Web Based Fixed Asset Management Information System Using the Waterfall Method (Case Study: National University)

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ABSTRACT

Asset Management is one of important keys in institutions. Therefore, each asset that is owned must be optimally, effectively and efficiently managed in order to give proper advantages to Institutions. The National University is the oldest private University in Jakarta. The National university has a lot of assets to support its operational such as computers, air conditioning, vehicles, laboratory equipment and etcetera. Currently the asset management systems at National University is still using Microsoft excel. it causes the process of the asset Recording, asset maintenance and asset Report at national university are less Optimal. it takes longer time to trace the data of the assets. To overcome the issue, an Information system is needed. This Research Uses waterfall method. This information system (of fixed asset management) is created using PHP programming language and using MYSQL as the database. The presence of this website-based (fixed assets management) information systems hopefully can facilitate the general administration officer to work more effective and efficient in managing the assets.

Keywords: Information System, Asset Management, Web, Waterfall

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1. Introduction

Asset management is the process of managing the assets of a company or organization that is important in every financial policy, expenditure and management decision making. Every organization or company will use assets to support its business and operational activities. Asset management can be done by recording assets, bookkeeping, reporting and also the use of assets according to company needs so as to provide benefits for the company in carrying out organizational activities (Hasan, 2019). Therefore, every asset in the company / organization must be used optimally.

In the rapid development of technology in the 4.0 era, it makes us to continue to innovate in technological progress (Ariawan, Triayudi, & Sholihati, 2020). The positive impact of information technology is to provide convenience and speed in obtaining information, delivering information and making it easier to complete tasks or work (Mudiar & Hidayat, 2019). Information systems are used in maximizing data processing into valuable information and used to achieve its objectives. There are three main requirements related to information that is timely, relevant and accurate (Yunita & Devitra, 2017).

Asset management systems are used to carry out administrative control in the management and data collection of goods (Ridwan, Muhammad, & Ramadhani, 2017). The form of optimizing asset management is monitoring assets. Monitoring is carried out not only by recording the asset register but also concerning asset valuation. (Astriyani, Putri, & Widianingsih, 2020). Asset valuation is influenced by the acquisition value, the useful life and also the depreciation value. Physically, assets can be monitored by maintaining assets to maintain the quality and function of the assets owned. Asset maintenance is an activity carried out in an organized manner to ensure the assets that are operated with the best conditions at the lowest cost (Yaakub & Devitra, 2017).

Asset management systems are used to support its operational activities such as computers, air conditioners, vehicles, laboratory equipment, etc. Currently the asset management system at the National University is still manually...
using Microsoft Excel. This causes the process of recording assets, maintaining assets and asset reports at the National University to be not optimal. Manually recorded records also result in searching or tracing asset data for a long time. In addition, interrelated data is not mutually integrated so that duplication of data from repeated input. The absence of an asset management information system also results in limited information to those who make requests for asset acquisition.

Therefore, there needs to be a computerized system to help these problems. Web-based asset management information system is expected to provide convenience, speed, and effectiveness for users in processing data assets.

Limitations in this study are:
- a. Case study research in the National University General Administration Bureau.
- b. The system does not discuss the purchasing process and budget funds.

2. Literature Review

2.1. Understanding Information Systems

Information systems are "a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization" (Laudon & Laudon, 2012). In another sense stating "Information system is a system within an organization that meets the needs of processing daily transactions that support the managerial function of the organization's operations with the strategic activities of an organization to be able to provide certain outsiders with the necessary reports" (Sutabri, 2012).

2.2. Definition of Asset Management

Assets are wealth and resources that are owned and can be utilized by an organization. The classification of assets according to their existence is tangible and intangible assets. According to (Hery, 2015) "Fixed assets (fixed assets) are the equipment or property of an organization or company that is used for operations that are physically visible and have a long-term nature (useful life)". Examples of fixed assets are office equipment, machinery, land, factories, buildings, electronic and computer equipment, vehicles, furniture and others. Fixed assets also have depreciation values. The method of depreciation of fixed assets has several variations, one of which is the straight-line method. The straight-line depreciation method is a method of depreciating property, plant and equipment that contributes equally or evenly to the end of its useful life or economic life.

While asset management is an activity of planning, monitoring and organizing in using, repairing, maintaining and buying and eliminating assets physically to maximize services and reduce costs and risks in managing tangible and intangible assets with or without technology in carrying out operational activities.

