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Optimizing the New Student Admission Process Through the Implementation of a Laravel-Based CRM System at STABA

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Abstract

The New Student Admission Process (PMB) is an important agenda in higher education institutions that requires structured data management and communication to run effectively and efficiently. The Bakti Asih College of Analysts (STABA) still manages prospective student data and promotional activities manually using Microsoft Excel and Google Drive. This approach risks data errors and makes communication monitoring less effective. This study aims to develop a Customer Relationship Management (CRM) system to assist in managing prospective student data, monitoring communication, and supporting targeted follow-up actions. The development method used is Waterfall, which includes needs analysis, design, implementation, verification, and maintenance. The CRM system provides features for managing prospects, WhatsApp integration, chat history, automatic status updates, and promotional team performance reports. Black Box testing shows that all functions work as needed. Overall, this system integrates data management, communication, and promotional performance monitoring into a single structured and controlled platform. The system is also designed to improve data accuracy, responsiveness, and efficiency in managing the overall PMB process.

Keywords: Customer Relationship Management, New Student Admissions, WhatsApp, Information System, Web-based application

1 INTRODUCTION

The development of educational institutions in Indonesia is increasing [1]. The high level of competition has resulted in universities having to manage their institutions professionally and focus on service quality [2]. In this competitive environment, the ability of institutions to provide fast, accurate, and targeted services has become one of the determining factors in attracting prospective students. The development of information and communication technology has become an important part of supporting this process, especially in data management and communication [3]. One concept that can be applied to improve service quality is Customer Relationship Management (CRM) [4]. CRM is a system developed to support companies in building close relationships with their customers [5], considering that customers are a very important aspect for the sustainability of an institution [6]. CRM focuses on managing customer data and interactions to improve service quality and customer satisfaction [7]. In higher education, CRM is a digital system that functions to manage data and communication with prospective new students in a centralized platform so that services can be carried out more optimally and purposefully [8].

The Bakti Asih College of Health Analysts (STABA) is a higher education institution that focuses on developing competencies in the field of health analysis. The new student admission process is an important stage in attracting prospective students, which is an annual agenda [9]. However, the management of applicant data and the reporting process at STABA are still done manually using Microsoft Excel and Google Drive. The lack of a system capable of recording and monitoring communication activities between the campus, especially the promotion team, and prospective students has resulted in uncontrolled interactions and follow-ups, leading to the loss of potential applicants. The delivery of information and campus promotion has also not been effective because there is no digital media that can directly connect the two [10].

In addition to technical problems in data management, another challenge faced in the New Student Admission (PMB) process is the suboptimal follow-up strategy for prospective students. Many prospective students who have made initial contact do

not receive continuous follow-up, resulting in lost enrollment potential. This is due to the limitations of the system in recording communication history and the absence of systematically measurable indicators of potential status.

The use of Customer Relationship Management (CRM) technology in education is a relevant solution to overcome these problems. CRM not only functions as a data management tool, but also as a strategic means to build long-term relationships between educational institutions and prospective students. With an integrated CRM system, the campus can monitor every interaction in real time, making the decision-making process faster and more accurate.

Based on this background, this study focuses on the application of a Laravel-based CRM system integrated with WhatsApp as the main communication medium. This system is expected to improve the effectiveness of the PMB process at STABA.

2 LITERATURE REVIEW

2.1 New Student Admissions (PMB)

New student admissions (PMB) are a routine agenda carried out by universities. The number of new student admissions reflects the public's perception and interest in the university. Private universities compete with each other to increase the number of new student admissions. Therefore, the number of new student admissions may increase or decrease each year. New student admissions (PMB) is the process of screening prospective students who are accepted into a university. Identifying patterns in PMB can provide useful information to universities in terms of study programs or prospective students who enroll in a study program [11]. In this process, prospective students usually come to the university they are interested in to register by bringing the required documents in accordance with the provisions. With the new student admission CRM system owned by universities, this process has changed. Prospective students no longer need to come in person but can simply do so through the system that has been provided. In other words, the new student admission information system is a very basic and necessary system for any institution or university, and is even the spearhead of marketing to obtain the expected number of students. Because the new student admission information system is an important system, it needs to receive more attention, namely by conducting continuous evaluations to determine the level of success in its implementation [12].

