

Development of Motorcycle Service Application Using Design Thinking Approach and User Persona

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ABSTRACT: A motorcycle workshop, where regular maintenance and spare part replacements are carried out manually, currently lacks an application. The utilization of a manual system sometimes leads to operational challenges within the workshop, encompassing difficulties in spare part inventory tracking, transaction handling, and report generation. As a response, the author endeavors to develop an application for the motorcycle workshop. The chosen approach involves Design Thinking and user personas, with the aim of identifying core issues and user preferences. This process encompasses five stages: empathize, define, ideate, prototype, and test. The initiative commences with a user persona approach to gain insights into the potential users of the application. The achieved outcomes result in an information system design that can assist the company in addressing issues, such as service data management and service reports that are highly valuable for business development.

KEYWORDS: User Interface, Design Thinking, Service Application

1. INTRODUCTION

The current trend in information is moving towards effectiveness and efficiency, aiming to provide convenience. Every aspect, whether in education, entertainment, or business, now greatly relies on accurate, quick, and precise information. One such area is automotive workshops, which operate within the automotive industry. The need for reliable information is paramount, encompassing aspects like spare parts inventory, transactions, and report generation. Disorganization of such information can hinder business development. This was experienced by the 'Surya Abadi' workshop, where manual handling of information, including spare parts, transactions, and reports, posed challenges. Accurate spare parts inventory management and report generation proved problematic.

The waterfall approach is commonly used in designing vehicle service applications. This is due to its systematic process, which includes analysis, design, development, testing, implementation, release, and maintenance (1). However, the waterfall method's sequential nature can be limiting and is best suited for software aiming to build a system from scratch (2). In the dynamic realm of business, the waterfall method may not fully accommodate user needs. Design thinking presents a solution by involving users in addressing issues related to business success and needs (3).

2. LITERATURE

Information is an integral part of any organization. The quality of information acquired is directly proportional to the quality of decisions made by the management within an organization. Information itself is gleaned from collected data. Data represents values, states, or attributes that exist independently of any context. Information is data that has been processed into a meaningful form for its recipient and proves beneficial in current or future decision-making (4). Processed data alone is not enough to qualify as information. To transform into information, processed data must possess quality and provide value to its users.

Information Systems are vital supportive elements for all levels of management within an organization when making decisions. Information Systems are defined as a collection of interconnected components that gather, process, store, and provide the necessary information to fulfill business needs (5). The objective of Information Systems is to present information for decision-making in the planning, organizing, and control of operational activities within a company's subsystems, thereby contributing to the organizational synergy throughout the process.

Design thinking is a stage in which designers seek to understand users by reframing relevant issues as an effort to achieve the best solutions (6). There are five effective steps for determining solutions in design thinking: empathize, define, ideate, prototype, and test (7).

User Persona is a technique to attain an approach tailored to user needs (8). Within user personas, the aim

is to attain a focus on the users who will be using the application, addressing desired needs and solving issues.

Hypotheses for persona identification and selection of interview subjects revolve around use cases, which become the primary target after personas have been established (9).

3. METHODOLOGY

3.1. Design Thinking

System Analysis is a term that collectively describes the early phases of system development. System analysis can also be interpreted as the separation of two things into specific components. These components are then studied and evaluated to determine if there are better ways to meet management needs. The definition of analysis can also mean understanding and specifying in detail what the system should do. So, system analysis is about what the system needs to do to meet client requirements, rather than how the system can be implemented. The core of analysis is to view the problem holistically within the context of systematic research and criteria for system effectiveness. Analysis usually starts by reviewing the organizational structure and job descriptions of the personnel involved. This is followed by the review of forms, records, procedures, methods, processing, and reports used, including relevant instructions from detailed procedures, which are valuable for system analysis to find facts.

The steps in system analysis are as follows:

1. Preliminary Analysis

In this preliminary analysis, information is collected to obtain an overall understanding of the area that will be analyzed. For this purpose, the system analysis takes worksheets to gather the required information in the preliminary analysis. This preliminary study can provide an initial understanding of the system, estimated costs required, and the time needed for the development of the system.

2. Feasibility Study

The next step is to conduct a feasibility study. The benefits of this study include improved management decision-making, increased member satisfaction, economic benefits, and more.

