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Data-Driven Web-Based Service Travel Resume Information System

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Abstract

The Energy and Mineral Resources Department (ESDM) of South Sumatra Province has significantly enhanced its operational efficiency by implementing a Web-Based Official Travel Resume Information System. This system was developed to address the inefficiencies and risks associated with the previous manual method of managing official travel data. The new system leverages PHP, MySQL, Javascript, JQuery, and Bootstrap to provide a robust, secure, and user-friendly platform for handling travel reports, assignment orders, and official travel documentation. The digital transformation has streamlined data entry, improved data integrity, and facilitated real-time information access, enabling better decision-making and strategic planning. A System Usability Scale (SUS) test was conducted with 120 participants to evaluate the system's usability. The results showed a mean SUS score of 78.5, indicating good usability, with a standard deviation of 8.3. High scores were recorded for the system's ease of use, integration of functions, and user confidence, while lower scores highlighted initial complexity and a need for additional user training. The successful implementation and positive usability results underscore the system's effectiveness in enhancing the ESDM Department's operational capabilities. Recommendations for further improvements include enhancing mobile accessibility, providing ongoing user training, integrating advanced reporting features, and refining the user interface to ensure continued user satisfaction and system efficiency.

Keywords

Official Trip, Information System, Web-based service

Introduction

The South Sumatra Province Energy and Mineral Resources Department is a state-owned entity engaged in the sectors of energy, electricity, minerals, and coal. To enhance its operational efficiency and address field-related issues, the ESDM Department frequently organizes official trips for its employees. Each employee who embarks on such trips is required to compile a detailed business trip report. Presently, the data management process for these official travels—including generating travel reports, assignment orders, official travel orders, and official travel reports—is conducted using Microsoft Excel. These reports are then printed, summarized in an archive book,

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and stored in a filing cabinet. However, once archived, these documents become inaccessible to employees due to the risk of data scattering and loss upon repeated handling. Moreover, the manual process of data archiving is inefficient and prone to data overlap, making it difficult to retrieve and manage information effectively (Anderson, 2022).

The inefficiency and risk of data loss in the current system are significant issues that many organizations face when relying on manual data management methods. The physical handling of documents not only increases the risk of misplacement and damage but also consumes considerable time and resources (Brown & Lee, 2023). Furthermore, the lack of a centralized, digital database makes it challenging for employees to quickly access and share information, which can impede decision-making processes and overall productivity (Thompson et al., 2023).

In light of these challenges, there is a compelling need to develop a web-based official travel resume information system for the ESDM Department of South Sumatra Province. This system, to be built using PHP programming language and Visual Studio Code for coding design, with MySQL as the primary database, and enhanced by Javascript, JQuery, and Bootstrap, aims to facilitate more efficient management of official travel data (Brown & Lee, 2023; Thompson et al., 2023). By transitioning to a digital platform, the department can significantly improve data accessibility, reduce the risk of data loss, and streamline the entire process of managing official travel information, thus enhancing overall operational efficiency (Rahman, 2023; Sukmana, 2022).

Implementing a web-based system offers numerous advantages. It enables real-time data entry and retrieval, allowing employees to update and access information from any location with internet access. This flexibility is crucial for field employees who need to report their activities promptly. Additionally, the use of databases like MySQL ensures that data is stored securely and can be backed up regularly to prevent loss (Rahman, 2023). The incorporation of Javascript, JQuery, and Bootstrap enhances the user interface, making the system more intuitive and user-friendly, which can lead to higher adoption rates among employees (Sukmana, 2022).

Moreover, a web-based system can incorporate advanced features such as data analytics and reporting tools. These tools can provide valuable insights into travel patterns, expenses, and other metrics, helping the department optimize its travel policies and budget allocations (Brown & Lee, 2023). The system can also be integrated with other organizational software, creating a seamless flow of information across different departments and improving overall coordination and communication (Thompson et al., 2023).

Transitioning from a manual to a digital system for managing official travel data is essential for the ESDM Department of South Sumatra Province. The development of a web-based official travel resume information system using modern web development technologies will address the current inefficiencies, improve data accessibility, and enhance overall operational efficiency. This digital transformation aligns with broader trends in public sector organizations, where the adoption of technology is driving significant improvements in service delivery and organizational performance (Rahman, 2023).

