Design of E-Consultation Service Information System for GMAHK Congregation Members to Web-Based Pastors Using Laravel and Vue.Js

Yonatan Simbolon*[1], Andrew Fernando Pakpahan[2]
Fakultas Teknologi Informasi, Universitas Advent Indonesia
e-mail: *[1]2181024@unai.edu, [2]andrew@unai.edu

Abstract

In the digital era, access to spiritual services has become a challenge for church members living in remote areas or those with limited time. This study is driven by the need of the Seventh-day Adventist Church (GMAHK) to provide an efficient online consultation platform between church members and pastors. This research developed a web-based e-consultation application using the Laravel and Vue.js frameworks. The development method used is the Rational Unified Process (RUP), an iterative and incremental software development model. This process consists of four main phases: Inception (user needs analysis), Elaboration (system architecture design), Construction (system development and testing), and Transition (implementation and system refinement based on user feedback). The main features include consultation scheduling, visitation requests, and direct interaction through live chat. This e-consultation application offers a practical and effective solution for flexible spiritual consultation services that can be accessed without geographical barriers.

Keywords: *E-Consultation, GMAHK, Laravel, Vue.Js, Rational Unified Process*

Perancangan Sistem Informasi Layanan E-Consultation Anggota Jemaat GMAHK Ke Pendeta Berbasis Web menggunakan Laravel dan Vue.Js

Abstrak

Dalam era digital, akses terhadap layanan spiritual menjadi tantangan bagi anggota jemaat yang tinggal di daerah terpencil atau memiliki keterbatasan waktu. Penelitian ini dilatarbelakangi oleh kebutuhan Gereja Masehi Advent Hari Ketujuh (GMAHK) untuk menyediakan platform konsultasi daring yang efisien antara jemaat dan pendeta. Penelitian ini mengembangkan aplikasi e-consultation berbasis web menggunakan framework Laravel dan Vue.Js. Metode pengembangan yang digunakan adalah Rational Unified Proces (RUP), model pengembangan perangkat lunak iteratif dan inkremental. Proses ini terdiri dari empat fase utama : Inception (analisis kebutuhan pengguna), Elaboration (perancangan arsitektur sistem), Construction (pengembangan dan pengujian sistem), dan Transition (implementasi serta penyempurnaan system bedasarkan uji coba). Fitur utama yang disediakan adalah penjadwalan perlawatan, dan interaksi langsung melalui live chat. Aplikasi ini menawarkan Solusi praktis dan iteraktif dalam layanan konsultasi spiritual yang fleksibel dan dapat diakses tanpa hambatan geografis.

Kata Kunci: E-consultation, GMAHK, Laravel, Vue.Js, Rational Unified Process

1. Introduction

In the ever-evolving digital era, information technology has brought significant changes in various aspects of life, including religious and spiritual matters [1], [2]. For the Seventh-day Adventist Church (GMAHK), the need for spiritual support in consultations with pastors is essential[3]. However, limitations in location, time, and circumstances make face-to-face consultations difficult to conduct.

GMAHK aims to provide spiritual guidance and support to its members[4]. However, church members who live in remote areas or have busy schedules often struggle to access spiritual consultation services easily. This creates a need for innovative solutions that can overcome these barriers.

Based on research on online consultations in the medical field [5], this method has proven to be effective in providing healthcare services, as it allows patients to receive rapid responses from doctors compared to non-real-time interactions in online medical communities. Although e-consultation does not allow for direct physical examination, studies have shown that the accuracy of diagnosing common and chronic diseases through online consultations is not significantly different from face-to-face consultations [6], making it a valid alternative [7]. Additionally, e-consultation can improve patient knowledge as doctors can provide important information related to health conditions, helping patients make better medical decisions. This service is also effective for patients who have already had face-to-face consultations and want to continue disease management or receive additional medical services online [7], [8], [9]. Overall, e-consultation allows for more informed medical decision-making and can be applied in the context of providing services from GMAHK members to pastors, offering a more flexible and efficient solution.

This research aims to fill the gap in studies on the use of e-consultation within the GMAHK community. While information technology has been widely used in religious services, there has been no specific research on the e-consultation application designed for GMAHK. Previous studies have generally focused on the church context without considering the specific needs of GMAHK members. Therefore, this research develops and tests an e-consultation application specifically designed for GMAHK, evaluating its effectiveness in improving accessibility and the quality of spiritual consultation services.

The GMAHK e-consultation application is expected to be an innovative solution by providing a secure and easy-to-use platform for GMAHK members to consult with pastors online [10]. Through this application, users can choose pastors, schedule real-time consultation sessions, and even request face-to-face visits if necessary. Additionally, this application also allows pastors to provide spiritual support more flexibly and efficiently, which is expected to enhance the effectiveness of pastors' services in meeting the spiritual needs of their congregation.

2. Research Methodology

The method used in this researh is the Rational Unified Process Model (RUP) [11], a software development method that provides a framework to organize and execute software development work[12]. RUP can accommodate several weaknesses in mobile-based software development, as it incorporates repetition through RUP's iterative model. RUP is object-oriented and is a well-defined and well-structured software engineering process. With an iterative and incremental approach to software development, it emphasizes team collaboration, architectural modeling, and strict quality control. This process consists of four main phases: Inception, Elaboration, Construction, and Transition[12].

1. Inception : In the Inception phase, researchers identify and validate the needs of users and stakeholders, as well as design an initial approach for the solution. This involves a thorough analysis of accessibility and efficiency challenges in spiritual consultations between GMAHK members and pastors. These initial steps help establish a strong understanding of the research's objectives and scope. This phase includes two stage:
    - Communication : In this stage, researchers hold meetings and communicate with GMAHK members and pastors to gain a deep understanding of their needs and expectations regarding spiritual consultations. This involves using various communication methods, such as interviews or group discussions, to obtain comprehensive insights.

- Planning : This planning stage involves developing a detailed project plan, including resource allocation, time scheduling, and task organization.

