Web-Based Inventory Information System Design of Research and Community Service

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ABSTRACT

This study aims to produce a website-based inventory information system that is appropriate for user needs and to become a supporting tool for the Institute for Research and Community Service (LP2M) in a practical inventory data collection process. The research method used in this research is Research and Development using the Prototype development model with the stages of Requirements analysis, Prototype Design Making, Prototype Evaluation, System Coding, System Evaluation and System Use. This research was conducted through a trial phase, the first stage was to test the validity of the instrument, the results of the validity test from two experts were 97.5% with a very valid category. The results showed that the Web-Based Goods Inventory information system for the Institute for Research and Community Service (LP2M) Makassar State University was valid and feasible to use after being tested using the ISO 25010 standard. In the test results obtained: a) functionality suitability is worth 100% which means that all functions of the system are running well; b) reliability was carried out using the WAPT 10.1 tool in testing successful sessions, successful pages, successful hits, a success percentage of 99.62% were categorized as 'good'; c) usability with the number of respondents 7 obtaining an average percentage of effectiveness of 95% which is categorized as very good; d) performance efficiency with success presentation at point A or very good; and e) portability by accessing the system on a mobile device or in several web browsers on a desktop and can run properly.

Introduction

One thing that is very important and needed by humans is the existence of information technology, both in the management process and in everyday life. With the development of information technology from year to year, it becomes a tough challenge for users of information technology. This encourages every sector of the organization both formal and informal or other institutions to be able to use it as a support for work activities so that it can produce fast, precise and accurate information. To achieve this, other supporting resources such as software that can be relied on are needed. In addition, human resources must also master the ability of information technology itself. Technology can help us complete each job easily and quickly, especially in the activity of reporting data on inventory items in an agency. Information technology services that are timely, safe, accurate and relevant to user needs are very important things to note in supporting the smooth implementation of library assessments. Maximum performance will be achieved if planning, strategy and implementation of information technology are aligned (Desy Ria & Budiman, 2021).

An inventory is a list that contains all office properties used in carrying out tasks (Lazim & Arifin, 2016). Data report on inventory items is an important aspect of an organization, company or agency. From this report, information can be obtained regarding the presence or absence of inventory items in a division or section and the condition of these inventory items. The problems encountered during the research include the process of inputting and reporting inventory items which still takes a long time and errors and duplication of data often occur due to data processing and inventory data backup, both consumables and non-consumables. still done by recording and inputting using Microsoft Excel.

The information system includes several components (humans, computers, information technology and work procedures), something is processed (data becomes information) and is intended to achieve a goal or goal. information Systems. Not only the ease of processing and accessing information, but the development of technology and information also provides convenience in various aspects of life such as transportation, education and the economy which play an important role in human life today. Influence on the development of several aspects of human life can occur through one of the steps such as the implementation of a management information system (Prabowo, 2015). The information system is not only the ease of processing and accessing information, the development of technology and information provides convenience in various aspects of life such as transportation, education and the economy which play an important role in human life today. The influence on the development of several aspects of human life can occur through one of the steps such as the implementation of a management information system.

A management information system is a system that uses information technology to capture, transmit, store, retrieve, manipulate, or display information used in one or more agencies. Management information systems that are implemented in institutions or agencies can be in the form of website management, employee data management, presentation of reports or activities, correspondence, and others related to information (Haq, 2017).

The Institute for Research and Community Service (LP2M) Makassar State University (UNM) is an institution that focuses on research and community service conducted by UNM lecturers. Institutional services carried out by LP2M are divided into two forms of services, namely internal services offered to the academic community within UNM and external services in the form of cooperation/partnership and non-cooperation/devotion services that support institutions outside UNM. So that automatically a lot of inventory will be prepared, one of which is goods or equipment used during research and service.

Based on the results of observations through observations made by researchers when carrying out Industrial Practices at LP2M UNM. Inventory data processing, such as storing and searching inventory data, is still not optimal because the data storage system is still implemented by recording it in a ledger and inputting it using the Microsoft Excel application so that when there is a movement or loss of goods, the officer who handles the inventory is overwhelmed to find or replace the goods because the recording of goods is less effective. To record the inventory of goods at LP2M UNM more precisely and accurately and easier to do, an inventory information system was designed to be able to record the whereabouts of these items. To overcome this, an inventory information system was designed that would make it easier for LP2M UNM to record inventory data and make reports on inventory data per room, reports on missing inventory and damaged inventory.

