Design and Implementation of a Tracer Study Application Website with the Laravel Framework

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***Abstract*—Tracer studies serve as a vital mechanism for monitoring alumni career development and obtaining feedback that informs the continuous improvement of educational management and graduate quality. Recognizing the strategic importance of alumni outcomes as indicators of institutional performance, we developed a web-based tracer study information system in SMK Ihya Ulumuddin. The system was designed using the Unified Modelling Language (UML) approach and implemented with the Hypertext Pre-processor (PHP) programming language, the XAMPP database, and the Laravel framework. Evaluation was conducted through beta testing employing the black-box method to ensure system reliability and functionality. The resulting application provides accurate and comprehensive alumni data, prevents duplication, strengthens database security, and enables efficient online questionnaire distribution. Furthermore, the system accelerates alumni data collection and facilitates a more systematic evaluation of tracer study outcomes. This innovation contributes to enhancing institutional capacity in managing alumni information and supports the production of competitive and career-ready graduates.**

Keywords*— *Laravel, PHP, Tracer, Web, XAMPP.

I. INTRODUCTION

Schools are educational environments where learning activities are carried out under the guidance of teachers. Their primary role is to facilitate knowledge development and character formation through structured instruction and supervision. Within this context, alumni are individuals who have completed their studies at an institution, and their presence significantly contributes to the ongoing improvement of educational quality. For this reason, conducting tracer studies is highly relevant, as they serve as a mechanism for gathering valuable feedback to enhance school management and strengthen the competencies of future graduates[1][2]. Alumni career paths are particularly important since they reflect the institution's ability to produce competent, career-ready individuals.

In recent years, the implementation of web-based tracer study systems has shown significant in data collection efficiency and alumni engagement. Research indicates that digital platforms enable institutions to reach a broder alumni network, increase response rates, and obtain more accurate and real-time data compared to conventional manual methods[2][3]. Futhermore, web-based systems provide flexibility for alumni to access questionnaires anytime and anywhere, which directly contributes to higher participation levels and better data quality.

Ihya' Ulumudin State Vocational School, an accredited "A" institution located at Jl. KH. Abdullah Hasbullah No. 8, Padang, Singojuruh, Banyuwangi, offers six majors: Light Vehicle Engineering, Computer and Network Engineering, Institutional Financial Accounting, Multimedia, Catering, and Fashion Design. The school's Guidance and Counseling (BK) unit is responsible for alumni-related activities, including the coordination, monitoring, evaluation, and reporting of tracer studies.

To ensure continuous quality improvement, the school conducts tracer studies to track alumni progress and assess stakeholder satisfaction, particularly from alumni and graduate users. Currently, the procedure involves alumni filling out a questionnaire during visits to arrange graduation matters or collect diplomas[4]. The BK unit then processes the data in Excel format. However, this process faces several challenges, including data input errors, insufficient data security, duplication issues, and incomplete or outdated contact information—especially alumni WhatsApp numbers. These shortcomings result in less accurate data, delays in processing, and limited feedback about alumni experiences after graduation.

To address these issues, the development of a web-based tracer study application is proposed. A website provides broader accessibility through hyperlinks, enabling users to easily search, input, and retrieve information. Similar studies show that web-based tracer study systems significantly improve efficiency and alumni participation while reducing administrative workload and minimizing data redudancy[3][5]. With this application, alumni will be able to complete questionnaires more efficiently, regardless of location, while providing richer details such as current activities, whether pursuing higher education or entering the workforce, along with specific information about their institutions or employers.

The application design employs the Unified Modelling Language (UML), which uses visual diagrams—such as Use

Case, Class, and Activity diagrams—to model and document system functionality. The system is built using the PHP programming language with the XAMPP database, supported by the Laravel framework. PHP is well-suited for dynamic web development and allows integration with databases such as MySQL for efficient data management[6].

The expected outcomes of implementing this application include improved data security, prevention of duplication, and enhanced alumni feedback collection. Moreover, it will accelerate data processing, ensure more accurate tracer study evaluations, and provide a better user experience. Ultimately, this application will strengthen alumni management practices and contribute to producing more competitive and career-ready graduates.

