



The Development of a Digitalization System for Electronic-Based Lettering Services at The Faculty of Social Sciences and Law Universitas Negeri Surabaya

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Abstract. Faculty-level services have not made the best use of technology. One of them is for creating the letters that kids require. This also occurred at Universitas Negeri Surabaya's Faculty of Social Sciences and Law. Frequently, students must wait one to two days for the letter's processing. This is caused by limited equipment, weak human resource expertise, as well as the large number of requests for incoming letters at close intervals. From this phenomenon, it is very feasible to implement electronic-based correspondence digitization services in the Faculty of Social Sciences and Law. With their individual devices, each student can request a letter at any time and from any location. In order to help educational staff file letters electronically and expedite the process of writing letters without having to visit the faculty, this research will attempt to develop a website-based system for electronic correspondence services for FISH students. The method used in developing this system is the waterfall method. The stages are requirements Analysis, Design, Implementation, Testing and Deployment and Maintenance. By building a service digitalization information can become faster and more efficient because several process stages can be made easier with online facilities that are connected and integrated. To improve the performance of this information system in the future, the development of this web-based information system can be implemented into a mobile-based information system, so that students can interact online more intelligently and practically.

Keywords: Electronic Letters (E-Letter), Digital Technology, Waterfall.

1 Introduction

The development of information technology is currently growing very rapidly, many technologies have been developed to facilitate the transfer of information and communication, one of which is E-Letter. [1]. The completion of many types of labour is greatly aided by the development of increasingly sophisticated technologies. Sophisticated technology has been applied to many different types of job. The administration of mail is one of them. Correspondence activities are an integral part of an educational institution's operations. An institution's letters serve as a vehicle for accomplishing its objectives, hence effective correspondence management is necessary. Archive management if done digitally will make it easier to manage [2].

An electronic letter of guarantee is seen as a first step toward establishing electronic governance and supervisory control, with the goal of mitigating disputes between the contracting parties. the nature of the relationship and the effect, and in order to do this, a fictitious research design explaining the primary and supporting hypotheses and confirming their validity was created. [3]

Research from [4] explains that Auto Crat is one of the plugins available on Google Spreadsheet to create reports with a mail merge mechanism, which can be sent to respondents in word or PDF file format, either directly or sent via email. Autocrat is not much different from making a mail merge in the office, but the advantage of Autocrat is that it can create reports in the form of files that are sent online to respondents, without any validation from the input.

Research from explains that The efficiency of the administrative offices at the government office in Indonesia indication has not been effective [5]. the implementation of the Office Administration System (E-Letter) Policy in the City of Semarang is said to have been implemented and running until now, however at the sub-district level not all of them have implemented it due to insufficient human resource capabilities. This unavailability illustrates that there are no consistent or permanent regulations in directing the implementation of Office Administration System (E-Letter) policies. This is what causes implementation to be inconsistent because there are no binding regulations regarding e-mail in the city of Semarang.

Research from [6] explains that in Catur Tunggal Subdistrict, the design of the E-Letter system aims to develop a website-based service system for letter submission and public complaint services. Because the procedure is sequential, the waterfall method is very suitable to be applied and used to design this research system.

From the conclusions of the previous research above, we will update the research we conducted by adding a validation feature from the admin so that if there is an error from the inputter, the system does not immediately generate it to the inputter, but can be corrected by the validator first and then degenerate the system so that it becomes E - Letter.

Given this, it becomes sense for educational personnel to have soft skills in place. Doing so will help them manage electronic correspondence materials and provide students with quick and effective service. Therefore, by offering students digital mailing services, it is anticipated that this research will be able to offer a solution.

2 Method

To start research, of course, several stages are needed so that the expected achievements can be carried out well. [7] This study employs a hybrid research strategy that blends qualitative and quantitative methods. Whereas our qualitative study employs field observations and interviewing strategies with instructors and students as target users. We will analyse the interview data to determine the type of system that they require. In the interim, we employ user happiness survey data obtained through a Google Form to analyze the data statistically and obtain user satisfaction numbers for the quantitative research model.

The Waterfall methodology, known for its sequential and linear approach to software development, is implemented to guide the development process of the payroll

application [8]. In this learning environment, the Waterfall technique makes it possible to approach complex content methodically, guaranteeing that every facet of computer networking education is covered effectively and efficiently [9].