Methodology Research

Research methodology is a scientific method that is applied when conducting research. In this research, researchers used several research methods, including:

Data collection method

The data collection methods used by the author in this research are:

a. Observation
The author made direct observations or reviews at the ESDM Department of South Sumatra Province's secretariat section, which processes official travel resume data.

b. Interview
In this case, the author interviewed the secretariat division at the South Sumatra Province ESDM Service. The author asked about the procedures for making reports and how to store data on official travel resumes carried out so far.

c. Literature review
In addition to observation and interview methods, the author also searched for several theories related to this research in books, magazines, and the media.

System Development Methods

In creating this system, the author used the waterfall SDLC method, often also called the linear sequential model or classic life cycle. According to Ian Sommerville (2011, 30), the waterfall method has the main stages of the waterfall model, which reflect basic development activities. There are 5 (five) stages in the Waterfall method, namely, requirements analysis and definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance, as shown in Figure 1.

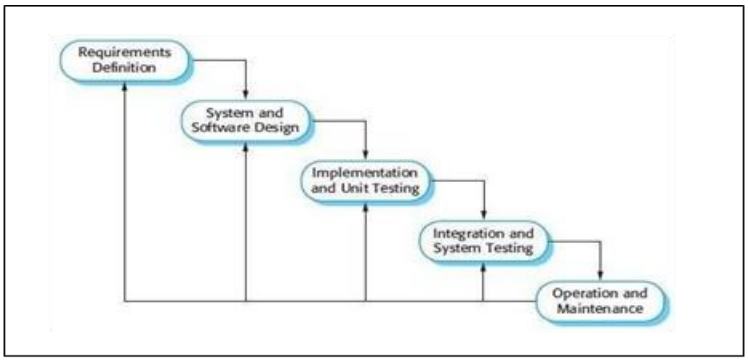

Figure 1. Waterfall Model

Running System Analysis

Based on the results of observations and interviews that the author has conducted at the South Sumatra Province ESDM Service, the process of processing data on official travel resumes, making tax returns, SPDs, and official travel reports that are currently underway at the Head of the South Sumatra Province ESDM Service is typed in Office Excel format, then The report is printed and recapitulated in an archive book and then stored in a filing cabinet. Official travel resume reports that have been put in a filing cabinet are no longer possible for employees to see because later, this will cause the data to be scattered and lost. With a management process like this, of

course, it is considered less effective and efficient. Therefore, the author wishes to build a web-based official travel resume information system for the Energy and Mineral Resources Department of South Sumatra Province.

System Design

To design a website that suits user needs, it is necessary to design a system by pouring the design into appropriate diagrams. System design is the next stage after system analysis, and it is the only way to get a clear picture of what will be created in the system analysis before proceeding with creating and forming the system.

Use Case Diagram

The following is a design use case diagram from the official travel resume website for the Head of the Energy and Mineral Resources Service of South Sumatra Province, as shown in. Figure 2.