II. METHOD

In software development, various approaches and methodologies can be applied. This research adopts the Rapid Application Development (RAD) technique, which emphasizes short, iterative, and accelerated development cycles[7][8]. The RAD methodology is particularly effective in producing software systems that address immediate user needs while significantly reducing the time required for application development. This approach allows continuous user involvement, ensuring that the system develop aligns closely with user requirements and expectations.

The system is built using the PHP programming language with the XAMPP database, supported by the Laravel framework. Previous research shows that Laravel provides a structured and efficient development environment for web-based information systems through its Model-View-Controller (MVC) architecture, which improves code organization, maintainability, and scalability[9]. Additionally, Laravel offers built-in security features such as authentication and data protection mechanisms, which are essential in managing sensitive alumni data.

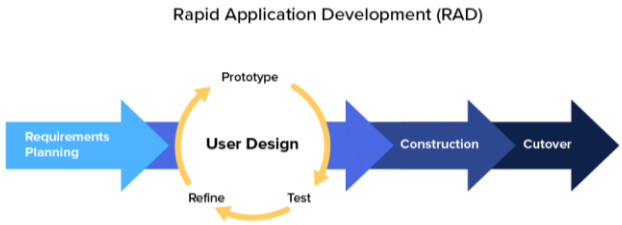

Figure 1. RAD Method

Figure 1 shows the framework of the RAD method, including:

A. Planning

This stage represents the system requirements analysis phase. At this stage, the researchers conducted direct interviews with relevant stakeholders to gather information needed to support the development of the tracer study application[10].

B. Needs Analysis

At this stage, an intensive requirements-gathering process is conducted to identify the software needs, ensuring that users and developers have a shared understanding of the system requirements[11].

C. System Design

At the system design stage, solutions to the identified problems are outlined and modeled using the Unified Modeling Language (UML) approach. Various diagrams, including use case diagrams, activity diagrams, and Entity Relationship Diagrams (ERD), are employed to visualize and document the system's structure and development process.

D. System Testing

This stage represents the testing phase of the implemented application. The purpose of testing is to identify potential weaknesses and deficiencies in the system so that necessary reviews and improvements can be made, ensuring the application functions more effectively and reliably. Testing is also conducted to evaluate the overall performance and functionality of the system. In this research, application testing was carried out using the black-box testing method, which evaluates the application's functionality based solely on inputs and outputs without examining its internal code or structure[12].

E. System Implementation

The implementation stage involves deploying the website-based tracer study application at Ihya Ulumudin Vocational School. At this stage, socialization activities are carried out to inform students about how to use the system, including updating profile photos, registering phone numbers, and completing the alumni questionnaires.F. Overview

To address these problems, it is necessary to provide an overview of the overall system during the construction and development process. This discussion is divided into two parts: an overview of the existing system at Ihya Ulumudin Vocational School and an overview of the proposed system. The comparison between the two highlights improvements that aim to make the system processes more efficient and effective.

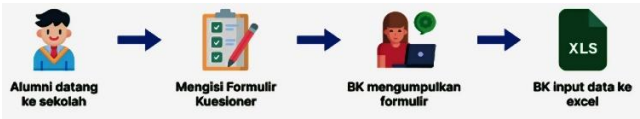

Figure 2. Overview of the previous system

Figure 2 illustrates the system currently implemented at Ihya Ulumudin Vocational School. As part of the requirements for requesting legalization, alumni are required to come to the school and complete a graduation form provided by the institution. Once the form is filled out, it is submitted to the Guidance and Counseling staff, who then manually input the alumni data into Excel based on the information provided.

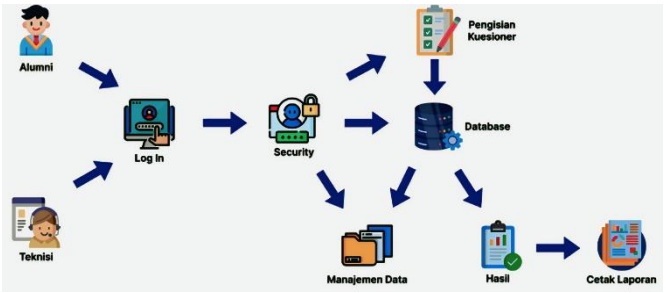

Figure 3. Created System

Figure 3 presents the proposed website-based tracer study application system at Ihya Ulumudin Vocational School. The system is integrated with the alumni database and allows alumni to access the web page by logging in, uploading a profile photo, and updating their latest phone number. Alumni are then required to complete a questionnaire that reflects their current activities, such as pursuing higher education or employment. Once the questionnaire is submitted, technicians can view the tracer results based on alumni status, manage departmental data and questionnaire content, as well as generate and print summary reports of the tracer study outcomes.

