Designing a Village Letter Filing System as an Effort to Improve Administrative Efficiency in Suka Muda Village (Case Study in Suka Muda Village)

Ummy Calsum[1], Apriansyah[2], Zulhipni Reno Saputra[3], Karnadi[4]

[1,3,4]Department of Information Technology, University of Muhammadiyah Palembang, South Sumatra
[2]Information Technology Study Program, Faculty of Engineering

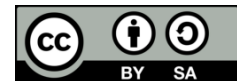| Article Info	ABSTRACT
	In the use of information technology, including the system of archiving incoming mails, outgoing letters are very important to support organizational development in terms of operational activities. This is because with the existence of an archiving system in an organization, it can speed up a work process and can make it easier to manage letters and make letters more organized and neat. The researcher sees that there are problems in the Sukamuda village letter filing system where at this time, the procedures applied to the management of incoming and outgoing letters in Sukamuda village, starting from receipt, storage, documentation, to letter verification, are all carried out conventionally. This research aims to make it easier to archive incoming and outgoing letters by developing a website-based archiving application . The research method used is the Development (R&D) method, observation data collection techniques and literature studies, the system development model used in this study is the Waterfall Model. Waterfall is one of the Software Development Life Cycles (SDLC) where software development activities start from specification, development, validation, and evolution and then divide it into phases and final testing using the Black Box method. With the implementation of this system, it is hoped that it can overcome problems in the application of letter archiving, especially at the letter stage in villages like to move.

Corresponding authors:
Ummy Calsum
Department of Information Technology
University of Muhammadiyah
Palembang South Sumatra
Email: ummycalsum509@gmail.com

1. Introduction

The current development of technology will be in line with the development of computer technology that encourages changes in various sciences, both in studies and implementation in the field. The role of computer technology that exists today helps to make it easier for institutions and companies to process archival data. Given the need to increase the efficiency and effectiveness of every archive data management

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activity. Therefore, a system is needed that facilitates the process of implementing activities in the agency or company[1]

Letters are an important tool for every agency, especially for the Village Office. Many people need a letter from the Village Office for various purposes, to move places, get married, birth, etc. Sukapindah Village is one of the villages located in the Rambutan sub-district, Banyuasin Regency. In this village, most of the service processes are still carried out conventionally, namely correspondence services and data management still use word processing programs (Ms. Office), so that in the process it takes more time to carry out services and documentation of mail files is not well administered and often errors occur and there are even data archives that are lost or damaged due to too many existing archives. "There are several things that can cause obstacles to a system that is run manually, including the large amount of data that must be processed, the complexity in processing a data, how to design a Correspondence Service Administration Information System at the Sukapindah Village Office that can help employees in providing services to the community with time efficiency[2][3][4].

Before the invention of computers, people stored written data in the form of paper that was put in a place and then arranged in such a way. These settings are often referred to as filing methods or methods file storage. After the invention of computers, the archiving of written data began to be transferred to computer storage media, so that written data in large quantities could be stored in a much smaller medium, such as compact disks. Such data storage and processing systems are often referred to as database systems[5][6].

In the use of information technology, including the system of archiving incoming mails, outgoing letters are very important to support organizational development in terms of operational activities. This is because with the existence of an archiving system in an organization, it can speed up a work process and can make it easier to manage letters and make letters more organized and neat. Physical storage of archives poses obstacles in the search process and requires a very large processing and storage room. This research will create an outgoing mail archive management system that can store mail digitally and make it easier for each division to find letters and assist staff in managing mail. Administrative officers can access this archiving application by entering the correct user login, can add, edit, delete and save incoming and outgoing mails, can search based on letter number, subject, sender, destination and date, and download digital mail based on search results. The research methods used to solve various problems that occur are literature, observation, interviews, data and system analysis, system design, program creation, program testing, and program implementation. From the results of this study, it can be concluded that the incoming mail archiving system can help staff in managing mail archives so that problems with finding letters and storage problems can be overcome[7][8]

At this time, the procedures applied to the management of incoming and outgoing letters in the village of Sukagerak, starting from receipt, storage, documentation, to mail verification, are all carried out conventionally. Documentation of incoming and outgoing letters is only in the form of writing in the ledger, while at the stage of archiving letters is only in the form of storing hardcopy documents. The application of this method was felt by the village secretary on duty in Sukapindah village who felt the management of incoming and outgoing letters. Among them is that it is difficult to find old documents because you have to first open the old data and search for them one by one. Difficulties in reporting incoming and outgoing mails, loss and damage to documents, and the status of letters that cannot be monitored by the letter applicant take a long time in making outgoing letters and dispositions[9].

