

Designing a Website for the Alumni Association using Software Development Life Cycle

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ABSTRACT

The rapid development of technology has penetrated into various sectors, including education. Universitas Islam Negeri Sunan Gunung Djati Bandung realizes the importance of participating in technological advances to improve information and communication services. One of the efforts made is to utilize the website to introduce and manage alumni data. This research is focused on the analysis and design of the Informatics Study Program alumni website, with the hope that it can support facilities at the university and provide benefits, especially for alumni of the Informatics Department. The results showed that the development of the Alumni Association website can be done well as a means of facilities for the Alumni Association in informing its work program. In addition, website development is carried out by making front-end with ReactJS and back-end with NodeJS Express on the website can run completed and implemented quite well.

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1. INTRODUCTION

Today, the development of technology has progressed quite rapidly and mushroomed into various fields [1], from access to data and information, advertising, communication and even the field of education [2]. Therefore, UIN Sunan Gunung Djati Bandung definitely needs and participates in the process of technological development itself, especially in order to improve the quality of services in the presentation of information and communication. One of them is the utilization of a website for a means of introducing the Alumni Association as well as a means of collecting alumni data. The existence of the website, alumni have facilities in terms of informing everything to further show their existence, and there are also alumni data collection facilities which are certainly needed by the University in addition to using the current social media [3], [4].

There are many similar studies, including those carried out Marta on redesigning the website of SMK SMTI Padang. The research discusses the redesign of the website design of SMK SMTI Padang which has been operating since 2012. Several problems related to the user interface were found that needed to be resolved. In order to answer these problems, a website design redesign was carried out using the SWOT (Strength, Weakness, Opportunity, Threat) data analysis method as well as communication theory, layout design, and color[5][6]. The main media used in this redesign is a website, with media applications in the form of Responsive Web Design, brochures, flyers, key chains, and others as supporting media. All of these media are part of the process of redesigning the SMK SMTI Padang website to simplify the website so that visitors can understand it better [7]. Other research explains the importance of a forum or communication media to introduce and strengthen the relationship between students and alumni. This research was conducted at Ganesha Polytechnic College in Medan. This research includes the stages of data collection, observation, interviews, analysis, design, depiction, creation, testing, and implementation. The design of the alumni bond web involves designing processes, databases, and using the WordPress platform. The implementation of this

web design allows students of Politeknik Ganesha Medan to access information about alumni, including alumni data, alumni activities, alumni CVs, and others through the POLGAN Portal [8]. In addition, another study discusses the scholarship information system at the Riau Caltex Polytechnic Alumni Association (IKAPCR) which includes a Decision Support System (SPK) and financial management of scholarships. Evaluation of beta testing shows that this system meets user needs, is informative and innovative, and accelerates the selection process for receiving scholarships. However, there are some weaknesses such as data integration with the Riau Caltex Polytechnic academic system, donation reminder services via email and SMS, semester payment management for scholarship recipients, and variations in info graphics for the analysis process. Therefore, an information system re-engineering process is needed to improve efficiency in each process mechanism. The results of WebQual testing show that the majority of students and alumni agree that the web quality of this system is good [9].

The research focuses on the analysis and design of the alumni website in the Informatics Study Program. Thus, the website is expected to help support the facilities in the University and benefit alumni, especially the Informatics Department. Therefore, this research discusses details related to needs analysis, design and implementation on the Informatics Alumni Association website at UIN Sunan Gunung Djati Bandung.

2. METHOD

A variety of methods can be used for system development, and one of them is the SDLC. Many development models, including rapid application development (RAD), joint application development (JAD), and the conventional waterfall model, can be employed with an SDLC [10]. In this study, The Software Development Life Cycle (SDLC) are used to solve the development of this website. SDLC approach is used to recognize the user needs and avoid any needs that are not in accordance with the needs of alumni website development. The stages of SDLC includes Planning, Analysis, Design, Development, Testing, Maintenance [11][12][13]. The stages are shown in Figure 1.

