



Manuscript management information system at the Mandala Dirgantara Museum

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Abstract. This research aims to change the paradigm in mail management the TNI AU Central Museum "Dirgantara Mandala" which previously used manual methods, is proposed to switch to utilizing information technology. The software produced from this research is an information system tested using correlation and black box methods. The tool used is a questionnaire. The research results show that the correlation method cannot be applied because the questionnaire data is too small. Meanwhile, the black box method proves that the software designed can work according to the research objectives.

Keywords: Archiving, Correlation Analysis, Pearson Product Moment, Museum.

1 Introduction

The TNI AU Central Museum "Dirgantara Mandala" is a museum initiated by the Indonesian National Army (TNI) Air Force (AU). This museum is located in the Special Region of Yogyakarta Province, precisely in the area of Adisutjipto Yogyakarta Air Field (Lanud). This museum has a collection of fighter aircraft and their replicas and supporting equipment. Other collections consist of documents and traces of events in the War of Independence in the form of dioramas. The museum, managed by the Indonesian Air Force, is open to the public on specified days and hours or according to working hours. The workers who operate this museum also have administrative skills supporting agency correspondence.

The research we conducted at this museum is closely related to correspondence management, where the museum leadership wants a change in governance, which is currently still manual to governance that utilizes information technology. Correspondence management using information technology can use CMS[1], web-based[2], or Android-based[3]. The form of information technology here is in the form of software that works on a computer or mobile computer in the form of a mail archive information system[4], which has been implemented in Gunung Terang village[5] and Jatimulyo village [6]. Applying information technology is not easy because you have to change your way of thinking and habits from manual to computerized. We tested the software from this research on all workers who staff the museum, especially those in charge of mail management. Test data from our software is analyzed using correlation analysis to find the relationship between without an application and using an application in correspondence management.

The correlation analysis used in this research has been proven to be used in research on Regional Apparatus Organizations[7], Scene Change Detection[8], COVID-19 Confirmed Case[9], Brain Imaging Genetics[10], Cross-View Recognition[11], Tensor Representation Learning[12], financial data of institutions[13], Regional Grid based on Monitoring Data[14], Based on Prediction Technology[15], dan weather factors and outage duration[16]. Correlation analysis in two dimensions has also been written for different image data sets without reshaping images[17]. Correlation analysis was also developed in the form of gray correlation for transformer fault diagnosis[18], electromagnetic solid environment and damage characteristics[19], and Optimal Mathematical Modeling of Drug Therapy [20]. Correlation analysis using Karl Person has also been used for Cyber Threats[21] and Power Analysis on Digital

Multiplier[22]. Correlation analysis has never been used for correspondence management software. This study used correlation analysis to find the relationship between correspondence management without and with software.

2 Research Methods

Karl Pearson correlation is used to find relationships and prove the hypothesis of a relationship between two variables (bivariate) in an interval or ratio. The data source from two or more variables is the same. The general purpose of correlation analysis (Karl Pearson product-moment correlation) is to see the level of strength or closeness of the relationship between two variables, see the direction of the type of relationship between two variables, and see whether the relationship is significant. The formula for calculating the Karl Pearson product-moment correlation is as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}} \quad (1)$$

Information:

r = Carl Pearson Correlation Value

$\sum X$ = Number of Observation Results for Variable X

$\sum Y$ = Number of Observation Results for Variable Y

$\sum XY$ = Number of Observation Results for Variable X and Variable Y

$\sum Xn$ = The number of X observation results that have been squared

$\sum Yn$ = The number of Y observation results that have been squared

The item is declared valid if r is greater than or equal to 0.300. This means that the research instrument is accurate in testing research hypotheses. However, if r is smaller than 0.300, the item is declared invalid and will not be included in subsequent hypothesis testing, or the instrument will be removed from variable measurement.