2. Elaboration : The Elaboration phase involves in-depth system architecture modeling and detailed planning for implementation. Researchers will develop a system design that enables effective e-consultation between church members and pastors. Additionally, risk evaluation and project management planning will be conducted to ensure a smooth development process. This phase includes the Planning and Modeling stages:
    - Planning : This plan also includes a thorough project risk assessment and strategies to menage these risks during system development and implementation.
    - Modeling : In this stage, the team will create a detailed system architecture model, possibly using Unified Modeling Language (UML) diagrams, to illustrate the structure and interactions between system components.
3. *Construction* : In the Construction phase, researchers will gradually build the system, focusing on developing core functionalities. System implementation will be carried out using the Vue.js, Laravel, and Firebase frameworks. This process will involve coding, testing, and integrating system components to ensure the system functions well and meets user needs..
4. Transition : The Transition phase involves thorough system testing and preparation for full implementation. Researchers will conduct comprehensive system testing to ensure that it is ready for use by GMAHK members and pastors. Additionally, user training and infrastructure setup will be conducted to ensure a smooth transition to active system use. This phase includes the Construction and Deployment stages :
    - Construction : In this stage, researchers focus on building the system by writing code, performing thorough testing, integrating components, and ensuring quality standards are met. This ensures that the implementation aligns well with user needs and established specifications.
    - Deployment : This is the full implementation stage, where the developed system will be widely deployed for use by GMAHK members and pastors. It involves the physical or virtual installation of the system, configuration, and setup

This method has had a signigicant on the evolution of object-oriented software and has become the foundation for many frameworks and development approaches used today [12]. To clarify the understanding of the system to be developed, Unified Modeling Language (UML) can be utilized. With UML, activities occurring within the system development process will be clearly illustrated. UML is a set of graphical notations based on a single model, aiding in the description and design of software systems, particularly those built with an object-oriented programming approach.

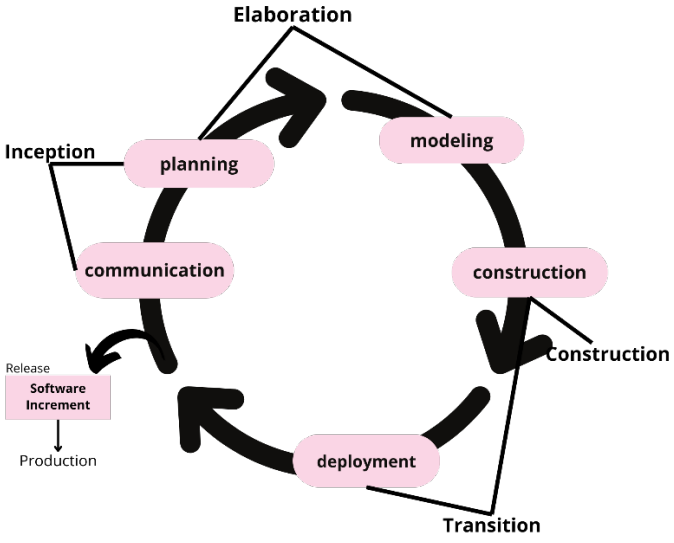

Figure 1 Rational Unified Process Model.

Use Case Diagram (UCD)

A Use Case Diagram is a diagram used to visualize interactions between one or more actors and the system being developed. Figure 2 displays the use case for the system's design outlined below. This system is designed to facilitate consultation services between general users and pastors. Users can register, log in, search for pastors, schedule consultations, and communicate directly via live chat. Pastors can also register, log in, accept consultation requests, and provide consultation services, with additional features like notifications. For a more comprehensive analysis, it is beneficial to clarify the specific purpose and scope of "visitations", the types of notifications that will be sent, and any special features available to pastors. Additionally, a detailed understanding of the system's main objectives, the types of consultations offered, and the technology stack used will enhance the accuracy of this Use Case Diagram. This expanded detail can help refine and clarify the design intentions, ensuring that each feature aligns with the core functionalities of the consultation service.