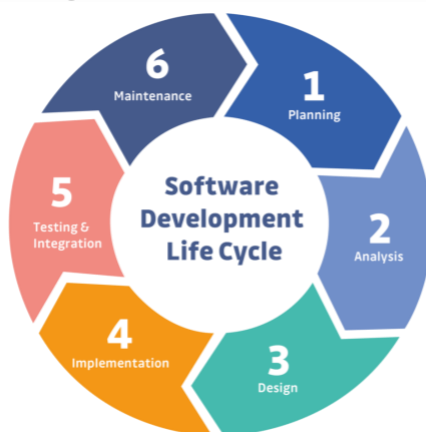


Figure 1. Software Development Life Cycle (SDLC) stages [14], [15], [16]

2.1 Planning

The stages started from describing the problem. There are many problems in in developing this website, it includes Profiling, Branding, and Tracking [17], [18]. Profiling and branding focus on how to introduce the Alumni Organizations, so it can be recognized by the wider community. In addition, tracking alumni are required for collecting data of alumni who have completed their studies at the Informatics Department. The information is obtained that will be useful for the University administration system, especially for the Department. Furthermore, another problem is related to management. Where management focuses on managing data from the Informatics Alumni that collected by Informatics Alumni Association (IAIF). At this stage the problems obtained are described in the form of needs in website development. So that the expected system includes the following various needs:

1. The system is able to display information about the Informatics Alumni Association of UIN Sunan Gunung Djati Bandung.
2. The system is able to display the questions for tracer study purposes of the Alumni and collect the answers data from those questions.
3. The system is able to display news related to the Informatics Alumni Association of UIN Sunan Gunung Djati Bandung.

4. The system is able to manage Alumni data, management data, news data, and other data related to the Informatics Alumni Association of UIN Sunan Gunung Djati Bandung.

The method used to implement the SDLC is Agile. The Agile method has considerable flexibility in dealing with changes to the application.

2.2 Analysis

Based on the analysis of the planning stage in the expected system section, it was decided that the website components would be 3 parts, namely client-side, admin-side, and server-side. Client-side is the front-end that is displayed to users, which in this case are Alumni and the public. Admin-side is the front-end that is displayed to users who are in charge of managing data related to Alumni. Server-side is the back-end that manages all the processes needed by the front-end.

2.2.1 Functional Requirements

Functional requirements contain functions that exist in the system. The following are the functional requirements of the IAIF UIN SGD Bandung website as shown in Table 1.

Table 1. Client Functional Requirements

ID	Function	Explanation
KFC-001	Authentication	Client can create an account by providing some user information as input.
KFC-002	News	The client can access and read the news on the website with or without the authentication process.
KFC-003	Survey	Clients can participate in the survey process carried out on the website by authenticating first.
KFC-004	About	Client can find out about IAIF UIN SGD Bandung through the information available on the website with or without authentication process.
KFC-005	User Profile	The client gets access to change their data by performing the authentication process.
KFC-006	Logout	The client can exit the website and delete the authentication history that has been done, so that if the client wants to access services that require an authentication process, they must authenticate first.

Based on the results of the analysis of the needs of the Alumni Association web development, at least 9 (nine) admin functional requirements are required which can be shown as in the following Table 2.

Table 2. Admin Functional Requirements

ID	Function	Explanation
KFA-001	Authentication	Admins must first authenticate before entering the Admin website.
KFA-002	Dashboard	Admins can access and read the news on the website with or without the authentication process.
KFA-003	Data Alumni	Admin can manage Alumni data such as deleting, adding, and changing.
KFA-004	Manage Administration and Position	Admins can manage management data such as adding administrators, adding positions, changing administrators, and changing positions.
KFA-005	Manage Survey	Admins can manage surveys such as creating surveys, adding questions, adding or removing options to questions, setting start dates and end dates, and setting the status of surveys active or not.
KFA-006	Manage Response	Admins can view responses from surveys held and export to Excel.
KFA-007	Admin Manager	Admins can manage Admin data such as adding and deleting Admins.
KFA-008	News Manager	Admins can manage news data (news) such as adding, changing, and deleting news data.
KFA-009	Gallery Manager	Admins can manage gallery data such as adding, changing, and deleting gallery data.

