

Data Collection Service Information System Population Based Web in Lambanapu Village

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Abstract

The rapid development of information technology has a major impact on the government sector, especially in public services. In Lambanapu Village, population data collection is still done conventionally using paper forms, which causes a number of problems such as inefficient processes, risk of data loss, and data that is not always accurate. To overcome these problems, this research aims to develop a website-based population data collection information system that can simplify the data collection process, improve data accuracy, and provide better service to the community. The implemented features include data collection of newcomers, address changes, deaths, births, permanent residents, and total population. The collected data stored digitally and can be accessed by village officials. The development method used is System Development Life Cycle (SDLC) with Waterfall model, which allows a structured approach from requirement analysis to implementation. The system was built using PHP and MySQL. The SUS test results show an average value of 70%, which gives a grade of C and falls into the "Good" category based on the standard grade scale of the SUS method, indicating this system is quite effective in meeting user needs

Keywords: Population Data Collection, Website, Lambanapu Village, Waterfall Method, PHP My SQL.

1. Introduction

Lambanapu Village Office, which falls under the East Sumba Regency Government, is responsible for the management of government resources at the village level, including population control. Population growth in this kelurahan is measured through births, deaths, newcomers, and. Currently, Lambanapu has a total population of 3,183, consisting of 1,627 men and 1,556 women. The population data collection process conducted by village officials still uses conventional methods with lined folio paper, which causes various problems. These include time inefficiency, recording errors that result in repetitive data, and the risk of loss or damage to documents due to negligence. This requires officers to re-collect data, which of course burdens their work.

With a large population, this manual method is no longer adequate and affects the effectiveness of data collection. Manually recorded data takes a long time to process and report to the kecamatan. Therefore, a more efficient system is needed to support the processing of population data.

The researcher proposed the development of a website-based information system that can facilitate the population data collection process in Lambanapu Village. With this system, data collection can be done more quickly, accurately and efficiently, reducing errors and the risk of data loss. Hopefully, this system can help village officials in providing better services to the community.

2. Research Methods

2.1. Population Data Collection

The population data collection process is one way to collect evidence from the results of research that can be used as a study material in conducting a Data collection can be interpreted as a process of proving research results and is more associated with empirical collection. Empirical data collection can be done by means of interviews, questionnaires or questionnaires, observation, document studies. Empirical data can be used to build knowledge that can be tested through the scientific method. Empirical data is very important as up-to-date information that has a positive impact on society [1].

2.2. Total Population

The Central Bureau of Statistics explains that the population is all people who have been domiciled in the geographical area of the Unitary State of the Republic of Indonesia for six months or more and/or those who have been domiciled for less than six months but intend to stay. Population is "the number of people who inhabit an area at a certain time and is the result of demographic processes, namely fertility, mortality and migration" [2].

2.3. Website

"Web" or abbreviated from Website, can be interpreted as a set of pages consisting of several pages containing information in the form of digital data, in form of text, images, video, audio, and other animations provided through an internet connection [3]. When viewed from its function, websites are generally grouped into four categories, namely websites as communication functions, websites as information functions, websites as transaction functions, and websites as entertainment functions.

2.4. Waterfall Method

The Waterfall method is the oldest SDLC method used in software development. In the Waterfall method there is a sequence that starts from the process of planning, analyzing, designing and implementing the system. This method is applied systematically, starting from the system requirements stage then proceeding to the analysis, design, coding, testing or verification, and maintenance stages. The steps must be completed one by one (cannot jump to the next step) and run sequentially, so it is called waterfall [4].

2.5. System Usability Scale

Determination of SUS respondents based on convenience sampling which is the selection of respondents based on the availability of system users. SUS testing is tested based on the personal point of view of each system user. From several articles that have been reviewed by the author that the respondents from each article using SUS testing are not certain, all of them are different, which means that SUS testing can be randomized or can be distributed to how many respondents depending on how many use the system or how willing to assess the system. Contribution scores (positive input) and (negative input), the contribution is 5 minus the scale position. Then multiply the sum of the scores by to get the overall SUS .

$SUS\ Score = (((R1-1) + 5-R2) + (R3-1) + (5-R4) + (R5-1) + (5-R6) + (R7-1) + (5-R8) + (R9-1) + 5-R10)) * 2.5.$

Calculation of SUS scores for each respondent, the SUS score of each respondent in the average score is calculated by summing up all scores and dividing by the number of respondents.

