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Design of a Web-Based Bus Rental Information System for PO Dika Trans

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Abstract

Information technology is developing rapidly and has an impact on almost every area of life, one of these information media is the Internet. The progress of the times has had an indirect impact on the world of transactions, namely changing the transaction system from conventional to online, therefore there are several business opportunities that are exploited by individuals or companies in Indonesia. PO Dika Trans is a domestic company domiciled in Klaten Regency, operating in the transportation sector. This research aims to design and implement a web-based information system at PO Dika Trans. The use of technology is expected to provide convenience in all aspects and provide expansion of the company's promotional network at relatively low costs. This research uses the System Development Life Cycle (SDLC) waterfall model method. The waterfall model was chosen because it has structured and sequential stages. Testing uses the blackbox method and usability scale system. The system's expected results can be realized and easily accessed by users.

Introduction

Information technology is growing rapidly and has an impact on almost every field of life, one of these information media is the Internet. The Internet is an information medium that can be accessed easily by anyone through various existing communication media, including computers and smartphones. This opens up opportunities for companies to develop services, businesses, relationships, and promote their products and services to a wide audience via the Internet. Service companies that take advantage of the presence of the Internet are transportation service providers (Rahardjo et al., 2019). The progress of the times has an indirect impact on the world of transactions, namely changing the transaction system from conventional to online, therefore there are several business opportunities that are utilized by an individual or company in Indonesia

Every company or organization has utilized this facility for various purposes. As a medium of promotion, news, sales and so on. Not only in one field, starting from the industrial, manufacturing, and transportation sectors have used websites to increase business productivity. The transportation sector has become a basic need in today'(Sunarya et al., 2020)s modern era . PO Dika Trans is one of the domestic companies domiciled in Klaten Regency, engaged in the transportation sector. This company still uses manual booking transactions and has not used information media that makes it easier for prospective passengers to order buses, so it is necessary to make the most of internet technology such as using an online web-based application

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The purpose of designing an online web booking system or using an online web-based application that has the benefit of making it easier for prospective passengers to get information on how to book a bus from PO Dika Trans. The company's goal is to collaborate with technology to improve precise results regarding the quality of the company's services, so a web-based information system is a solution. So the use of a computerized Bus Rental System has many advantages such as bus data information or available booking data can be known quickly. Obtaining information will also be more efficient compared to the manual method using books, hopefully this bus booking application design can continue to be developed and can be used for bus rental places or other transportation rentals (Hekmatiar & Erlangga, 2020).

Literature Review

The overall system requirements analysis discusses web-based bus rental information systems being an effective solution in various industries, including transportation services such as bus rental (Yonatan, 2019). The Web-Based DAMRI Tourism Bus Rental Application and Bandung DAMRI Facility Service Information can provide convenience in the form of features that can rent vehicles online, can assist in reporting statistics to the Head of marketing, because the Head of marketing easily sees rental statistics via the web online.

Some previous studies also such as (Savitri & Supriyono, 2022) PT Hadi Mulyo Raya is known to still collect data manually using paper media as a means of storing data. If the data is needed, it will take a long time to search. Customers must come directly to the company to find out the type and availability of buses, therefore the author will design a system to assist employees in collecting data on renters and facilitate data searches. Research conducted by (Bahrun & Suhendri, 2022) The creation of this bus rental website is expected to be enjoyed by the general public and make prospective passengers more interested in renting the bus because the ordering process is easier and faster. Research by (Bahrun & Suhendri, 2022) with this bus rental application system makes it easier for customers to book buses and also makes it easier for the data management process for PO. Metropolitan.

Research that has been conducted by previous researchers (Mahardika et al., 2023), so the author makes a web-based tourism bus booking information system using the waterfall method. This information system has several advantages that previous research does not have, such as a payment feature that gives customers the option to choose between payment in advance or full payment. Other research by (Sujarwadi et al., 2023) after being made it is expected to make it easier for customers in transaction activities and the administration in producing accurate rental reports so as to create effective and efficient performance.

According to previous researchers (Jaya & Indahyanti, 2023) the rental information system was created to provide convenience for the bus rental process and improve employee performance. According to (Nirmala et al., 2020) a web-based rental information system makes it easy for renters to choose a suitable vehicle. The benefits of the system for tenants are to provide ease of rental, remote payment transactions and get accurate information about company information and the company can receive complaints or criticisms and suggestions from customers via the internet.