Based on the series of backgrounds above, the author raised the title "Design of Web-Based Goods Inventory Information System at the Institute for Research and Community Service, Makassar State University"

Literature Review

1. *Design*

Design is determining the process and data required by the new system. The benefit of this system design stage is to provide a complete design overview as a guide for programmers in developing applications. By the computerized system components, what must be designed at this stage includes hardware or software, databases and applications. The definition of design is a stage that must be carried out before making and implementing an application (Rahmasari, 2019)

According to John W (2015), system design is a set of activities that describe in detail how the system will work. It aims to produce software products according to user needs.

2. *Information Systems*

The Information System is a combination of software (software), hardware (hardware) infrastructure, and trained Human Resources (HR). These four main parts are interrelated to create a system that can process data into useful information. It also includes planning, control, coordination and decision-making processes. Thus, as a system that processes data into information that will be presented and used by users, the information system is complex (Aprisa & Monalisa, 2015).

According to (Taufiq, 2013), an Information System is a collection of sub-systems that are integrated and collaborate to solve certain problems by processing data with a tool called a computer so that it has added value and is useful for users. Meanwhile, according to (Sutabri, 2013), an information system is a system within an organization that brings together daily transaction processing needs that support organizational operational functions that are managerial in nature with the strategic activities of an organization to be able to provide reports by certain external parties.

Based on some of the opinions stated above, it can be concluded that an information system is a system that consists of collecting, entering, processing data, storing, processing, controlling, and reporting to achieve information that supports decision-making within an organization to be able to achieve its goals and objectives.

3. *Website*

A website is a collection of site pages, which are usually summarized in a domain or subdomain, which is located on the World Wide Web (WWW) on the internet. A web page is a document written in HTML (Hyper Text Markup Language) format, which can be accessed via HTTP, which is a protocol that conveys information from a website server to be displayed to users via a web browser. All publications from these websites can form a very large information network (Trimarsiah & Arafat, 2017).

4. *ISO* **25010**

ISO 25010 is an example of a test standard that is commonly used as a standard for measuring the quality of software. ISO 25010 has complete characteristics compared to previous ISO versions. There are eight characteristics of ISO 25010 including, *functional*

suitability, usability, compatibility, reliability, security, portability, performance efficiency, dan *maintainability.*

Research Methods

The development model used in this study is the prototype development model. A prototype is an initial design of a software system that is used to demonstrate designs, test designs, and find more problems and possible solutions (Sanatang & Massikki, 2021).
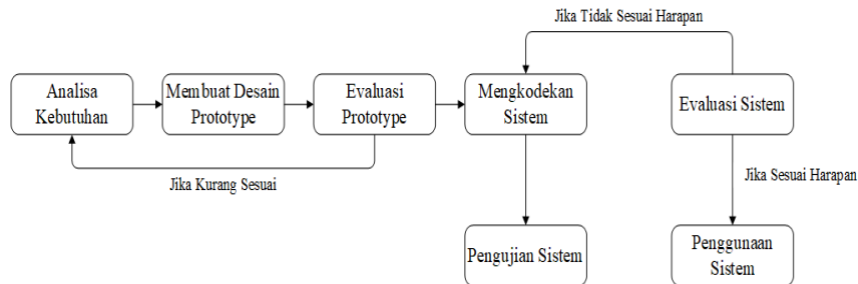

Figure 1. *Prototype* Model

The prototype design was made as a temporary system design that focuses on serving the user based on the needs analysis in the first stage. The prototype design was created using a *data flow diagram* (DFD)*, use case diagram, flowchart, entity relationship diagram* (ERD), and *design interface*.

Research Result

Based on research that has been conducted at the Institute for Research and Community Service (LP2M) Universitas Negeri Makassar, a recommendation was obtained named SRI-LP2M UNM (Inventory Information System for Research and Community Service Institute, Makassar State University), this system is designed based on the web. SRI-LP2M UNM is designed using the programming language PHP (Hypertext Preprocessor), HTML (Hyper Text Markup Language), CSS (Cascading Style Sheet), and JavaScript, this system is intended to record or store inventory data in the Research and Community Service Institute. Community of Makassar State University based on the Website:

1. *Needs analysis*

Needs analysis is the stage for analyzing the needs that will be used/required in making this system such as collecting information about the inventory of goods that will be made a web-based information system. At this stage of analysis, Problem Analysis is used to look for problems that arise in the inventory of goods at the Institute for Research and Community Service, Makassar State University and look for possible solutions that exist and can be used to overcome these problems.

