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Article

Design and Construction of a Web-Based Sales Information System (Case study of a simple coffee shop business)

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ABSTRACT

Sales transactions at Kedai Kopi Selamat are still carried out manually through handwritten order records, cash payments, and daily sales reports without digital support. This manual process leads to several issues, including recording errors, inaccurate orders, data loss risks, and delays in generating sales reports. This study aims to design and develop a web-based sales information system to improve operational efficiency and data accuracy. The FAST (Framework for the Application of Systems Thinking) method was used, consisting of scope definition, problem analysis, requirements analysis, logical and physical design, system construction, and testing. The system was developed using PHP with the Laravel framework and MySQL database. The results show that the system successfully automates ordering, payment validation, menu management, and real-time sales reporting. Black Box testing indicates that all features function properly according to user requirements. Therefore, the system enhances business efficiency, reduces recording errors, and enables the business owner to monitor sales performance more effectively.

1. Introduction

Coffee shops and cafes have become increasingly common in cities of all sizes, driven by lifestyle trends and technological advancements. The cafe industry has experienced significant changes, particularly in ordering, recording, and payment systems that now rely on information technology. Many business owners adopt digital systems to improve efficiency and support better organizational performance, especially in accurate and timely decision-making (Mahdalena et al., 2023).

Kedai Kopi Sederhana, located in Bangkinang City and established in early 2023, primarily serves students with affordable food and beverages. However, its sales process is still managed manually. Customers place orders directly at the cashier, transactions are recorded in a notebook, and payments are made in cash. Sales reports are also calculated manually. This conventional system often leads to recording errors, mismatches between orders and served items, payment verification difficulties, and potential data loss. In addition, manual reporting is time-consuming and prone to human error, limiting the owner's ability to monitor sales performance accurately and make data-driven decisions.

Figure 1. Simple Kopo shop menu board

To overcome these challenges, this study proposes the development of a web-based sales information system to streamline transaction processes and improve data management. The system allows customers to access menu information and place orders online within the Bangkinang area, while enabling the business owner to monitor sales, manage transactions, and generate reports more efficiently and accurately.

The system is developed using PHP with the Laravel framework and MySQL as the database. The development process applies the FAST (Framework for the Application System Thinking) method, which includes stages such as scope definition, problem analysis, requirements analysis, logical design, physical design and integration, construction and testing, as well as installation and delivery (Halim, 2020). FAST is known for its flexibility and ability to produce quality systems within a relatively short time.

Overall, this research aims to design and build a web-based sales information system that can enhance operational effectiveness and efficiency at Kedai Kopi Sederhana, while supporting better business management and decision-making.

2. Literature Review

2.1 Information Systems

A system is a collection of objects that are interconnected to achieve a common goal. Information is the result of data processing and collection, either in written or graphic form, into something more useful for the recipient. An information system is a system within an organization that integrates daily transaction processes and supports the organization's management functions, allowing it to generate and present specific reports to external parties.(Ilmi et al., 2024).

2.2 Website

*Web*A website is a page of information provided via the internet, allowing it to be accessed anywhere as long as there is an internet connection. The web itself is a collection of pages containing information in the form of text, images, videos, and so on, which can be accessed anywhere, anytime, and by anyone with the help of internet technology. Web-based information systems have many benefits and can simplify human work, so information system development is still ongoing. This development must, of course, use a specific model or method according to the needs of each developer.(Rahmi et al., 2023).

*Web*It can be used as an effective and efficient marketing medium for MSME products because it can reach consumers from various regions and with more flexible time. However, many MSMEs still haven't utilized the web as a marketing medium for their products due to limited knowledge and skills in creating websites. Utilizing the web as a marketing medium for products can increase sales and expand the market both online and

offline.(Septarina et al., 2023).

2.3 FAST Method

The FAST (Framework for the Application of Systems Thinking) method is a system development method that can produce high-quality systems in a short time. This method is more flexible because it can be developed together with other methods being developed (such as object-oriented methods). The FAST method consists of the following stages: Scope Definition, Problem Analysis, Requirements Analysis, Logical Design, Decision Analysis, Physical Design and Integration, Construction and Testing, and Installation and Delivery.(Aldo et al., 2021)

The FAST method is used in information systems development due to its systematic and efficient approach to analyzing, designing, and implementing systems. FAST helps identify problems, opportunities, obstacles, and desired system requirements, enabling improved change. This method has eight development phases that help produce more effective, efficient, and accurate systems (Novianti & Sari, 2022).