Methods

The research method that will be applied to create the PO Dika Trans bus rental information system is the System Development Life Cycle (SDLC) waterfall model. This waterfall SDLC sequence is serial from the planning, analysis, design, and implementation processes of the system. This model is a model that first appeared around 1970 so it is often considered ancient, but it is the most widely used model in Software Engineering (SE) (Erwanto, 2015). The implementation of this method is very suitable for the development of PO Dika Trans bus rental information system, the design process method is illustrated in Figure 1.

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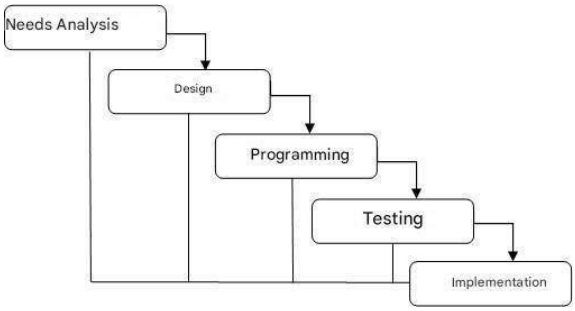

Figure 1. Waterfall method

Needs Analysis

This analysis is the initial stage carried out by researchers in developing the system. In this analysis, you must get several things that are considered to support the research being carried out, such as looking for existing problems, collecting data. The initial stage for system design is to carry out observation and interview activities with the manager of PO Dika Trans as well as analyze related problems. According to (Prasetyo et al., 2017) The stage of a need is in monitoring data collection and interview activities to learn what users expect. The results formulated after the results of observations and interviews, the needs used for the design process are divided into functional and non-functional needs, business analysis needs

Functional Requirements

Functional requirements contained in the rental information system, namely, the login and register system for admins and users, admins can perform management related to bus data, data collection of tenant data, tenants can carry out ordering activities, perform data input and transactions. According to (Setiyani & Tjandra, 2021) functional requirements analysis is a process carried out to define what needs will be applied to the system.

Non-Functional Needs

Non-functional requirements needed for the operation of making information systems are divided into hardware devices besides that non-functional requirements have other aspects including the system must have a security mechanism with strong authentication and data encryption is needed to prevent unauthorized access, the system response must be fast to minimize user waiting time during the tenant booking process, the system provides guidance in the form of SOPs in the form of PDF documents and admin contact numbers to support user transaction needs. According to (Hamzah et al., 2022) non-functional requirements are system requirements that include hardware and software used to support the design process. The system can be accessed online with cellular data or wifi via browsers such as google, safari, mozila and other browsers. This requirement is needed to support users when accessing the PO Dika Trans rental system.

Design

After carrying out the needs analysis stage in the next waterfall method is the design stage, researchers design the system with overall system design support equipment based on the needs which then carry out the system design process which will then be implemented, using use cases and activity diagrams to define system design.

Use Case Diagram

The first stage for designing this website is the use case diagram. Use case diagrams are visual representations that show the relationship between actions performed by system users (use cases) and the parties involved in these interactions (actors). These involved parties can be

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individuals, devices, or even other systems that interact with the system being developed (Fauzi & Wulandari, 2020). The following use case diagram is illustrated in Figure 2.

Figure 2. Use Case Diagram of SIP Bus PO Dika Trans

Activity Diagram

The second step for website design is the activity diagram, according to the view (Rega, 2023) Activity Diagram describes several activity flows in the system being designed, how each flow starts, decisions that may occur, and how they end. The stages are described in Figure 2.3, namely the admin will log in, then from the system displays the dashboard page, after that checking bus data, checking transactions, verifying user transactions and completing user transactions / orders from these reviews is the admin flow when managing the system.