2.3 PHP Programming Language

PHP (Hypertext Preprocessor) is an open source programming language used by programmers in creating a website (Oktasari & Kurniadi, 2019). PHP is needed to make a web portal attractive, user friendly, responsive and dynamic. PHP is used to access databases such as MySQL and run on a webserver.

2.4 MySQL database

MySQL is a database that connects php scripts using the same query and escapes character commands as php (Muhammad Sadeli, 2014). MySQL is a development of the SQL language (Structure Query Language) which is used for the interaction of program scripts with database servers for data processing. (Sriwahyuni, Oktoria & Dewi, 2019)

2.5 Black Box Testing

One of the activities that need to be done in the process of making a system or application is Testing. Testing a system or application must be done to determine whether every function on the system is running well or there are still bugs or errors. One type of system testing is Black-box testing. Black box testing can be done by the user, programmer or tester by defining a list of system input processes and testing the methods and functions that run on the system (Hidayat & Mutaqin, 2018). The Black Box Testing process is based on test parameters and indicators in the system. In this case, tools are needed to collect data called the User Acceptance Test (UAT). This UAT contains a list of functions in the system which are then tested according to the expected results, whether it has been successful or not. (Setiyani, 2019)
3. Research methods

3.1 Method of collecting data
The stages of data collection in this study are:

a. Observation
   Observe directly and collect data and information from the General Administration Bureau, and
   learn firsthand the process of asset management at the National University.

b. Interview
   Conduct question and answer directly with the General Administration Bureau to find out data
   and information needs

c. Literature review
   Study and understand theories and previous research related to asset management through books,
   journals, and websites in order to be a reference and guide in solving problems in research.

3.2 Systems Development Method
   In this research, the system development method or model used is the waterfall method. There
   are several stages to this method, namely:

a. Requirements Analysis
   In the initial stages, the process is identifying the needs and expectations and analyzing the
   system that is being used to obtain solutions to problems.

b. System Design and Design
   This stage is the process of making the flow, process, and appearance of a system or application.
   At this stage, the system design will be built using the Unifield Modeling Language (UML) as a
   system modeling and using Entity Relationship Diagrams (ERD) for modeling data structures
   and relationships between data.

c. Implementation
   This stage is programming or designing information systems according to the results of the
   design at the system design and design stages.

d. System Testing
   The process of testing or testing the system uses the black box testing method, if the output does
   not match or there is still an error then repairs are made until the results are as expected.

e. System Installation and Maintenance
   At this stage, applications that have been developed are installed for normal use and perform
   system maintenance.

4. Results and Discussion

4.1 Current Systems Analysis
   Analysis of the existing system or which is being used, that is, the Admin does all the asset
   management in the building, room and floor. Starting from the submission of asset expenditure,
   recording data on assets, the process of maintaining an asset and reporting data on assets. Submission
   of assets can be done by the general administration department or from the faculty, after the
   submission is completed the approval will then wait for the assets to be received. When an asset has
   been purchased, it will be recorded by the BAU admin. Then the existing assets will be inspected
   and maintained periodically.

4.2 Proposed System Design
The researcher carries out the Analysis phase of the proposed system to provide solutions and also solutions to the existing or currently in use system. The proposed system design is illustrated by activity diagrams, class diagrams and usecase diagrams.

**a. Use Case Diagrams**

Use case diagrams on the National University's fixed asset management information system as follows:

![Use Case Diagrams](image)

**Fig 1. Use Case Diagrams**

In Figure 1. It can be seen that the design system created has 2 actors namely admin and user. Admin can run the system by logging in, managing asset request data, managing category data, managing vendor data, managing building data, managing floor data, managing room data, managing asset data, managing maintenance data, managing user data, printing reports, and logging out. Users can log in, make asset requests, and log out.

**b. Activity Diagram**

Following is the presentation of activity diagrams on the design of the National University's fixed asset management information system. Activity diagram of the asset master input can be seen in Figure 2. Input of asset data can be done by the admin after a successful login.
Activity diagram of asset maintenance data input can be seen in Figure 3. Input of asset maintenance data can be done by the admin after successfully logging in.

Activity diagram of building master input can be seen in Figure 4. Input of building master data can be done by the admin after successfully logging in.
Activity diagram input master data categories can be seen in Figure 5. Input of asset category data can be done by the admin after a successful login.

![Activity Diagram master input data categories](image)

**Fig 5.** Activity Diagram master input data categories

Activity diagram for inputting asset demand data can be seen in Figure 6.