2.6. Black Box Testing

Black box testing is done to find out exactly what types of failures exist in the system that has been built. At this point, researchers use the black box testing method for functional testing of the software built without looking at the source code. The benefits of black box testing are as follows:

1. Testing is only limited to the user , therefore the tester does not need to understand the language used, namely the programming language.
2. Testing is done neutrally, meaning that testing is carried out based on the user'point of view in testing the system.

3. Research Flow

The following is a flow that is an overview of this research conducted, namely:

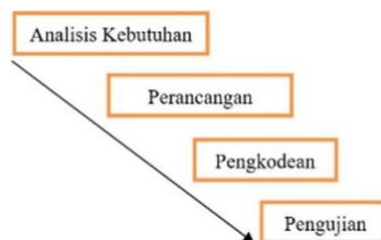


Figure 1: Research flowNeeds Analysis

At this stage the researcher conducts observations and interviews to collect all data related to the steps in making this information system which will be used as the basis for making a population data collection system.

1. System Design; This system design modeling uses UML (Unified Modeling Language) diagrams, user system interface design, and process specifications. The UML diagrams designed are use case diagrams, activity diagrams, sequence diagrams. UML design is used to clarify data that can be accessed by administrators and users. Documents prepared at this stage are Process Modeling, Data Modeling, and Interface Modeling.
2. Encoding; Coding is done using the PHP programming language and MySQL (My Structured Query Language) as the database. Other supporting software are XAMPP 3.2.2 as a web server, Google chrome as a web browser, and Sublime Text
3. Testing; In the testing phase, black box testing is used which a testing approach by studying the input and output given. This testing stage is carried out with the aim of ensuring that the system is made in accordance with the results of the analysis and produces a conclusion whether the system is as expected without any errors in the system. The test that will be carried out using the System Usability Scale (SUS), this test is carried out to determine the level of difficulty of system users in operating a web-based information system.

4. Development Method

4.1. Use Case Diagram of Population Data Collection

The Use Case below found 1 actor who uses the system, namely administrative staff as admin. in the master data menu there are two options, namely add data and display penduduk, the resident data menu has a resident confirmation option, in the report menu there is a

print report option, the report is printed as needed. The admin can log in and has the right to add population data and display population data, the admin can change population data according to the population's biodata, the admin can delete population data that has left or moved from the lambanapu village area to another village, the admin can confirm whether the population data entered is in accordance with the population's biodata and after all the data entered is appropriate the admin can print the population data collection report.

4.2. Activity Diagram

4.2.1. Login Activity Diagram

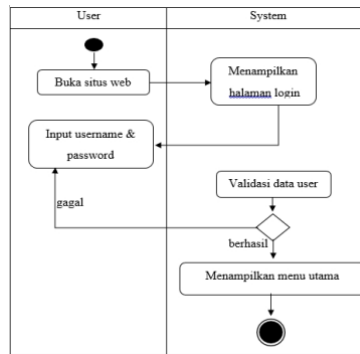


Figure 2: Login Activity Diagram

The picture below is the login process to the system from the admin. the process starts with the admin filling in the username and password. then the user data validation system will assess the correctness of the username and password provided. if the combination is wrong, the database will be redirected back to the login page.

4.2.2. Activity Diagram of Master Data

The picture below is a workflow that illustrates the admin process will enter the master data menu then the system displays population data as a place to input population data and display residents which is the sum of all population numbers, then the admin can select population data or display residents, then the admin can log in and is authorized to enter, display, and store data to be added through the application into the database.

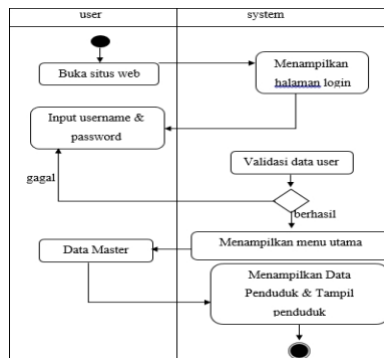


Figure 3: Activity Diagram of Master Data

4.2.3. Activity Diagram of Resident Data

The figure below is an administrative diagram or workflow that illustrates the admin process will enter the population data menu then the system displays permanent resident data, died, moved, came, and was born, then the admin can select the data to be added as permanent resident data, died, moved, came, and was born then the admin can log in and is authorized to enter, display, and store data to be added through the application into the database.

