

Paperless office system and data integration

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Abstract—

Paper-based correspondence has many constraints on sending, receiving, and filing. The filling makes it difficult to search document. Electronic-based office mail is able to solve many problems regarding the mail system such as speed of delivery, filing, and searching of documents. By utilizing the database system, documents can be stored well and integrated. With electronic mail is expected to reduce paper usage. This study reveals that the utilization of electronic mail cannot eliminate the use of paper. The main reason is the habit of employees needed paper evidence in their work.

Keywords electronic mail, paperless system, database, data integration.

I. INTRODUCTION

Information technology is the integration of technology, information, computers, and information systems, and computer devices. Processes used for computers and devices to create, modify, store, process, transmit, and retrieve information securely.[1].

The terms of "paperless," "electronic," and "digital" are made by people who use information technology and communication technology. A paperless office in a work environment where the creation, modification, storage, and retrieval of documents takes place electronically. It supports the management of business documents[1]. See also an understanding of the Electronic Service Manuscript (TNDE) which is part of an e-Government that will roll out forms that can be used to manage more easily, quickly, transparently, orderly, integrated, efficient, safe and efficient. [2]. In the electronic understanding where the letter

of service no longer use paper but the letter of service made, sent and stored using the information technology and communication in digital form.

Electronic-based office mail is able to solve many problems regarding the mail system such as speed of delivery, filing, and searching of documents.

- Reduce paper, paper converted into digital paper. Thereby reducing environmental pollution
- Ease to store: with digital document management system, all documents can be stored and accessed easily
- Ease of audit: Each company has strict document rules in storage and display of documents. The document has a unique number that generates an audit trail automatically.

Time savings document search is done quickly and easily and gives very fast results.

Make it simple: digital document management system will simplify some business processes. Users can use the authorities and transfer data when and wherever. Digital traces can be seen clearly.

Ease of accessing documents can be arranged in accordance with the authority of the right and ability to check and view the same document.

The digital document management system stores all documents on the server with guaranteed security. Documents can be authorized and not everyone can access the data, thus avoiding documents accessed by unauthorized persons.

The digital management system can result in better and more accessible customer service. This will help in retrieving information in serving customers

Improve efficiency where digital management system will be easy in search and retrieval of documents easily and simple.

The system has been created for the purpose of: reduction of paper usage Streamlining Communication; Eliminates the use of versatile software for routine mechanistic daily work to be directed at the full system usage; Concentrate the assignment of human resources to mechanistic non-routine work that requires the power of inventiveness, taste; Suppressing the use of paper only to print documents that have special legal powers such as certificates, promissory notices and so on.

II. LITERATURE REVIEW

Communication and mobile technologies have influenced consumers' lives, including how they read books. Book readers begin to change reading habits, choosing different types of book formats, such as e-books. An e-book, also known as an electronic or digital book, is a digitally released version of the book, often consisting of text and images and available on electronic devices, such as specially designed e-book readers.

Paperless is also used in education where communication used e-learning where the use of "paperless" educational technology increases the potential of teachers by offering more freedom and creativity to new teaching techniques and technologies that engage students in the creative process[3].

The Chambers Thesaurus proposes alternative words to paper as certificates, documents, files, gazettes, journals, newspapers, letters, notes, manuscripts, theses, etc. This term all refers to products containing information.

Paper documents refer to typeset documents (hard copy) and digital documents refer to the document on the

screen (soft copy). Although the document may be in the form of various combinations of text, digital, video and digital audio stored in the form of file files or folders[4].

Document management automatically creates a paperless working environment. Focusing on business processes and automation forces organizations to be customer-oriented and operate across organizational, cross-functional boundaries, ensuring competitive advantage.

Real business integration remains a key challenge that needs to be addressed by integrating applications (documents, papers, voice and database, handling email, fax and phone). The role of corporate information portal, in this case, should be a growing research[4].

Using web-based technology for the dissemination of course materials and for the storage of test results provides many benefits to instructors and students. Web-based software for users has many benefits such as 24-hour accessibility from any internet connection, electronic archive, paper stack removal, and reduced tasks[5].