![Activity Diagram of the input of asset request data](image)

**Fig 6.** Activity Diagram of the input of asset request data

c. **Class Diagram**

Class diagrams created on this system can be seen in Figure 7.
4.3 Implementation results

The results of implementation in this study are a web-based information system using the PHP programming language and using a MySQL database. Below this is the display of the system that has been built.

In Figure 8. It is a login page, where users will enter their username and password to enter the main system page.

In Figure 9. Is the main page of the system where there are dashboard menus, assets, procurement, vendors, master data, admin, and reports.

In Figure 10. Is the display of the asset data input form on the asset menu.
In Figure 11. It is a display of the maintenance data input form in the maintenance menu.

In Figure 12. It is a display of the category data input form on the master data menu.

In Figure 13. Is a display report on the demand for asset procurement.

In Figure 14. Asset Maintenance Report.
In Figure 14, is a view of the Asset Maintenance report

![Asset Maintenance Report]

**Fig 15. Asset Data Report**

In Figure 15, is a display of data asset reports from export excell results

4.4 System Testing

The results of testing using the blackbox method can be seen in table 1.

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Test Scenarios</th>
<th>Expected results</th>
<th>The results obtained</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Login</td>
<td>Enter the correct username &amp; password</td>
<td>The system will show the main page.</td>
<td>The system shows the main page.</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Incorrect username &amp; password input</td>
<td>The system prevents access.</td>
<td>The system prevents access.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Only input one of the username or password</td>
<td>The system will prevent login access by displaying the message &quot;please fill out this field&quot;.</td>
<td>The system will prevent login access by displaying the message &quot;please fill out this field&quot;.</td>
<td>✓ Received</td>
</tr>
<tr>
<td>Main course</td>
<td>Select the asset menu</td>
<td>The system will show menu choices: asset data, asset input.</td>
<td>The system shows menu choices: asset data, asset input.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Select the procurement menu</td>
<td>The system will show menu choices: procurement data, input requests</td>
<td>The system shows the menu choices: procurement data, input requests</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Choose the maintenance menu</td>
<td>The system will show menu choices: maintenance data, maintenance input.</td>
<td>The system shows menu choices: maintenance data, maintenance input.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Select the vendor menu</td>
<td>The system will show menu choices: vendor, vendor input.</td>
<td>The system shows menu choices: vendor, vendor input.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Select the master data menu</td>
<td>The system will show menu choices: options: category, building, floor, room, service.</td>
<td>The system shows menu choices: categories, buildings, floors, rooms, services.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Choose the admin menu</td>
<td>The system will show menu options: admin, admin input</td>
<td>The system shows menu options: admin, admin input</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Select the report menu</td>
<td>The system will show menu options: asset data reports, procurement request reports, maintenance reports, master data reports.</td>
<td>The system shows menu options for asset data reports, procurement request reports, maintenance reports, master data reports.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td>Asset Data Menu</td>
<td>Click Input Data</td>
<td>The system will show the input data form.</td>
<td>The system shows the data input form.</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click Details</td>
<td>The system will show detailed asset data.</td>
<td>The system shows detailed asset data.</td>
<td>✓ Rejected</td>
</tr>
<tr>
<td></td>
<td>Click Edit, Click Delete</td>
<td>Data will be changed.</td>
<td>Data changed</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click export excel</td>
<td>Will show the results of data export in excel form.</td>
<td>Will show the results of data export in excel form.</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click search</td>
<td>The system shows the data sought.</td>
<td>The data sought was found successfully.</td>
<td>✓ Received</td>
</tr>
<tr>
<td>Procurement Menu</td>
<td>Click Input Data</td>
<td>The system will show the input data form.</td>
<td>The system shows the data input form.</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click Details</td>
<td>The system will show detailed procurement data.</td>
<td>The system shows detailed procurement data.</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click Edit, Click Delete</td>
<td>Data will be changed.</td>
<td>Data changed</td>
<td>✓ Received</td>
</tr>
<tr>
<td></td>
<td>Click Export Excel</td>
<td>Will show the results of data export in excel form.</td>
<td>Will show the results of data export in excel form.</td>
<td>✓ Received</td>
</tr>
</tbody>
</table>
6. Conclusion

Based on the results of implementation and testing, a conclusion can be made that the web-based fixed asset management information system can simplify work, provide convenience in recording, tracking, reporting, and monitoring of assets. The system development using the waterfall method successfully produces the system as expected. Suggestions for further research are expected to be developed more broadly into systems that can be integrated with other information systems and can also be developed into programming.

6. Reference