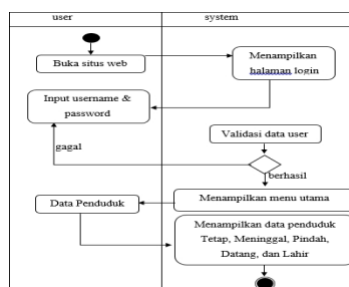


Figure 4: Activity Diagram of Resident Data

4.2.4. Report Activity Diagram

The picture below is an illustration that explains the workflow that the admin login process enters the report menu so that the system displays data on permanent residents, died, moved, came, and was born, then the admin can select the data to be printed as a report on data on permanent residents, died, moved, came, and was born then the admin can log in and is authorized display and print reports stored in the application.

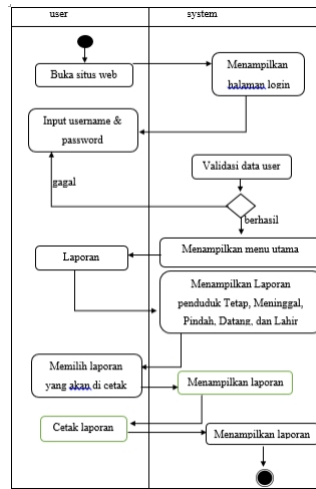


Figure 5: Activity Diagram Report

4.3. Class Diagram

The Class Diagram below consists of seven classes namely user, resident, resident died, resident born, permanent resident, resident moved, resident migrants.

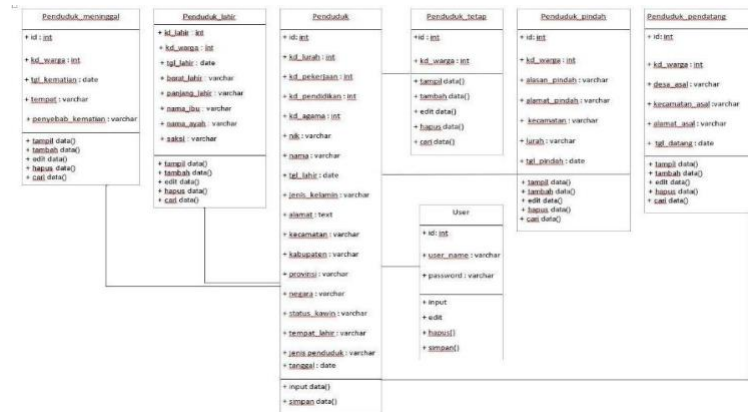


Figure 6: Class Diagram

4.4. System Implementation

4.4.1. Login Page Display

The following image is the login page, which functions as an administrative login page where the administrator needs to log in by entering his username and password. If the login is successful, a login confirmation message will appear. Then you can click ok to continue to the website page. However, if the login fails, an error message will appear indicating the login failure.

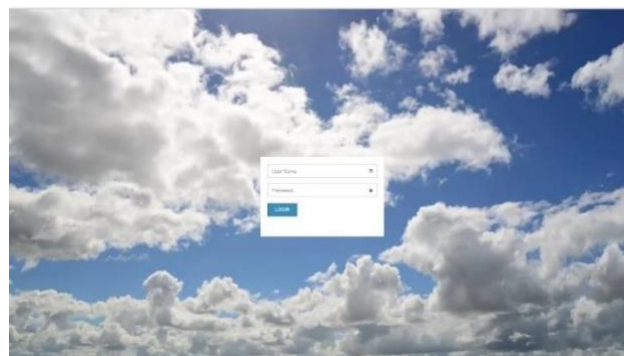


Figure 7: Login Page Display

4.4.2. Admin Main Page Display

Display the main page that can display the total data of residents moving, residents died, immigrants, residents born, permanent residents, total residents and total users.



Figure 8: Admin Main Page Display

4.4.3. Page View of Resident Movers

The interface of the moving resident page where the admin can view moving resident data and the admin can add, delete and edit moving resident data.