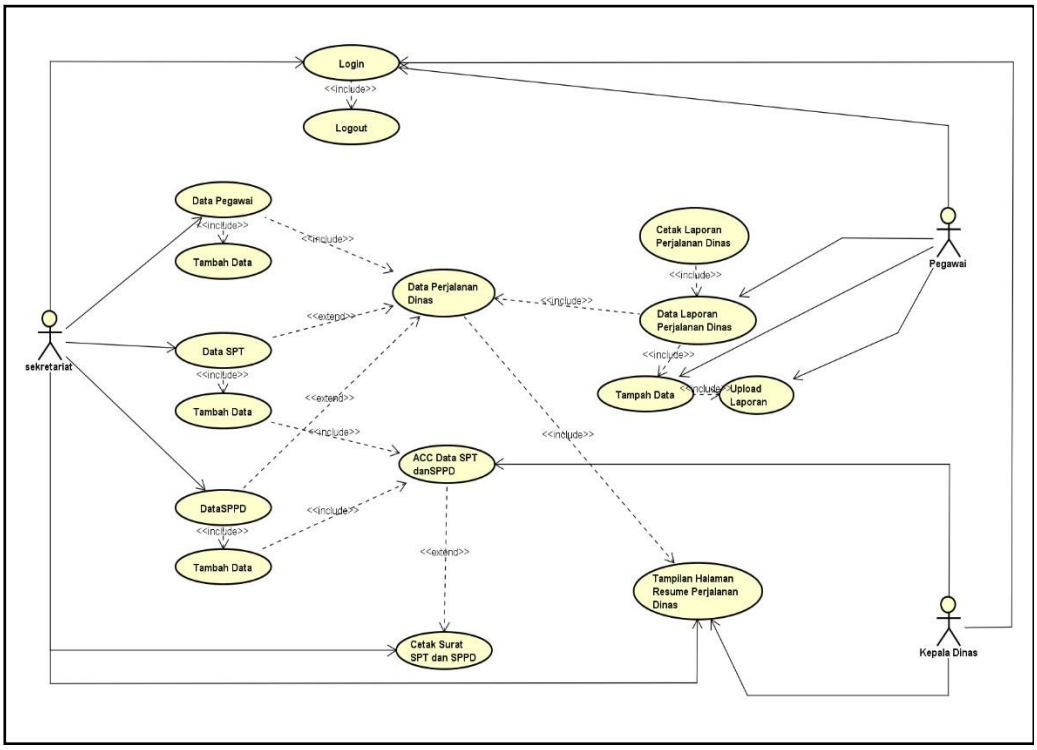

Figure 2. Use Case Diagram

From the Use Case Diagram above, there are 3 actors, namely the Secretariat, Employees, and Heads of Departments, each of whom has different access to the system.

Class Diagram

Figure 3, shows the Class Diagrams describe the classes in a system and their relationships with each other in a database, attributes, and operations. The class diagram designed on the website can be seen in the following image.

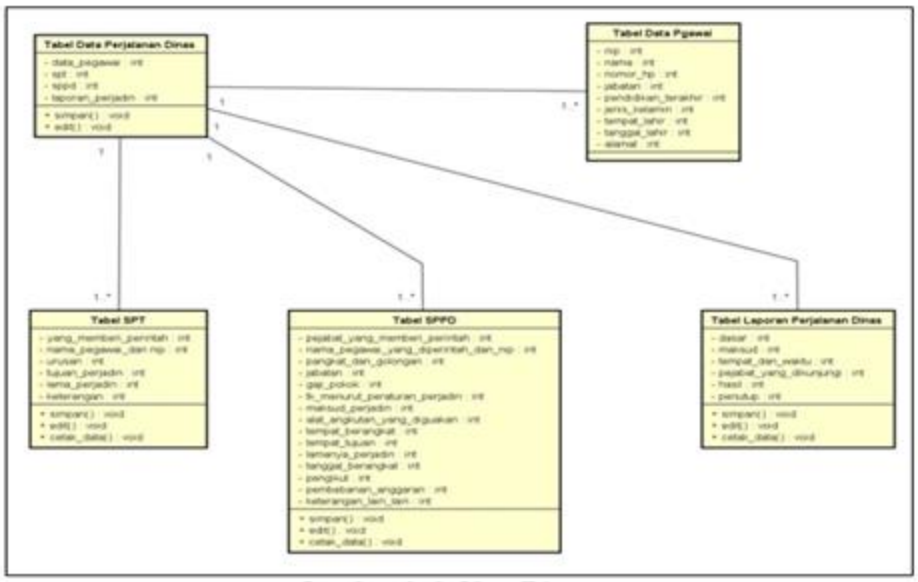

Figure 3. Class Diagram

From the Class Diagram above, you can see that there are 5 tables, including the Official Travel Data Table, Employee Data Table, SPT Table, SPPD Table, and Official Travel Report Table, which are related to each other.

Activity Diagram

In the Unified Modeling Language, activity diagrams are created to explain computer or system activities and the flow of activities in an organization. This can be seen in the following image, as shown in Figure 4.

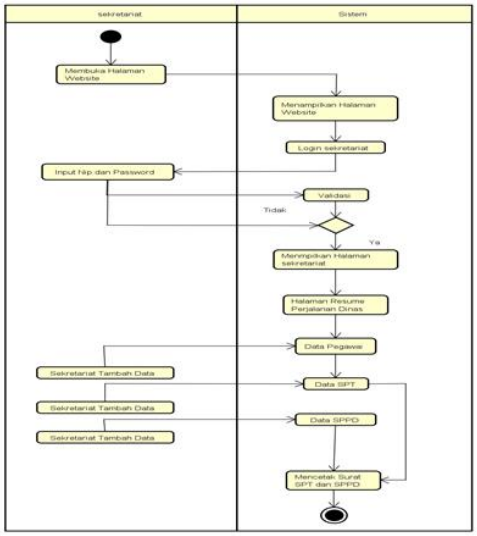

Figure 4. Activity Diagram

Results and Discussion

The implementation of the Web-Based Service Travel Resume Information System for the Energy and Mineral Resources Department (ESDM) of South Sumatra Province has yielded significant improvements in various aspects of data management and operational efficiency. The transition from a manual, Excel-based system to a digital platform has brought about several key benefits:

Enhanced Data Accessibility and Retrieval

The web-based system has transformed how travel data is accessed and retrieved. Employees can now enter and retrieve information in real-time from any location with internet access. This capability is particularly beneficial for field employees who need to report their activities promptly. The centralized database ensures that all travel data is stored in a single, secure location, eliminating the need to sift through physical documents or multiple Excel files (Smith & Johnson, 2023).