3. Identifying Problems and User Needs

Identifying problems can be done by identifying the root causes of issues that need to be fixed. The implementation of system analysis is designed by the system analysis in a written document called the system implementation proposal. The purpose of this written document is to bring together the user's

thoughts with the system analysis regarding the development work of the system to meet user information needs.

4. Understanding the Existing System

Once the source and location of the problem are known, the next step is to understand the existing system to gather data and analyze the issues. Understanding the existing system can be done by conducting research to gather data about the current system. Research can be carried out with the following steps:

- a. Determine the research type, whether it's an interview, observation, survey, or sampling. Interviews are conducted to obtain data and information in the form of questions and answers from designated leaders or employees who know about the research subject. Observation is done to directly see the research location. Surveys or sampling are needed when specific data about the research location is required.
- b. Plan the research schedule.
- c. Assign the research tasks.
- d. Conduct the research.
- e. Gather the research results.

5. Analyzing the Research Results

After the research is conducted and the results are gathered, the next step is to analyze the research results. Analyzing the research involves analyzing the weaknesses of the old system and analyzing user information needs. Analyzing the weaknesses of the old system is meant to find the causes of the malfunctioning old system. Analyzing user information needs is necessary to produce relevant information.

3.2. Design Thinking

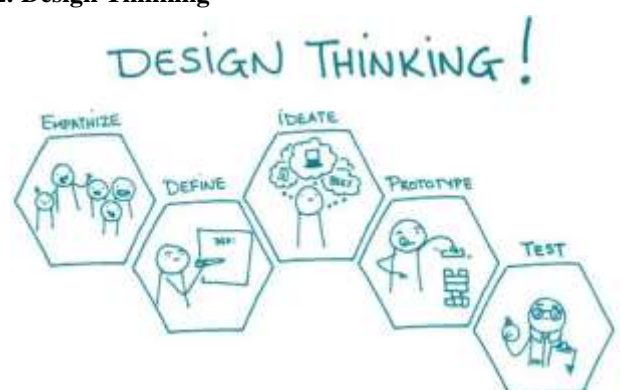


Figure 1: The five stages of the design thinking method(7)

1. Empathize Table 1 contains interview questions for the respondents

Table 1: List of interview questions

No	Question
1	Do customers express complaints regarding the vehicles they want to service?
2	Is there any record of desired repairs?
3	Is there a selection of responsible mechanics?
4	Can mechanics provide information about spare part replacements?
5	Do mechanics provide cost estimation notes?

2. Define

This stage involves identifying problems from the data gathered in the empathize phase. The goal is to understand user complaints that require solutions. User issues are categorized to pinpoint the core problems.

3. Ideate

In this stage, various ideas are generated to produce effective solutions.

4. Prototype

This phase entails visualizing ideas by designing prototypes. The design aims to allow users to access the service application and provide feedback.

5. Testing

Testing is conducted to verify if the solution aligns with user expectations. If it doesn't match, the process cycles back to the empathize, define, and ideate stages. If the feedback indicates alignment, the next step, application development, can proceed.

4. DESIGN AND DEVELOPMENT

4.1. Hypothesis Stage

Table 2: Hipotesis

Activities	Persona	Explanation
H0	Staff Admin	Administrative staff face challenges in inputting service data
H1	Mechanic	Not all mechanics manage service information clearly

4.2. Empathize

Based on this stage, initial information is obtained from users, which will be further developed in idea formulation. Table 3 contains the conclusions regarding issues derived from user interviews.

Table 3: Conclusion of Issues

No	Conclusion of Issues
1	Users desire a system for recording initial service analysis
2	Users wish for a feature to record performed repairs
3	Users want the option to select or indicate the responsible mechanic

4	Users seek a feature to provide information about spare part replacements
5	Users desire cost estimation information

4.3. Define

Categorization of problems to facilitate researchers in finding solutions. Table 4 contains problem categories based on user complaints.

Table 4: Problem Categories

Problem	Category
Lack of an application to facilitate vehicle service recording	User Friendly
Users face difficulties in analyzing vehicle services	Concept Recommendations Service report/history

4.4. Ideate

Mapping is conducted based on the identified issues, resulting in the establishment of the objectives for creating this service application.