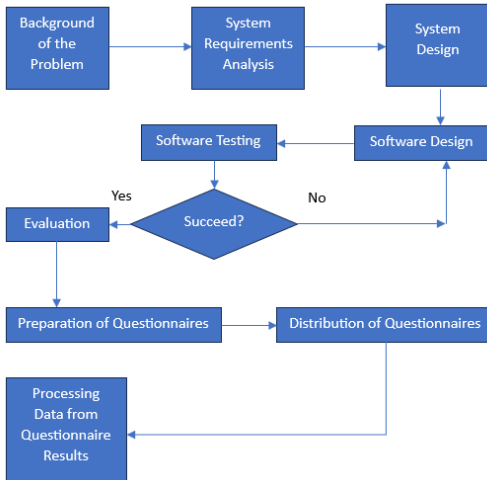


Fig 1. Research flow

The research began by collecting problems with managing correspondence in the museum, as seen in Fig 1. After the issues were collected, the research continued with developing computer hardware and software requirements used in designing the application for letter management. The application that has been created is then tested, and improvements will be made if bugs are found during the testing. After

no bugs are found, the research continues with an evaluation through a questionnaire distributed to stakeholders in the museum. The questionnaire results are then processed using Karl Pearson to obtain data for the conclusion.

3 Results and Discussion

The software design results from this research can be seen in Fig 2 for the software used by museum staff and in Fig 3 used by the head of the museum. The software created from the results of this research was tested directly in the museum and explained to the users who would later operate this software. These users will also be given a document containing a questionnaire to fill in, and the data will be analyzed using correlation analysis. At this stage, we discuss the results of testing the application or system created to find out whether the application or system is running well or not, as expected. There are three tests: function tests using the function testing method, comparison tests, and x and y correlation analysis tests.

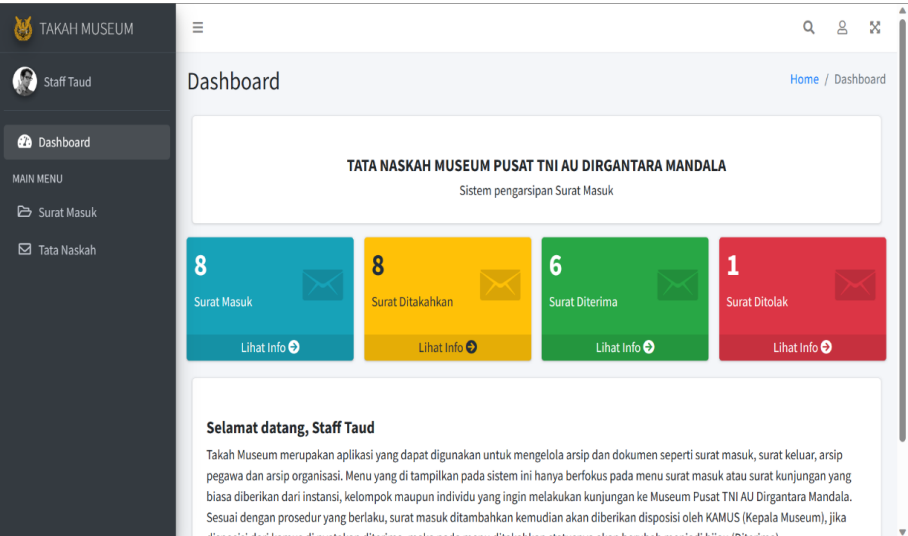


Fig 2. Staff Dashboard Page

The difference between these two software can be seen in the menu, which requires less staff than the menu at the head of the museum. Both of these software are designed to work on smartphone devices; this is done to anticipate that museum employees' work in managing correspondence will be highly mobile. This is, of course, very different from the formal management that they have carried out in managing museums.

On the incoming mail page, staff can see the incoming mail data in the incoming mail table. The entry letter data consists of the number, date, from, subject, description, and an action table where the action column will contain the disposition of the head of the museum as to whether the entry letter is accepted or rejected. On the incoming letter page, the Head of the Museum can see the incoming letter data in the incoming letter table. The entry letter data consists of the number, date, from, subject, description, and an action table where the action column will contain the disposition of the head of the museum as to whether the entry letter is accepted or rejected.