III. RESULTS AND DISCUSSION

The Tracer Study system is designed using the Unified Modeling Language (UML) method and provides output namely Use Case Diagrams, Activity Diagrams and Class Diagrams.

A. Use Case Diagram

Use case diagrams illustrate the interaction between users and the system to be built[8]. The design of this website-based tracer study application system has two types of users, namely alumni and technicians. The following is a use case diagram.

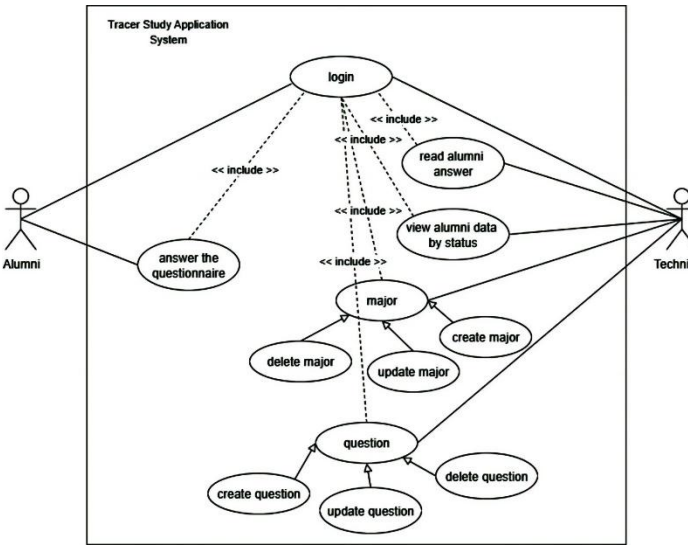

Figure 4. Use Case Diagram

Figure 4 illustrates the interaction between alumni and technicians. Alumni can access the system to log in, update their profiles, and complete the questionnaires provided by the system. Technicians have access to manage alumni data, configure questionnaires, and generate tracer study reports.

B. Activity Diagram

Activity diagram to represent the entire activity flow process in the system[6]. Figure 5 shows that to log in, users must enter their NIS/NIK/NISN first. The system then validates based on the available data. If an error occurs during the validation process, an error message will be displayed. If successful, the user can go directly to the form page to enter information data.