2.2 Customer Relationship Management (CRM)

Customer Relationship Management (CRM) is an approach to customer management through effective communication and relationships. It aims to build relationships and provide sustainable value [13]. Customer relationship management is also a combination of business processes and information technology used to understand various needs [14]. This concept is applied by educational institutions as subjects or service providers. This can attract the interest of the public, especially prospective students. Service is one of the keys to success for educational institutions because it involves a mutually beneficial relationship. With good management, educational institutions can provide more focused, personalized, and sustainable services that support the success of the New Student Admission (PMB) process [15].

2.3 Website

Websites are one of the most widely used sources of information [16]. A website is an application that contains multimedia documents (text, images, sound, animation, video) using the HTTP (hypertext transfer protocol) protocol and accessed using software called a browser [17]. A website is also an address (URL) that functions as a place to store data and information based on specific topics. The web is a hypertext system, consisting of millions of text pages linked by hyperlinks [18].

2.4 Visual Studio Code

Visual Studio Code is a very lightweight yet powerful source code editor that runs from the desktop. It comes with built-in support for JavaScript, scripts, and Node.js and has an array of extensions available for other languages, including C++, C#, Python, and PHP [19]. Visual Studio Code provides many features, including Intellisense, Git Integration, Debugging, and extension features that add to the text editor's capabilities. These features will continue to grow as new versions of Visual Studio Code are released.

2.5 PostgreSQL

PostgreSQL (pronounced Post-Gres-Q-L) or post-gres is one of a number of large databases that offer scalability, flexibility, and high performance. Its use is widespread across various platforms and supported by many programming languages [20]. PostgreSQL is an open source Object Relational Database Management System. PostgreSQL emphasizes extensibility, creativity, and compatibility. It competes with major relational database vendors such as Oracle, MySQL, SQL Server, and others [21].

2.6 Laravel Framework

A framework is a basic conceptual structure used

to solve or handle complex problems. In short, a framework is a container or framework for a website that will be built. By using this framework, the time spent on creating a website is reduced and repairs are made easier. Laravel is an open-source PHP-based framework that uses the model-view-controller concept. Laravel is licensed under the MIT License [22]. The Laravel framework has its own advantages that make it better than other frameworks. The following are the advantages of Laravel: faster performance, more stable data reloading, data security, the use of advanced features such as blade using the HMVC (Hierarchical Model View Controller) concept, the availability of ready-to-use libraries, and the migration management feature for creating table schemas in the database [23].

2.7 Node JS

Node.js is a freely accessible server environment that can operate on various platforms, including Linux, Windows, and Mac. The runtime environment provided by Node.js allows JavaScript to be executed outside of a browser environment. Node.js also has a rich ecosystem with various modules and tools that speed up the development process. With its speed and scalability, Node.js has become a popular choice for developers to build server-side applications, real-time web applications, and high-performance network applications [24]. Node.js complements the role of JavaScript so that it can also function as a server-side programming language, similar to PHP, Ruby, Perl, and so on. Node.js can run on Windows, Mac OS X, and Linux operating systems without any code changes. Node.js has its own HTTP server library, allowing it to run a web server without using web server programs such as Apache or Nginx [25].

3 RESEARCH METHODS

3.1 System Development

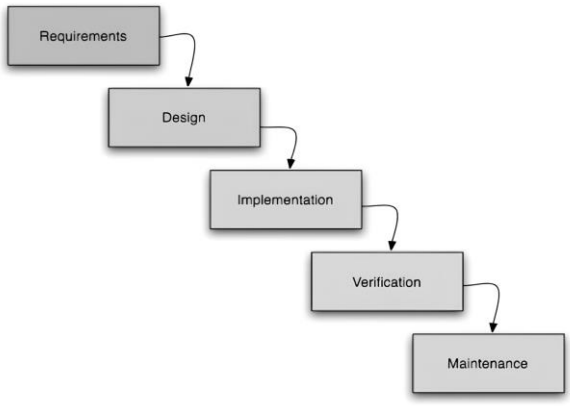

Figure 1. Waterfall Method [26]

The selection of the Waterfall method in the development of this CRM system is based on system requirements that have been clearly defined from the outset. The Waterfall method is a model developed for software development, creating software [27]. The model develops systematically from one stage to another in a waterfall-like mode as shown in Figure 1. This model proposes a systematic and sequential approach to software development, starting from the level of system progress in all analysis, design, coding, testing, and maintenance. This model covers the following activities: requirements analysis, design, implementation, verification, and maintenance. This development model is linear from the initial stage of system development, namely the planning stage, to the final stage of system development, namely the maintenance stage. The next stage will not be carried out until the previous stage has been completed and cannot be returned to or repeated [28].