This will be the basis for researchers to provide solutions in solving various problems that are faced, how important technological developments are to the management of mail service applications using information technology-based systems, based on this description this research will make the development of website-based archiving applicationswhich is expected to overcome problems in the application of letter archiving, especially at the letter stage in the village of suka moving,

2. Research Methods

According to Gay (1990) Development Research is an effort to develop an effective product for school use, not to test theories, In his book Research and Education Methods, Sugiono stated that the Research and Development (R&D) method is a research method used to produce a certain product, and test the effectiveness of the product [10]

(Educational Research and Development (R&D) is a process used to develop and validate educational products. The steps of this process are commonly referred to as the R&D cycle, which consists of studying research findings related to the product to be developed, developing the product based on these findings, the testing field in the setting in which it will be used eventually, and revising it to correct the deficiencies found in the testing submission stage[11]

2.1 Research Framework

The research framework is an arrangement of concepts that are interrelated in a research. In addition, this framework serves to systematically connect the visualization of one variable with another. The research framework is usually prepared before the research steps are implemented, so this section is often considered the initial preparatory stage in the research[12]

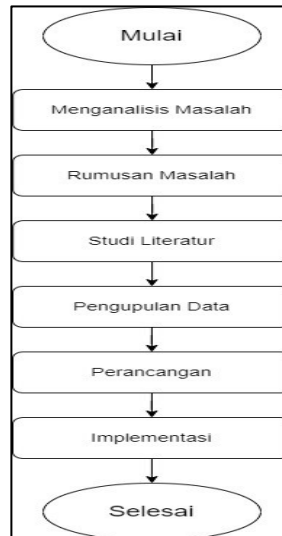Here is the flow of the research framework:

Figure 1. Research framework flow

The research on the design of the Village Letter Service Application as an Effort to Improve Administrative Efficiency in Suka Muda Village was carried out through the following research stages:

1. Analyze issues

   The application system for the desan letter service is still carried out conventionally. Documentation of incoming and outgoing letters is only in the form of writing in the ledger, while at the stage of archiving letters is only in the form of storing hardcopy documents.

2. Problem formulation

   After the problem is identified, then determine the formulation of the problem clearly in this study, namely how to create a system for designing the Village Letter Archiving Application as an effort to improve administrative efficiency in Suka Muda Village.

3. Literature studies

   The researcher compared the results of previous research. By applying this concept, researchers can find new studies of what they want to develop.

4. Data collection

   The technique used in this data collection is using observation techniques and literature studies. The observation technique is direct observation. Literature Studies is looking for several books and sources to be used as references in research.

5. Design

   Application of Village Letter Archiving as an Effort to Improve Administrative Efficiency in Suka Muda Village using UML (Unified Modelling Language) design consists of: Use Case, Activity Diagram, and Class Diagram

6. implementation

   The final stage of this research framework is implementation, where this application is tested using XAMPP, Visual Studio Code, HTML, PHP, JavaScript, and MySQL Database[13].

2.2 Research Time and Place

The research period was carried out for four months from September to December. With this duration, it is expected to provide deep results and in accordance with the goals to be achieved. The location of this research is located at the Suka Muda Village office, Banyuasin District, Banyuasin Regency, South Sumatra Province.
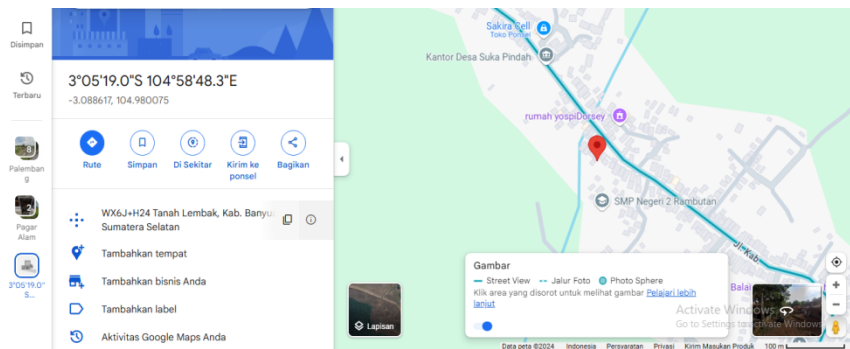
Figure 2. Research location

2.3 Data Collection Methods

In the discussion of the methodology of this research, there are several data collection techniques that will be discussed in this study, namely:

1. Observation is a data collection technique carried out by researchers directly observing the research area to closely observe the activities being carried out. Direct observation at the Village office to find out the existing problems.
2. Literature Study is a data collection technique that is carried out by studying and collecting information from reference sources of books, journals and other sources that are directly related to the discussion of this research.