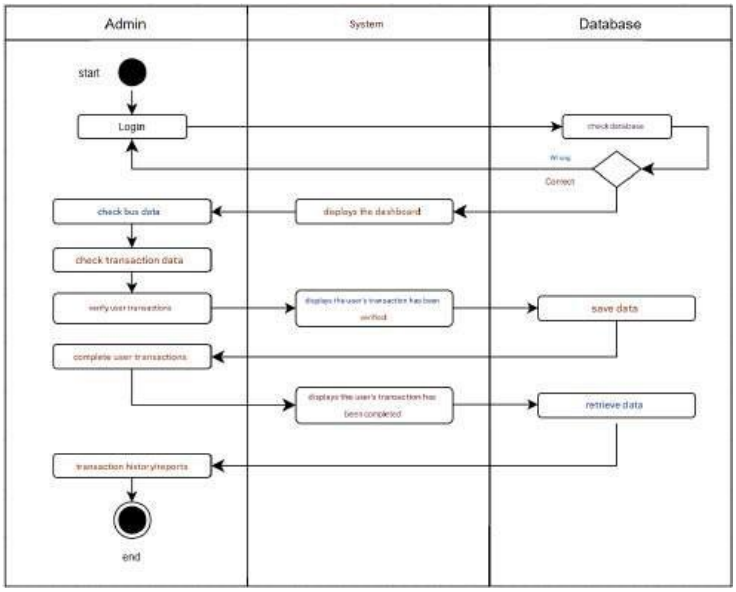

Figure 3. Activity Diagram

User Interface Design Mockup

The third stage is User Interface Design, according to (Kurniawan & Romzi, 2022) User interface (UI) is part of computers and software that can be seen, heard, touched, spoken to, and which can be understood directly by humans. It can be said that the user interface is a

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technique and mechanism for displaying interfaces to interact with users. User Interface is a system that manages the interface display while facilitating users to interact with the system (Al-Faruq et al., 2022). The initial page has a login display for the user or admin illustrated in Figure 5, this mockup aims to be the basis of design related to the system to be created.

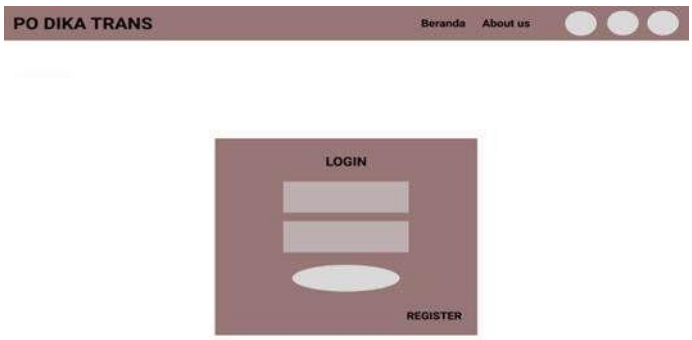

Figure 5. SIP Bus Login Page Mockup PO Dika Trans

The menu page used to perform the activity of choice activities illustrated in Figure 5, contains menus contained in the system.

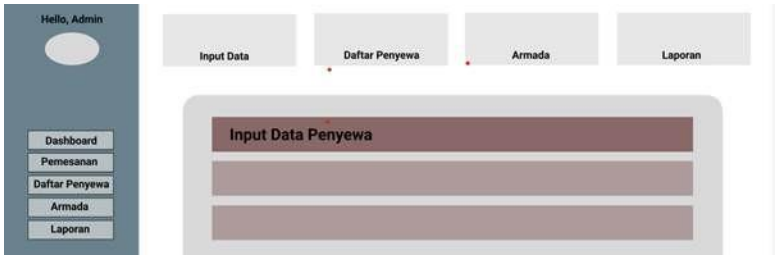

Figure 6. SIP Bus menu page mockup PO Dika Trans

Next is the fleet list page containing the availability of the fleet owned intended for user convenience when choosing a fleet this page is illustrated Figure 6.

Figure 7. Mockup Page Armada SIP Bus PO Dika Trans

The last page contains a report view, which is an information display containing a report or company history illustrated in Figure 7.

Figure 8. Bus SIP Report Mockup PO Dika Trans

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Entity Relationship Diagram

The fourth stage of system design is the Entity Relationship Diagram (ERD) which is a crucial tool in database design for information systems. ERD is used to visualize the connections between entities in the context of bus rental and the attributes attached to each of these entities. ERD graphically illustrates the structural format of databases that vary in their various types. According to (Permana & Sudarsono, 2017) so that data can be processed, previously data must be collected or stored in a storage area, of course in the form of digital data seen in Figure 8.