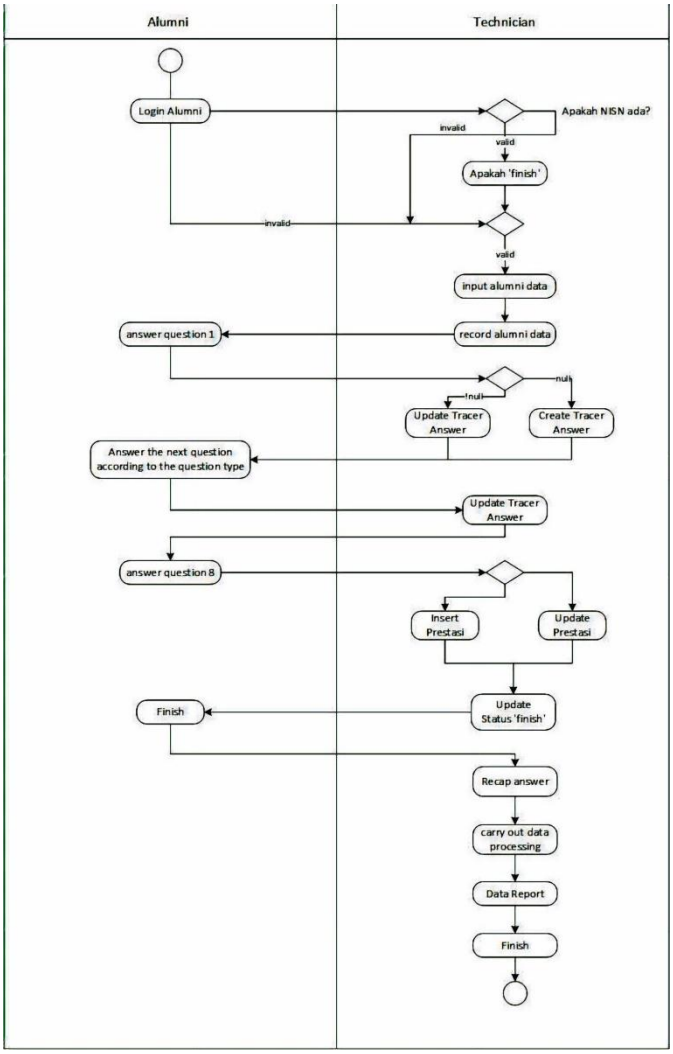

Figure 5. Activity Diagram

Figure 5, the activity diagram illustrates the sequence of user activities within the system. Alumni perform the login process; if successful, they will be directed to the profile page, while if unsuccessful, the system will display an error message. This diagram represents the system workflow in a structured sequence.

C. Class Diagram

Class diagrams provide an overview of a system by showing each class, attributes, and relationships within each class[8]. In addition, the use of Unified Modeling Language (UML), particularly class diagrams, enables developers to model system structures in a more organized and systematic manner, while also improving communication between stakeholders and reducing misinterpretation during system design[13]. The following is the system design class diagram in Figure 6.

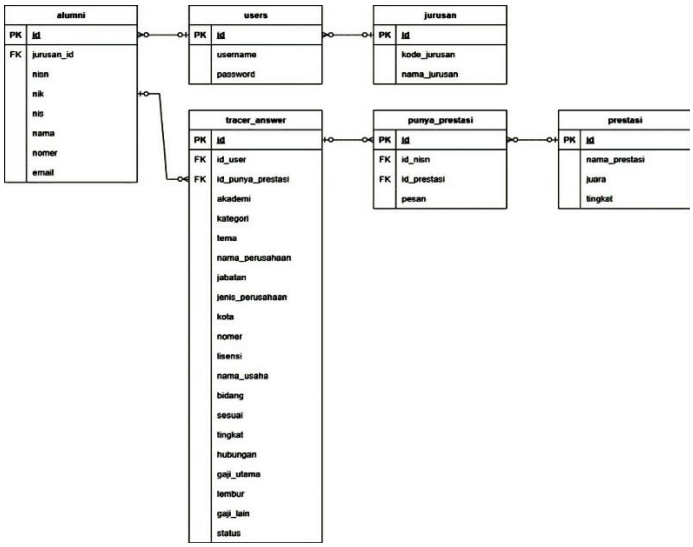

Figure 6. Class Diagram

Figure 6 shows the structure of the designed tracer study system. The class diagram presents the main classes along with the attributes of each class.

D. Implementation

1. Login Page

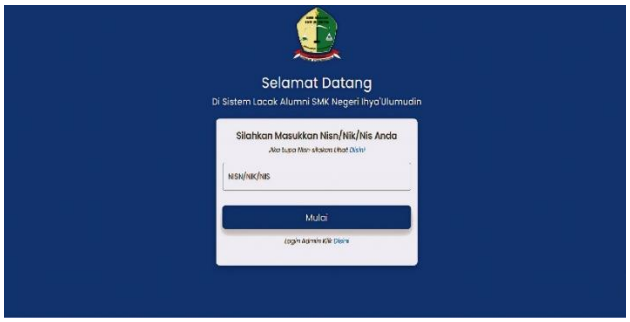

Figure 7. Login Page Alumni

Figure 7. Shows the alumni login page. The alumni login page is the page that will be used by alumni to enter the system. The login process is carried out by entering NISN/NIK/NIS.

2. Profile Page

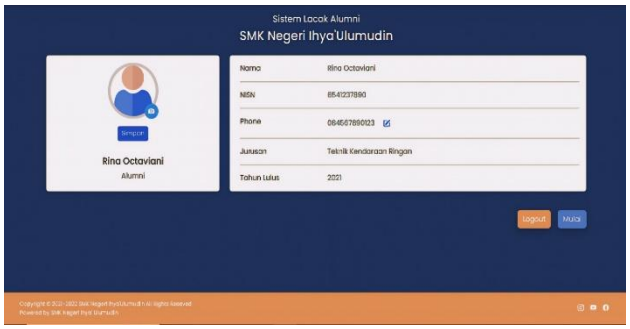

Figure 8. Profile Page

Figure 8. Is a Profile Page, on this page the user can change the profile photo and if the user has changed the telephone number the user can change the phone description.