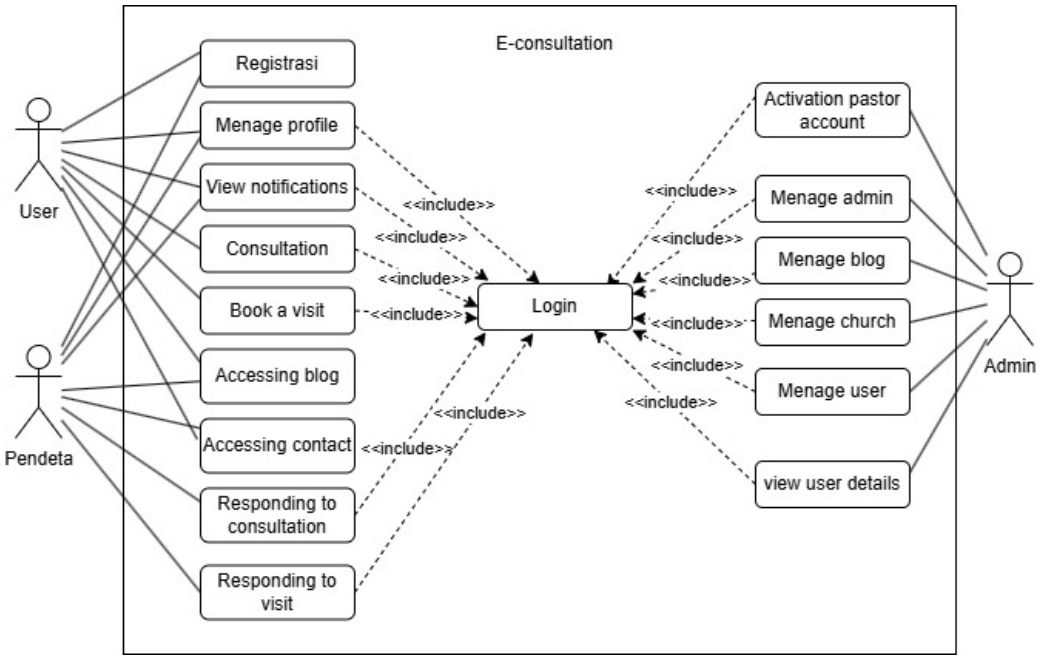

Figure 2 Use Case Diagram

Activity Diagram

To illustrate the activities accurring between actors an the system, an Activity Diagram is used [13]. All three actors—regular users, pastors, and admins—have login activities. Figure 3 explains the user's activity flow. This includes regular users, pastors, and admins. First, the user accesses the application on the web page, and the system displays the home page. Here, the system checks if the user already has an account. If not, the system redirects them to the registration page, where they fill out an email and password form. If the user has an account, the system performs two rounds of validation. In the first validation, the system checks if the account is valid. If not, the user is redirected back to the registration page to re-enter their email and password. If the account is valid, the user is allowed access to the dashboard page. In the second validation, the system checks if the account has been activated by the admin. If it has not been activated, the system displays an alert, prompting the user to wait for admin activation.

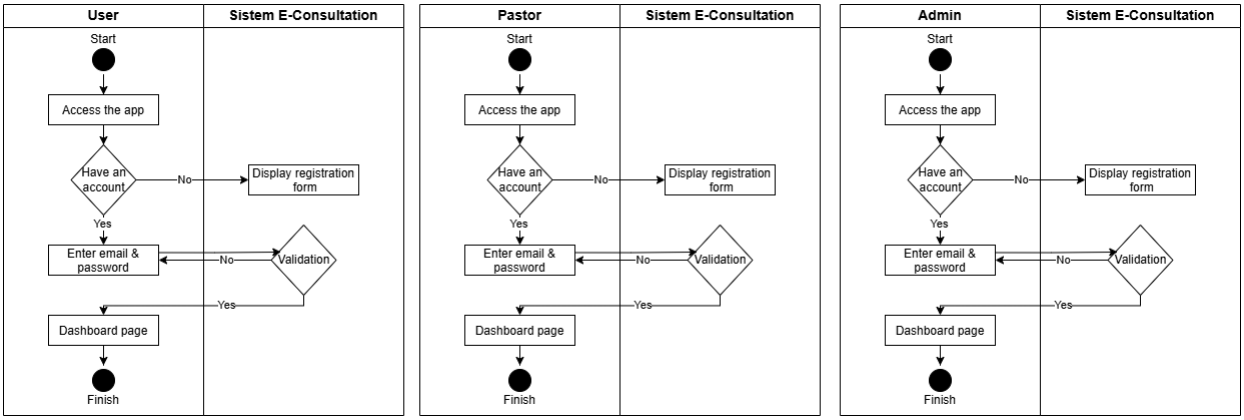

Figure 3 Login activity diagram

Figure 4 illustrates the user registration activity. When a user accesses the application for the first time and does not have an account, they are required to register an account on the registration page.

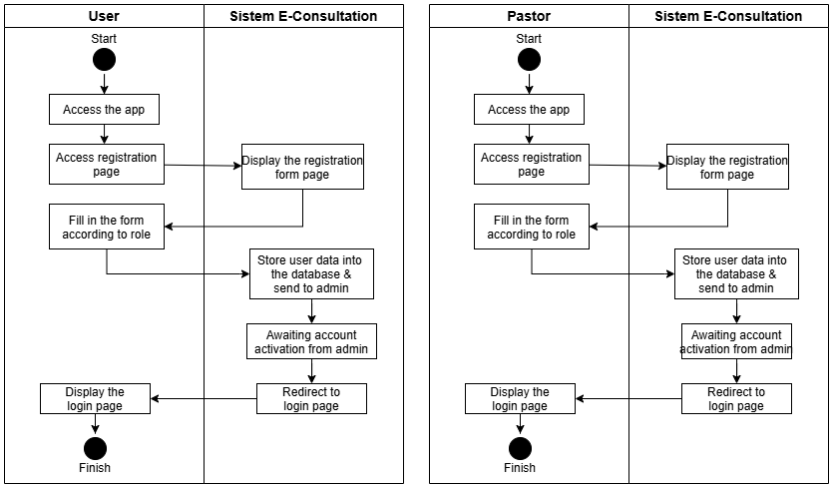

Figure 4 Activity diagram registration

Figure 5 illustrates the admin activity for managing users, churches, and blogs. The admin can add regular users and pastors, as well as delete and edit their data. The admin can also view the detailed profiles of all users. Additionally, the admin has the ability to add, delete, or edit church information and blog posts.

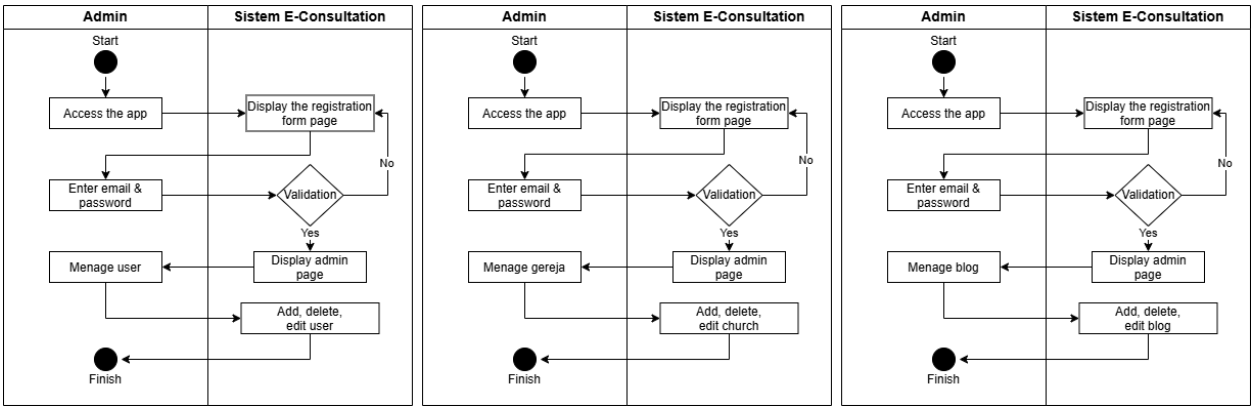

Figure 5 Activity Manage User, Church, Blog

Figure 6 illustrates the admin activity for activating the pastor's account and the consultation activity. After a pastor completes their registration, they can contact the admin to request account activation. The consultation activity describes the process where the user selects a pastor for consultation. The consultation session is conducted live (real-time), and the author uses Firebase to enable real-time responses during the consultation..