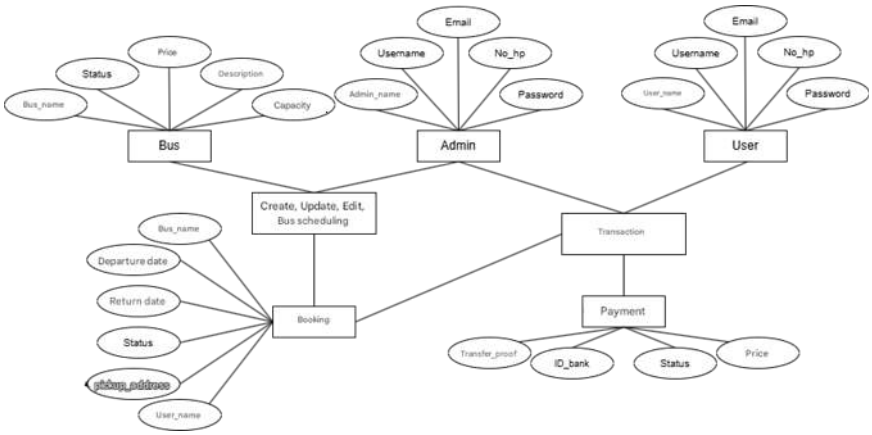

Figure 8. Bus SIP Report Mockup PO Dika Trans

Programming

After doing the programming stage, the next stage is to test the integrity of the system that has been created. The main purpose of system testing is to ensure the quality and reliability of the system, this stage is carried out to verify and validate the entire system to ensure that the system functions as expected, meets the requirements, and is reliable. The system is tested through the black box testing method and usability testing using the System Usability Scale (SUS). Black box testing is a type of test that is carried out using data from specifications, this test focuses on the output produced in response to input to the system (Sudarmilah & Wahendra, 2021). Usability is a software testing technique or software observed through aspects of learnability, efficiency, memorability, errors and satisfaction (Fatmawati, 2021).

Implementation

The implementation stage is the stage of making information systems according to the results at the design stage (Romadhoni et al., 2015). After going through various stages from requirements analysis, design, programming, testing the last stage of the prepared method is to implement the system into the business network, the implementation stage indicates that the system created has successfully passed the test and can be implemented by the company to be applied as a new rental service system, a conventional rental system can be migrated to digital hosting services.

Results and Discussion

The results of the design of this information system provide various pages and interesting features that give an impression and experience to the user, the initial page of the PO Dika Trans information system consists of two accesses, namely admin and user

Home Page

This page displays the system's home page which shows all the main menus available. Figure 10, there are several features such as the homepage which includes all features, the about us feature which contains a brief explanation of PO Dika Trans, the service feature which

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contains the services available at PO Dika Trans, the contact feature which is listed to be able to write a feedback / criticism and the login feature for admin and user.

Figure 9. PO Dika Trans Home Page

Admin Page

This page consists of login, dashboard, bus data, transactions waiting for confirmation, cancel requests / canceled transactions and website settings. Figure 3.2, displays the login and register pages, to verify the admin or user who will enter the system.

Figure 10. PO Dika Trans Bus Login Page

Figure 11 of the picture is a display of bus data and edit bus data, which functions as supporting admin tasks to check company reports containing the number of buses that are often used and the least used, as well as the company's annual chart report.

Figure 11. PO Dika Trans Bus Dashboard Page

Figure 12 shows a display that functions as a support for admin tasks to add or edit and delete available bus data then the results will appear on the user dashboard.

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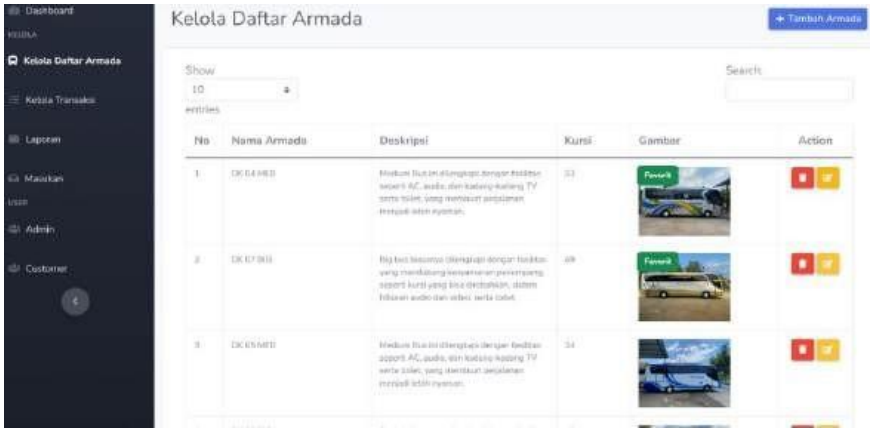

Figure 12. PO Dika Trans Bus Data Page

Figure 13 This page is in the form of managing transactions. Through this the admin can verify the status of the order, once verified then the status in the user will change.