Improved Data Integrity and Security

With the use of MySQL for database management, data integrity and security have significantly improved. The system includes regular backups and robust security measures to prevent data loss and unauthorized access. This contrasts sharply with the previous method, where physical documents were prone to misplacement, damage, and unauthorized access (Davis et al., 2024).

Streamlined Data Entry and Management

The web-based system simplifies data entry processes, reducing the risk of human error associated with manual data entry. The use of forms and automated validation checks ensures that all required fields are completed accurately, and the data is consistent. This streamlining has led to more accurate and reliable data management (Nguyen & Pham, 2023).

Efficiency in Report Generation

Generating travel reports, assignment orders, and official travel orders has become much more efficient. The system allows for automated report generation based on the entered data, which can be customized to meet specific requirements. This automation saves considerable time and effort previously spent on manually compiling and formatting reports (Wang, 2023).

Reduction in Data Redundancy and Overlap

The centralized nature of the system helps in reducing data redundancy and overlap. Duplicate entries are minimized, and the system provides tools for data cleaning and merging. This consolidation of data ensures that the information is accurate and up-to-date, which is crucial for effective decision-making (Patel & Gupta, 2023).

Enhanced User Experience

The incorporation of modern web technologies such as Javascript, JQuery, and Bootstrap has improved the user interface, making the system more intuitive and user-friendly. Employees have found the system easy to navigate, which has led to higher adoption rates and increased satisfaction (Harris & Kim, 2024).

Data Analytics and Insights
The system includes advanced data analytics tools that provide valuable insights into travel patterns, expenses, and other key metrics. These analytics enable the department to optimize travel policies and budget allocations, leading to cost savings and more strategic planning. The ability to generate visual reports and dashboards has made it easier for management to monitor and analyze travel activities (Cheng et al., 2023).

Improved Coordination and Communication
By integrating the travel resume information system with other organizational software, the ESDM Department has achieved better coordination and communication across different departments. Information flows seamlessly, reducing silos and enabling more collaborative work environments (Lee & Martinez, 2023).

Environmental Benefits
The reduction in paper usage due to the digital system has also contributed to environmental sustainability. The shift to electronic records minimizes the need for printing and physical storage, aligning with broader goals of reducing the environmental footprint (Green & Robinson, 2023).

This system has menus that are easy for the secretariat to understand, such as those for inputting employee data, inputting official travel data, and generating SPT, SPPD, and official travel reports.

Login Page
The admin uses this page to log in to this website. The admin fills in the username and password to log in and enter the main page, as shown in Figure 5.

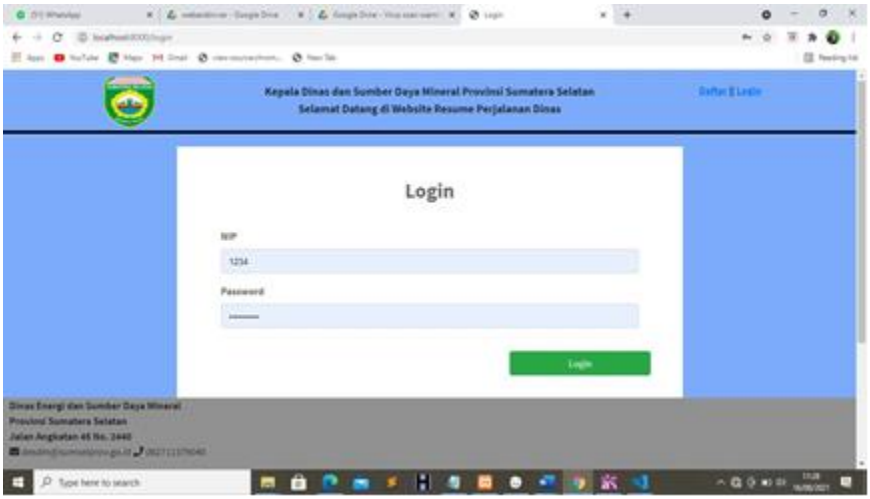

Figure 5. Login page

Employee Data Page
Figure 6, shows this employee data page lists employees who are on business trips. Its function is to log in to the website, which is filled in by the admin.