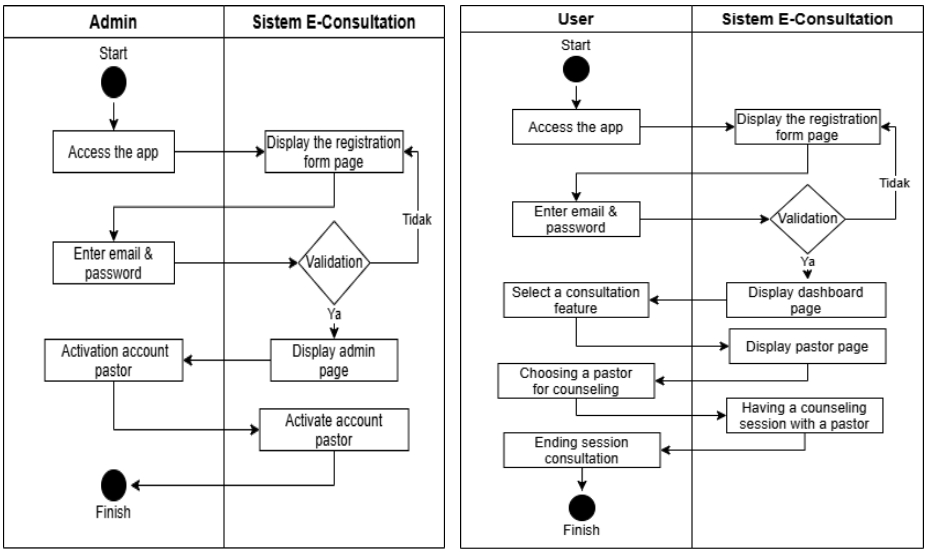

Figure 6 Pastor activation and consultation activity

Figure 7 illustrates the visitation schedule activity. If a user wants to arrange a visitation, they must first search for a pastor. After selecting a pastor, the user will be directed to a visitation form to schedule the visit. However, the system will first check whether the user's profile information has been completed. If not, the system will display an alert asking the user to complete their profile information. Once the profile is filled out, the system will allow the user to proceed with the form to schedule the visitation. The selected pastor will then receive a notification about the visitation session and will determine whether they agree to proceed with the session or not.

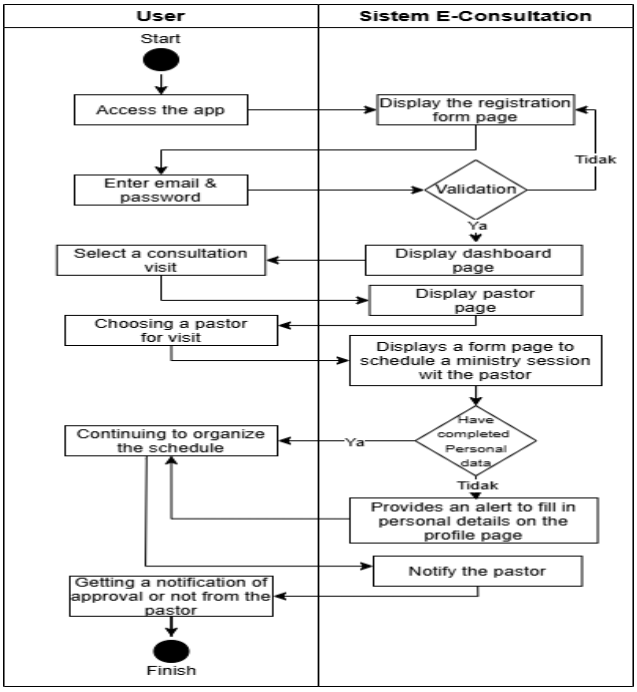

Figure 7 Visiting Activity

Figure 8 illustrates the blog and contact activities. All user roles can access the blog and view blog details, as well as the contact page. In the contact activity, users can provide feedback, suggestions, activate pastor accounts, or address any issues related to the application system to the admin.

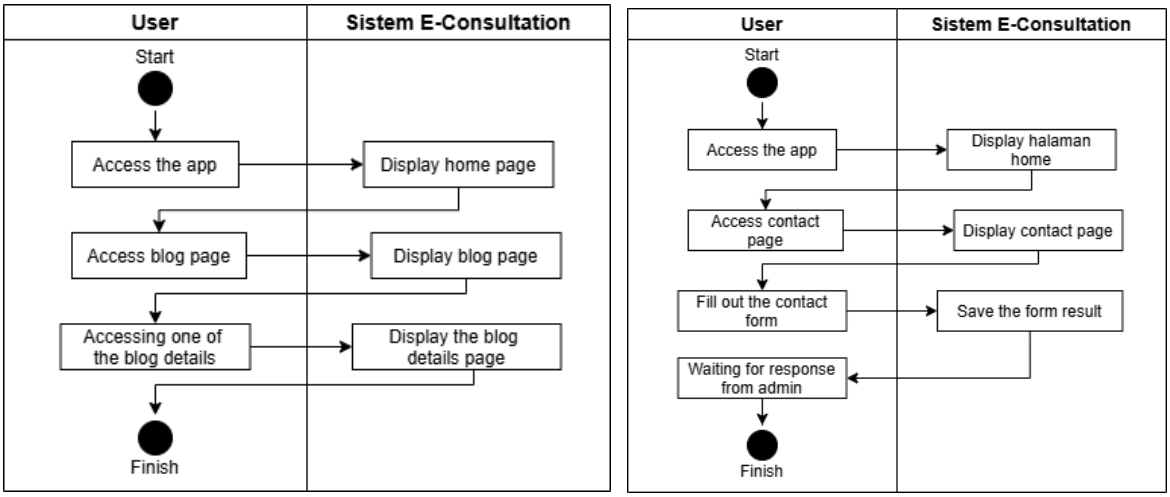

Figure 8 Activity *blog* dan *contact*

Database Diagram

This database diagram illustrates the structure of the database in terms of defining the classes that will be created to build the system tables, including: table_roles. table_church, table_user, table_pastor_details, table_message, table_treatment, table_blog, table_contact, and table_kategoris. The database diagram is the most commonly used diagram in object-oriented modelling. Below is the E-consultation database diagram shown in Figure 9.