The waterfall method is a plan for creating software that combines various techniques such as requirements analysis, design, implementation, testing and maintenance [10]. The stages of the waterfall method can be seen in Figure 2.

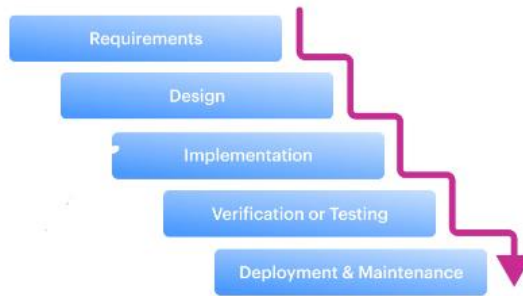


Fig.1. Research stages

2.1 Requirements

The analysis of system requirements is the current step. At this point, observations, interviews, and literature reviews can all be used to collect data. In order to create a computer system that can perform the tasks that the user requests, the system analyst will try to gather as much information as possible from the user. A user requirements document, or information on the user's preferences for the system's creation, will be generated at this point. System analysts will use this document as a guide when they convert it into programming language.

2.2 Design

The stage where ideas are expressed and system design is carried out for solutions to existing problems using system modeling tools such as use case diagrams, entity relationship diagrams and data structures and discussions.

2.3 Implementation

Translating a design into a computer-readable language is called implementation, performed by a programmer who will interpret the transactions that the user has requested. The actual stage of system development is at this point. This implies that at this point, computer use will be maximized. Testing will be done on the previously developed system after the code is finished. Finding and fixing bugs in the system is the goal of testing.

2.4 Verification or Testing

In the last step, the effectiveness and capabilities of the new system are tested to identify any flaws or weaknesses. The application is then improved and refined to achieve maximum perfection.

2.5 Deployment and Maintenance

There will undoubtedly be updates to software that has been given to consumers. These modifications may be the result of bugs that arise from the need for the software to adjust to a new environment (a new operating system or peripheral) or from requests from users for functional advancements.

3 Method

3.1 Requirement

Faculty of Social Sciences and Law served as the site of data collecting. Interviews and observation are the methods used in this study to gather data and information. Interviewing students from the Faculty of Social Sciences and Law about issues with letter processing—which is still laborious and time-consuming at the moment—is a necessary first step in developing the system. The findings from student interviews conducted by the Faculty of Social Sciences and Law.

After the interview was conducted, we obtained letter data that could be automated, including letters:

- a. Parental Benefit Certificate (PNS, TNI, POLRI)
- b. Certificate of Active Study
- c. Research Permit Letter
- d. Internship Permit Letter
- e. Observation Permit Letter
- f. Letter of Recommendation for MBKM

The Faculty of Social Sciences and Law has traditionally processed letters by hand-typing them on a personal Whats app for the teaching staff. The Faculty of Social Sciences and Law intends to replace its antiquated, slow, and automated E-Letter service automation system with a more recent one that will enable students to quickly and easily handle letters for public consumption.

3.2 System Requirements

When implementing the suggested digital E-Letter service automation system, the following devices and systems must be met:

1. Windows 10 operating system
2. Browser (Google Chrome / Mozilla Firefox)
3. HTML, CSS, PHP Code
4. At least 4GB of RAM are needed for the system to function normally.
5. Processor Core I-3 Generation 6 or more.

3.3 System Design

Administrators and students use this system. The technology produces a completed letter in PDF format to facilitate student letter writing and help administrators with paperless archiving.

Use case diagrams, a component of object-oriented design, are used in the design of the E-Letter digital service automation system.

3.4 Use Case Diagrams

Use Case Diagrams are used to explain how a system works and each user's rights when using its features. The E-Letter digital service automation system's use case diagram is visible. in Fig 2.