2.4 System Development Methods

Information system development is often referred to as the system development process. System development can be defined as drafting a new system to replace the old system as a whole or improve an existing system. Many system development methods are available. The most well-known method is also called System Development Life Cycle (SDLC).[14]

SDLC has several models in the application of its process stages, including Sequential Model or Waterfall model, Parallel Model, Iterative Model, Prototyping Model, RAD (Rapid Application Development) Model, Spiral Model, VShaped Model and Agile Development. So, system development is a system that is old processed in such a way or replaced so that it becomes a new system and undergoes changes in a better and more useful direction. The old system needs to be repaired or replaced due to several things, namely problems, to seize new opportunities and when there are instructions from the leadership

The system development model used by the author in this study is the Waterfall Model. Waterfall is one of the Software Development Life Cycles (SDLC) where software development activities start from specification, development, validation, and evolution and then divide it into process phases such as requirements specifications, software design, implementation, testing, and others. The advantages of the Waterfall model are that they are easy to understand, milestones are well understood, requirements will be stable, and provide structure for inexperienced staff[15].
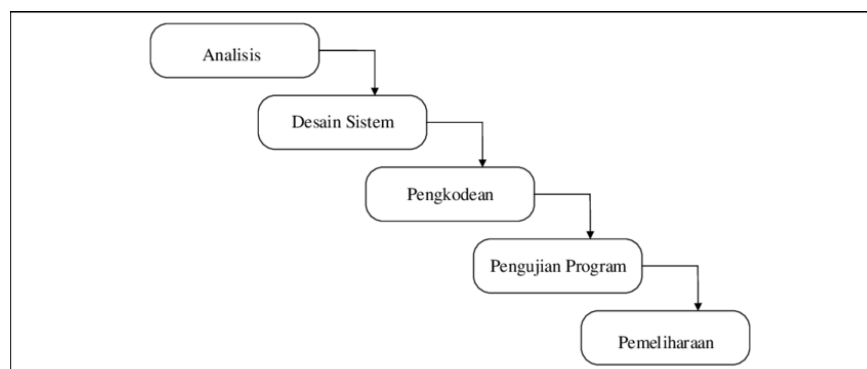

Figure 3. Waterfall Stages

The Waterfall model has five stages:

1. Requirement analysis and definition, is the process of analyzing user needs to find out the goals, limitations and services in a system. In this stage the requirements are defined in detail and used as a system specification,

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2. System and software design, is the process of designing a system based on needs by building the entire system architecture. Software design involves the activity of identifying and describing the abstraction of software systems and their relationships,

3. Implementation and unit testing, in this stage the software design is implemented as a program unit and then tested using the unit testing strategy,

4. Integration and system testing, in this stage the program units are integrated with each other so that the functions can run and then tested using the integration testing strategy,

5. Operation and maintenance, in this stage the system is maintained if errors are found, or improve the implementation unit and improve system services.

3.   Results and Discussion

This research succeeded in producing a website for incoming and outgoing letters in Sukamuda Village, Banyuasin Regency, using the waterffal method, the process starts from the design and user with a simple and elegant appearance according to the needs of the user, this design includes the main features such as archiving incoming and outgoing letters in Suka Muda Village.

3.1 Running system image

Figure 4. Running system

The picture above explains the process of archiving village letters manually where the process is carried out where the secretary records incoming and outgoing letters, after which the secretary will index the letters and store the letters based on the index of letters that have been made. After that, put the letter in the archive cabinet.

3.2 Proposed system

The proposed system overview is an overview of the system where admins can access the website. Admins can log in to the Suka Muda Village Office website and input their username and password to enter the main page.