Figure 9 Database diagram e-consultation

Firestore

Figure 10 illustrates the Firestore structure in Firebase that the author used for the live chat consultation feature. Firestore is a NoSQL database, and it stores data in the form of collections and documents. This database supports real-time updates, allowing the application to receive data changes instantly. Firestore is ideal for applications that require fast data synchronization and supports flexible queries, high scalability, and is equipped with security rules to control data access.

Figure 10 Firestore Databse

System Architecture

Figure 11 illustrates the architecture. In general, the system is divided into two part: the client side and the server side [13]. The client side directly interacts with the user, and its user interface is built using Vue.js. The server side consists of the application server, which contains the business logic for processing data from the database server. The users here refer to the user, pastor, and admin. Since the system is web-based, users can access it using computers, laptops, or mobile phones, as long as the device is connected to the internet and has a browser. For designing this system, the researcher chose to use PHP programming language and the Laravel framework. This framework follows the MVC (Model, View, Controller) pattern and also uses Eloquent-ORM (Object-Relational Mapper), which allows interaction with the database using objects and classes, eliminating the need to write SQL queries directly [13], [14].

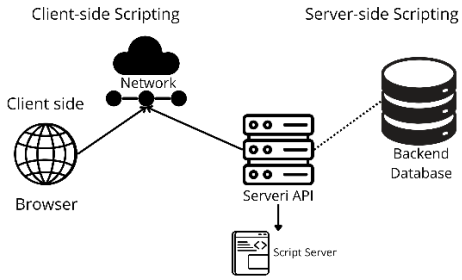

Figure 11 E-consultation system architecture

Web Application Interface Design

The system design was created as a refence for designing a system [16]. Below are the system designs that have been planned: In Figure 12, the interface design for the login and registration pages can be seen. Once the login is successfully completed, the user will be directed to the dashboard.

Figure 12 Login and Registration page design

Figure 13 illustrates the design of the admin page. On this page, the admin can manage users, churches, blogs, activate pastor accounts, and view detailed user information.

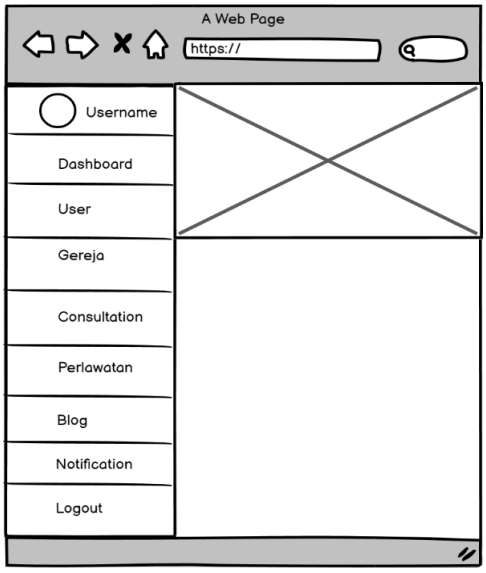

Figure 13 Admin page design

Figure 14 illustrates the design of the pastor consultation and pastor visitation pages. On these pages, users can search for pastors based on their specialization for consultations or visitations. Users can also view detailed information about the selected pastor.

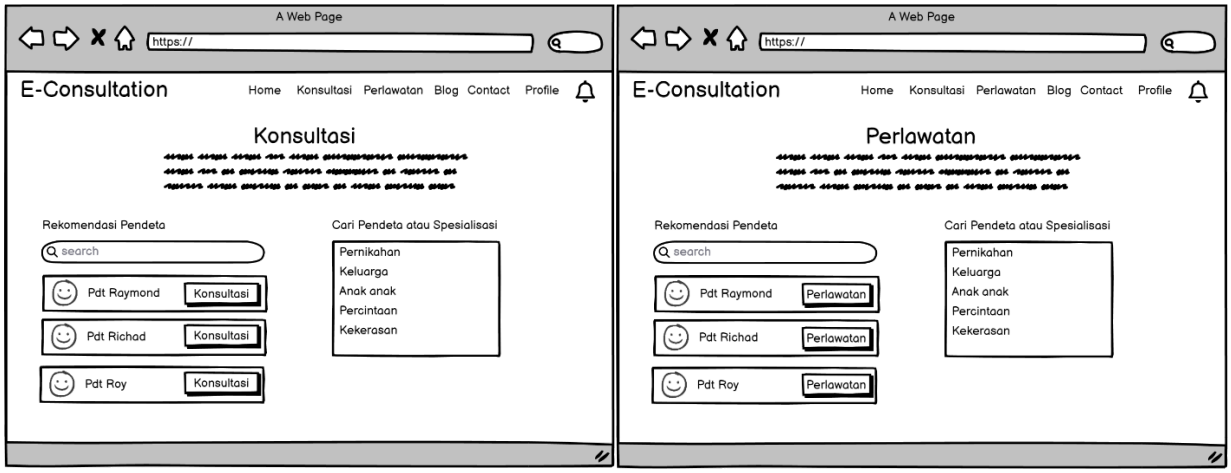

Figure 14 Design of the pastor consultation page, Pastor Visiting

Figure 15 illustrates the design of the pastor detail and visitation order pages. On the pastor detail page, users can view detailed personal information about the pastor, including experience, biography, specialization, and more. On the visitation order page, users can fill out a form to schedule a visitation with a pastor.

