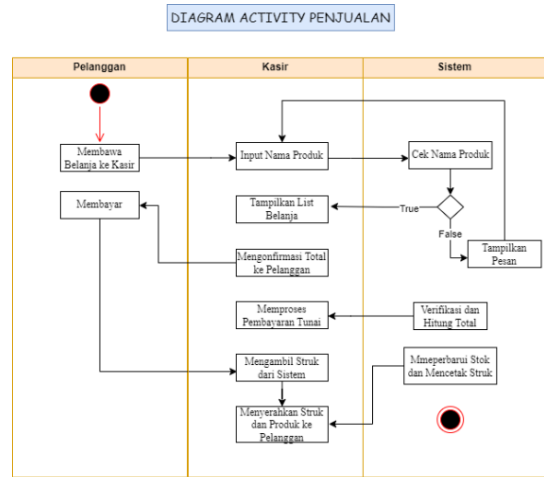Figure 2. Class Diagram   Figure 3. Activity Diagram Penjualan

A. PHP Programming

PHP stands for Preprocessor Hypertext. PHP provides a way to create dynamic web pages by processing data directly on the server. PHP can be inserted directly into HTML code. When the server finds a PHP file, it processes the PHP code before sending the result to the client as HTML.

B. Framework Laravel

Laravel is a feature-rich and flexible PHP framework, designed to make web application development more efficient and enjoyable. With features such as MVC, Eloquent ORM, Blade templating, and Artisan CLI, Laravel provides powerful tools for developers to build scalable and maintainable web applications.

C. Database MySQL

RDBMS stands for relational database management system, and MySQL uses structural query language (SQL) as the core language. MySQL is renowned for its reliability, speed, and ease of use. MySQL was originally developed by the Swedish company MySQL AB, but it is currently owned and supported by Oracle Corporation. MySQL is open source software, so anyone can download and use it for free. The business version is also available with professional support and additional features.

RESULTS

Using the Waterfall Model, this study aims to analyze existing problems and identify the main problems in the development of Website-Based MSME Cashier Application Design. At this stage, the researcher interviews the MSME corner coaches to identify the needs of the application users. In addition, observation of the system in progress is carried out and discussions with parties related to subscriptions.

A. System Design

System design is how the author designs the system that will be implemented in the MSME Corner, the author uses ERD (Entity Relationship Diagram) to create a design display of the MSME Corner Cashier Application. System design is how the author designs the system that will be implemented in the MSME Corner, the author uses ERD (Entity Relationship Diagram) to create a design display of the MSME Corner Cashier Application

B. System Design Analysis

System design analysis is the first step in system creation that provides an overview of the flow or process that occurs in the system to be developed. In the design of the web-based cashier application, the user who can use the cashier is the cashier admin. The process in this system involves admins who upload goods, manage orders, and buyers who select, order, and pay for goods. To solve the problem in designing the web-based MSME Corner Cashier Application, a use case diagram is used.

C.   Program Design

In accordance with the design of the system found earlier, the application has several list display designs from the data displayed on the application pages.
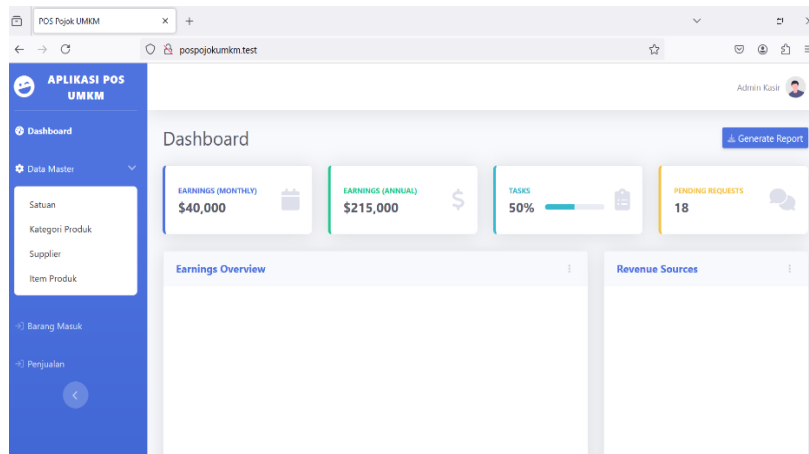

