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Design of a Web-Based Vehicle Asset Information System at The Islamic Shariah Office in Banda Aceh City

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Abstract: This study describes the design of a web-based vehicle information system for Islamic Shariah services in Banda Aceh City. An issue under discussion is the use of computers in the design of vehicle asset information systems. The purpose of this study is to examine the use of vehicle asset information systems. Data collection was conducted through literature and field surveys by interviews and direct observation of the objects in question. Extreme programming techniques are used in system development. The following can be concluded from the created application program: 1) Vehicle Asset Information System of Islamic Shariah Service can quickly and efficiently view the vehicle asset data system according to existing data, so you can get timely vehicle asset data reports. 2) Implementation of asset vehicle information system in Islamic Shariah office will make data processing faster, more accurate and more efficient. 3) Applying asset vehicle information system in Islamic Shariah office facilitates data retrieval and greatly reduces human and financial resources.

Keywords: Information System Design; Vehicle Assets; Web-Based; Islamic Sharia Service; Extreme Programming.

1. Introduction

Technological advances in the field of transportation have had an impact on the development of road traffic and transportation, resulting in the modernization of road infrastructure, transportation facilities and other traffic devices. Vehicle assets are one of the most important assets for individuals and groups, because vehicle assets are movable objects that have high economic value and can provide great benefits for their owners. Regional assets are also an important resource for local governments as the main support for local revenue. Therefore, managing regional assets is very important to increase efficiency, effectiveness, and create added value in managing assets, so that they can become initial capital for local governments to develop their financial capabilities, and can support the role and function of local governments as public service providers. to society.

In this case, the Islamic Sharia Office (DSI) plays a vital role in supporting the strategic role of the Government of Aceh in realizing its vision and mission, related to the existence of Regional Regulation Number 33 of 2001. One of DSI's tasks is to record the number of vehicle assets at DSI. However, the technology used today is still limited to the use of Microsoft Excel, so that data processing is limited to only one computer device. Therefore, the authors took the initiative to design a Vehicle Assets Information System at the Islamic Sharia Service Office, with the aim that processing vehicle asset data can be accessed anytime, anywhere, and using any computer. With the information system built, it is hoped that it will facilitate ASN's tasks in managing vehicle asset data, so that data processing can be carried out more effectively and efficiently.

Several studies have been conducted related to the development of vehicle asset data collection information systems. One of the previous studies was conducted by Suciati and Solikin (2018) which aimed to develop a vehicle asset data collection application for the Palembang branch of the BPJS office. This study uses a web-based information system development approach with the prototyping method. The results of the study show that the developed application can assist BPJS in collecting vehicle asset data effectively and efficiently [1]. In addition, Sujarwo, Sari, Lestari, and Yani (2020) also conducted research related to a web-based vehicle insurance data collection information system using UML. This study aims to develop an information system that can assist the process of filing vehicle insurance claims quickly and accurately. This study uses a web-based information system development method with the waterfall model and uses UML as a modeling tool. The results of the study indicate that the developed information system is capable of increasing efficiency and effectiveness in the process of filing vehicle insurance claims [2]. Pasaribu (2021) also conducted research related to office asset inventory management using a web-based information system development approach. This research was conducted at PT. MPM Finance Bandung with the aim of developing an information system that can help the office asset inventory management process more effectively and efficiently. This study uses a web-based information system development method with a spiral model. The results showed that the information system developed was able to increase effectiveness and efficiency in managing office asset inventory [3]. Furthermore, Sanjaya, Abdurachman, Wicaksono, and Masya (2021) conducted research related to vehicle asset control information systems in transportation companies. This study aims to develop an information system that can help control vehicle assets of transportation companies more effectively and efficiently. This study uses a web-based information system development method with a waterfall model and utilizes PHP and MySQL as programming languages and databases. The results showed that the developed information system was able to increase the effectiveness and efficiency in controlling transportation company vehicle assets [4].