3. Question Page

Figure 9. Question Page

Figure 9. Questions Page, this page displays four categories of questions. Alumni can only choose one answer according to the current alumni activities, then, several further questions will automatically appear regarding the answer chosen by the alumni.

E. Test Result

After the system was successfully developed, the next stage was system testing. The purpose of this testing is to identify potential errors and ensure that the system functions in accordance with the requirements set by SMK Ihya Ulumudin. Black-box testing was employed, as this method focuses on verifying system functionality without examining the internal code structure[14]. The results of the black-box testing are presented in Tables I and II.

TABLE 1.
BLACK BOX TESTING

Testing Type	Test Case	Expected Result	Test Result	Conslusion
Login	Enter correct NISN	The system accepts login access and directs to the profile page	As Expected	Valid
Login	Enter Incorrect NISN	The system rejects login access and displays an error message on	As Expected	Valid

Testing Type	Test Case	Expected Result	Test Result	Conslusion
		the login page		
Update Profile	Change photo and phone number	The system saves the changes and displays a success message on the profile page	As Expected	Valid
Update Profile	Do not change photo and phone number	The system still saves and displays a success message on the profile page	As Expected	Valid
Kuesioner	Fill out the questionnaire according to alumni activities	The system saves the data and proceeds to the next questionnaire	As Expected	Valid
Kuesioner	Do not fill out the questionnaire	The system displays an error	As Expected	Valid

System testing was conducted on the alumni of Ihya Ulumudin Singojuruh State Vocational School through a questionnaire administered after their use of the tracer study application. The evaluation employed the Guttman scale to measure the suitability of the application for its users. In this method, responses were coded with a score of "1" for answers marked "YES" and "0" for answers marked "NO." The percentage of user satisfaction was then calculated based on the accumulated results of the questionnaire[15].

Percentage of result value = (number of "YES" answers) / (Ideal value) X 100

The criteria obtained from the percentage calculation results are as follows:
0% - 25% = not good
26% - 50% = quite good
51% - 75% = good
76% - 100% = excellent
The following test results are presented in Table II:

TABEL 2.
BETA TESTING

No	Question	YES Answer	NO Answer	Percentage
1	Does the Alumni Login Page function properly?	15	0	100%
2	Does the Profile Page function properly?	10	5	100%
3	Does the Status Page function properly?	15	0	67%
4	Does the Questions Page function properly?	15	0	100%
5	Do the "Other Answers" function properly?	10	5	67%
6	Does the Completion Page function properly?	15	0	100%
	Total	80	10	89%

Based on the Guttman scale calculation from the alumni questionnaire at Ihya Ulumudin Singojuruh State Vocational School, the results showed a score of 89%, indicating a predominant response in the "YES" category.

IV. CONCLUSION

The implementation of a website-based tracer study application using the Laravel framework was carried out to facilitate faster questionnaire completion by alumni, expand accessibility, and reach a wider range of users from various locations. This finding is consistent with previous studies which indicate that web-based tracer study systems can significantly improve accessibility and participation of alumni in providing feedback. The system was designed using the Unified Modeling Language (UML) approach and developed with the PHP programming language in combination with the XAMPP database and Laravel framework. The use of the Laravel framework, which implements the Model-View-Controller (MVC) architecture, has been proven to enhance system maintainability, scalability, and security in similar applications. This application is expected to accelerate the process of alumni data collection, support more efficient evaluation of tracer study results, and contribute to improving the quality of graduates. n line with prior research, the implementation of digital tracer study systems contributes to more accurate data processing, reduced redundancy, and faster reporting, which are essential for institutional evaluation. In addition, the system enhances user experience by providing a more accessible and reliable platform for data management. Based on testing results, the application demonstrated an interface and features that were easy to understand, with 89% of respondents selecting "YES" in their evaluation, indicating a high level of user acceptance. This level of user acceptance indicates that the system meets user requirements effectively, which aligns with findings from previous studies that emphasize the importance of usability in web-based information systems.

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