2. *Make design prototypes*

The prototype design was made as a temporary system design that focuses on serving the user based on the needs analysis in the first stage. The prototype design was created using a *data flow diagram* (DFD)*, use case diagram, flowchart, entity relationship diagram* (ERD), and *design interface*.

3. *Evaluation of prototypes*

This evaluation is carried out by the user whether the prototype that has been built is to the wishes and needs of the user. If it is appropriate then step 4 will be taken. If it does not match, the prototype is revised by repeating steps 1, 2 and 3.

4. *Coding*

Stage Based on the research conducted, an inventory information system was obtained for the Research and Community Service Institute (LP2M) Makassar State University. This information system is designed using sublime text 3 and xamp applications that support the programming languages PHP, JavaScript, css, html, and MySQL as data storage media (database). This application or system is useful for helping LP2M UNM in managing and recording inventory items. The following is the interface for the goods asset information system for the Institute for Research and Community Service, Makassar State University which has been completed:
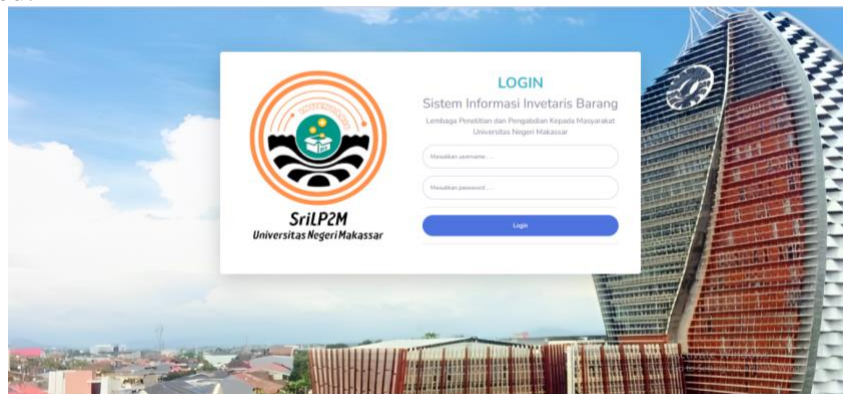
Figure 2. Login Page

Figure 2 shows the login page to the system which has 2 levels, namely the operator and officer (user) login levels.
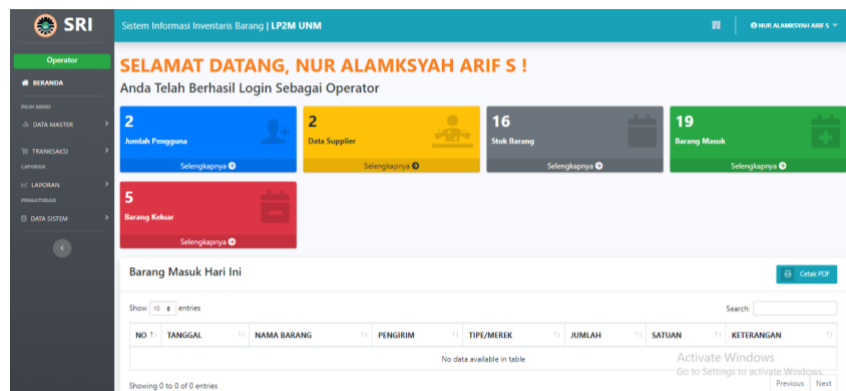
Figure 3. Dashboard Page

Figure 3 shows the dashboard page or the main page that shows data on the number of users, supplier data, stock, incoming and outgoing goods in the operator's account.

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Figure 4. Inventory Data Page

Figure 4 shows the inventories data page which displays the input of goods data in the operator's account.

Figure 5. Supplier Data Page

Figure 5 shows the login page to the system which has 2 levels, namely the operator and officer (user) login levels.