Matin (2022) conducted research related to web-based asset data processing at the Regional Secretariat Office of Tebo Regency. This study aims to develop an information system that can help process asset data more effectively and efficiently. This study uses a web-based information system development approach with the prototyping method and utilizes PHP and MySQL as programming languages and databases [5]. The results of the research show that the developed information system can assist the processing of asset data by. Harriyanto (2022) conducted research on the web-based Service Vehicle Management Information System for the Tanah Laut Regency government using qualitative and quantitative approaches [6]. Nazihah (2022) conducted research on the Asset Management Management Information System at BPDASHL Way Seputih Way Sekampung using a descriptive method [7]. Arif *et al*. (2023) conducted research on designing a Vehicle Checklist Information System using the Rapid Application Development (RAD) method in educational journals [8]. Jannah and Turahyo (2023) conducted research on the Monitoring Information System for Budgeting and Physical Realization at the Regional Financial and Asset Management Agency using qualitative and quantitative approaches. In the current era of digitalization, designing an effective and efficient vehicle asset data collection information system is very important to support the operational activities of a company or agency, to increase efficiency and productivity [9]. It is hoped that the results of this study can become a reference for other agencies in developing web-based vehicle asset data collection information systems.

Research regarding the design of a Web-Based Vehicle Assets Information System at the Office of the Islamic Sharia Service in Banda Aceh City has an important urgency. In the context of managing vehicle assets, especially in government agencies such as the Islamic Sharia Service, an effective and efficient information system is needed to collect data, monitor and manage vehicle assets in an integrated and transparent manner. In the era of digitalization and information technology that is growing, the use of web-based information systems is the right solution to overcome these problems. This research is very relevant because not much research has been conducted regarding the development of web-based vehicle asset information systems, especially in the Islamic Sharia Office of Banda Aceh City. With an integrated information system, the management of vehicle assets can be carried out more easily, effectively, and efficiently. In addition, the use of information systems can also help minimize errors and confusion in managing vehicle assets that may occur if you still use the manual method. Therefore, this research is expected to provide a major contribution and benefit to the management of vehicle assets at the Islamic Sharia Office of the City of Banda Aceh as well as being a reference for the development of a web-based vehicle asset information system in other government agencies.

2. Research Method

In the research stage of designing a vehicle asset information system at the Islamic Sharia Service Office, the authors used several methods to collect the necessary data and information. The first stage is a field study which is carried out by conducting direct visits to the Islamic Sharia Office to obtain more objective data in the discussion. In addition, this method is also applied as a learning method to add to the author's insight in seeing the advantages of the intended training institution. The second stage is the interview, where the author conducts question-and-answer communication with officers directly related to the problems being observed [10]. The purpose of this method is to obtain more detailed and in-depth information regarding the flow of vehicle asset data collection at the Islamic Sharia Service office. The third stage is observation, which is carried out by directly observing the flow of vehicle asset data collection at the Islamic

Sharia Service Office to obtain a clear picture of the object under study. This method is carried out to obtain information about problems that occur in the data collection process and find the right solution to overcome them. Finally, the literature study method is used by taking several books as references to obtain theoretical explanations related to the problem under study. This method is useful for increasing the author's understanding of concepts and theories related to the design of vehicle asset information systems at the Islamic Sharia Office. In addition to using the various methods above, the author also uses the Extreme Programming (XP) method in designing vehicle asset information systems. XP is a software development method that emphasizes communication, teamwork, and flexibility in dealing with change [11][12][13]. In the research phase, XP is used to ensure that the development of a vehicle asset information system can run efficiently and effectively by actively involving all team members. XP also helps in dealing with change and guarantees the quality of the software produced [14][15].