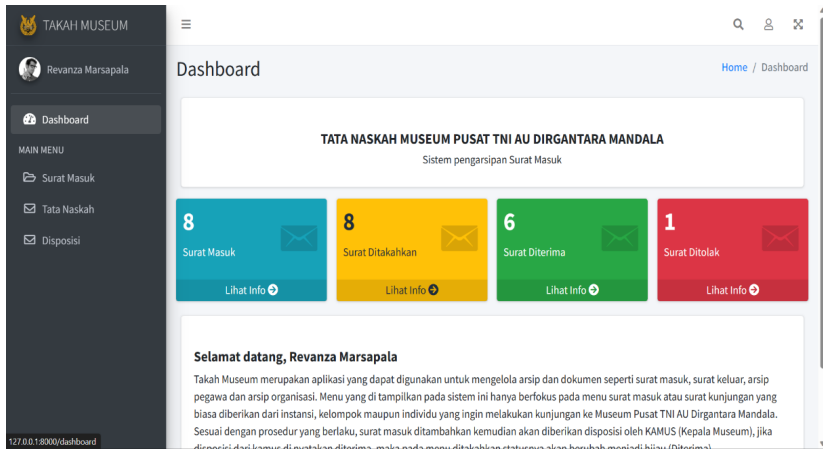


Fig 3. Museum Head Dashboard Page

3.1. System Testing

In this test, tests are tested on several different operating systems (OS), such as Android smartphones and iOS, and the computers used have different specifications, so it is known which devices can support the use of the applications in the following table. The test results can be seen in Table 1.

Table 1. Function Test Results

No	Device Name	Operating System	Access
1	Samsung AS25	Android Version 13	✓
2	Realme 8	Android Version 11	✓
3	Xiaomi Redmi Note 10	Android Version 12	✓
4	Oppo 17AK	Android Version 12.1	✓
5	Xiaomi Redmi 9T	Android Version 12	✓
6	Samsung A32	Android Version 12	✓
7	Asus VivoBook	Windows 10	✓
8	Acer	Windows 10	✓
9	Asus ExpertBook	Windows 10	✓
10	iPhone 11	IOS Version 16.5	✓

3.2 Comparative Testing

In this test the author carried out a test where test was carried out to find out what the value is for the UI display of the management of correspondence Museum application with the Manuscript Application on the ITD Adisutjipto campus with a value rating of 1 - 10, the respondents who assessed this application were from Faculty of Industrial Technology Admin, Head of Informatics, TE and IT Study Program, Head of Student Affairs and Academic Affairs, ITD Adisutjipto, which can be seen in the following table.

Table 2. Comparative Testing Result

No	The official who controls the Manuscript Management	Results
1	Head of the Informatics Study Program	8,2
2	Head of Academic Department	8,1
3	Head of the Industrial Engineering Study Program	8,5
4	Head of the Electrical Engineering Study Program	8,5
5	Head of Student Affairs	8,5
6	Admin Faculty of Industrial Technology	8,4
7	Admin Faculty of Aerospace Technology	8,5

3.3 Black Box Testing

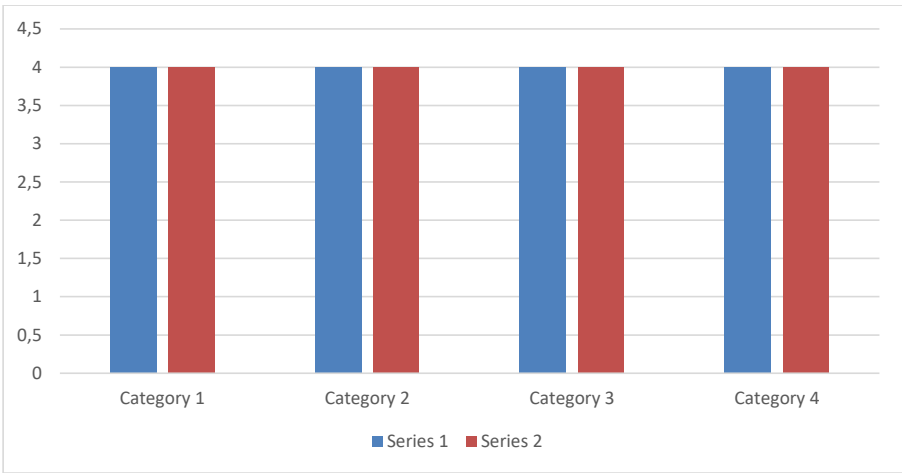


Fig 4. Test results with black box

We also tested the software resulting from this research using black box testing, the results of which can be seen in Fig 4. Series 1 refers to the software used by museum staff, while series 2 is the software used by the museum head. Categories 1 to 4 are the menus available on the software used by staff and museum heads, while the values 0 to 4 are the scores we calculate based on the user's assessment questionnaire.