Figure 13. Manage Bus Transactions PO Dika Trans

Figure 14 shows the view of the report section that functions if the admin looks for details of transactions that have been completed.

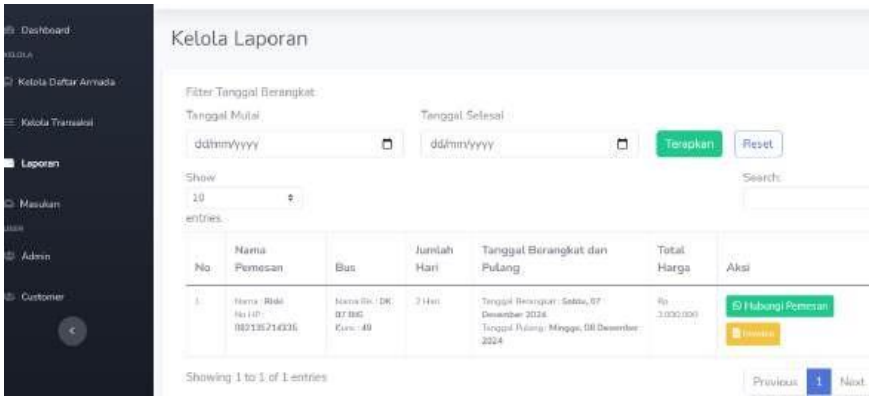

Figure 14. PO Dika Trans Bus Report

Figure 15 shows the display of customer feedback that aims to support the process of improving the quality of a service, or system. So the admin can see input from customers here and evaluate it.

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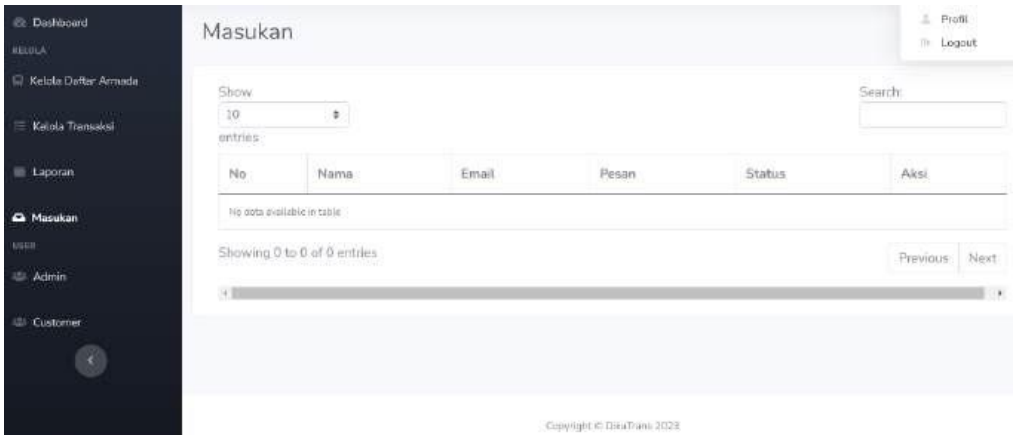

Figure 15. PO Dika Trans Bus Input

Next is the account settings page of the admin and cutomer, the admin can manage this section which contains customer accounts from PO Dika Trans which is shown in Figure 16.

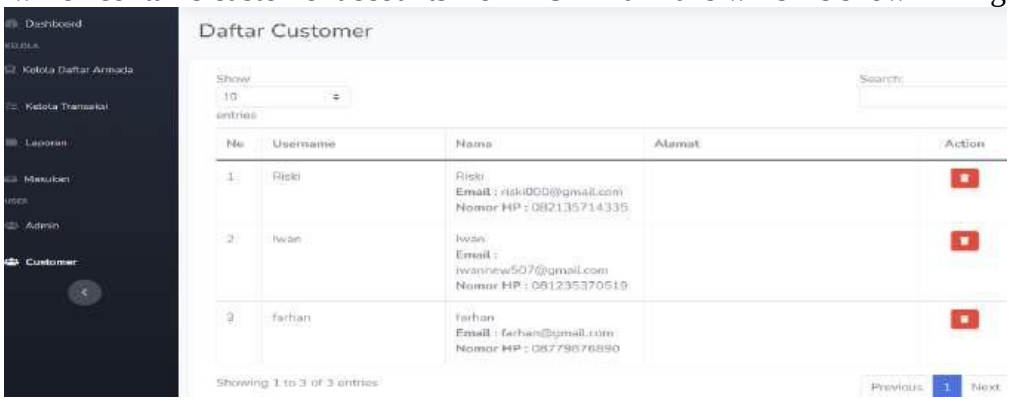

Figure 16. Customer Bus PO Dika Trans

User Page

This page consists of login, homepage, order history, profile and everything on the main page. First the user will check the unit through the date to select the available bus units, the bus displayed in Figure 16. The user will select the bus to be ordered by clicking the add order button on the available image then the system will respond to proceed to the order page.