2.4 PHP

PHP (Hypertext Preprocessor) is a scripting language with many features that make it easy to design a website. PHP is a scripting language that is placed on the server and processed there. The results are sent to the client, where the user uses a browser. PHP is known as a scripting language, integrated with HTML tags, executed on the server, and used to create dynamic web pages, similar to ASP (Active Server Pages) or JSP (Java Server Pages). PHP is open source software.(Mahdalena et al., 2023).

2.5 Laravel

A framework simplifies system development, eliminating the need for developers to design the system from scratch. In the web context, a framework provides ready-to-use functions, syntax, libraries, extensions, and templates to accelerate website development. Web applications must adhere to the framework's established rules. In this regard, a PHP framework allows developers to focus on application logic without having to write underlying code.

Laravel is an open-source PHP framework designed with the Model View Controller (MVC) architectural pattern for building web applications. Laravel was first created by Taylor Otwell on February 22, 2012. This framework is also considered an MVP-based web development written in PHP, with the aim of improving software quality, reducing development and maintenance costs, and providing a more efficient development experience with expressive and clear syntax (Sinaga & Samsudin, 2021).

2.6 MySQL

MySQL (My Structured Query Language) is a Relational Database Management System (RDBMS) that supports SQL, a standard language established by ANSI. MySQL is widely used in conjunction with PHP and allows users to create, manage, and utilize data in a relational model, where tables in the database are related to each other (Hermiati et al., 2021).

2.7 Black box testing

Black-box testing is a testing technique that focuses on the conformance of software functions to predetermined specifications by providing various input conditions on each form to evaluate the resulting output. This testing aims to ensure the system operates according to user requirements and is capable of implementing all designed features. It also detects errors in functionality, interfaces, behavior, performance, database access, and system initialization and termination processes (Shadiq et al., 2021; Fahrezi et al., 2022).

2.9 UML

The Unified Modeling Language (UML) is a standardized software modeling language used for visualizing, specifying, constructing, and documenting software systems through blueprint diagrams. UML helps developers understand and build systems in a structured manner by clearly representing system requirements and design (Abdillah, 2021). In this study, the UML diagrams used include Use Case Diagrams, Class Diagrams, and Activity Diagrams.

The theoretical review presented in this chapter indicates that the implementation of a sales information system is a strategic necessity for coffee shop SMEs to address the limitations of manual transaction recording, improve data accuracy, and support effective decision-

making. A web-based system is selected due to its accessibility, flexibility, and efficiency in managing ordering and transaction processes. The FAST method is applied because it provides a systematic development approach that aligns with the characteristics and resource constraints of SMEs, while the use of PHP with the Laravel framework and a MySQL database supports a structured, maintainable, and cost-effective system implementation. Furthermore, UML modeling and Black Box testing ensure that the system is designed in accordance with user requirements and operates as intended, thereby demonstrating a clear linkage between the theoretical concepts and the practical needs of a sales information system for coffee shop SMEs.

3. Research Methodology

This research uses a qualitative approach with a case study method in a simple coffee shop to analyze the business processes and constraints of a manual sales system. Data were obtained through observation, interviews, and document analysis, then analyzed descriptively to formulate a solution in the form of a more efficient web-based sales system.

3.1 Location and time of research

This research was conducted at the Simple Coffee Shop located on Jl. Letnan Boyak, Bangkinang. Subjects included the shop owner, employees (baristas and cashiers), and customers. The research focused on the design and development of a web-based sales information system to support the digitalization of the sales and ordering process. The research was conducted in stages from February to June 2025.

a. Research subjects

The research subjects included those directly involved in the operations and sales system of the Simple Coffee Shop: the shop owner, employees (baristas and cashiers), and customers. The owner acts as the decision-maker and primary user of the system, managing orders and inventory. Employees are responsible for daily operations and recording transactions. Meanwhile, customers are end users who provide feedback regarding transaction experiences and the need for a web-based ordering system. Subject selection was based on direct involvement in operations and sales systems, with the research location being Kedai Kopi Sederhana.

b. Data source

The data sources in this study were primary data obtained directly through observation, interviews, and interactions with the owner and other parties involved in the operation of Kedai Kopi Sederhana. Primary data included transaction records and daily sales reports, weekly customer data, and menu and price lists. Furthermore, manually calculated sales reports served as the basis for analyzing the needs of a web-based sales information system.

3.4 Data collection technique

The data sources for this research are primary data obtained through observation, interviews, and interactions with relevant parties at Kedai Kopi Sederhana. This data includes daily sales transactions and reports, weekly customer numbers, and menu and price lists, which served as the basis for analyzing the needs of a web-based sales system.