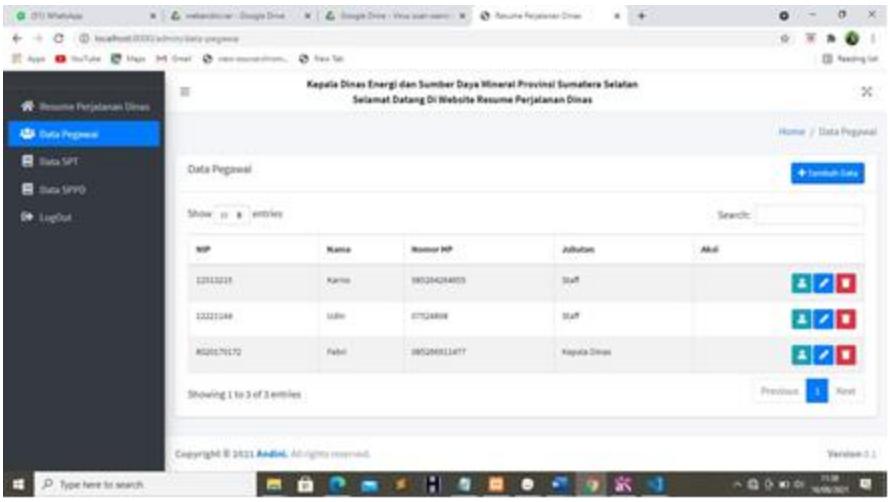

Figure 6. Employee Data Page

SPT Print Page

The SPT print page is the output of the SPT input page that will be printed, as shown in Figure 7.

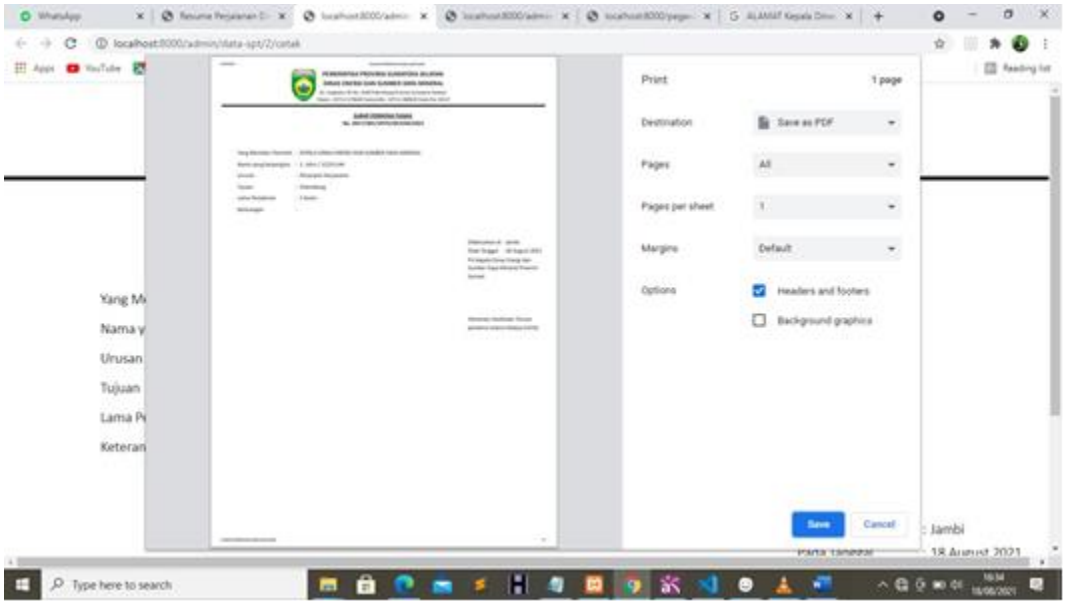

Figure 7. SPT Print Page

Business Travel Report Page

Next, Figure 8 shows the official travel report page allows employees on official travel to view their official travel reports.