3.4 Testing X and Y Test Correlation Analysis

The author carried out this test to collect questionnaire data directly from users. Staff manage the correspondence Museum application. This research aims to determine the close relationship between two variables, namely variables x and y, which can be seen in Table 3.

Table 3. List of Questions

Variable	Questions	Code
Improve Service Quality	The applications created can be accessed anywhere and at any time.	Q1
	The information displayed on the application is up to date information.	Q2
	The data presented in the application is based on its classification.	Q3
User Satisfaction	The application provides interaction between the Head of the Museum and staff.	Q4
	Presentation of Manuscripts is faster and more interactive.	Q5
	I like the appearance of this website.	Q6
	I found it easy to understand how to operate this website.	Q7
	I feel fast in getting a disposition response from the head of the museum	Q8
	It is easy to add and annotate incoming letters.	Q9
	Content that corresponds to that contained in the Incoming Mail Agenda ledger.	Q10

The results of testing with one respondent who has provided an assessment of the management of correspondence Museum application, namely Mr. Drs Kworoseto Puspoputro as staff in charge of certifying incoming letters at the Internal Affairs Administration (TAUD) office which can be seen in Table 4.

Table 4. List of X and Y Correlation Analysis Tests

No	Questions	SD	DA	A	SA
1	The applications created can be accessed anywhere and at any time.			3	
2	The information displayed on the application is up to date information.			3	
3	The data presented in the application is based on its classification.			3	
4	The application provides interaction between the head of the museum (Dictionary) and TAUD staff.			3	
5	Presentation of Manuscripts is faster and more interactive.			3	
6	I like the appearance of this website.			3	
7	I found it easy to understand how to operate this website.			3	
8	I felt fast in getting a dispositional response from the head of the museum (Dictionary).			3	
9	It is easy to add and add incoming letters.			3	
10	Content that corresponds to that contained in the Incoming Mail Agenda ledger.			3	

Based on the x and y test data for the correlation analysis in Table 4, the next step is carrying out a correlation coefficient analysis. Correlation coefficient analysis is intended to measure the closeness of the correlation relationship between two variables, namely the service quality improvement variable and the user satisfaction variable. The calculations used are as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

$$r_{xy} = \frac{5 \times 45 - (15)(15)}{\sqrt{[5 \times 45 - (15)^2][5 \times 45 - (15)^2]}}$$

$$r_{xy} = \frac{225 - 225}{\sqrt{(225 - 225)(225 - 225)}}$$

$$r_{xy} = \frac{0}{\sqrt{(0)(0)}}$$

Based on analysis using the Karl Pearson product-moment correlation formula, the results obtained are $r_{xy} = 0.000$, which means it is not very high, so there is no significant influence between variables x and y, namely increasing service quality on user satisfaction.

The results of testing the management of the correspondence Museum application using the Black Box Method, which is used for each menu feature and function on the page for TAUD Staff and Head of the Museum (Dictionary), run according to the application design.

4 Conclusion

The results of system testing using the Black Box Method are used in each menu on the TAUD Staff and museum heads (Kamus) pages, and they run according to the main design of the application. The functional tests were conducted using several Android, IOS, and computer devices. Application testing results show that all operating systems used for testing can run well on each browser and each operating system. This comparative test was conducted to determine how many marks were given for the UI display of the management of correspondence Museum application with the Manuscript Application on the ITD Adisutjipto campus. The assessment provided by respondents was an average of 8 for the appearance of the management of the correspondence Museum application. In testing the x and y tests, correlation analysis used the Karl Pearson Product Moment Method with 1 sample of respondents. Based on the calculations using Karl Pearson Product Moment, the r_{xy} calculation results were 0.00, with the results stating that there was no relationship between the two variables because the number of respondents was relatively small.

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