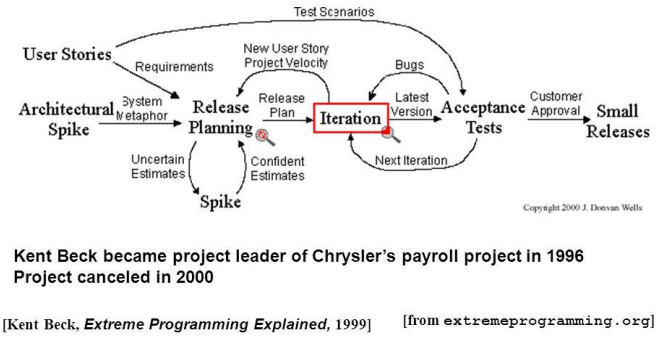


Figure 1. Extreme Programming (XP) (Beck & Fowler, 2001)[16]

The Extreme Programming (XP) stage consists of Planning Game, Small Releases, Metaphor, Simple Design, Testing, Refactoring, Pair Programming, and Continuous Integration [25]. The Planning Game is carried out to set goals and prioritize the work to be carried out. Small Releases focus on developing the product in small iterations by adding new features with each iteration. Metaphors are used to create an easy-to-understand description of the system [17][18]-[19]. Simple Design emphasizes easy code maintenance and development. Testing is done to ensure the quality of the code works properly. Refactoring is done to reduce code complexity and improve structure. Pair Programming is a collaborative process between two programmers in completing tasks. Continuous Integration is used to integrate code from team members and ensure the alignment of all code. All these stages are carried out continuously and continuously to produce quality products that can adapt to changing user needs. At the testing stage, questionnaires were distributed, the questionnaire consisted of eight questions to measure user satisfaction with the program. The first five questions focus on program features, ease of use, comprehensiveness, task performance, and overall performance. The sixth question is about problems or difficulties encountered when using the program. The seventh question asks how often the program is used in a week. The final question is about a user's willingness to recommend the program to others, with four possible answers ranging from highly recommended to not recommended at all.