In addition, the functional requirements of the server where the server needs to be able to provide several modules that can be used by the frontend so that data can be connected directly to the frontend system, which are as in the following table.

Table 3. Server Functional Requirements

ID	Function	Explanation
KFS-001	Auth Module	The server provides a module for authentication processes such as login, register, and logout using tokens.
KFS-002	User Module	The server provides modules for adding, changing, deleting, and retrieving user data
KFS-003	Admin Module	The server provides modules to add, change, delete, and get admin data.
KFS-004	Jabatan Module	The server provides modules to add, change, delete, and retrieve job title data.
KFS-005	News Module	The server provides modules for adding, changing, deleting, and retrieving news data.
KFS-006	Gallery Module	The server provides modules for adding, changing, deleting, and retrieving gallery data.

2.2.1 Non-functional requirements

Non-functional requirements are system limitations so that they can be said to be good. Detailed non-functional requirements are in table 4 below.

Table 4. Non-functional Requirements

ID	Parameters	Requirements
KNF-001	Hostname Authorized	The system can only be accessed by the hostname registered on the server.
KNF-002	Reliability	The system runs with minimal bugs and errors.

2.3 Design

2.3.1 Use Case Diagram

Use case diagrams describe the actors and interactions inherent in each actor in the system. This research contains many use case diagrams that are shown in Figure 2.

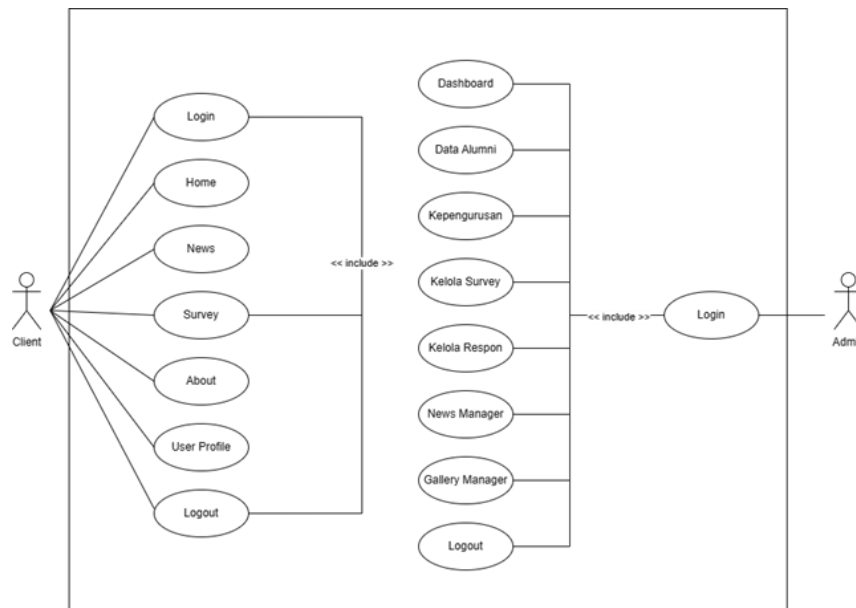


Figure 2. Use Case Diagram

2.3.2 Class Diagram

1. Client-Side

The class diagram for client-side can be shown in the Figure 3.