At the analysis stage, we identify the requirements that must be met in order for the system to record and monitor the status of prospective students as well as all communication and follow-up activities carried out by the promotion team. The system provides user management features with different access rights, supports automatic report generation, and serves as a medium for more effective information delivery and campus promotion.

During the design phase, the structure and flow of the system are designed based on the results of the previously determined requirements analysis. The system design is visualized in the form of a Use Case Diagram to illustrate the interaction between actors and the system, an Activity Diagram to show the process flow and activities in the system, and a database structure design to define the tables, attributes, and relationships between the data used. The design stage aims to provide a comprehensive overview of the system to facilitate the implementation process and minimize errors in the development stage.

At the system implementation stage, the system was implemented with the first step being development using Visual Studio Code and XAMPP. The process began with database configuration and Laravel installation. Next, system features are developed, such as user management, prospective student data management, communication activity recording, potential status management, and report generation. This stage aims to produce a CRM system that can be used according to user needs.

At the verification stage, verification or testing of the system is carried out to ensure that it is in accordance with the design and that it functions smoothly. Testing is carried out by testing each feature of the system, starting from the login process, data management, recording of communication activities, to report generation. The

verification stage aims to find and fix errors or functional inconsistencies so that the system can run well, be stable, and be ready for use by users.

At the maintenance stage, researchers monitor the system's performance to ensure that it continues to run properly. Maintenance includes bug fixes, system performance improvements, and feature updates in accordance with user needs or developments in the new student admission process. This stage aims to maintain the quality of the system so that it remains optimal and can be used for a long period of time.

3.2 Data Collection

Observations were conducted for 3 weeks on the manual follow-up management process, starting from the collection of prospective student data, performance recap calculations, to registration. The purpose of this observation was to identify the weaknesses of the conventional system and define the system to be developed.

Interviews were conducted with the head of the promotion team. The questions asked focused on the difficulties of the conventional system, the features needed in the system, and expectations for the system to be implemented.

Documentation was carried out by collecting various supporting data from previous conventional management.

4 RESULTS AND DISCUSSION

The results of the Waterfall model make it easier for researchers to compile development stages in a systematic and structured manner. By following this process, researchers can ensure that system development runs smoothly and in a controlled manner. The following are the research stages that were applied:

4.1 System Design

a. Use Case Diagram

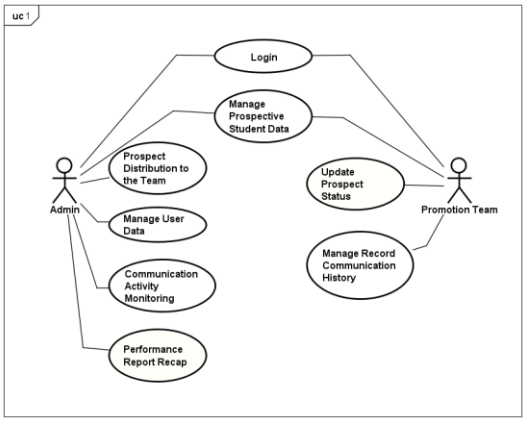

Figure 2. Use Case Diagram

In Figure 2, the Use Case Diagram involves two actors, namely Admin and Promotion Team. The Admin acts as the system manager who is responsible for managing user accounts, managing prospective student data, assigning prospects to the Promotion Team, monitoring communication activities, and performance reports recap. Meanwhile, the Promotion Team is responsible for handling prospective students by updating prospect status and recording communication history based on the interactions conducted. All activities performed by the Promotion Team are stored in the system database and can be monitored by the Admin to support performance evaluation.

