

# Laravel Framework-Based Information System of the Department of Information Technology of Universitas Muhammadiyah Yogyakarta

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## Abstract

*It is crucial to have a reliable and adequate information system to implement information technology. It explains why technology must continue advancing in this area, specifically regarding the Information Technology Department's information management at Universitas Muhammadiyah Yogyakarta (UMY). Information has been disseminated through the WhatsApp and Telegram applications, leading to improper conveying of the made and supplied information due to excessive stacking. Hence, a web-based information system was developed in PHP with the help of the Laravel framework to overcome the issue. Moreover, a database was set up using MySQL to circumvent the issue. The newly constructed information system could enhance information management, leading to more accurate and efficient information generation for various uses.*

**Keywords:** *Laravel Framework, PHP, MySQL, Information Technology, Information Administrator, Web*

## 1. Introduction

The significance of technology in an information system is enhanced due to the ease of information transmission and reception made possible by the continued development of information technology in Indonesia. The administrator website of the Information Technology Department at Universitas Muhammadiyah Yogyakarta (UMY) is no exception. However, the absence of filtering for recipients of information has caused an issue. As a result, any member or student of the department can receive information created by the administrator without proper conveyance. It also leads to the transmission of information not intended for its intended recipient. Therefore, the administrator requires a system to create and transfer information efficiently and adequately. Thus, an information system was built.

Nowadays, technology is incredibly useful in every aspect, particularly in a business or organization. It is also true for the information system of the Information Technology Department at UMY. A system designed to manage academic data and information is known as an academic information system. A study entitled "Web-based Information System Design" [1] aims to facilitate users' Internet access to academic content. An excellent example of how universities integrate educational technology into their data processing systems is the information dissemination of the Information Technology Department at UMY, where students and faculty utilize messaging applications like WhatsApp and Telegram to stay in touch. As stated in "Information Systems Analysis and Design," an information system refers to a tool for presenting information in a way that is valuable for the recipient [2].

In order to facilitate organization and planning, it is necessary to provide information for decision-making. However, there is no absolute certainty regarding the importance of an information system to an organization's development. A solid information system can help an organization in many ways, which is great for the organization's growth. In this way, information technology is a tool that helps an institution process its resources. This

research indicates that educational institutions like UMY, particularly the Information Technology Department, greatly benefit from the utilization of technology, especially in the information sector, when it comes to communicating course materials and student events. Two advantages of information technology are quicker access to information and the replacement of all current methods with an application simplifying information dissemination.

## **Literature Review**

### **Information System**

Data refers to an independent quality or value. On the other hand, information is data transformed into visual or textual form and is beneficial for making decisions either now or in the future. Hence, one way to understand an information system is as a tool for making visual or textual information more helpful to the recipients. It aims to provide information for decision-making on the operational activities of a company's or institution's subsystem [2].

### **Web-based Application**

Applications that run on the World Wide Web Consortium's (W3C) standards and technology are known as web-based applications. They supply particular online resources through a web browser and user interface, including content and services. Users can access web-based applications through various operating systems, devices, and manufacturers, which is one of the main reasons for their popularity compared to desktop and mobile applications [3].

### **Web Service**

Web services allow for the electronic connection of various user applications and platforms. They are built upon web frameworks and utilize web-based object-oriented standards and technology. Connecting corporate functions, web services allow for real-time data interchange in web-based applications [4].

### **Laravel Framework**

Laravel is a Hypertext Preprocessor (PHP) programming language framework for developing web-based applications using the model view controller (MVC) concept. Taylor Otwell created this framework and released it on June 9, 2011. Laravel is open-source licensed, signifying that it is free to use without paying. The official website address of the Laravel framework is <https://laravel.com>. Its modern features that help developers create applications cover Bundles, Eloquent ORM (Object-Relational Mapping), Query Builder, Application Logic, Reverse Routing, Resource Controller, Class Auto Loading, View Composer, Blade, IOC Containers, Migration, Database Seeding, Unit Testing, Automatic Pagination, Form Requests, and Middleware [5].

### **MySQL**

A database management system (DBMS) is the English term for MySQL, a server that stores and manages databases. Relation database management system (RDBMS) describes the database management system architecture of MySQL [5].

### **PHP**

PHP is an open-source programming language highly suitable for web development and can be embedded in an HTML script. The PHP language defines several programming languages, such as C, Java, and Perl, which are easy to learn [6].

### **XAMPP**

XAMPP is an instant installation package for Apache, PHP, and MySQL [7].