Information and communication technology brings to the needs of fast and accurate transactions (online and real-time). By using internet technology, data can be sent in seconds, so the paper is no longer needed. Evan Golub says that web technology has replaced paper, so the paper is no longer needed anymore.[6]

Electronic office letter is a web-based application system that works to replace the work process of the system of physical correspondence (manual). This system works integrated with the smallest unit to the highest leadership. (bureaus, institutions, majors, faculty, and rectorate).

The system will work following a well-built manual workflow. Letters that have been made and approved by the boss will be automatically sent to the destination, from

the recipient side of the letter will be read in seconds after the letter was sent. This process will reduce send errors, and delivery time is very significant, and no less important is to reduce the employees in charge of sending mail. Service letters are specially designed such as letters in order to format and shape the same as paper mails

III. METHODOLOGY

Web-based e-mail design uses two stages of web-based application development and application usage survey.

1. SDLC (software development life cycle) software development method consist of System investigation, System analysis, Design Environments, Testing, Training, and transition, Operations and maintenance[7].
2. Evaluation: Spreading questionnaires to test the capabilities of built applications and user satisfaction. Questionnaires were deployed to view the satisfaction of electronic mail usage and receive input for system perfection.
3. Analysis: by spreading the question form to the user. There are 15 questions that can help infer the usefulness of the mail system.
 - a. the paperless office helpful in making letters (digitizing letters)
 - b. the paperless office helps to searching for data
 - c. the paperless in the office make us do not print a letter (paper form)
 - d. the paperless office makes you faster reporting
 - e. the paperless office have Backup function on the application
 - f. the paperless office is an Easy Feature / short-key to remember and understand
 - g. the paperless office is the system quickly responds to inputs

- h. the paperless office system are easy to learn
- i. the application is very accurate in providing reports
- j. the paperless office system the system provides information when there is an error
- k. paperless office system provides a help menu
- l. the papaerless office system are still relevant
- m. the system makes it easy to complete the job
- n. there is a complete manual documentation
- o. easy to learn documentation

4. Conclusions

IV. DISCUSSION

Identify actor

1. The primary business actor is a Stakeholder taken in most benefited from the implementation of use-case. They received benefit in cases that their mail system can run well so that their business processes can run smoothly.
2. Primary system actor: Stakeholders that interact directly with the system to trigger business or system events (business or system events) in this case are administrative staff and related leaders.
3. External server actor: is a Stakeholder that responds to requests from use-case. Head Unit authorizing letter can be sent or not
4. External receiver actor: is a Stakeholder which is not a primary actor but receives something of value from use-case. A Staff and Lecturer receiving the letter.

Data Flow diagram

The Flow diagram Figure 4.1 is the proses making a letter until received. Letters that have been made by staff must be approved by the head of the unit, if approved then the letter is automatically sent. In this process has some activity that is scheduling and disposition letter.

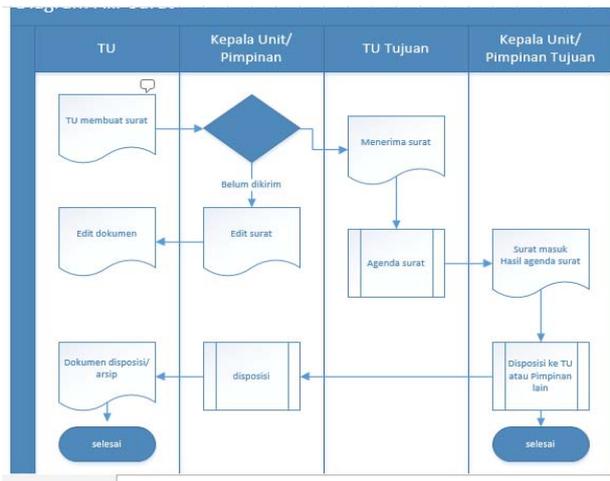


Figure 4.1. Data flow diagram

Use case diagram

In the use case Figure 4.2, the actor is the staff and the unit leader. The tasks of each actor are different and are included in the existing use case. However, before they can perform the task there is an include that requires them to log into the system.