b. Activity Diagram

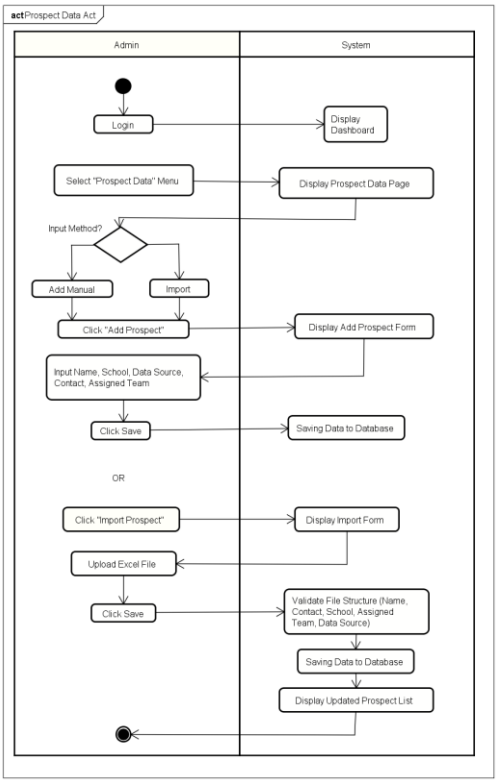

Figure 3. Prospective Student Data Activity Diagram

The Prospective Student Data Activity Diagram in Figure 3 illustrates the workflow of prospective student data management carried out by administrators through the CRM system, starting from the login process to the system displaying the dashboard page. The administrator then selects the prospective student data menu so that the system displays the prospective student data page. Administrators can add prospective student data

manually by clicking the "Add Prospective Student" button and filling in detailed information such as the prospective student's name, school of origin, data source, contact details, and assigned team, then saving the data to the database. In addition, administrators can also enter data in bulk through the data import feature by selecting an Excel file. The system will then validate the file structure to ensure that required data such as name, contact, school, assigned team, and data source are available before storing the data into the database. After that, the system will save all prospective student data to the database, display the updated prospective student data list, and the prospective student data management process is complete.

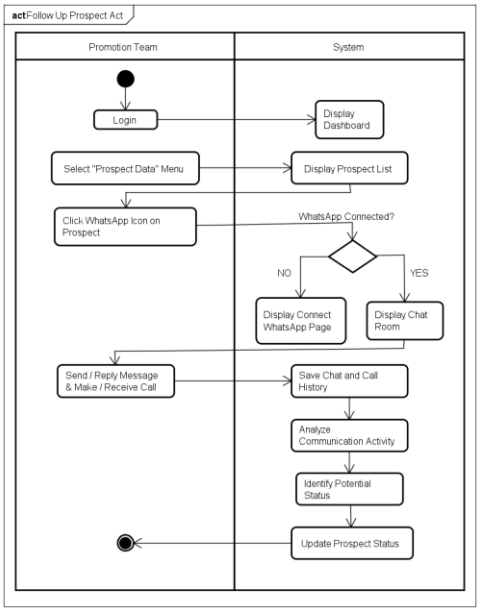

Figure 4. Follow-Up Activity Diagram

Figure 4, the Follow-up Activity Diagram, illustrates the follow-up process for prospective students involving users (the promotion team) and the CRM system. It begins when the user logs in and the system displays the dashboard page. The user then selects the prospective student data menu, and the system displays the prospective student data page. Next, the user connects to WhatsApp to start communicating with the prospective student. Once the connection is successful, the system displays a chat room as a medium for interaction. Based on the conversation content, the system identifies the prospective student's status as a result of the follow-up process, and once the potential status is recorded, the follow-up process is complete.