### Unified Modeling Language (UML)

UML is a tool for visualizing and documenting analysis and design results, containing syntax for modeling systems visually. UML is also a collection of modeling conventions that define a software system related to objects [8].

### Entity Relationship Diagram (ERD)

Database relationships can be better understood with the help of ERD, a model that relies on basic data objects with interrelationships [9].

## 2. Method

Software and hardware were the necessary tools in this study. Web application development tools included Windows 10 Education, Xampp, Visual Studio Code, 16 GB RAM, an Intel® Core™ i7 processor, MySQL, HeidiSQL, and JQuery. The Information Technology Department's Information Administrator of UMY provided the paradigm and concepts of this research.

Using the software development life cycle (SDLC) method, the Information Technology Department built a web-based application that powered its information system. It was employed to carry out the software development and maintenance. A prototyping model was utilized as the SDLC method. Figure 1 illustrates various steps involved in the prototyping process.

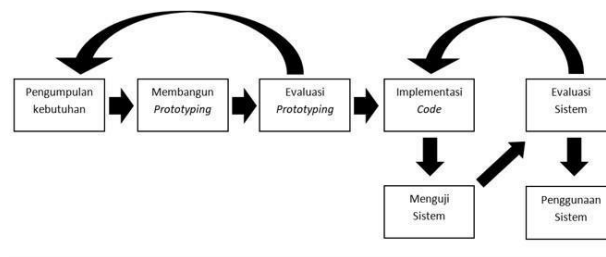


Figure 1 Prototype Concept

## 3. Results and Discussion

### Use Case Diagram

Figure 2 illustrates the correlation between actors and cases. The illustration illustrates that the admin actor serves as the administrative authority for the Department of Information Technology. The administrator possesses unrestricted privileges to the application. For data management in the web application, officers are required to log in to the system. Once logged in, officers can access various pages of the web application, including the Profile Menu, Information, Information Details, and more.

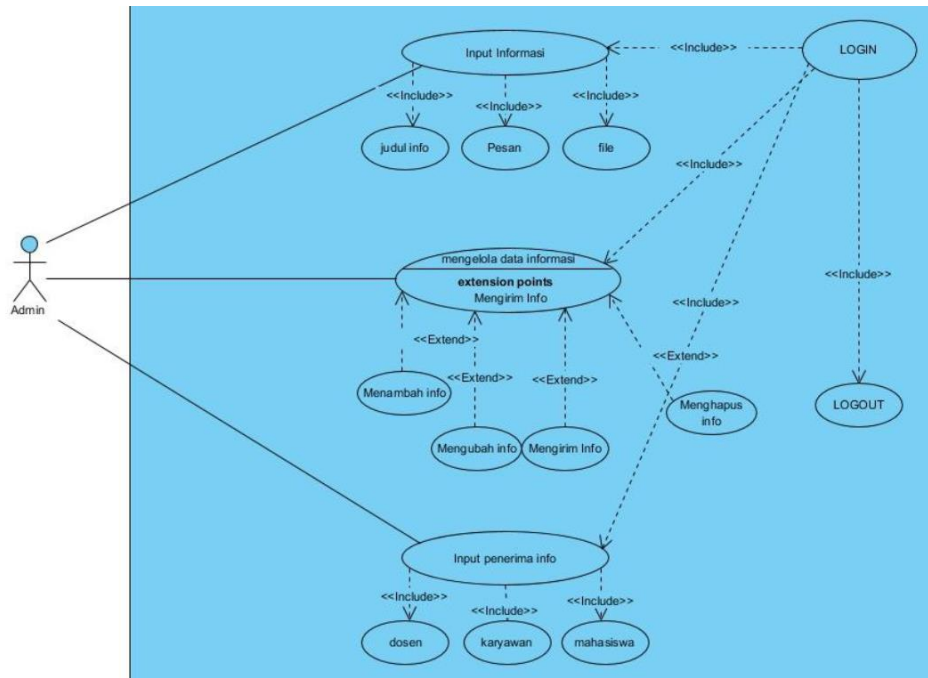


Figure 2 Use Case Diagram

### Class Diagram

Figure 3 depicts a class diagram model that encompasses classes, characteristics, operations (or methods), and their corresponding relationships. The system's class diagram takes the shape of a web application controller, with each controller performing the same function as the operation or method in the class diagram. The Diagram class has been modified to suit the specific requirements of the applications, serving as a guide for developing application programs in this research.