Figure 6. Incoming goods page

Figure 6 shows the incoming goods page which displays the incoming goods input.
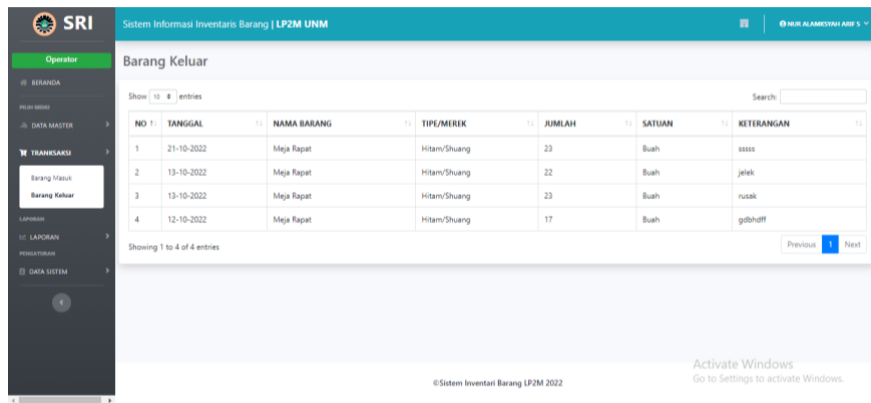
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Figure 7. Outgoing goods page

Figure 7 shows the outgoing goods page which displays the outgoing goods input.
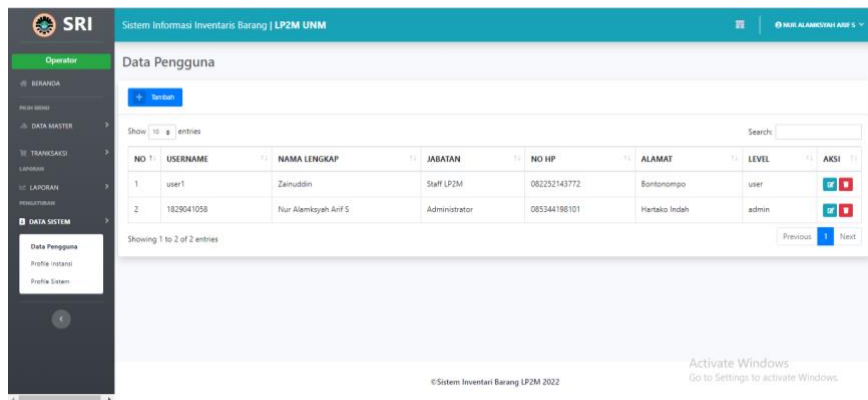

Figure 8. User Data Page

Figure 8 shows a user data page that displays user data that has been registered with an operator account. Here we can add, edit and delete user data that we have input.
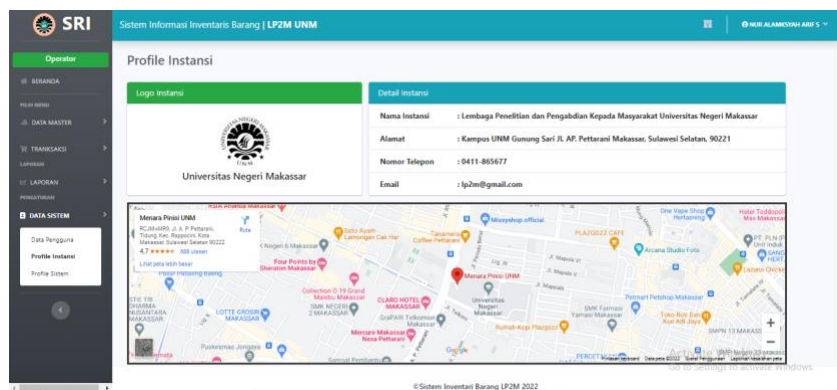

Figure 9. Profile Page

Figure 9 shows the agency profile page that displays detailed data and Google maps of the agency.

Figure 10. System Profile Page

Figure 10 shows the system profile page that displays system data details.

5. *Prototype testing*

Testing the recommendation selection system for this study program is carried out by testing the ISO 25010 standard. As explained in the previous chapter, the characteristics used in testing the recommendation system for selecting this study program using five quality characteristics from ISO 25010, namely: *Functional Suitability, Reliability*, *Usability, Performance Efficiency* dan *Portability*.

a.   Functional suitability analysis

Testing the functional suitability aspect is a system validation step before being used in the field. This validation was carried out by 2 system validators using the test case method.