c. Database Structure

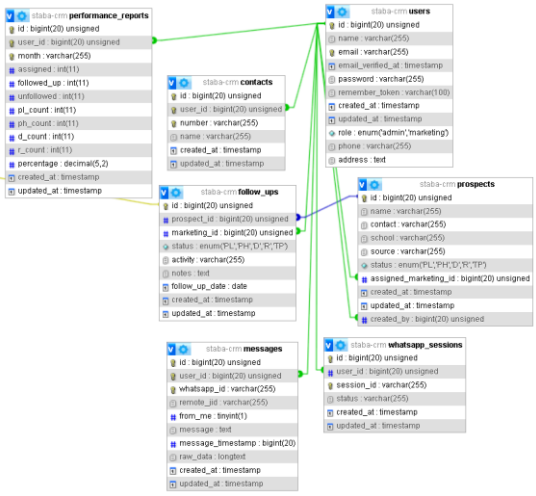

Figure 5. Database Structure

The database structure in Figure 5 of this CRM system consists of seven main integrated tables to support the new student registration process, namely the users, prospects, contacts, follow_ups, messages, whatsapp_sessions, and performance_reports tables. The users table serves to store system user data with roles as admin or promotion team and is the main table related to most of the other tables. The prospects table is used to store prospective student data along with their potential status and their relationship with assigned users and data recorders. The contacts table stores WhatsApp contact information linked to users, while the WhatsApp_sessions table stores WhatsApp connection session data for each user. The messages table is used to record all WhatsApp conversation activities between users and prospective students as part of the communication process. In addition, the follow_ups table is used to record follow-up activities carried out by the promotion team for prospective students, along with their status and follow-up schedule. Finally, the performance_reports table is used to store summary data on the marketing team's performance based on follow-up activities and communication results, all of which are connected through foreign key relationships to ensure data integrity and consistency in the CRM system.

4.2 System Implementation

The system implementation phase covers the results of applying the design based on the specified requirements. The implementation results show that the

system is capable of supporting the new student admission management process in a structured and integrated manner. All prospective student data is stored in a centralized database, minimizing the risk of data loss and duplication. The potential status monitoring feature provides a clear picture of each prospective student's position in the admission stages, allowing the promotion team to determine more appropriate follow-up strategies.

The integration of WhatsApp as the main communication medium makes it easier for the promotion team to interact directly with prospective students without having to switch platforms. All communication activities are automatically recorded, making it easier for administrators to monitor and evaluate the performance of the promotion team objectively. With performance recap reports that can be filtered based on specific periods, campus management can obtain accurate information as a basis for strategic decision-making in the new student admission process.

Based on the implementation results, the following is the main interface display of the CRM system used by administrators and users (promotional teams).

The Login page is accessed by administrators and users (promotional teams). Administrators create accounts for users so they can access the system. The system will verify the email and password entered and then direct users to the dashboard page according to their role, whether administrator or user (promotional team).

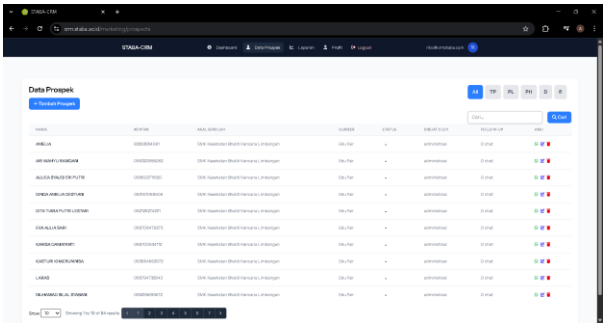

Figure 6. Prospect Data Page (User)

The Prospect Data page in Figure 6 is used by users to view a list of prospective students assigned by the admin. On this page, users can view basic information about prospective students, such as their name, school of origin, and potential status. This page serves as a basis for following up and communicating with prospective students through the CRM system.

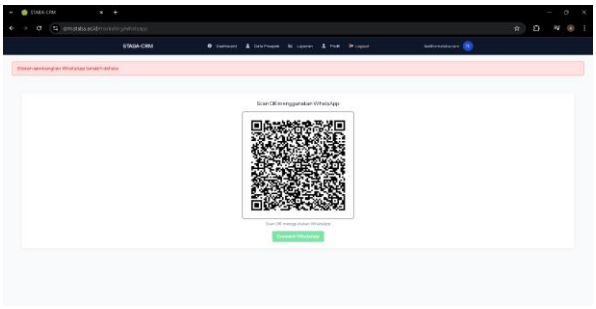

Figure 7. WhatsApp QR Scan Page (User)

The WhatsApp QR Scan page in Figure 7 is used by users to connect the CRM system with the WhatsApp application before the communication process is carried out. This page is accessed through the Prospect Data page, when the user clicks the WhatsApp icon on the prospective student's data. Once this page is open, the system will display a QR Code that must be scanned by the user using the WhatsApp application. If the scanning process is successful, the system will display an active WhatsApp connection status so that the user can continue the communication process with prospective students through the chat room page on the CRM system.