3.5 Data validity techniques

The validity of the data in this study was tested using triangulation techniques to ensure its validity and reliability. The triangulation used included source triangulation by cross-checking the data with the owner of Kedai Kopi Sederhana, technical triangulation through observation and interviews, and time triangulation conducted from February to July 2025.

3.6 Data analysis

An analysis of the current system revealed that transaction recording and sales reporting were still performed manually, potentially leading to recording errors, delays in recapitulation, and the risk of data loss. The unintegrated ordering process also increased the likelihood of order discrepancies and limited service to on-site transactions.

Data processing was carried out through observation, interviews, and documentation which confirmed the need for a web-based sales information system to automate ordering, transaction recording, and sales reporting in a structured and real-time manner.

4 Results and Discussion

4.1 Logical design with use case diagrams

*Use case diagram*to describe user interaction with the system.

1. Actor List

A1: AdminThis actor has full access to the entire system. Admins are responsible for managing products, monitoring transactions, generating sales reports, managing cashier accounts, and managing data within the system.

A2: CashierThis actor has limited access rights focused on the sales transaction process. The cashier is responsible for receiving customer orders, processing payments, printing receipts, viewing transaction history, and updating transaction data.

A3: CustomersThis actor is a general user who uses the system to view products, select menu items, place orders, and enter order details. Customers do not need to log in to access the system.

2. Use case list

U1: Login: Admin and Cashier log in to the system by entering the username and password specified by the admin.

U2: View Admin Dashboard: admin can see the main page of the admin dashboard which displays the menu, incoming orders, transactions, and reports.

U3: Manage Menu Management: admin can create, view, change, and delete products such as name, price, available menu, description, and product photos.

U4: Manage Sales Reports: admin can view and manage sales reports such as total transactions and daily sales revenue.

U5: Manage User Management: admin can view and change user username and password.

U6: Logout Admin: admin logs out of the system safely after finishing using the system.

U7: View Cashier Dashboard: cashiers can see the main page of the cashier dashboard which displays transaction features and sales history.

U8: Order Management: the cashier accepts orders from customers or cancels orders.

U9: View Order Details: View customer information, order items, and payment details.

U10: View available menu management

U11: Customer Purchase History

U12: Cashier Logout: the cashier exits the system safely after the transaction is complete.

U13: Access the website: customers access the coffee shop website via a browser to view products.

U14: View Product Menu: customers see a complete product menu list with product categories, available quantities, prices, images, and descriptions.

U15: Add to Cart: the customer selects the desired product and adds it to the cart.

U16: Check Cart: the customer rechecks the contents of the basket to see the quantity and total of the order.

U17: Fill in Customer data: enter name, address, telephone.

U18: Select payment method, if transfer upload proof of payment.

U20: Order Confirmation**:**The customer clicks the "Continue Order" button to process the order.