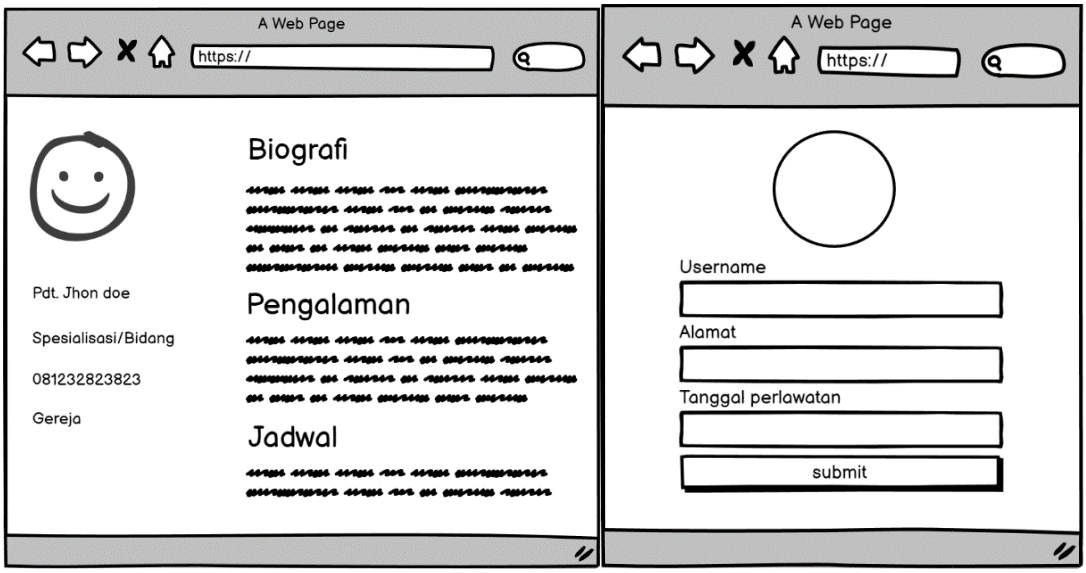

Figure 15 Design of the pastor detail page, visit order page

Figure 16 illustrates the design of the consultation page. On this page. On this page, users can engage in live consultations with pastors regarding spiritual matters or topics related to religion and for the contact page, users can provide feedback and suggestions to the admin.

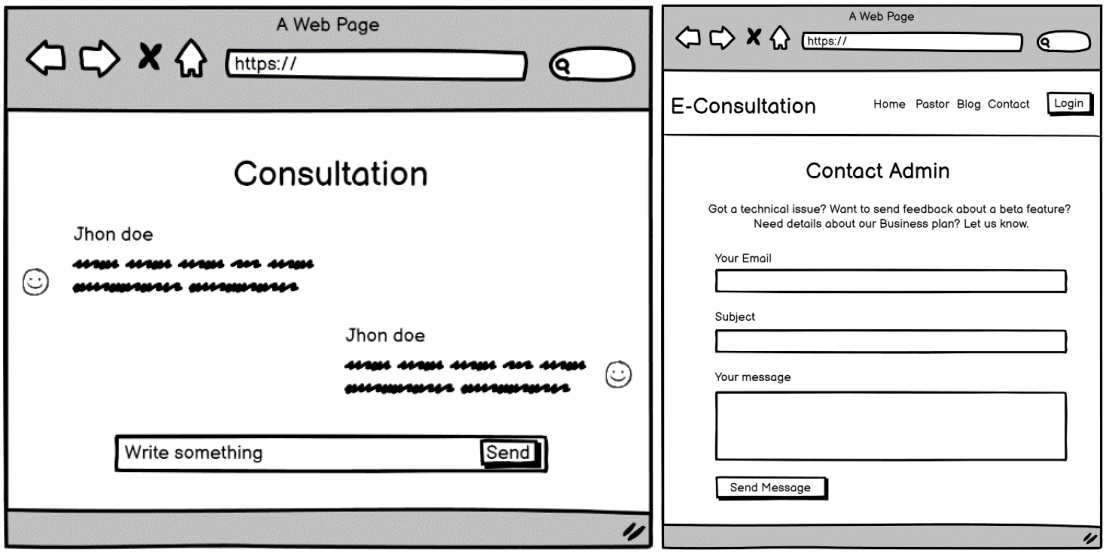

Figure 16 Design of the consultation page, contact-admin page

3. Results

The software used in researching and developing the GMAHK e-consultation information system for pastors consisted of several tools. These tools assisted the author in effectively researching and building the application. The tools included: Windows 11 Operating System, Google Chrome, Visual Studio, Postman, DBeaver, Firebase, Laravel, and Vue.js.

Design Results

The designs described in the previous section have been realized in the form of a web application. Due to space limitations, not all parts of the fully functioning application can be displayed in this paper

Web Application

Figure 17 shows the design results of the login and registration pages. All users must go through the authentication process first to access the application.

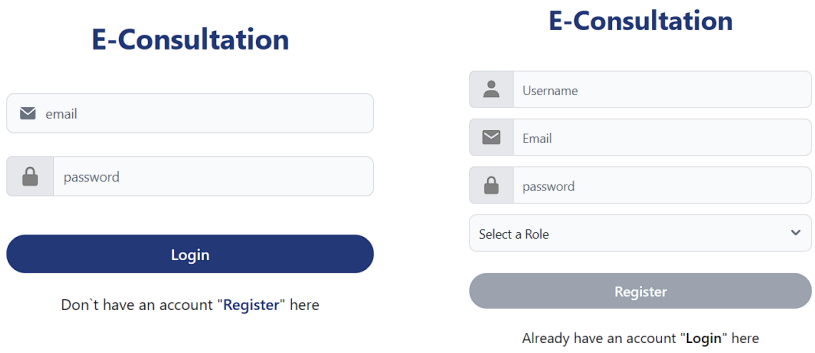

Figure 17 Design of the website login adn registration

Figure 18 displays the design results of the admin page. From the admin interface, it can be seen that the admin can manage all users, churches, and blogs, view user details, and activate pastor accounts. The resulting website is an implementation of the designs previously outlined in this study.