Admins can manage incoming and outgoing mail with the incoming and outgoing mail data input feature. In addition, admins can also print agenda books. Admins can also access the mail gallery that contains a digital archive of incoming and outgoing mail. And admins can also create mail classifications to group mail based on specific categories
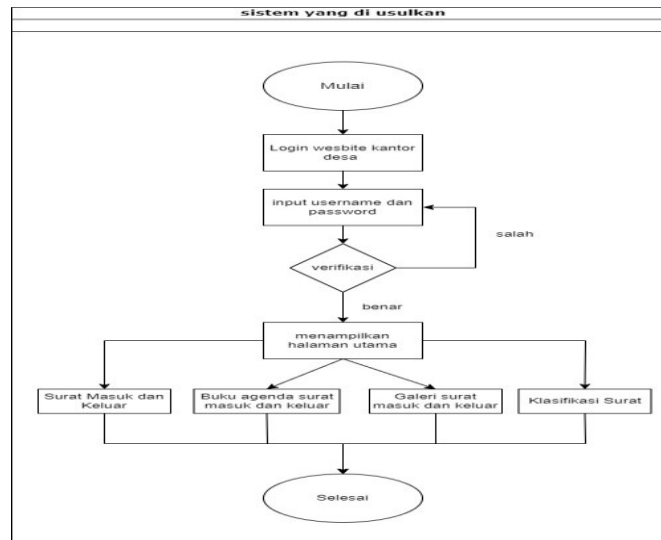
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Figure 5. Proposed system

3.3 System Planning

System design is an important process in software development that aims to create a system that can work better, effectively, and efficiently. The end goal is to ensure that the system is able to complete tasks according to user needs, in an easier, faster, and more precise way. This stage also involves an in-depth analysis to understand how the system will function, what needs need to be met, and how the system interacts with other elements[16].

In designing a website, one of the approaches that is often used is to utilize the Unified Modeling Language (UML). UML is a visual modeling language that helps to describe systems clearly and structurally, both in terms of design and interaction within them. Using UML, developers can create diagram-like illustrations that make it easier for them (and other stakeholders) to understand the system as a whole[17]

3.3.1   Use Case Diagram

Use Case Diagram on the planning of the mail archive management website system. There are 2 actors who can access the system determined by the account level, including.

1. Admin
    Admins can log in, incoming and outgoing mail transactions, incoming and outgoing mail agendas, incoming and outgoing mail file galleries, mail classification, data backup, restore data and logout.
2. Village head
    The Village Head can log in, incoming and outgoing mail transactions, incoming and outgoing mail agendas, gallery of incoming and outgoing mail files and classification of letters and logouts.

This use case diagram explains the access that can be done by admins and village heads as shown in figure 4[18].
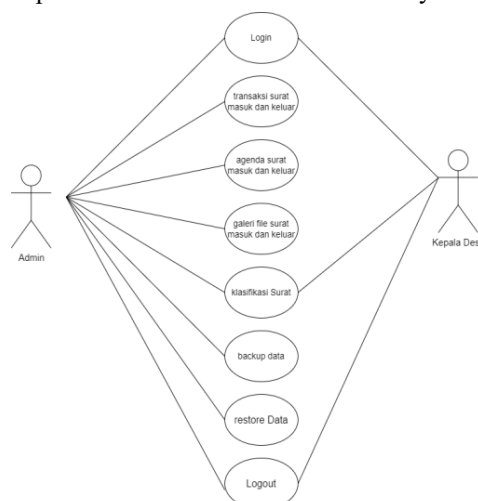

Figure 6. Design use Case Diagram

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3.3.2   Activity Diagram

The following is an explanation of the activity diagram on the letter archive management website at the moving village office using the waterfall method as follows:

1. Activity diagram admin

An admin activity diagram is a flow designed for any stage of the activity performed by the buyer. Further explanation can be seen in Figure 4.
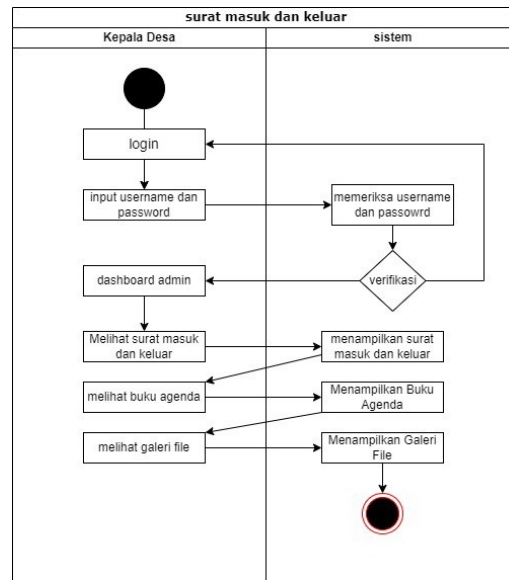