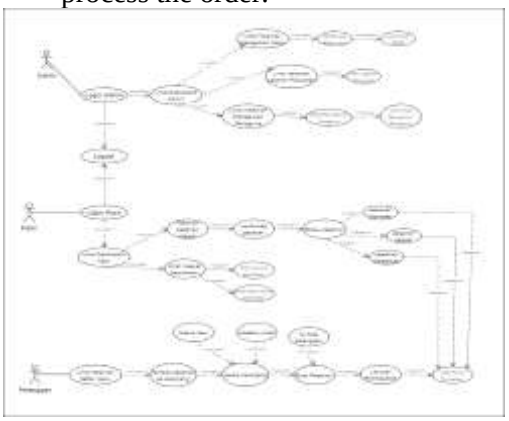

Figure 2. Final use case

4.2 Activity diagram design

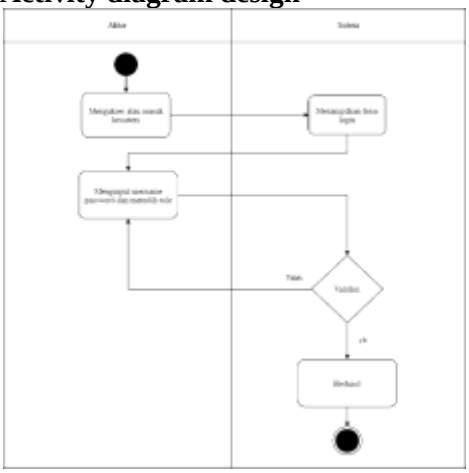

Figure 3. Login activity diagram

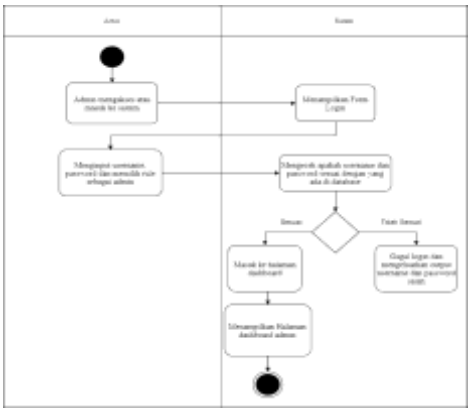

Figure 4. Admin dashboard activity diagram

Figure 5. Activity diagram of customer orders

4.3 Class diagram

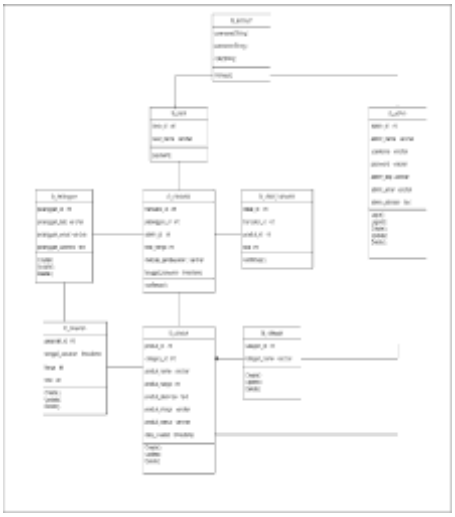

Figure 6. Class diagram

4.4 *Physical design*(Physical design)

Figure 7. Login view

Figure 8. Admin dashboard view

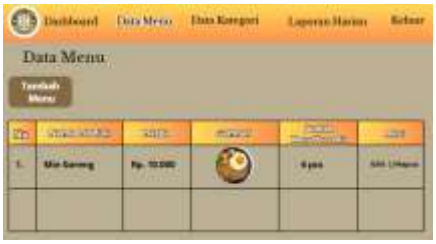

Figure 9. Data input menu display

Figure 10. Menu category input view

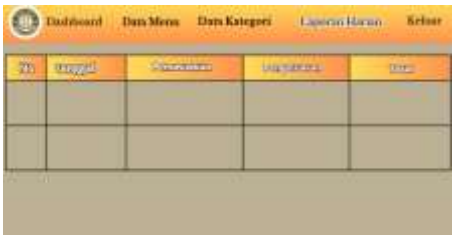

Figure 12. Daily sales report view

Figure 13. Customer dashboard view

Figure 14. Menu display to customers

Figure 15. Shopping cart view

Figure 16. Customer checkout view

Figure 17. Payment method display

Figure 18. Display the status of the order being processed

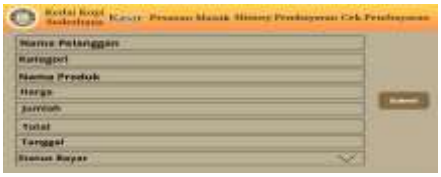

Figure 19. Cashier main view

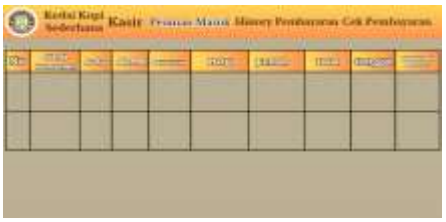

Figure 20. View incoming order details

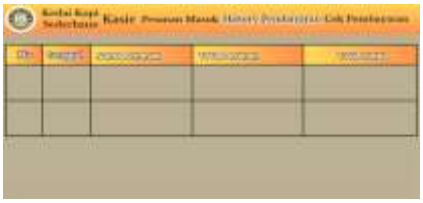

Figure 21. Payment history display

Figure 22. Payment check view

4.4 Decision analysis

Table 1. Decision Analysis

No	Components Analyzed	Decisions Taken	Reason for Selection
1	Development Platform	PHP programming language, Framework (Laravel)	A clear, secure, modern, and community-supported MVC structure
2	Database	MySQL	Open-source, lightweight, easy to use, Laravel compatible
3	Server Hardware	Localhost	Free (because it's only on your own computer)

4	System Design & Documentation Tools	Draw.io	Free, web-based, easy-to-use tool for creating a variety of system diagrams.
5	System Testing Methods	*Black box testing*	Suitable for testing functionality without viewing the program code.
6	System Development Methods	FAST (Framework for the Application of Systems Thinking)	Provides a structured and flexible approach to system development

4.5 System implementation

*Implementation*System implementation is the system implementation step carried out after the system design is complete and ready to be implemented. This stage is the result of the analysis and design implementation that has been carried out. In this phase, the system, involving three actors, will be displayed. The following is a display of the interface for a Web-Based Sales Information System at a Simple Coffee Shop using PHP, the Laravel framework, and MySQL as a database.