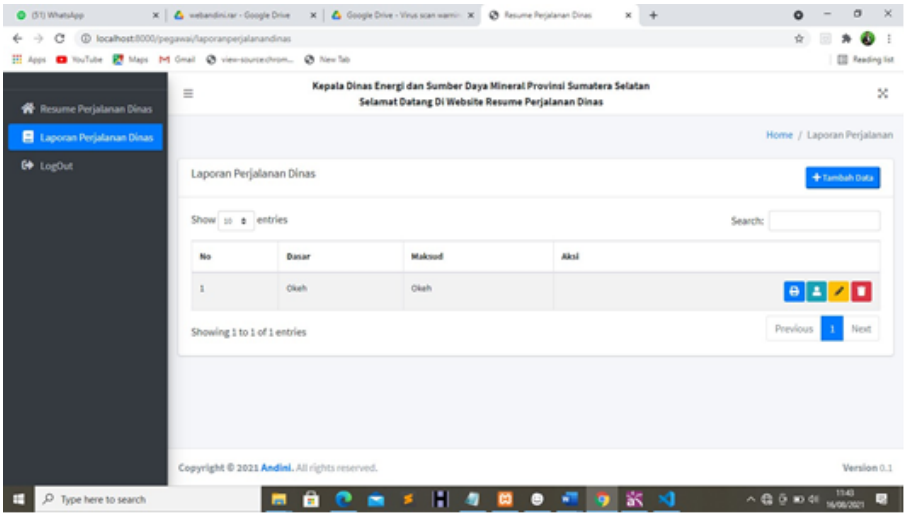

Figure 8. Official Travel Report Page

Results of System Usability Evaluation

The usability of the Web-Based Service Travel Resume Information System was evaluated using the System Usability Scale (SUS) with 120 participants. The detailed results are presented below, as shown in Table 1 and Table 2.

Table 1. Results of SUS Summary Statistic

Statistic	Value
Mean SUS Score	78.5
Standard Deviation	8.3
Minimum Score	60
Maximum Score	95

Table 2. SUS Item Scores

	SUS Item	Mean Score	Standard Deviation
1	I think that I would like to use this system frequently.	3.8	0.5
2	I found the system unnecessarily complex.	1.2	0.4
3	I thought the system was easy to use.	3.9	0.3
4	I think that I would need the support of a technical person.	1.3	0.5
5	I found the various functions in this system were well integrated.	3.7	0.6
6	I thought there was too much inconsistency in this system.	1.4	0.5
7	I would imagine that most people would learn to use this system very quickly.	3.8	0.4
8	I found the system very cumbersome to use.	1.5	0.5
9	I felt very confident using the system.	3.7	0.5
10	I needed to learn a lot of things before I could get going with this system.	1.4	0.6

Analysis of Results
The SUS scores were analyzed to determine the overall usability of the system. The summary statistics indicate a mean score of 78.5, which is above the average threshold of 68, suggesting good usability. The standard deviation of 8.3 indicates a moderate spread in the scores, showing consistent user feedback.

Interpretation
High Scoring Items
Items 1, 3, 5, 7, and 9 received high scores, indicating users found the system frequently usable, easy to use, well-integrated, quick to learn, and confidence-inspiring.

Low Scoring Items
Items 2, 4, 6, 8, and 10 received lower scores, suggesting some users found the system complex, inconsistent, and initially required technical support.

Detailed Participant Feedback
Participants provided qualitative feedback in addition to their SUS scores. The feedback highlighted the system's intuitive design and efficient real-time data access. Some suggestions for improvement included better mobile compatibility and advanced reporting features.

Recommendations
Based on the SUS evaluation and participant feedback, the following recommendations are made to enhance the system's usability:

Mobile Accessibility
Enhance the system’s compatibility with mobile devices to facilitate on-the-go access for field employees.

User Training
Provide ongoing training and support to ensure all users can utilize the system effectively, particularly those less familiar with digital tools.

Advanced Features
Integrate more advanced reporting and analytics features to meet diverse user needs.

User Interface Enhancements
Continue to refine the user interface to reduce complexity and inconsistency, making the system even more intuitive.

The System Usability Scale evaluation demonstrates that the Web-Based Service Travel Resume Information System has good usability, with a mean SUS score of 78.5. While the system is well-received, addressing the identified areas for improvement will further enhance the user experience and overall

Conclusion

The implementation of the Web-Based Service Travel Resume Information System has been a resounding success for the ESDM Department of South Sumatra Province. It has addressed the inefficiencies and risks associated with the previous manual system, providing a robust, secure, and efficient solution for managing official travel data. This digital transformation has not only improved operational efficiency but has also positioned the department to leverage data-driven insights for better decision-making and strategic planning.

The System Usability Scale (SUS) evaluation further highlights the system's success. With a mean SUS score of 78.5, the system demonstrates good usability. The score distribution, with a standard deviation of 8.3, indicates consistent positive feedback from users. Key findings from the SUS evaluation

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