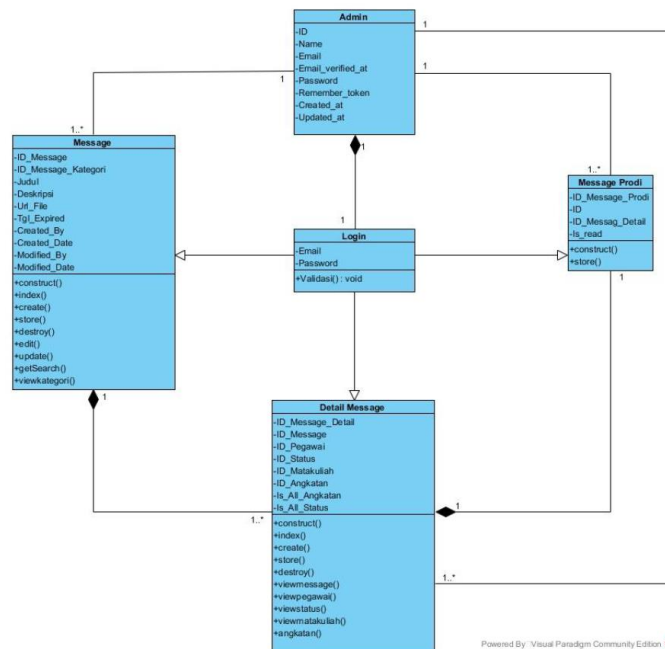


Figure 3 Class Diagram

## Database Creation

Creating a website using data as the information is inseparable from the database. This website application for the information administrator utilized MySQL as software to create a database. The following figures 4 display the database details of the website application for the information administrator.



Figure 4 Database details of the website application for the information administrator

## Implementation of the user interface

Figure 5 depicts the webpage where users will initiate the login procedure. Upon successful authentication, the system will redirect the website user to the information page. In the event of authentication failure or mismatched credentials, the system prompts the user to enter the accurate login information.

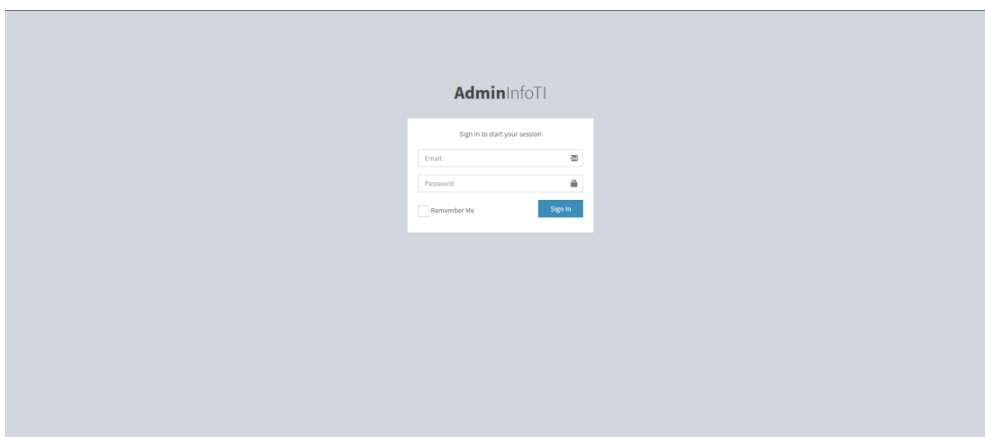


Figure 5 Database details

Figure 6 displays an information page that serves as a repository of data, allowing users to perform various data management tasks such as creating, updating, searching,

and deleting. This data will subsequently be utilised for generating information. The information page includes a column with links that can be in the form of files or photos. These links assist the administrator in obtaining a clearer and more detailed view of the data. Displayed below are images of the page that can be modified by the administrator.