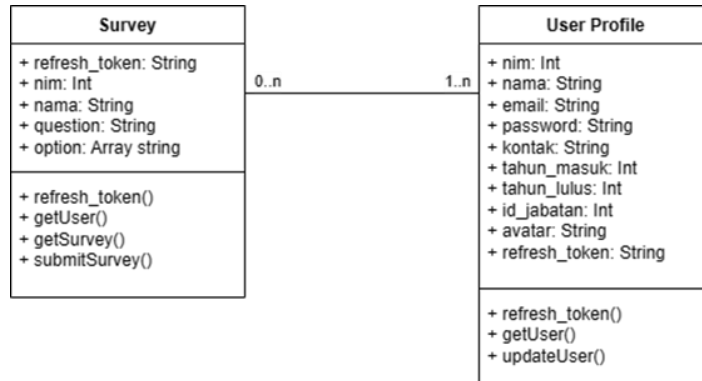


Figure 3. Class Diagram Client-side

2. Admin-Side

The class diagram for the admin-side can be shown in the Figure 4.

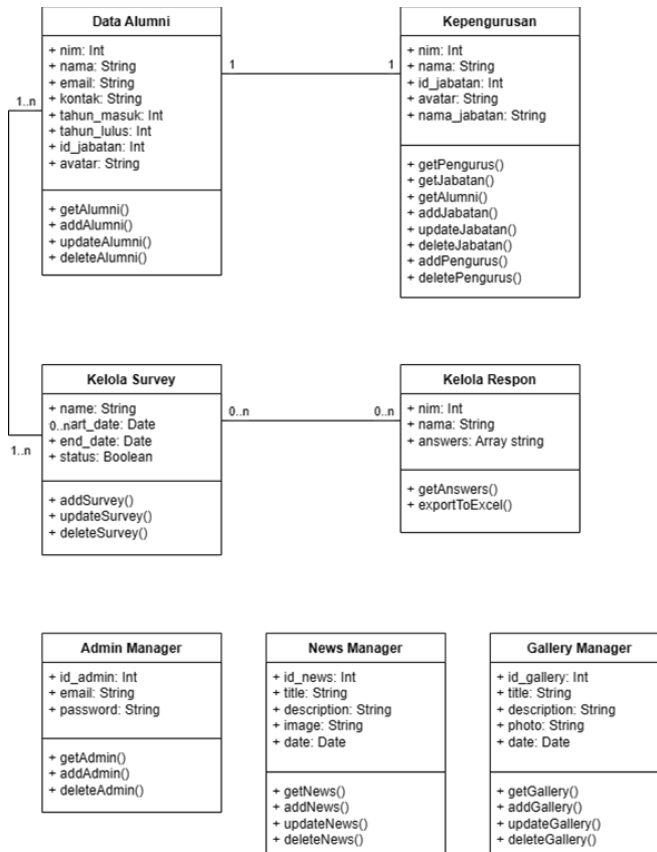


Figure 4. Class Diagram Admin-side

2.3.3 Entity Relationship Database

ERD or Entity Relational Database describes the design of the database structure used to manage data on the website. The following is the Entity Relational Diagram that is shown in Figure 5.

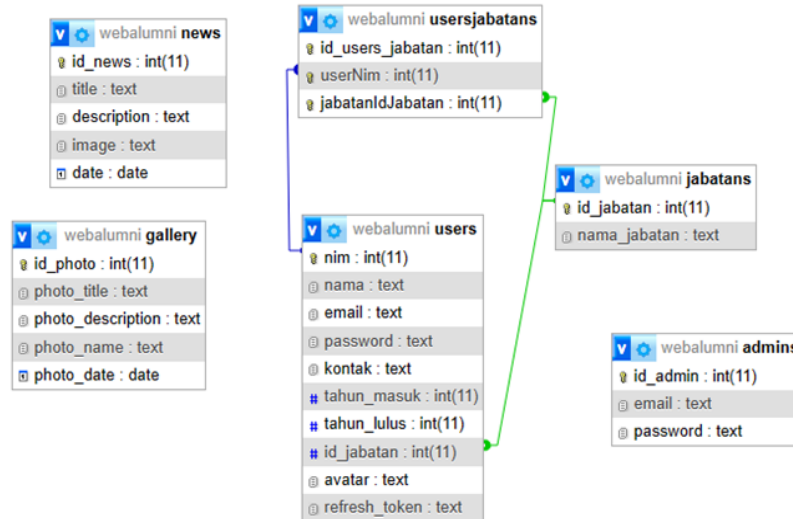


Figure 5. Entity Relational Diagram

3.2.1. Development

The development are done with JavaScript programming language but different frameworks. The front-end uses ReactJS as a framework, and the back end uses NodeJS Express as a framework. The Database Management System (DBMS) used is MySQL and Firestore.