3. Result and Discussion

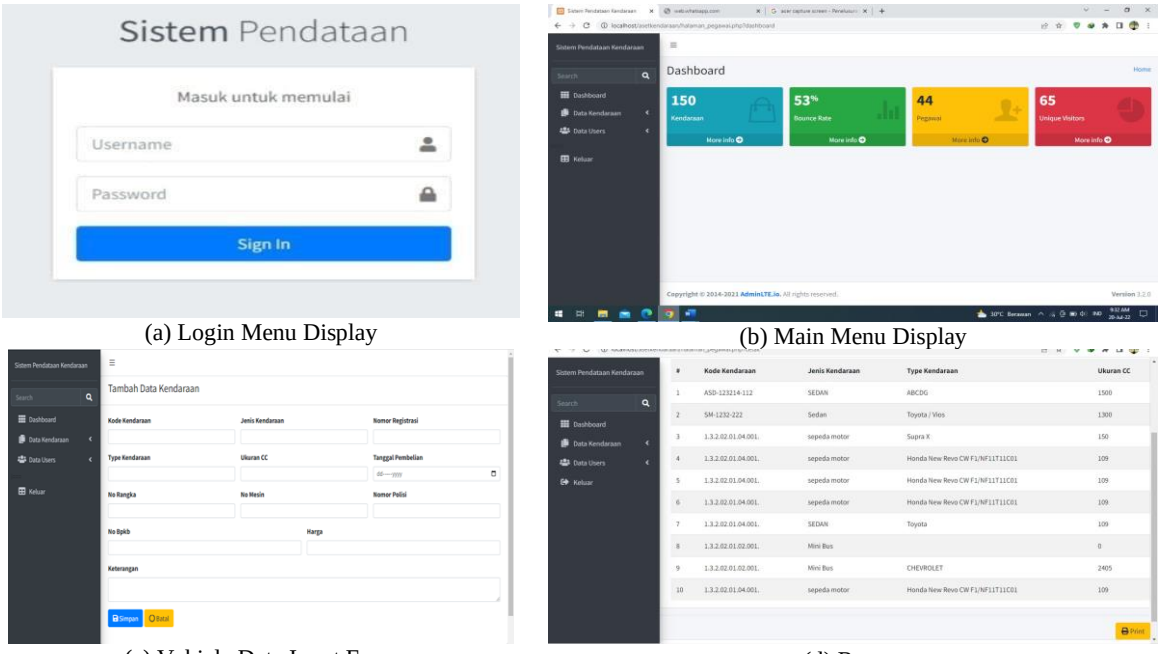
3.1 Results

The results obtained from this study are the design process at the Islamic Shari'a office in the city of Banda Aceh which is implemented through data flow diagrams and flowcharts. These flowcharts and procedures are used as a basis for identifying decisions in storing data. From the pictures presented, there are several menus, namely the login menu, main menu, vehicle data input form, and reports. The login menu is a place to enter a username and password so you can log onto the website. The main menu contains counter data from vehicle data, bounce rate data, employee data, and unique visitors. The vehicle data input form is used to input, edit, and delete vehicle data. Reports are used to check the type of vehicle that has been issued. Additionally, no information was provided regarding the tests performed on the system. Therefore, an analysis of the results of tests carried out on the system cannot be carried out.

3.1.1 Program Implementation

Figure 2.a shows the appearance of the login menu which functions as a place for users to enter usernames and passwords so they can enter the website. If the username or password entered does not match what is registered in the system, the user will not be able to enter the website. Figure 2.b shows the appearance of the main menu after the user has successfully logged in. Here there is a data counter for several things, namely vehicle data, bounce rate data, employee data, and the number of unique visitors. This data counter provides brief information about the amount of data available in each category. Figure 2.c shows the display of the vehicle data input menu. This menu is used by admins or devices to enter new vehicle data into the system, edit existing vehicle data, or delete vehicle data that is no longer needed. Figure

2.d shows the display of the vehicle data output menu. This menu is used by the admin or device to see the types of vehicles that have been issued. This information could be useful in making decisions regarding vehicle management in the future.



(a) Login Menu Display (b) Main Menu Display

(c) Vehicle Data Input Form (d) Report

Figure 2. Application Display

3.1.2 Testing

Testing at the Extreme Programming (XP) stage is carried out to ensure product quality and suitability for user needs. Testing is done to ensure that every feature and change added in each iteration of Small Releases functions correctly. Refactoring is done to improve the structure and reduce the complexity of the code to make it easier to maintain and develop. Pair Programming helps improve code quality by working together with two programmers. Continuous Integration is carried out to ensure that all code integrated by team members can work properly. By carrying out these stages on an ongoing basis, the resulting product can be of high quality and can adapt to changing user needs. Tree maps can be used in Extreme Programming (XP) testing because tree maps can assist in data visualization and data analysis. In XP, there are three main types of tests: unit tests, integration tests, and functional tests. Tree map can assist developers in analyzing data from unit and integration test results. Unit tests are performed at the component or small unit level of the application to ensure that each component functions correctly. Tree maps can help developers see the status of each unit test and make decisions based on the results of those unit tests [20][21]. Integration tests are carried out at the system level or a combination of several components to ensure that the entire system functions correctly [22]. A tree map can help developers see the status of each integration test and identify areas where there are errors or failures. However, tree maps may not be fully useful in functional tests where testing is done at the usage level and the overall functionality of the application [23][24]. Functional tests are usually performed by a QA team or end users and are more focused on user interaction and user experience.