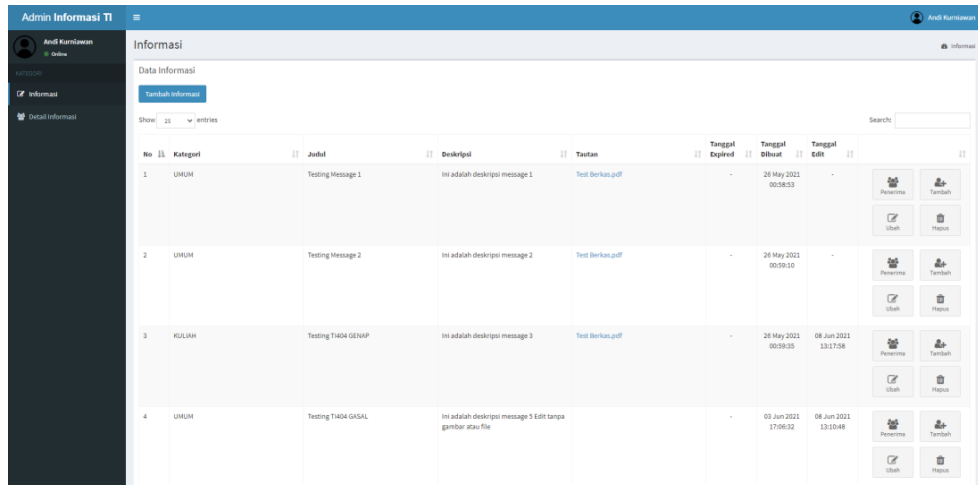


Figure 6 Homepage

### Functional Test Results

Table 1 displays the outcomes of the testing phases aimed at verifying the proper functioning of each function and feature of the program, as well as identifying any remaining problems or flaws.

Table 1 Functional Test Results

No	Test Case	Expected Result	Obtained Result	Status
1	Login page	The administrator can successfully log in.	The administrator could successfully log in.	Succeed
2	The sign-in button on the login page with incorrect email and password input	A notification will appear informing that the credentials were not found because the email and password entered were incorrect.	A notification appeared informing that there was no matching credential in the database due to an incorrect	Succeed

No	Test Case	Expected Result	Obtained Result	Status
3	Information page	The administrator will go to the information page.	The administrator entered email and password. The system directed the administrator to the information page.	Succeed
4	Log-out button	The administrator returns to the home page, which is the login page.	The system directed the administrator to the login page.	Succeed
5	Information page	The administrator can view all the information data.	The administrator could view all the information data.	Succeed
6	Create an information data page	The administrator can enter the create information data page.	The administrator could enter the create information data page.	Succeed
7	Save button on the create information data page	The administrator can successfully add information data to the create information data page.	The administrator successfully added information data, and then the system directed the administrator back to the information page.	Succeed
8	Save button on the create information data page with inappropriate data	The administrator cannot add information data.	The system refused to add data when the administrator entered inappropriate data.	Succeed
9	Information data update page	The administrator can go to the information data update page.	The administrator could enter the information data update page.	Succeed

No	Test Case	Expected Result	Obtained Result	Status
10	Save button on the information data update page	The administrator can successfully change the information data on the information data update page.	The administrator could successfully change the information data, and then the system directed the administrator back to the information page.	Succeed
11	The save button on the information data update page with inappropriate data	The administrator cannot change information data.	The system refused to change information data when the administrator entered inappropriate data.	Succeed
12	Delete button on the information page	A confirmation alert will appear informing that the administrator can delete the data.	A confirmation alert appeared informing that the administrator could delete the data.	Succeed
13	The search textbox on the information page	The administrator can search for data on the information page.	When a keyword was entered in the search textbox, the system searched data based on the keyword.	Succeed
14	The search textbox on the information page with an inappropriate keyword	The information page is empty, indicating the inappropriate keyword.	When an inappropriate keyword was entered in the textbox, the system directed the administrator to an empty information page.	Succeed
15	Add a recipient button on the information page	The administrator can go to the add information recipient page.	The administrator could enter the add information recipient page.	Succeed



No	Test Case	Expected Result	Obtained Result	Status
16	Save button on the add information recipient page	The administrator can successfully add information recipients on the add information recipient page.	The administrator successfully added the information recipients, and then the system directed the administrator back to the information page.	Succeed
17	Save button on the add information recipient page with an inappropriate recipient	The administrator cannot add an information recipient.	The system refused to add an information recipient and provided an alert when the administrator entered an inappropriate recipient.	Succeed
18	Recipient detail button on the information page	The administrator can enter the detail page of the information recipient with the same information.	The administrator could enter the detail page of the information recipient with the same information.	Succeed
19	Hyperlinks on the information page	The administrator can view images or download data.	The data were successfully downloaded and entered into the download folder. Image data were displayed on the webpage.	Succeed
20	Information detail page	The administrator can view detailed information data.	The administrator could view detailed information data.	Succeed
21	Search textbox on the information detail page	The administrator can search for data on the information detail page.	When a keyword was entered in the textbox, the system searched for data based on the keyword.	Succeed

No	Test Case	Expected Result	Obtained Result	Status
22	Search textbox on the information detail page with an inappropriate keyword	The information detail page is empty, indicating an inappropriate keyword.	When an inappropriate keyword was entered in the textbox, the system directed the administrator to an empty information detail page.	Succeed

#### 4. Conclusion

Research conducted in the Information Technology Department of Universitas Muhammadiyah Yogyakarta revealed that its web-based application for information administration was functional and met all requirements for managing program data.

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