Figure 7. Activity plan of the village head diagram

3.3.3   Class Diagram

The image below describes the class diagram about entity relations used on the letter archive management website at the Suka Muda Village Office.
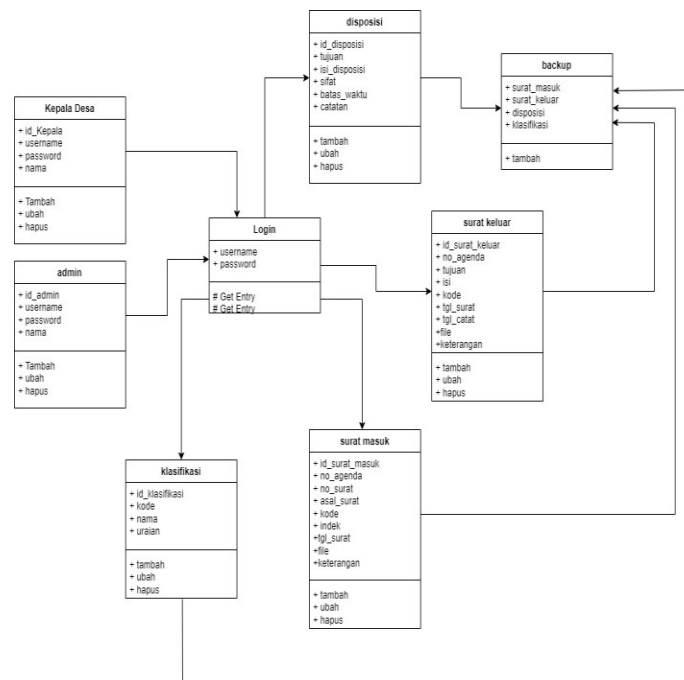

Figure 8 Diagram class design

Figure 4.6 is a class diagram design from the letter archive management website at the Suka Muda Village Office. This class diagram has several entities, namely: login, admin, village head, incoming mail, outgoing mail, classification, disposition, backup[19].

3.4 Website UI/UX Design

UI/UX design is a website design before it is applied to a website. It will be explained one by one about the stages of designing this website[20].

a) Login page interface design

The login page on **the incoming and outgoing mail website** in Sukapindah Village is a digital feature used to manage user access to the mail management system owned by the village, the design of the login page has 2 inputs, namely username, password, and login button to access the main page[21].
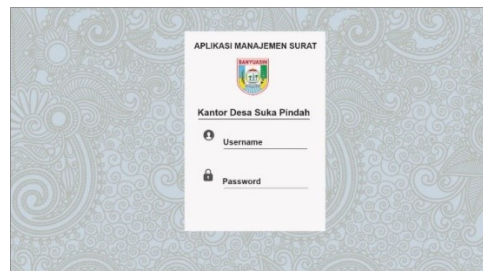

Figure 9 Login page interface design

b) Home Page Interface Design

The home page is the main interface that serves as the starting point for user navigation in accessing various features and information in the incoming and outgoing mail management system. The home page serves as an information center that displays the archive page to the important functions within the website.The home view design is the main view that will appear after successful login.

Figure 10 Home page interface design

c) Inbound Mail Interface Design

The incoming mail page is part of the mail management system used to record and archive letters received by Sukapindah Village from various parties, such as residents, government agencies, or other parties. This page contains a list of incoming letters along with details of the information. The design of the incoming mail display is for incoming mail management.
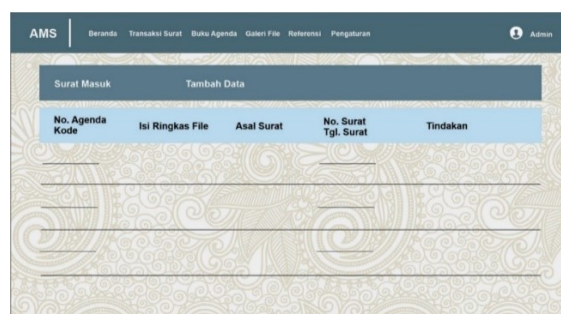

Figure 11 Incoming mail interface design

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d) Outgoing Mail Interface Design

The outgoing mail page is part of a mail management system designed to document official letters made and sent by Sukapindah Village to residents, government agencies, or other parties. This page contains a list of outgoing letters along with detailed information about their contents and purposes, the design of the outgoing mail appearance for outgoing mail management[22].