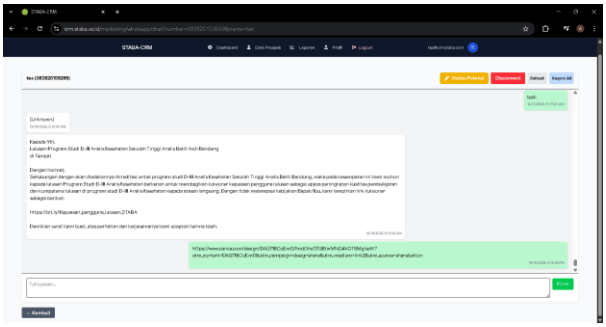

Figure 8. Chat Room Page (User)

The Chat Room page in Figure 8 is used by users to communicate directly with prospective students via WhatsApp. All incoming and outgoing messages are automatically recorded in the CRM system, can be monitored by the admin for monitoring purposes, and are used by the system to automatically update the status of prospective students based on the content of the conversation.

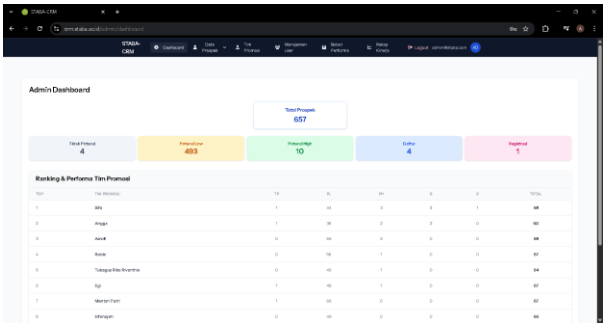

Figure 9. Dashboard Page (Admin)

The Admin Dashboard page in Figure 9 serves as the CRM system monitoring center. This page displays a summary of prospective student data based on potential status, as well as a table ranking the performance of the promotion team, sorted by the number of prospective students who have successfully registered. This dashboard helps administrators monitor and evaluate the performance of the promotion team and the overall new student admission process.

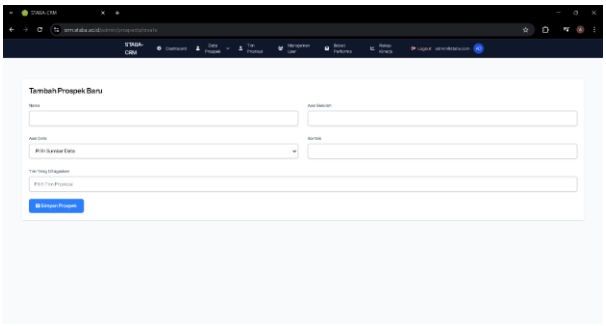

Figure 10. Add Prospective Student Data (Admin)

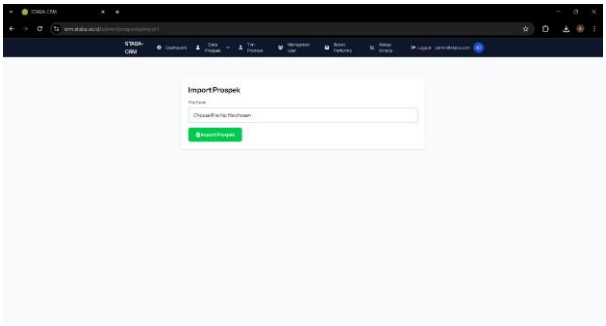

Figure 11. Import Prospect Data (Admin)

The Add and Import Prospect Data pages in Figures 10 and 11 are used by administrators to manage prospective new student data. On the add prospect data page, administrators can manually enter prospective student data one by one by filling in information such as name, school of origin, contact details, data source, and promotional team assignment. Meanwhile, the import prospective student data page is used to add prospective student data in bulk via an Excel file. After the saving process is complete, all prospective student data will be automatically stored in the CRM system database.