Figure 4. Dashboard Page

As seen in Figure 5 above is the result of the design where this page functions as a dashboard which includes Units, Product Categories, Suppliers, Product Items, Incoming Goods, and Sales Transactions
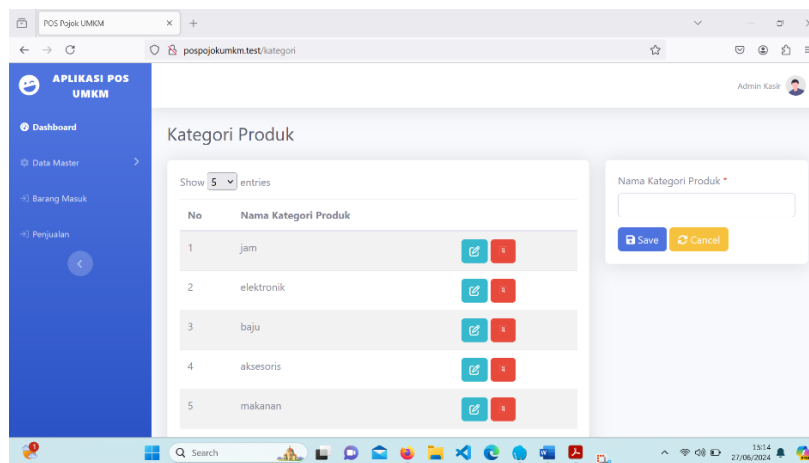

Figure 5. Product Category Page

As seen in Figure 6 above is the result of the design where this page functions as an input to the Product Category, where this page inputs Category Data, such as the category of accessories, the category of food, in order to make it easier for the Admin to input the category, so that it can be divided into category groups
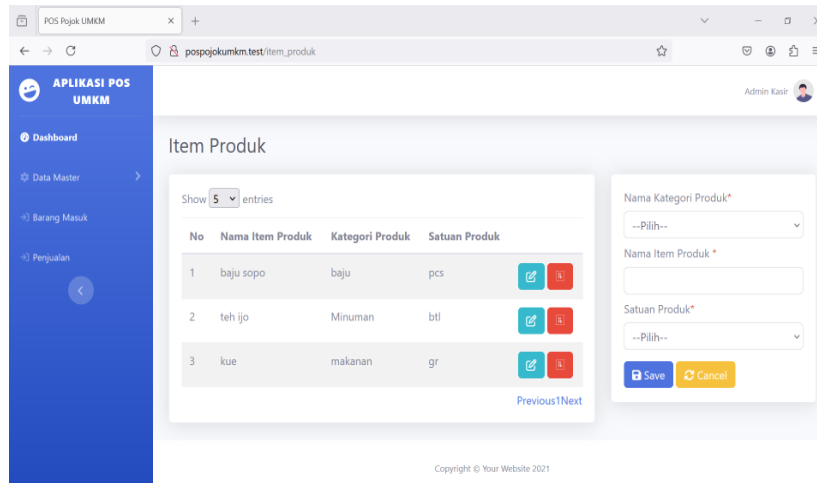
Figure 6. Product Item Page

As seen in Figure 7 above is the result of the design where this page functions as an input to the Product Item, in this page it functions as an input to the Product Category, where the product item is input by the Admin to find out the type of product item that is included in the Cashier system.
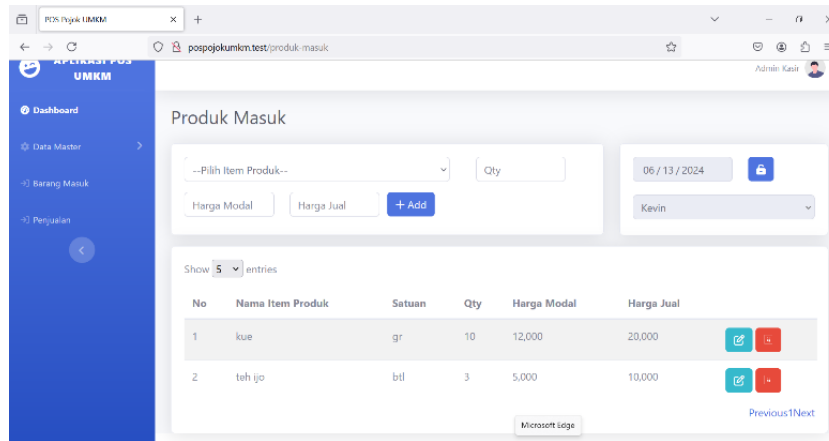

Figure 7. Login Product Page

As seen in Figure 8 above is the result of the design where this page functions as an input to the Incoming Product Page, where this page functions as an input to the Incoming Product from the supplier to the system, which functions to find out the capital price and selling price so as to know the presentation of profits and the number of products.

CONCLUSION

The conclusion that the author can conclude is that the cashier application for the UMKM Corner has been designed and developed successfully using the Laravel Framework. This application is intended to simplify the transaction process and data management. With this cashier application processing system, it is expected that the UMKM Corner can more easily make transactions, input data, and manage product categories, thereby reducing the need to record transactions manually. In addition, this cashier application is developed through a web-based approach using the Waterfall method, which ensures that each stage of development is carried out systematically and structured.

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