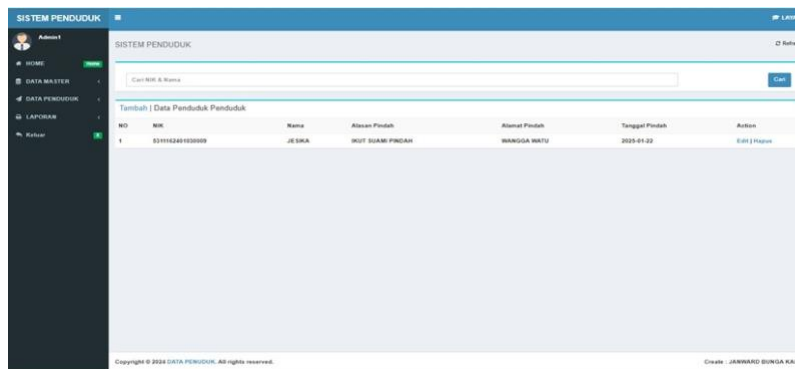


Figure 9: Page View of Residents Moving

4.4.4. View of the Deceased Population Page

View of the deceased population page, where the admin can view data and admins can also add, edit and delete population data.

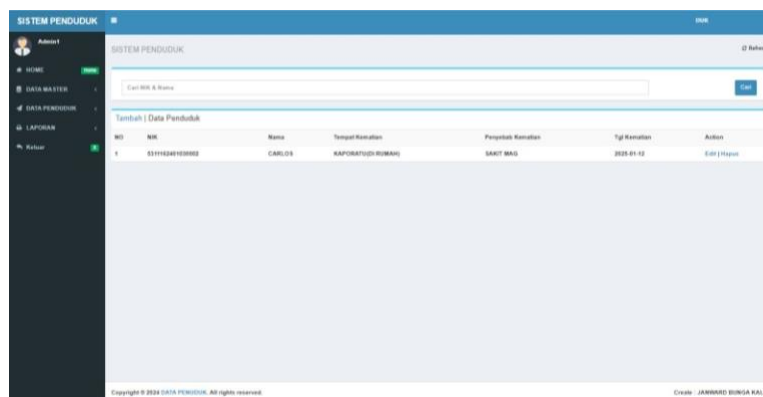


Figure 10: View of the Deceased Population Page

4.4.5. View of the Immigrant Page

The immigrant population page, on this page the admin can add, edit and delete immigrant population data.

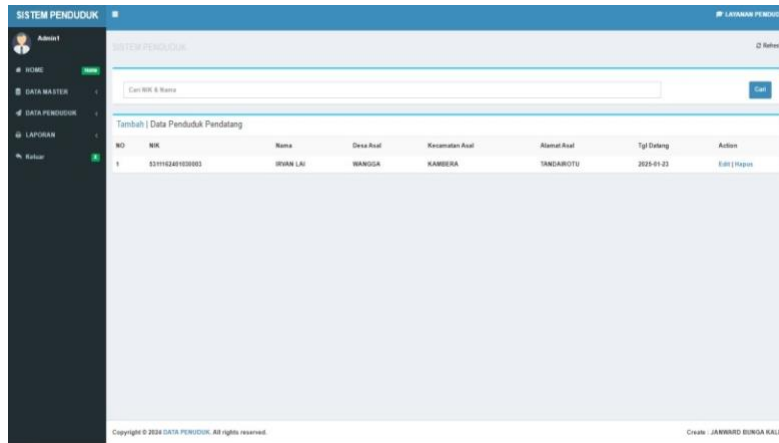


Figure 11: View of the Immigrant Page

4.4.6. Resident Born Page Display

The birth population page, admin can add, edit and delete birth population data.