Figure 12. Outgoing mail interface design

3.5 Website Design Results

a) Login Page

The login page serves as website security and protection before entering the main page.
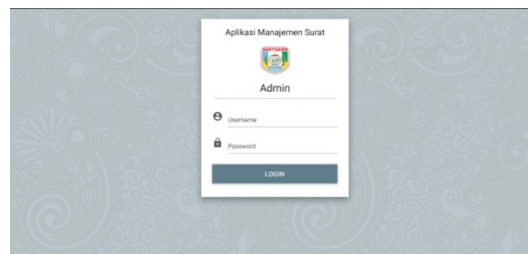

Figure 13 Login category page

b) Home

This main page, usually called homepage, has 4 menus that have functions to move to mail transaction pages, agenda books, preference file galleries.
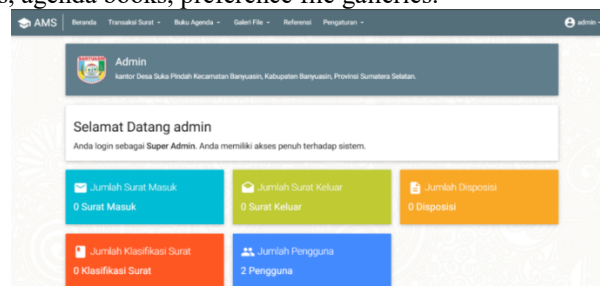

Figure 14. Home

c) Inbound Mail Page

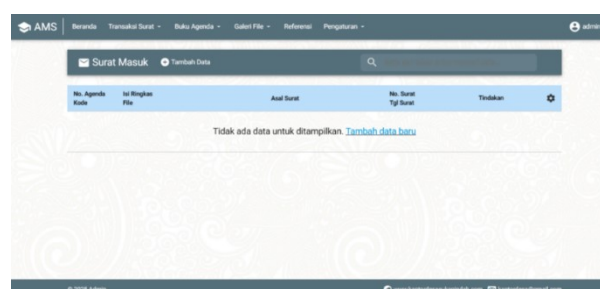The incoming mail transaction page serves to record letters

Image Page 15 Incoming mail page

d) Outgoing Mail Page

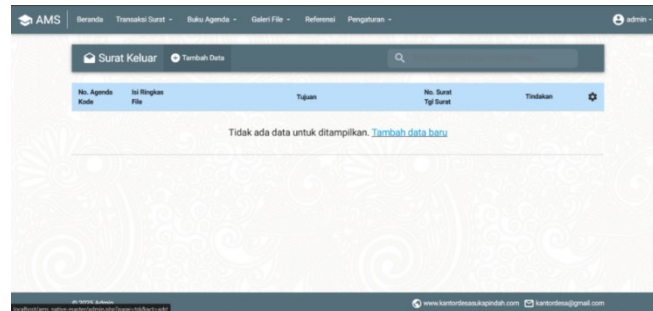The outgoing mail transaction page serves to record outgoing mails.

Figure 16. Outgoing Mail Page

3.6 Black Box Test Results

Before this application can be used, testing must be carried out first. Some testing was done by the author himself. The testing of the letter archive management website was carried out using the black box testing approach. Testing is required as one of the stages of implementation to test the minimum level of error and accuracy of the software designed. The test was carried out using the black box testing method. Black box testing is a test that allows software engineers to obtain a set of input conditions that fully utilize all the functional requirements for a program. Testing is conducted based on pre-made use cases[23][24][25].

1. **Testing of the use case login admin**

Table 1. Use Case Testing login admin

Identification	Description	Testing Procedure	Input	Exodus that Expected	Results Obtained	Conclusion
P-1-101	Entering *Username*	Input *Powered by* Admin	-	The user will successfully log in and	User Successfully log in and log in to the dashboard	Accepted user dashboard
P-1-102	Entering *your password*	Input *Copyright © 2019 T*	-	The user will succeed Login and log in to the dashboard	User Successfully login and log in to the dashboard	Accepted

2. **Testing the use case of the admin and village head entry letter transaction**

Table 2. Testing Use Case Entry Letter for Admin and Village Head

Identification	Description	Testing Procedure	Input	Exodus that Expected	Results Obtained	Conclusion
P-2-101	*Add data*	Add incoming mail data in incoming mail transactions	-	Admins and village heads will go to where to add data	Admin and village head go to the add data menu	Accepted
P-2-102	Enter the agenda number	Input of the agenda number	-	-	The agenda number has been entered	Accepted
P-2-103	Enter the origin of the letter	Original Input of the Letter	-	-	The origin of the letter has been entered	Accepted