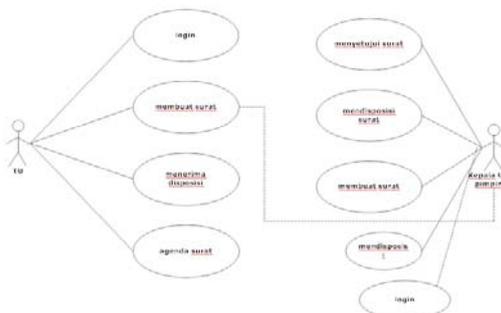


Figure 4.2. Use case diagram

Database design

The database on Figure 4.3 is reviewed using the normalization method up to 3NF so

it can eliminate redundant (useless), anomaly data and ensure logical data dependency.

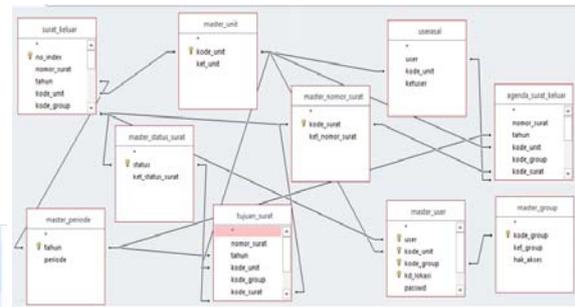


Figure 4.3. Data design incoming mail

Figure 4.4 indicates the outgoing mail table relation. each table should be related to each other's primary key.

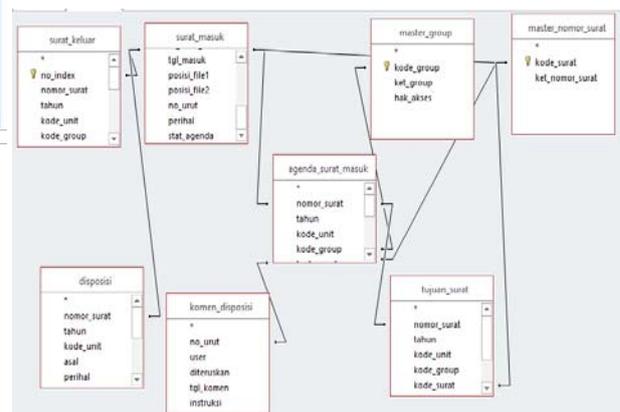


Figure 4.4. Data design outgoing mail

Implementation of Input Design

User login

Figure 4.5 view of user login, everyone who will access paperless system must authenticate users and passwords in order to avoid data manipulation. Sync user can use ID and also by using an institutional email address.



Figure 4.5. login form

Front view

The front view after login is designed to display all mail information in both incoming mail, outgoing mail, or disposition. If there is a change that is incoming, outgoing or disposition letter will appear red status. Users will automatically see and perform as soon as possible. So there is no delay in activities, as shown in Figure 4.6.



Figure 4.6. form information incoming and outgoing letter

Incoming mail view

The incoming and outgoing messages display all the information from the mail, so the user can easily see and open and the button used to display the content simply use on click, as shown in Figure 4.8

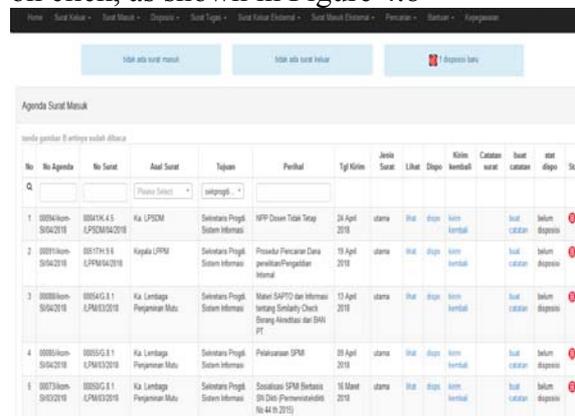


Figure 4.8. display incoming and outgoing letter

The view creates a letter

At the time of making a letter, the user simply selects the destination, the letter number, the origin of the letter using pulldown so as to avoid writing errors. Only the contents of the letter should be typed in accordance with the needs, as shown in Figure 4.7.