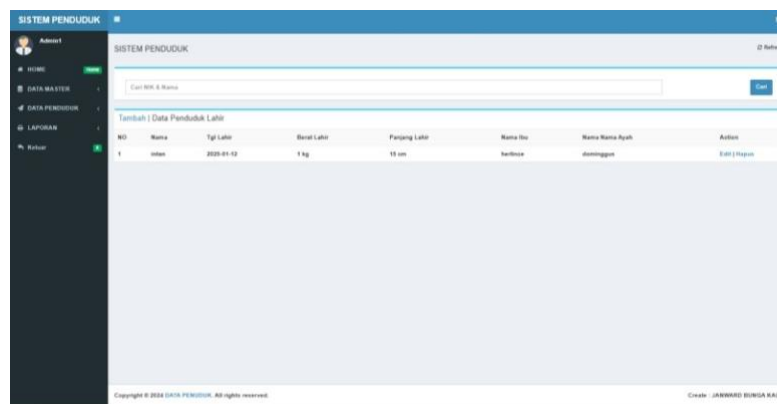


Figure 12: View of Resident Born Page

4.4.7. Permanent Resident Page View

The birth population page, admin can add, edit and delete birth population data.

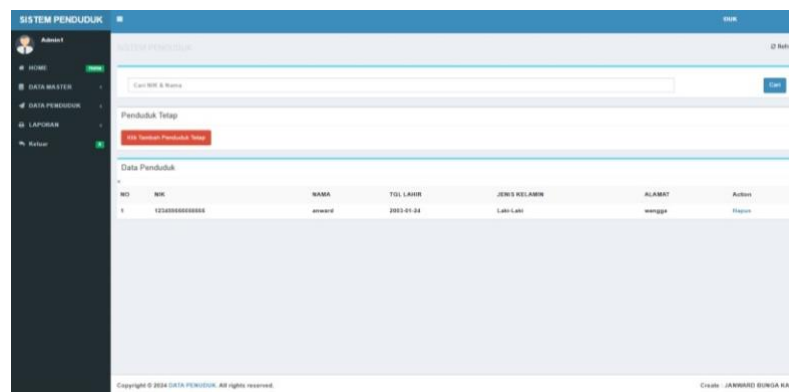


Figure 13: Permanent Resident Page View

4.4.8. Total Population Page Display

On the total population page, the admin can see the total population in Lambanapu Village. Admins can also add, edit, delete and view details of overall population data.

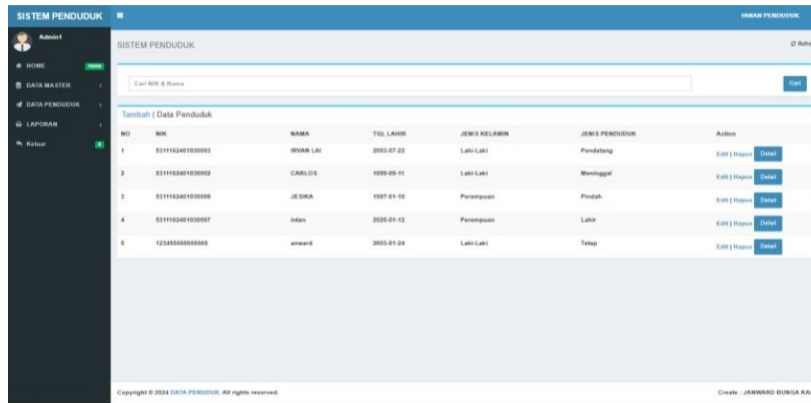


Figure 14: Total Population Page Display

4.4.9. Display of Data Input Form page

On the resident data input form page, the admin can fill in resident data, namely NIK, Name, Date of Birth, Gender, Address, Type of Resident, Occupation, Education, Religion, Village, District, Province, Country. After the admin fills in the resident data, the admin can save the resident data by clicking the 'save' button.