Figure 23. Implementation of the admin login page

Figure 24. Implementation of the admin dashboard page

Figure 25. Implementation of menu category page

Figure 26. Implementation of the manage menu page on the admin

Figure 27. Implementation of the add menu page

Figure 28. Implementation of sales report page

Figure 29. User management implementation

Figure 30. Implementation of the cashier login page

Figure 31. Implementation of the cashier dashboard page

Figure 32. Implementation of the incoming order page

Figure 33. Implementation of the view order details page

Figure 34. Implementation of the cashier menu display page

Figure 35. Implementation of customer menu page

Figure 36. Implementation of the order data entry page

Figure 37. Implementation of the order details page

4.6 Database implementation

*Database*created using MySQL, the following is a database display for designing a Web-Based Sales Information System at a Simple Coffee Shop.

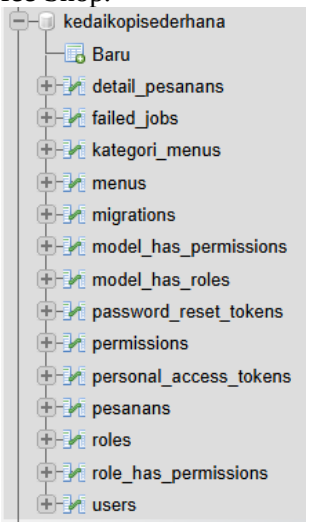

Figure 38. Simple coffee shop database

*Database*Simple Coffee Shop is the name of the database used for the Website-based Sales Information System.

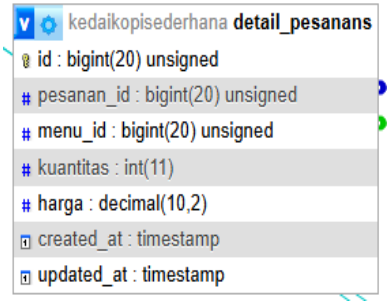

Figure 39. Order details table structure

Figure 40. Order table structure

4.7 System testing

Table 2. Black box test results

No	Actor	Test Description	Testing Procedures	Input Data	Expected results	Result Criteria Evaluation	
						YES	NO
1	Admin	*Login*	1. *Enter username* and password 2. Click the button Login	*Enter username* and password	The system displays the admin dashboard page	✓	
		Pageincoming orders	Click the incoming order menu	-	The system displaysorder entry page	✓	
		Pageorder details	Click the order details menu	-	Order details	✓	
		Add menu and category page	1. Click the menu button 2. Add menu or category 3. Click the button Okay	Input menu and categories	The system adds menus and categories	✓	
		Sales report page	1. Click the sales report button	-	The system displays *menu*sales report	✓	
		Logout	Click the logout button	-	The system logs out and displays the login page again.	✓	

No	Actor	Test Description	Testing Procedures	Input Data	Expected results	Result Criteria Evaluation	
						YES	NO
2	Cashier	*Login*	3. *Enter username* and password 4. Click the button *Login*	*Enter username* and password	The system displays the cashier dashboard page	✓	
		Pageincoming orders	Click the incoming order menu	-	The system displaysorder entry page	✓	
		Pageorder details	Click the order details menu	Confirm order received	Order details	✓	
		Add menu and category page	4. Click the menu or category button	-	The system adds menus and categories	✓	
		Purchase History Page	2. Click the Purchase History report button	-	The system displays*menu*sales report	✓	
		Logout	Click the logout button	-	The system logs out and displays the login page again.	✓	

Based on the results of Black Box testing, it can be concluded that all main system functionalities operate in accordance with the specified requirements. Each tested feature, including login, order management, menu management, transaction processing, and sales reporting, produced outputs that matched the expected results. These findings indicate that the developed system is functionally reliable and capable of supporting daily sales operations at the coffee shop. However, this testing is limited to functional aspects; therefore, further evaluation related to system performance, security, and user satisfaction is recommended to ensure the system's robustness and long-term usability.

5 Conclusion

Based on the research results and referring to the problem formulation and research objectives, it can be concluded that the web-based sales information system for Kedai Kopi Sederhana was successfully designed and implemented using the FAST method with Use Case, activity, and Class Diagram modeling. The system was developed using the PHP-based Laravel framework and MySQL database. The system implementation has been proven to be able to increase the effectiveness of the sales process by overcoming the problems of manual recording, data loss, and limited menu information. The results of testing using the black box method indicate that all system functions run according to the established requirements.

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