Figure 17. List of PO Dika Trans Buses

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After that the user can fill in the order form available in Figure 18, by checking the data, specifying the pick-up location and choosing the payment method.

Figure 18. Order Form PO Dika Trans

After completing the order form the user immediately appears on the order history this page is shown Figure 3.10, functions to store order history data, the user can upload proof of payment and see whether the order has not been verified by the admin or has been verified in the verification status section. Users can also contact the admin via whatsapp.

Figure 19. Order History PO Dika Trans

Blackbox Testing

The information system created will be tested by testing the blackbox method, which is a test that focuses on the specifications and functional features contained in the PO Lestari Alam Raya rental information system, testing through ten statement points that contain the condition of the system when run and the expectations or responses of the system when after running, this parameter will show that whether the features that have been made have run as expected or not accordingly, this method is shown in Table 1.

Table 3.1 Blackbox Testing

No.	Conditions	Hop	Results
1	Username: True Password: Correct	Login successfully and enter the dashboard page	Valid
2	Username: False Password: False	login	Valid
3	User checking date for bus list	User successfully enters the available bus page	Valid

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4	User selects a bus and it is added to the order	User successfully adds an order and can continue to checkout the order or delete the order.	Valid
5	User has filled out the order form and uploaded proof of payment	Transaction data will be saved and displayed in history	Valid
6	User sends	Data will appear in the admin input	Valid
7	Admin adds and edits bus data	Bus data will appear in the user's bus list	Valid
8	Admin verifies user transaction	User gets verification status from Admin in the form of already verified	Valid
9	Admin clicks the user transaction completion mark in the managed report	The transaction status in the manage admin report section will change to completed transaction.	Valid
10	Admin accesses manage reports and searches for transaction details	Transactions will appear according to what the admin is looking for	Valid
11	Logout admin or user	Successful exit and return to page	Valid

The results of Blackbox testing of the system created stated that the functionality features contained in the system have run as expected and obtained valid results for ten conditioning and have achieved the expected.

SUS (System Usability Sclae) Testing

After Blackbox testing the system will be given another test, namely SUS (system usability scale) testing which functions to test the system whether the interface display is in accordance with the standards that have been expected, with the classification of the formula: a) Odd questions= answer score; b) Even questions= 5 - score ; c) Final result= sum of odd & even scores x 2. D) Average score= *Number of SUS scores*

Number of respondents

This standard-compliant SUS formula will be applied through a series of questions to respondents, as detailed in Table 3.2, which contains ten basic questions related to user satisfaction with the system. Based on the guidelines (Sharfina & Santoso, 2016) the statements in this instrument retain the same meaning as the original version of SUS and do not undergo semantic changes in translation. This test aims to assess whether the system designed is in accordance with the expected usability criteria.

Table 3.2 System Usability Scale Testing

No.	Statement
1	I'm thinking of using this system again.
2	I find this system complicated to use.
3	I found the system easy to use.
4	I need help from other people or technicians in using this system.
5	I feel that the features of this system are working properly.
6	I feel that there are many inconsistencies (mismatches in this system)
7	I feel that others will understand how to use this system quickly.
8	I find this system confusing.

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9	I feel there are no obstacles in using this system.
10	I need to familiarize myself first before using this system.

Based on the available formulas, statement a represents odd values, while equation b is even values. Equation c describes the final result of the test, while statement d is the average result of the system usability scale (SUS) test. In accordance with the capabilities of the respondents, the data is processed based on Table 3.3.