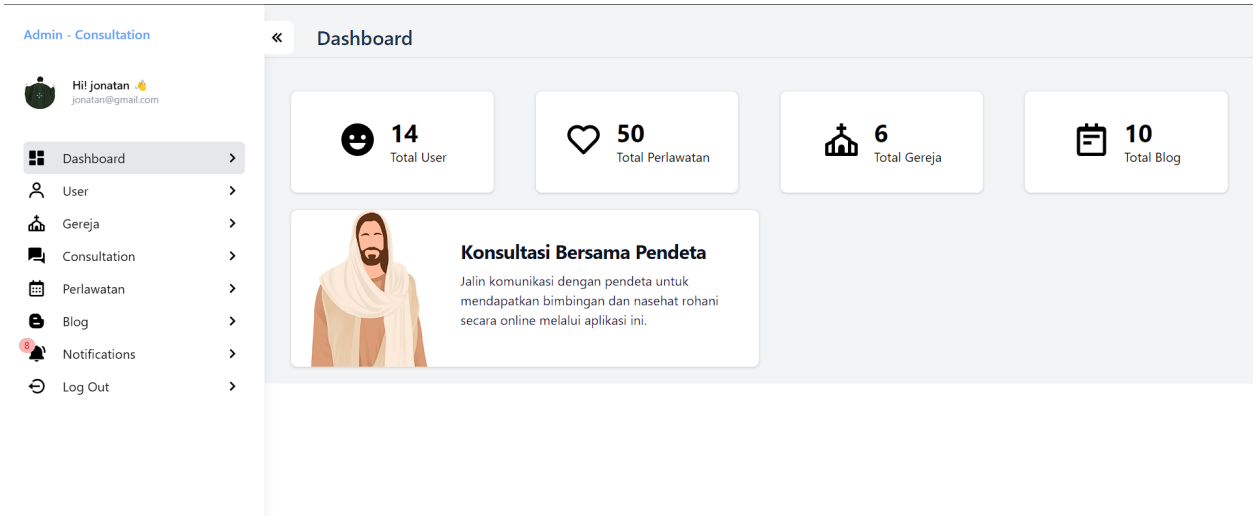

Figure 18 Design of the admin page

Figure 19-20 displays the final design of the pastor page and pastor detail page. On this page, users can search for pastors based on their specialization and view detailed information, including biography, experience, and schedule.

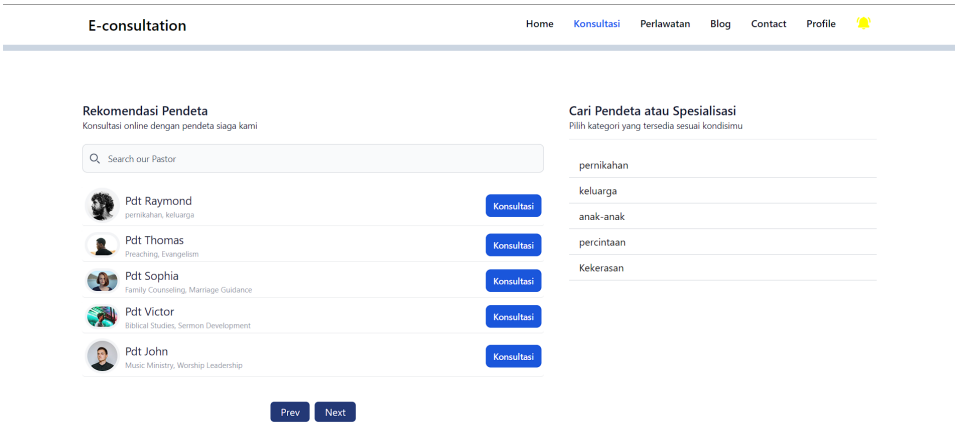

Figure 19 Design of the pastor page

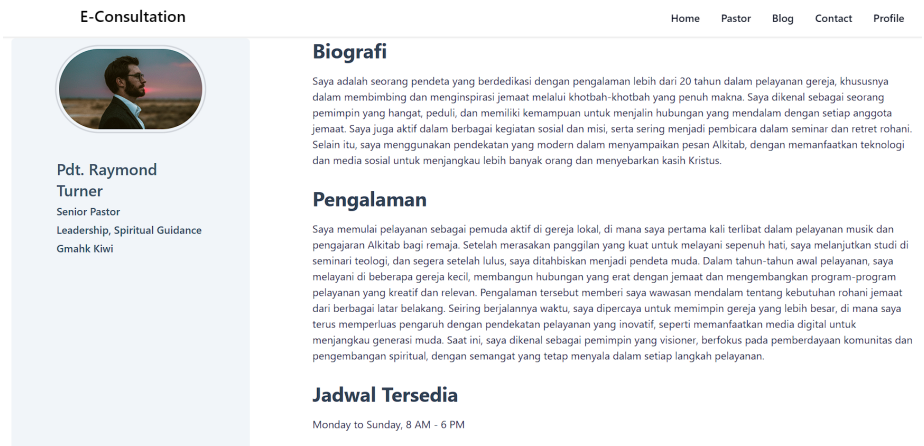

Figure 20 Design of the pastor detail page

Figure 21 show the design results of the website pages for visitation and consultation. In line with the purpose of this application, which is to facilitate online visitation and consultation with pastors, the displayed layouts reflect the implementation of the designs outlined in this paper.