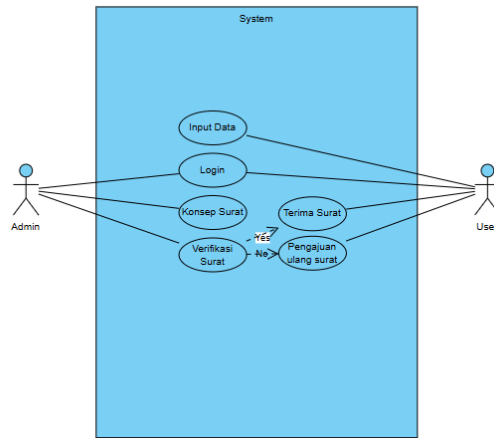


Fig.2. Use case Diagram

The aforementioned Use Case Diagram delineates the many functionalities of the system, including login, letter drafting, data input, letter verification, letter receipt, and letter resubmission. When use Unesa email to log in to Google for the first time, the login is utilized. If the email address is appropriate, it enters the system; if not, an erroneous login alert appears. The term "Letter Concept" refers to the administrative process of conceiving which letters—such as those from active colleges, civil servants, TNIs, POLRI allowances, MBKM recommendation letters, and others—will be automated. Data input refers to pupils completing the form-based input data. Letter verification is the process by which the administrator verifies that the letter generated by the system is accurate, if it is not correct then the student will resubmit the letter. Receive a letter means that students will get the letter they want if they pass admin verification. Re-submitting a letter means that students will submit a re-application if they do not pass admin verification.

3.5 Implementation

The automation system digital e-letter interface is implemented using multiple views, each with a specific function. The digital e-letter automation system's interface display looks like this:



Fig. 3. SIDILAN initial display

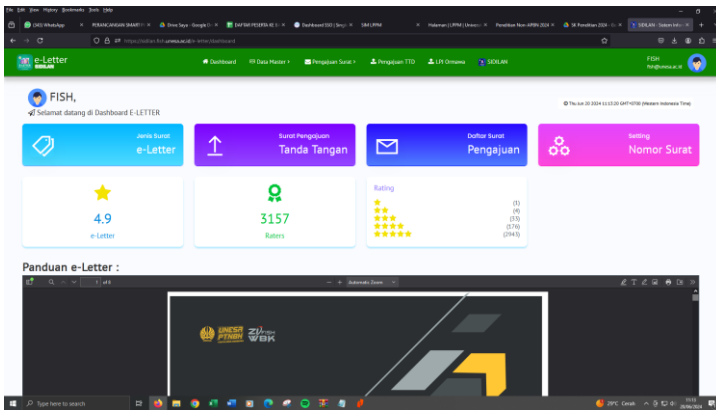


Fig. 4. Display After Login

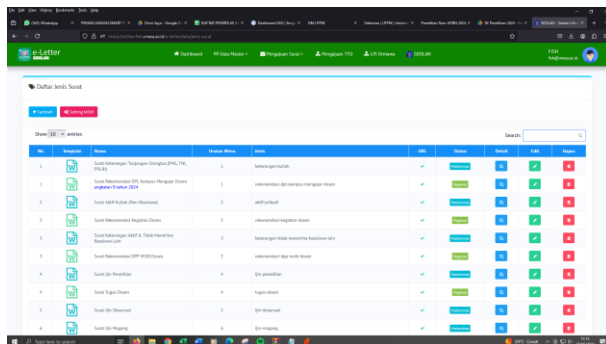


Fig. 5. Letter management display

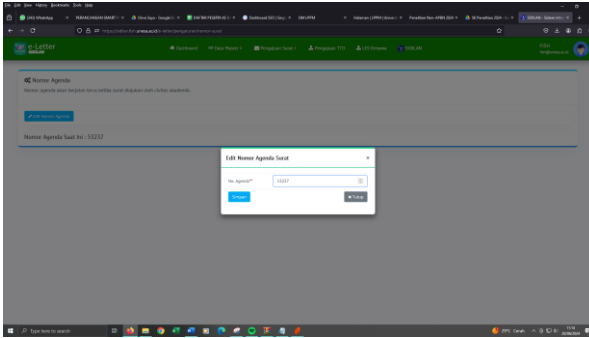


Fig. 6. Display of letter number settings

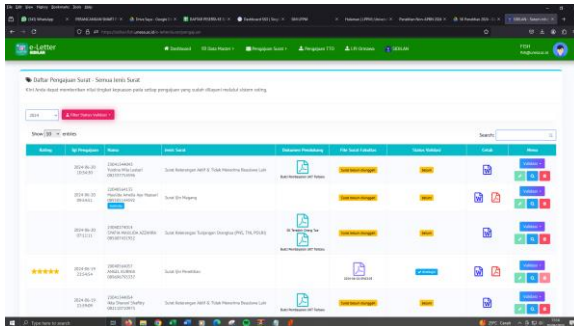


Fig. 7. Display When a letter from a user (student) has entered the system

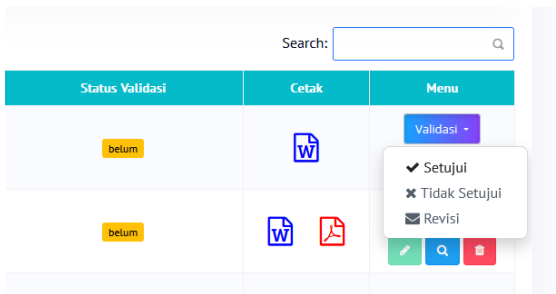


Fig.8. Admin validation button display

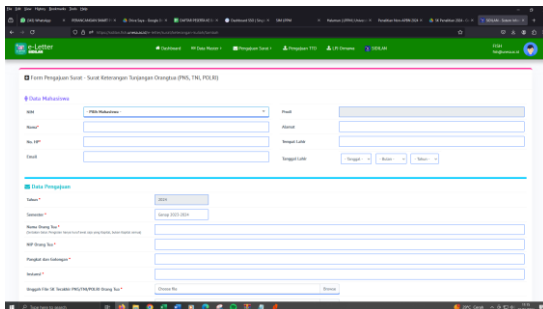


Fig. 9. Display of letter input form for users

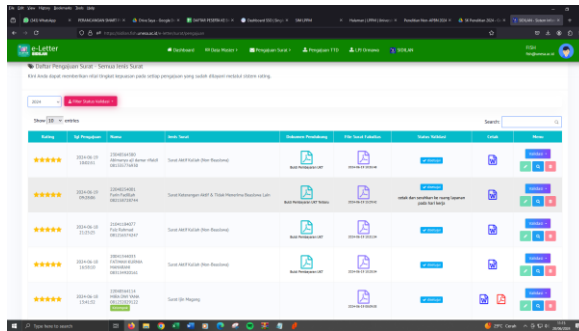


Fig. 10. The letter has been validated by the admin, and can be downloaded by users

3.6 System Testing

The system testing step comes next once the system implementation stage is finished. To make sure the system is operating as intended, system testing is carried out. Black box testing is the testing technique applied to functional testing. The black box testing method merely tests the input and output for acceptability; it does not require knowledge of the system's operations. This system is merely being tested in terms of its functionality. Table 1 displays the system testing findings. It can be inferred from black box testing results that the system is operating as intended. Due to the eight test cases that were conducted, the expected and actual results of the system are appropriate.

Table. 1. Black-Box Test Results

Test Case	Test Scenario	Action	Expected Result	Status
TC1	Admin drafts the letter and uploads the letter to the RTF format system	<i>Creating letters, and uploading letters to the system</i>	The system displays information that the letter format is appropriate	PASS
TC2	Admin sets the letter number	<i>Setting number of letters</i>	The system saves the number that the admin has input	PASS
TC3	User/Admin logs in using email	<i>Username = "arinahyudhistira@unesa.ac.id" Password = "admin"</i>	Enter the main menu dashboard	PASS
TC4	The user logs in with a user and password that do not match	<i>Username = "arinal@gmail.com" Password = "admin"</i>	The system displays the message "login failed, username and password are not the same"	PASS
TC5	Users fill in the form according to user data	<i>Name = "arinal" NIM= "20040254001" Study program = "SI Civics" etc..</i>	System saves Input data to database	PASS
TC6	Admin validates, can accept or reject	<i>Click accepted or not accepted</i>	The system processes the letter, and the system displays a message why it was rejected	PASS

Test Case	Test Scenario	Action	Expected Result	Status
TC7	User downloads mail from the system	Downloading letters	Letter downloaded	PASS

3.7 Deployment and Maintenance

The final step in the waterfall technique, testing the system to make sure it is operating properly, and maintenance (i.e., correcting different problems overlooked in previous phases, improving system development and implementation, and program maintenance) are all part of this step. System maintenance can be carried out by an administrator to improve and elevate the quality of the system.

System maintenance is carried out periodically, namely every week.

There are 3 reasons why system maintenance is necessary, namely:

- a. To correct system errors or weaknesses that were not detected during testing.
- b. To make the system up to date.
- c. To improve system capabilities.

In this case the system has been pushed to the server and runs at the URL:

4 Conclusion

By building a service digitalization information system in the Faculty of Social Sciences and Law, the Faculty's business processes can be made faster and more efficient because several process stages can be made easier with online facilities that are connected and integrated. To improve the performance of this information system in the future, the development of this web-based information system can be implemented into a mobile-based information system, so that students can interact online more intelligently and practically.

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