Table 3. SUS test results

No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Valu Tota (x2,5)
1	4	4	4	4	4	4	4	4	4	4	40	100
2	4	2	4	4	4	4	4	4	4	1	35	88
3	3	3	3	2	3	2	3	2	3	2	26	65
4	3	3	3	2	3	3	3	3	3	2	28	70
5	0	3	2	4	0	3	2	2	2	3	21	53
6	3	2	2	4	4	2	4	4	3	2	30	75
7	2	4	2	2	3	2	2	2	2	3	24	60
8	4	2	3	3	4	4	4	4	4	4	36	90
9	4	4	4	3	4	4	4	4	4	3	38	95
10	2	2	2	2	2	2	2	2	2	2	20	50
11	3	2	2	2	3	1	3	3	2	2	23	58
12	3	3	3	3	3	3	3	3	3	2	29	73
13	3	3	3	3	3	2	3	3	3	3	29	73
14	3	3	2	3	3	3	3	3	3	3	29	73
15	3	3	3	3	4	4	3	4	4	2	33	83
16	4	3	4	3	3	3	3	4	4	2	33	83
17	2	3	3	2	3	3	3	4	3	3	29	73
18	2	1	1	1	1	1	1	2	2	3	15	38
19	3	2	2	4	3	4	3	3	3	3	30	75
20	3	3	3	2	3	3	2	3	3	3	28	70
21	3	2	2	4	3	4	3	3	3	3	30	75
22	3	2	3	2	3	2	2	3	2	2	24	60
23	3	2	4	2	3	2	3	2	3	2	26	65
24	2	2	2	4	3	2	2	1	3	3	24	60
25	2	4	1	2	3	3	2	3	3	4	27	68
26	2	3	3	3	3	4	2	3	2	2	27	68
27	2	2	3	2	3	2	3	3	2	3	25	63
28	4	3	4	3	3	3	3	4	4	2	33	83
29	3	3	3	2	3	3	2	3	3	3	28	70
30	3	2	3	2	3	2	3	2	3	2	25	63
Average												**70**

Based on the test results that have been carried out with 30 respondents consisting of 25 general audiences, 3 PO employees, and 2 UI/UX designers, the data will be processed to determine the test results. After the division will produce the final average score= 70

After the data processing is complete, proceed to provide an assessment with the assessment standards tested against the information system, using the SUS Score table assessment benchmark these results will be determined according to the standard value that has been stated and determined according to the assessment criteria contained in Table 3.4.

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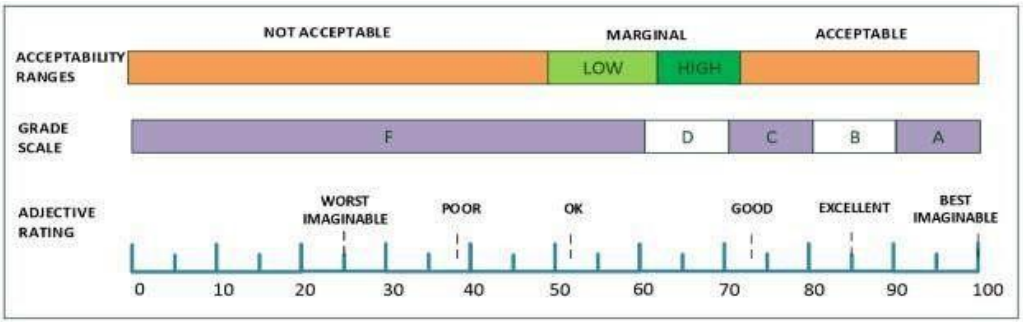

Figure 20. SUS Assessment (Prabowo & Suprapto, 2021)

Based on the benchmarks tested along with the results that have been validated, the test results produce a score of 70, which is categorized as Good, which means it is in accordance with the assessment standards listed in Table 4. These results can be categorized as acceptable and the PO Dika Trans bus rental information system is well received by users and renters. These results will later become a benchmark regarding the development of further transaction processes.

Conclusion

This research provides positive results that are expected to be able to manage and facilitate transaction activities in the booking process at PO Dika Trans, this system has gone through several stages of design with the waterfall method which is carried out according to the stages that refer to the standards that have been set when determining the concept of system design, this system has gone through two tests, namely blackbox testing and system usability scale (SUS), blackbox testing states that the system has operated as expected with valid results and system usability scale (SUS) testing proves that the system has met user criteria with a final assessment ratio of 70, this is based on the support of questionnaire data taken from respondents. This research is expected to be the foundation for the development of the rental transaction process at PO Dika Trans to be more efficient, this system provides assistance to the admin to facilitate his activities and make it easier for users in the ordering process.

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