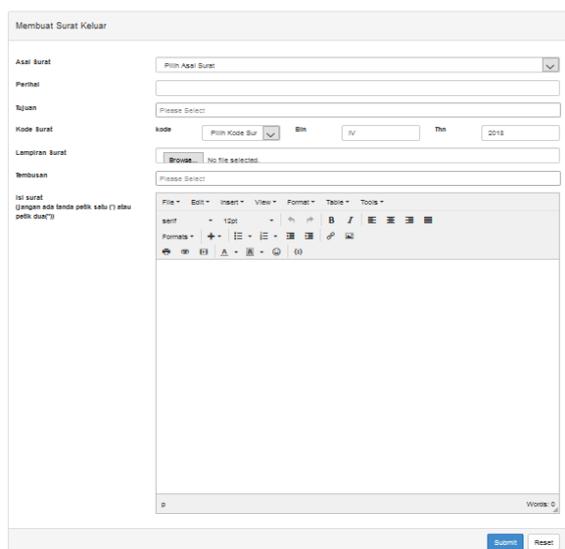


Figure 4.7. login form create letter

Data analysis

From the data processing obtained 3 Group where group 1 which has an average value 3.5. The value is considered a good enough value. Group 2 is a moderate group between 3.0 and 3.5. While group 3 with low value that is less than 3.0, as shown in Figure 4.9

question	1	2	4	7	8	11	13	14	15	
total number	196	170	180	210	190	186	186	180	186	Group 1
average	4.26	3.70	3.91	4.57	4.13	4.04	4.04	3.91	4.04	
pertanyaan	5	6	9							
total number	144	140	160							Group 2
average	3.13	3.04	3.48							
pertanyaan	3	10	12							
total number	124	126	132							Group 1
average	2.70	2.74	2.87							

Tabel 4.9. Data group

In group 2 has an average value above 3.5. The system is very helpful in making letters (digitizing letters), respondents provide an average grade of 4.26. In search of respondent data facilitated by the system with average value 3.7.

With the e-mail, the process of making reports faster because with the letter response quickly and making reports immediately done. at the system level, respondents see that the system response is very fast that the data load is very short and the data storage process is very fast because it is supported by an adequate server.

Respondents stated that studying online letters is quite easy and enough to see well-organized forms so that new users have no trouble using them. The help menu helps respondents in understanding the letter system to make it easier to understand the application.

Respondents can complete the work of the correspondence easier and faster this is because there is ease of editing sentences and delivery with a very short period, and ease in making the letter again by looking at the pattern of the mail archive.

In group 2 has an average value of 3 to 3.5. respondents still need ease of understanding of existing features, application backup and application accuracy in generating reports even though data inputted as outgoing mail, and received as incoming mail can be reported accurately and precisely, due to good database design support, no redundancy and not duplicate data.

In group 3, electronic mail that has been made does not necessarily change the habit of printing a letter. Electronic mail should still be printed as valid proof. In the system, there are still weaknesses that have not provided an error message if something goes wrong or the process is not working properly. The system based on client-server is not easy to be changed according to the needs of each client. Changes must be centralized.

Another weakness in this system is the word processing function is still not able to match word processing like Microsoft word that has many features. This system uses TinyMCE template which fundamentally this letter system has been able to solve the problem of digitalization of correspondence system.

V. CONCLUSIONS

The paperless app has helped digitize the mail system well and all parts run the work using electronic mail. And the system runs stable. The paperless system has been able to solve the problem of late delivery and receipt of mail and letter can be searched quickly.

Applications are able to simplify some business processes viewed from the fast and easy delivery process and digital archives can be seen clearly.

The e-mail application stores all documents on the server with guaranteed security. Documents may be authorized according to their respective access rights.

The electronic mail system has not been able to change the habit of printed letters, many still keep printing letters as physical evidence.

The weakness of the electronic mail system is that it does not yet have a feature like in MS Word word processing, but overall it has been able to solve the problem of digitizing correspondence.

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