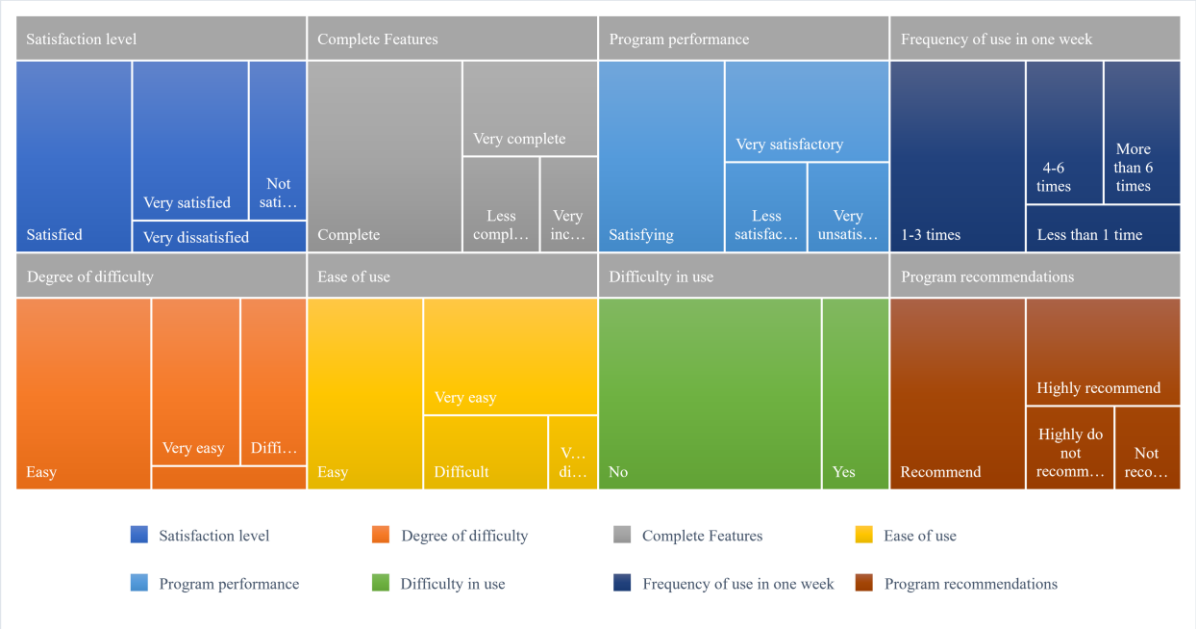


Figure 3. Tree map of Test Results

The graph above shows the results of a survey of user satisfaction with a program. The results of this survey are divided into several categories, such as satisfaction level, difficulty level, complete features, ease of use, program performance, difficulty in use, frequency of use in one week, and program recommendations. In the satisfaction level category, there were 10 respondents who were very satisfied, 12 respondents who were satisfied, 5 respondents who were dissatisfied, and 3 respondents who were very dissatisfied. Meanwhile, in the category of difficulty level, there were 8 respondents who said the program was very easy to use, 14 respondents who said the program was easy to use, 6 respondents who said the program was difficult to use, and 2 respondents who said the program was very difficult to use. In the complete feature category, there were 7 respondents who stated that the program was very complete in features, 16 respondents stated that the program was complete in features, 4 respondents stated that the program was incomplete in features, and 3 respondents stated that the program was very feature incomplete. The ease of use of the program was also a highlight, with 11 respondents saying it was very easy to use, 12 respondents saying it was easy to use, 5 respondents saying it was difficult to use, and 2 respondents saying it was very difficult to use.

Program performance is also an important factor, with 9 respondents stating the program was very satisfactory, 13 respondents stating the program was satisfactory, 4 respondents stating the program was unsatisfactory, and 4 respondents stating the program was very unsatisfactory. While in the category of difficulty in use, there were 7 respondents who had difficulty and 23 respondents who did not have trouble in using it. In the category of frequency of use in one week, 4 respondents used the program less than 1 time a week, 14 respondents used the program 1-3 times a week, 6 respondents used the program 4-6 times a week, and 6 respondents used the program more than 6 times in one week. Finally, in the program recommendation category, 9 respondents highly recommended, 14 respondents recommended, 3 respondents did not recommend, and 4 respondents strongly did not recommend. To visualize the data above using a tree map, we can display the categories at the top level and the answers from each category at the bottom level. Each box on the tree map will represent answers from each category, with the resulting box size proportional to the number of respondents who gave that answer. Thus, we can easily see the distribution of user satisfaction survey results for the program.

3.2 Discussion

Based on the results of research conducted at the Islamic Shari'a office in the city of Banda Aceh, it shows that the design process in the office is implemented through data flow diagrams and flowcharts. These flowcharts and procedures are used as a basis for identifying decisions in storing data. Some of the menus presented are the login menu, main menu, vehicle data input form, and reports. Testing is carried out at the Extreme Programming (XP) stage to ensure product quality and suitability for user needs. Tree maps are used in XP testing because they can assist in data visualization and data analysis. The tree map graphic shows the results of a survey of user satisfaction with a program. The results of this survey are divided into several categories, such as satisfaction level, difficulty level, complete features, ease of use, program performance, difficulty in use, frequency of use, and technical problems.