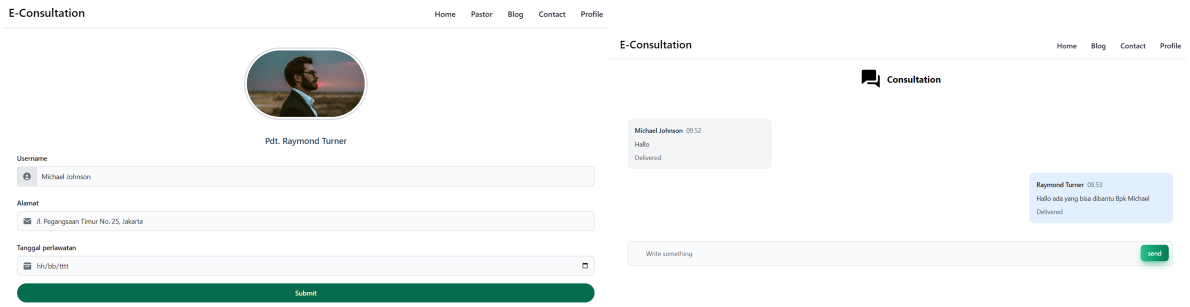

Figure 21 Design of the visiting page and consultation page

Figure 22 display the design results of the website pages, namely the blog and contact-admin pages. The blog page was created to allow users to access information on spiritual matters, while the contact-admin page enables users to provide feedback and suggestions to the E-Consultation admin. The displayed layouts reflect the implementation of the designs outlined in this study.

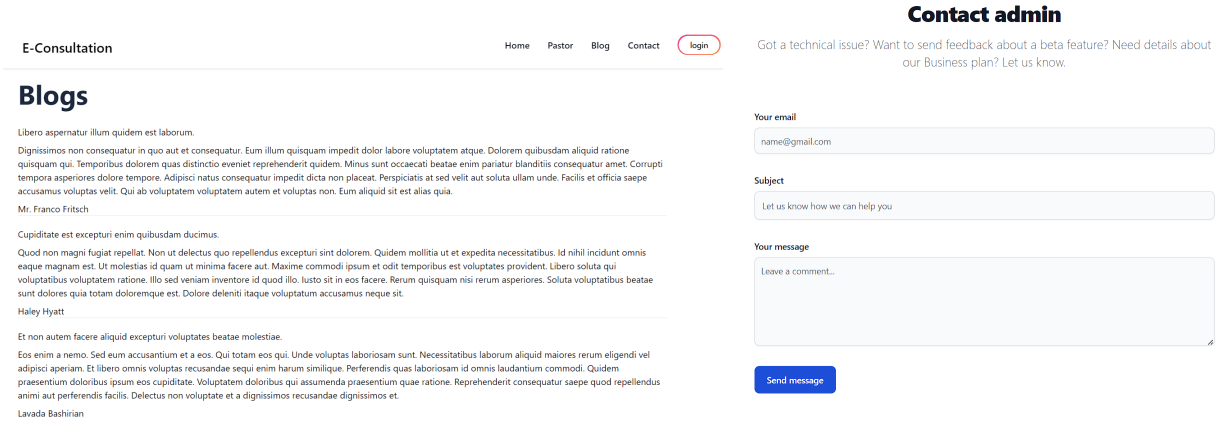

Figure 22 Design of the blog page and contact-admin page

System Testing

To ensure that the system's functionality operates as designed, the author tested the application using the Black Box testing method, whic aims to evaluate a system's functionality [15], [16], [17]. The testing was conducted at the GMAHK Kayu Tinggi congregation. The results of the application testing can be seen in Table 1

Table 1 System Testing Result

Test Case	Test Scenario	Expected Result	Result
Login	Enter the corret email adn password	Login successfully and enter the dashboard page	Success
Register	Enter username, email, password, and select role as neede in the form	Succesful registration process and redirect page	Success

Admin manages users	Admin can add, delete users and edit user data	Users are successfully added, deleted and user data is change	Success
Details user	Display details of information that has been filled in by the user	Admin successfully views all user information	Success
Admin manage church	Admin can add, delete churches and edit church data	Churches are successfully added, deleted and church data is modified	Success
Admin sees the maintenance process	Display the status of the user's visit process	Admin can successfully view the status of the user's visit process	Success
Admin manage blog	Admin can add, delete blogs and edit blog data	Blogs are succesfully added, deleted and blog data is modified	Success
Admin activates pastor account	Displays which pastor users have registered and provides activation access to login	Admin successfully activates pastor account	Success
User accesses the blog page	Display all blogs on the blog page	User successfully accesses the blog page and views the entire blog	Success
User views blog details	Display detailed blog information	User successfully views blog details	Success
User provides feedback through the contact-admin page	User fills out the form to give feedback to the admin	User successfully sends feedback to admin	Success
User accesses the pastor page	Provide a list of all pastors	User successully views the list of pastor	Success
User searches pastor according to specialization	Choosing a pastor according to specialization	Displaying all pastors who have their specialization	Success
User views detailed pastor information	Display detailed pastor information	User can successfully view all pastor information	Success
User consults one of the pastor	Live online consultation with a pastor	Successfully conducted a live online consultation	Success
User create a ministry schedule for one of the pastors	User filss in the form to detemine the schedule to the pastor	Succcessfully made a schedule to the pastor	Success
User completes personal data	User fills in personal data	User successfuly completes personal data	Success
Logout	User presses the logout button	User is redirected to the home page	Success

4. Conclusion

In this study, a web-based e-consultation application for GMAHK members was successfully designed and implimented using the Laravel adn Vue.js frameworks, with a Rational Unified Process (RUP) approach. The use of the RUP methodology proved effective in ensuring that the system was developed in a structured and phase manner, from the planning phase through to implementation. This approach helped to ensure that all user needs, especially in terms of easy access to spiritual services, were well met. System testing conducted at the GMAHK kayu tinggi congregation demonstrated that the features developed-such as consultation scheduling, visitation requests, and live chat consultations-functioned as expected. The application effectively addresses the geographical challenges and time constraints often faced by members living in remote areas or with busy schedules. The applications's ability to provide real-time access also enhances the quality of services provided by congregational pastors. This research demonstrates that a web-based e-consultation application can be an effective solution ofr GMAHK in providing flexible and efficient spiritual consultation services.

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