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P-2-104	Enter the mailing number	Mail number input	-	-	The mail number has been entered	Accepted
P-2-105	Enter a brief body	Concise content input	-	-	Brief content has been inputted	Accepted
P-2-106	Enter a classification code	Classification code input	-	-	Classification code has been entered	Accepted
P-2-107	Enter file index	File index input	-	-	The file index has been entered	Accepted
P-2-108	Enter the date of the letter	Date input	Dd/mm/yy	-	Date has been entered	Accepted
P-2-109	Enter a description	Input description	-	-	A description has been entered	Accepted
P-2-110	Files	Input from the file	Jpg, Pdf, Docx, Png	-	The file was uploaded successfully	Accepted
P-2-111	Save more data	Select the save data button in add data	-	-	Data saved successfully	Accepted
P-2-112	Edit data	Edit data in incoming mail transactions	-	-	Admin moves to the data edit page	Accepted
P-2-113	Perform data deletion	Delete data in incoming mail transactions	-	-	Admin successfully deleted data	Accepted
P-2-114	Dispose of data	Dispose of data in incoming mail transactions	-	-	Admin successfully disposed of data	Accepted
P-2-115	Print letters	Print the letter in the incoming mail transaction menu	-	-	The admin and village head managed to print the letter	Accepted

3. Testing the use case of the outgoing letter of admin and village head

Table 3. Testing Use Case Letters for Admin and Village Head

Identification	Description	Testing Procedure	Input	Exodus that Expected	Results Obtained	Conclusion
P-3-101	*Add data*	Add outgoing mail data in incoming mail transactions	-	Admins and village heads will be logged in to the add	Admin and village head go to the add data menu	Accepted

data page

P-3-102	Enter the agenda number	Input of the agenda number	-	-	The agenda number has been entered	Accepted
P-3-103	Enter the purpose of the letter	Input the purpose of the letter	-	-	The purpose of the letter has been entered	Accepted
P-3-104	Enter the date of the letter	Input letter date	Dd/mm /yy	-	The date the letter has been entered	Accepted
P-3-105	Enter a brief body	Concise content input	-	-	Brief content has been inputted	Accepted
P-3-106	Enter a classification code	Classification code input	-	-	Classification code has been entered	Accepted
P-3-107	Enter the mailing number	File number input	-	-	The file index has been entered	Accepted
P-3-108	Enter a description	Input description		-	A description has been entered	Accepted
P-3-109	Upload images	Input from the file	Jpg, Pdf, Docx, Png	-	The file was uploaded successfully	Accepted
P-3-110	Save more data	Select the save data button in add data	-	-	Data saved successfully	Accepted
P-3-111	Edit data	Edit data in incoming mail transactions		-	Admin moves to the data edit page	Accepted
P-3-112	Perform data deletion	Delete data in incoming mail transactions	-	-	Admin successfully deleted data	Accepted

4. Conclusion

The development and implementation of an inbound and outgoing letter archive website in Sukapindah village, Rambutan District, Banyuasin Regency using the waterfall method has provided a positive impact on the efficiency and overall management of incoming and outgoing letter data. Through structured stages, starting from searching for incoming and outgoing letters, needs analysis, system design, implementation, to testing.

The results of the implementation show that this website is able to provide convenience for the village administration in carrying out daily tasks. With a user-friendly interface, the system can be used effectively even by users with a limited level of technological understanding. In addition, the real-time reports generated by the website provide a clear picture of the mail archive in the village, making it easier to administer the village and manage incoming and outgoing letters. Overall, the implementation of this mail archive website has been an effective and efficient solution to improve manual data search.

Suggestion

Implementation of digital mail archiving Given the importance of efficiency and ease in managing letters, it is recommended that Sukapindah Village immediately implement a digital mail archiving system. This system allows incoming and outgoing mail to be stored in a digital format, reducing reliance on physical archives and making it easier to search for mail. Benefits Reduce the risk of losing mail, save storage space, and speed up access to needed mail information.

By following these suggestions, Sukapindah Village can increase efficiency and accuracy in managing mail administration. The implementation of a structured and technology-based mail filing system will be very beneficial in speeding up the administrative process, reducing reliance on physical archives, and increasing transparency in village mail management.

Reference

[1] Aldo. (2025). Design of a Web-Based Sales Information System at Toko Maju Jaya Keramik. Journal of Technology and Information Systems Management (JMS) Volume 5, Number 1, March, 903 - 911.

[2] Arianti, T. (2022). The design of the library information system uses the UML (Unified Modelling Language) diagram. Scientific Journal of Applied Computing and Information, 19-25.