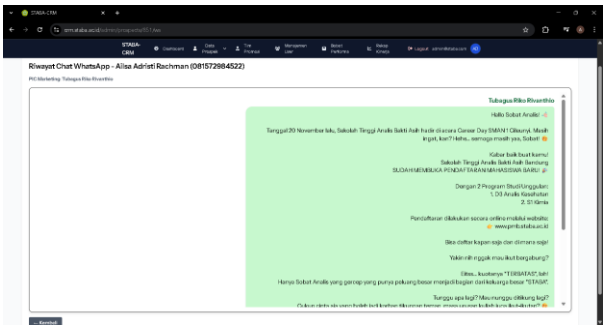

Figure 12. WhatsApp Message History Page (Admin)

The WhatsApp Message History page in Figure 12 is used to display the communication history between users and prospective students. This page is accessed through the Prospect Data page by clicking the WhatsApp icon on the prospective student's data. All incoming and outgoing messages that occur through the chat room will be stored and displayed on this page, so that it can be used by the admin as material for monitoring and evaluating the communication activities of the promotion team.

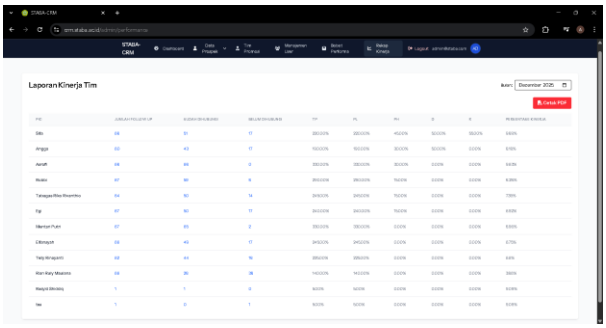

Figure 13. Performance Recap Report Page (Admin)

The Performance Recap Report page in Figure 13 is used by administrators to view and evaluate the performance of the promotion team based on their activities. On this page, administrators can filter reports by month, so that performance data is displayed according to the selected month. In addition, the system also provides a report printing feature that makes it easy for administrators to save or document the promotion team's performance recap results for evaluation and reporting purposes.

4.3 Testing

Testing was conducted using the black box method, as shown in the following table:

Table 1. System Testing

Feature Tested	Scenario	Result	Description
Login	Entering registered email and password	The system displays the dashboard according to the role	Succesful
Admin Dashboard	Accessing the admin dashboard page	The system displays a summary of the number of prospects based on potential status and promotion team performance ranking.	Successful
Prospect Data	Displaying prospect data	The system displays a list of prospective student data.	Successful
Add Prospect Data	Clicking the add prospect button and filling out the form	The system displays a form to add prospects and save data.	Successful
Import Prospect Data (Admin)	Clicking the import prospect button and uploading the file	The system displays a form to import prospects and save data.	Successful
Edit Prospect Data	Clicking the pencil icon and editing the data	The system successfully updates data.	Successful
Delete Prospect Data	Clicking the trash can icon and deleting the data	The system successfully deletes data.	Successful
WhatsApp Message History	Clicking the WhatsApp icon on the prospect data page	The system displays the user's WhatsApp message history with prospective students.	Successful
Team Performance Report (Admin)	Selecting the month filter and printing the report	The system displays data according to filters and prints promotional team performance reports.	Successful
Scan WhatsApp QR Code (User)	Scanning the WhatsApp QR Code	The system displays the WhatsApp connection status.	Successful
Chat Room (User)	Sending and receiving WhatsApp messages	Messages are displayed and stored in the CRM system.	Successful
Potential Status (User)	Conversing with prospective students	Potential status is automatically updated according to the content of the conversation.	Successful

5 CONCLUSION

Based on the results of the design, implementation, and testing of the Laravel-based Customer Relationship Management (CRM) system in the New Student Admission process at the Bakti Asih College of Analysts (STABA), it can be concluded that the system that was built is capable of improving the effectiveness and efficiency of prospective student data management. This system provides centralized prospect data recording facilities, potential status monitoring, and documentation of all communication activities and follow-ups carried out by the promotion team.

The application of the Waterfall method in system development provides a structured and systematic workflow, so that each stage of development can be carried out properly and in a controlled manner. The integration of WhatsApp as the main communication medium has proven to help improve the quality of interaction between the promotion team and prospective students, as well as facilitate the monitoring process by the admin.

6 SUGGESTION AND RECOMMENDATION

With this CRM system, the reporting process becomes faster and more accurate, the risk of data recording errors can be minimized, and the performance of the promotion team can be evaluated objectively based on available data. For further development, this system will be synchronized with the PMB website, so that data management and the new student admission process become more integrated, responsive, and sustainable.

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