Table 5: Solution

Problem	Solution
The absence of an application to facilitate vehicle service recording.	Creating a Vehicle Service Application with Complaint Logging and Working Order features, enabling users to obtain clear and easily analyzable information.
Users face difficulties in analyzing vehicle services.	Designing a service history report feature, thereby minimizing service follow-up actions.

4.5. Use Case

The developed system must support the tasks and responsibilities handled by the Front Office. Below (refer to Figure 2) are the main tasks within the transaction file system domain application, namely: Front Office can enter services and complaints, payments, and input nota.

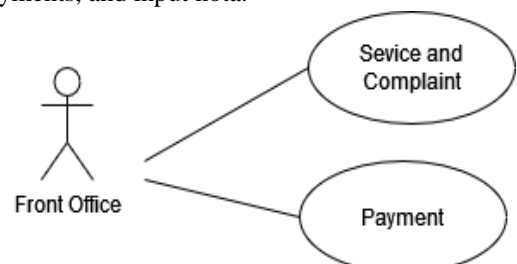


Figure 2: Use case Transaction

The system to be developed must be able to support the tasks and responsibilities handled by the Front Office. Below (refer to Figure 3) are the main tasks within the application domain of the report generation system, namely: Front Office can print service complaint reports to view service history and print payment reports.

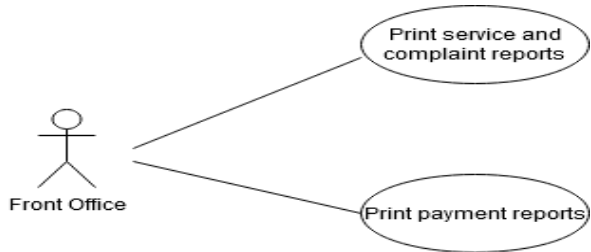


Figure 3: Use case Report

4.6. Prototype

The following (see Figure 4) is one of the sub-displays from the service and complaint menu that is used when a motorcycle is about to be serviced, and customers provide information regarding what services they would like to have done and any issues they want to report. The user will input information about the vehicle, the service package, and the spare parts that need to be replaced.



Figure 4: Service and Complaint

The following (refer to Figure 5 and 6) is one of the sub-displays from the transaction menu, namely the Payment Receipt, used when the motorcycle servicing is completed and the customer is making a payment. The user will click the print button, and the payment details will appear along with an exit button if they wish to close the form.



Figure 5: Payment



Figure 6: Payment Receipt

The following (see Figure 7) is one of the sub-displays from the service history and complaint document, which is used when needed for service analysis purposes, and customers engage in discussions regarding vehicle issues related to previous services.

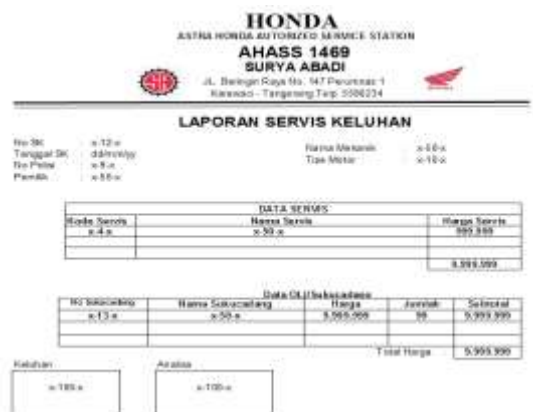


Figure 7: Service history and Complaint

The following (see Figure 8) is one of the sub-displays from the payment report document, which is used when needed to view transaction results within a specific period to determine the workshop's earnings.

LAPORAN PEMBAYARAN					
No Pembayaran	No Polisi	Pemilik	Total Servis	Total	Total
x-14-x	a-9-x	x-50-x	3.999.999	3.999.999	3.999.999
			3.999.999	3.999.999	3.999.999

Figure 8: Payment Reports

CONCLUSIONS

In software development, the design thinking approach can facilitate the creation of applications that align with user needs. Navigating through the design thinking phases accurately promotes the development of solution-oriented applications.

The incorporation of user personas further hones in on the core issues and user requirements. Features within the application, such as service history and record-keeping, become more detailed, enhancing user convenience in making informed decisions for business development.

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