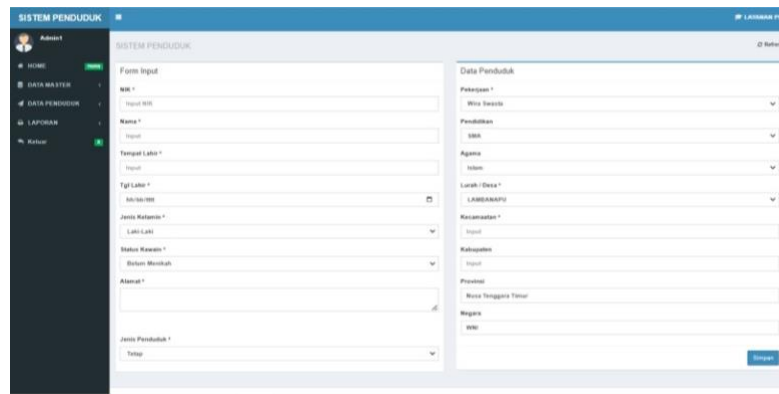


Figure 15: Display of Data Input Form page

4.5. Black Box Testing

Table 1: Black Box Testing

Testing	Testing Method	Results Expected	Results
Login	displays the login page properly and can successfully login by entering the username and password.	Can display the login page if username and password is filled in correctly	Accepted [√] Rejected []
Admin main page	Displays the main page properly	Can display the main page properly and run in line with expectations	Accepted [√] Rejected []
Residents moved page	Displays the resident move page properly	Can display the resident move page properly and run accordingly with hope	Accepted [√] Rejected []
Deceased population page	Displays the deceased resident page properly	Can display the deceased population page properly and running as expected	Accepted [√] Rejected []
Resident page entrants	Displays the immigrant population page properly	Can display the resident page comers with good	Accepted [√] Rejected []
Permanent resident page	Displays the permanent resident page properly	Can display the permanent resident page well and going as expected	Accepted [√] Rejected []
Total population page	Displays the total population page properly	Can display the total population page properly and running as expected	Accepted [√] Rejected []
Total user page	Displays the total user page properly	Can display the total user page well and going as expected	Accepted [√] Rejected []
Resident data input form page	Displays the resident data input form page properly	Can display the population data input form page properly and running as expected	Accepted [√] Rejected []

4.6. System Usability Scale

In the next test using SUS which is a direct test by the end user of the system. The following are the results of SUS testing obtained from 2 respondents who served as admins in collecting population data in Lambanapu Village.

Table 2: System Usability Scale

Question	Answer 1st respondent	Answer Respondent 2
Q1(the system is easy to learn)	4	5
Q2(the system is efficient to use)	5	5
Q3(the system is easy to use)	5	4
Q4 (feel confident with this system)	4	3
Q5 (the system is logical in its design)	5	5
Q6 (feel undisturbed when using this system)	5	3
Q7(do not need help to use this system)	5	5
Q8 (flexible system)	1	2
Q9 (the system is easy to operate)	5	5
Q10 (this system is not useful)	1	1

Table 2 Is the results obtained after testing the web-based population data collection information system on 2 respondents with a total of 10 questions.

Table 3: Results of SUS Value Calculation

Respondents	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Total
1	3	0	4	1	4	0	4	4	4	4	28	70
2	4	0	3	2	4	2	4	3	4	4	30	75
Average value											70+75/2	72,5

The results of the calculation of the assessment of the 2 respondents with the value of respondent 1 = 70 and respondent 2 = 75, to find the average value of the two respondents, namely by adding the values of respondent 1 and respondent 2, divided by 2, the average value result is 72.5 with a value scale in the class category "C". and in the Adjective ratings model "Good". This result shows that the web-based population data collection information system in Lambanapu Village is acceptable to its users. The value grade can be seen in the red arrow image below:

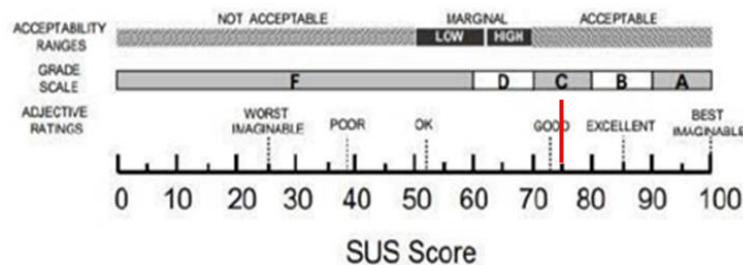


Figure 16: SUS Score

5. Conclusion

After analyzing, designing, making, and testing the system and implementation, it can be concluded that the web-based population data collection information system in Lambanapu Village has been completed. The test results using the blackbox method show that this system can run according to its function without any errors.

Meanwhile, from the results of SUS testing that has been carried out from the level of user satisfaction with the Population Data Collection information system, the assessment given to two respondents resulted in a score of 70% and 75% with an Average Value of 72%. With acceptability ranges "Acceptable" and range "High". With a value scale in the "C" class category. and in the Adjective ratings model "Good". These results show that the web-based population data collection information system in Lambanapu Village is acceptable to its users.

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