In XP testing, there are three main types of tests: unit tests, integration tests, and functional tests. Tree map can assist developers in analyzing data from unit and integration test results. Unit tests are performed at the component or small unit level of the application to ensure that each component functions correctly. Tree maps can help developers see the status of each unit test and make decisions based on the results of those unit tests. Integration tests are performed at the system level or a combination of several components to ensure that the entire system is functioning properly. A tree map can help

developers see the status of each integration test and identify areas where there are errors or failures. However, tree maps may not be fully useful in functional tests where testing is done at the usage level and the overall functionality of the application. Functional tests are usually performed by a QA team or end users and are more focused on user interaction and user experience.

The results of user satisfaction surveys for a program can also assist developers in making the right decisions in application development. In the survey, users provide an assessment of the level of satisfaction, level of difficulty, complete features, ease of use, program performance, difficulty in use, frequency of use, and technical problems. From the survey results, the developer can identify areas where the program needs improvement and where the program has been successful. Developers can improve the program in areas where users have rated it poorly and improve the program in areas where users have given it a favorable rating.

4. Related Work

Based on this research, the findings align with several relevant studies in the field of web-based asset management system development. Suciati and Solikin (2018) previously devised a web-based vehicle asset data collection application that effectively and efficiently gathered vehicle asset data [1]. Similarly, Sujarwo, Sari, Lestari, and Yani (2020) designed a web-based information system for vehicle insurance data collection, enhancing efficiency and effectiveness in insurance claim processing [2]. Furthermore, Pasaribu (2021) examined the development of a web-based asset inventory management system that significantly improved effectiveness and efficiency in asset management [3].

These research outcomes resonate with the endeavors of Matin (2022) in crafting a web-based asset data processing system at the Regional Secretariat Office of Tebo Regency [5], as well as Harriyanto (2022) endeavor in designing a Web-Based Service Vehicle Management Information System for the government of Tanah Laut Regency. The research also correlates with prior studies on the adoption of the Extreme Programming (XP) methodology in information system development [6], as elucidated by Kurniawan (2023) and Zuhri, Wali, and Idwan (2023) [11][12].

The results of the user satisfaction survey similarly parallel earlier research findings, which highlight the use of satisfaction surveys as a pivotal tool to inform decision-making in application development. This approach is in accordance with methodologies elucidated by Bangun, Faizah, and Koryanto (2023) and Ferdiansyah, and Andriasari (2023), emphasizing the significance of user feedback in shaping software refinement [14][15].

Consequently, this research contributes in-depth alignment with the trajectories of related studies in the realm of web-based vehicle asset information systems. It underscores the pivotal role of technological solutions in enhancing asset management practices across sectors, while corroborating the merits of employing established methodologies such as Extreme Programming (XP) and user satisfaction surveys for informed decision-making and iterative system development.

5. Conclusion

Based on the results of research conducted at the Banda Aceh City Islamic Shari'a Office, it can be concluded that the application program "Design of a Web-Based Vehicle Asset Information System at the Banda Aceh City Islamic Shari'a Service Office" was successfully implemented using data flow diagrams and flowcharts. This application has several menus, such as login menu, main menu, vehicle data input form, and reports, and was successfully tested using the Extreme Programming (XP) method which consists of unit tests, integration tests, and functional tests. The tree map is used in testing XP to assist developers in viewing the status of each unit test and integration test and in analyzing the results of a user satisfaction survey of the program. The results of this survey provide an assessment of the level of satisfaction, level of difficulty, complete features, ease of use, program performance, difficulty in use, frequency of use, and technical problems. From the survey results, the developer can identify areas where the program needs improvement and where the program has been successful. Therefore, it can be concluded that the application program "Designing a Web-Based Vehicle Asset Information System at the Banda City Islamic Sharia Service Office" has succeeded in assisting the office in collecting vehicle asset data quickly, accurately, and efficiently as well as facilitating data search and reducing large labor and costs.

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