Table 1. Recapitulation of functional suitability test results

Respons	Validator Score	
	Validator 1	Validator 2
Yes	84	84
No	-	-

Source: (Results of data processing, 2022)

The results of the calculations in table 4.3 show that the percentage result is 1 so the qualitative conversion of the percentage of Feature Completeness eligibility results shows that the percentage of system eligibility in terms of functionality is included in the Very Good Classification criteria and can be applied in the field.

b.   *Reliability*

Reliability testing was carried out by stress testing using WAPT software version 10.1. WAPT will simulate the system being accessed by 7 users at once. The results of this test can be seen in Figure 11.

Figure 11. Reliability Test Results Using WAPT 10.1

Researchers can identify that the success rate during the stress testing process is 99.62%, where according to Telcordia standards if the percentage results are 95% then it can be declared passed or has fulfilled the Reliability aspect.

c. *Usability*

For usability testing, a questionnaire was used to find out user responses regarding the Goods Inventory Information system for the Research and Community Service Institute (LP2M) Makassar State University. Respondents in the usability aspect were carried out by 7 people who were LP2M UNM staff. The following summarizes the results of the questionnaire answers on the usability aspect.

Table 2. Recapitulation of usability test results

Respondent	Total Score	Maximal Score	Percentage (%)
1	150	150	100%
2	122	150	81,3%
3	139	150	92,6%
4	150	150	100%
5	150	150	100%
6	141	150	94%
7	146	150	97,3%
Total	998	1050	

Source: Data Processing Results, 2022

Based on the data in table 2, shows data on the results of user responses to using this system. From this summary, an average value of 95% is obtained in the usability test. If converted into a percentage of effectiveness, then the value is in the "Very Good" category. These results indicate that the quality of the software from the usability aspect is appropriate.

d. *Performance efficiency*

Efficiency quality characteristic testing was tested using GTmetrix. GTmetrix is a tool that can test and measure the efficiency performance of websites.

Based on the results of testing the efficiency quality characteristics using GTmetrix, an average score of 98% or grade is "A" it can be concluded that the system is stated to be very good in terms of efficiency quality.

e. *Portability*

Testing the quality characteristics of portability is carried out by running the system in a desktop and mobile-based environment through several web browsers. Based on table 4.5, the portability test results are obtained, where this information system can run on 5 different types of web browser applications. This means that the developed information system can run well and no errors are found in several different information system environments. So, it can be said that this information system fulfils the aspect of portability.

6. *System Evaluation*

Based on the results of staff/user testing in validation from expert validators, input materials are obtained for future system improvements, such as printing stock results that still need to be updated with letterheads, as well as a recommendation system that needs to be improved to make it easier to get a truly optimal recommendation system.

7. *System Usage*

The system that has gone through evaluation is ready to be used by the future staff with the initial goal of making the system, namely to design and build a web-based inventory information system at the Institute for Research and Community Service, Makassar State University. Which is valid, practical and effective to use.

Conclusions And Suggestions

From the results of the development of information systems, the following conclusions are obtained:
1. The result of the software design is a web-based inventory information system within the Institute for Research and Community Service (LP2M) Makassar State University which was developed using the sublime text 3 and xamp applications supporting PHP, JavaScript, css, html and MySQL programming.
2. The results of the initial development of the Web-Based Goods Inventory Information System for Research and Community Service Institute (LP2M) Makassar State University are valid to apply based on the results of testing by the system validator with a percentage value of 100%, and the ease of accessing information systems from several web browsers makes it practical to use.
3. The results of the respondents' responses were obtained from testing the usability of the system through distributed questionnaires obtained an average value of 95%. If converted into a percentage of effectiveness, then the value is in the "Very Good" category. And testing performance efficiency testing using GTmetrix obtained an average score of 98% or grade is "A" This shows that the quality of the software is effective to use.

While suggestions that can be put forward in this study include:
1. For further researchers who wish to develop this system so that it can present new features that can encourage data processing of web-based goods inventory information systems at the Institute for Research and Community Service (LP2M) Makassar State University.
2. In future research, researchers can develop this system into a mobile app.

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