[3] Aziz. (2022). Information System Design Analysis. Bandung: Widina Bhakti Persada.

[4] Banjarbaru, P. A. W. S. . (2016). Information System Strategy Planning in Improving School Competitiveness at Smk Computer Mandiri Banjarbaru. Computer Bulletin, 4(1).

[5] Dkk, & Hidayat, A. (2019). Building a website for Gunung Raya Ranau High School using php and Mysql. . Jtim: Journal of Mahakarya Informatics Engineering, 2(2), 41-52.

[6] Enterprise. (2017). Jubilee. 2017. Complete Php. . Jakarta.: Pt Elex Media Komputindo.

[7] Fatmasari, F. (2022). Modeling Unified Modeling Language Information Systems Enterprise Resource Planning. Modeling Unified Modeling Language Information Systems Enterprise Resource Planning.

[8] Hartono, E., & Wardani, N. W. (2019). Web-based digital outgoing mail archiving system. Journal of Information and Computer Technology Volume 05, Number 02, 204 - 211.

[9] Jimmie, et al. (2021). Design and build a web-based payroll information system for lecturers and employees. Digit Technology, 32-38.

[10] M, Y. (2009). Analysis and Design of Client Server-Based Village Administration Service Information System in Kaliurang Village. Telemat, 38v- 49.

[11] Mawaddatarrohmah, et al. (2022). Design of an Online Registration Information System and Selection Exam at Jambi Bunda Family Health Vocational School. Journal of Technology and Information Systems Management (JMS) Volume 1 Number 2, 149 - 158 .

[12] Narulita, S, & et al. (2024). Unified Modelling Language (UML) Diagram for the Design of Research and Community Service Management Information System (Simlitabmas). . Bridge: Journal of Information and Telecommunication Systems Publications, 2(, 244-256).

[13] Narulita, S. (2024). Unified Modelling Language (UML) Diagram for the Design of Research and Community Service Management Information System (Simlitabmas). : Journal of Information Systems and Telecommunication Publications. 2 No. 3 August, E-Issn:3046-725x, P-Issn:3046-7268, pp. 244-256.

[14] Okpatrioka. (2023). Research and Development (R&D) Innovative Research in Education. Dharma Acariya Nusantara: Journal of Education, Language and Culture, 1(1), 86-100. Journal of Education, Language and Culture, 1(1),, 86-100.

[15] Priambodo, N. Y., & et al. (2023). Strategic Planning of Information Systems and Information Technology at Stie Pertiba Pangkalpinang. Technomedia Journal, 7(3), 323-339.

[16] Profession, D. E., & et al. (2018). Analysis and design of personnel information systems using Unified Modeling Language (UML). . E-Journal of Jusiti (Journal of Information Systems and Information Technology), 22-23.

[17] Ramadhan, F. P. (2025). Analysis and Design of a Web-Based Alumni Data Management Information System at SMK N 1 Kempas. Journal of Technology and Information Systems Management (JMS) Volume 5, Number 1, March, 1017 -1027.

[18] Sawitri, A. E., & et al. (2017). Analysis of the use of the Letter Procedure application in the management of incoming and outgoing letters at the Central Java Provincial Health Office.

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Department of Library Science, Faculty of Cultural Sciences, Diponegoro University, Jl. Prf. Soedarto, Sh,, 411 -420.

[19] Sinambela, et al. (2024). Design and build a website-based digital library at Private Elementary School 001 Pt. Kg Meral Barat in Karimun Regency. Mat. Journal of Informatics Engineering Karimun, 12-23.

[20] Sugiyono. (2017). Quantitative, Qualitative and R&D Research Methods. Bandung: Alfabeta.

[21] Supriyanta, et al. (2022). Design of an Employee Payroll Information System with the Waterfall Method. Indonesian Journal of Computer Science, 1-6.

[22] Surendro, K. (2007). The use of Enterprise Architecture Planning for strategic planning of information systems. Journal of Informatics, 8(1), 1-9.

[23] Susanti, , S., & et al. (2022). Design of a Web-Based Village Administration Service Information System. Jurikom (Journal of Computer Research), 1375−1385.

[24] Wahyudin, et al. (2020). Analysis of Website-Based Information System Development Methods: A Literature Review. Intercom Journal. Journal of Scientific Publications in the Field of Information and Communication Technology, 15(3), 26–40.

[25] Watts, E. (2019). Designing a Sales Information System with a Waterfall Method Approach. Journal of Informatics Media Budidarma, 1-8.