3. RESULTS AND DISCUSSION

The result of this research is a website consisting of various views that have been built based on the features defined in the previous stages. The results of this research are in the Development phase. In this Figure 7 are display the Client-Side News Page.

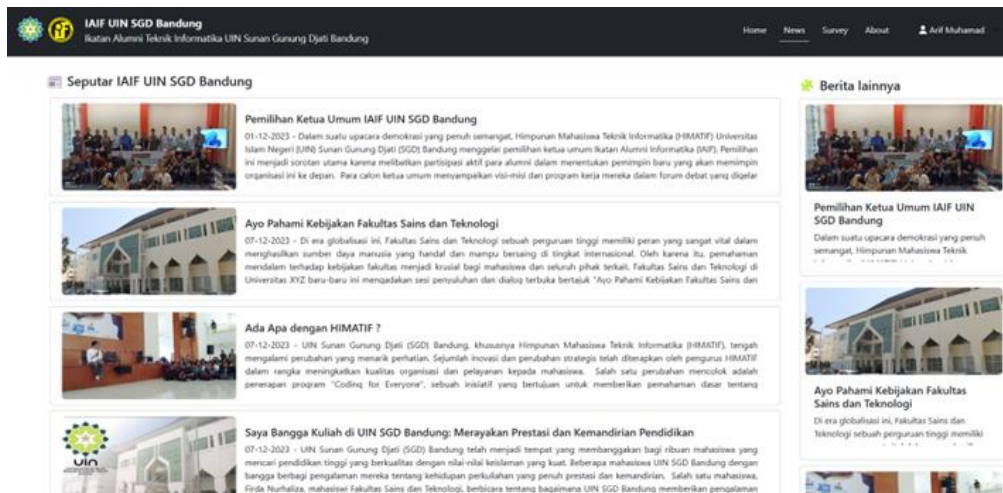


Figure 7. Client-Side News Page

3.1.3 Survey

On the survey page there are survey questions that can only be accessed if the user performs the authentication process first. The figure 8 shows the Client-Side Survey Page.

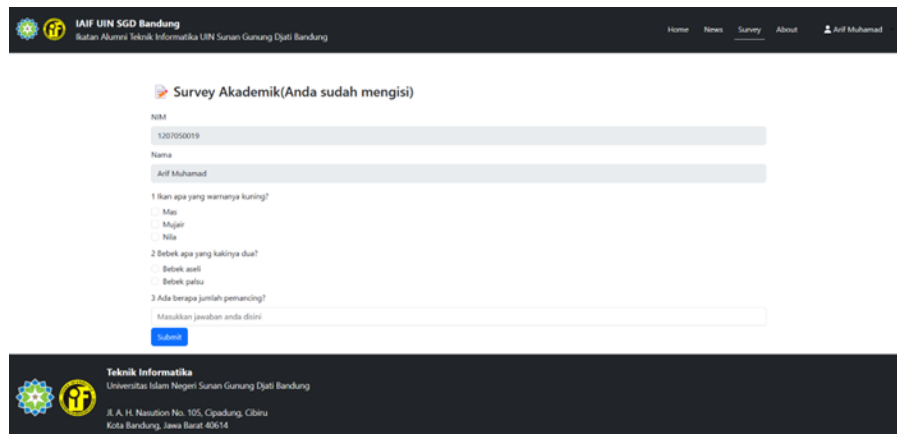


Figure 8. Client-Side Survey Page

3.1.4 About

The page About contains more in-depth information about the profile of Informatics Alumni Association University Sunan Gunung Djati Bandung. This information can be shown in Client Side About Page that are shown in Figure 9.

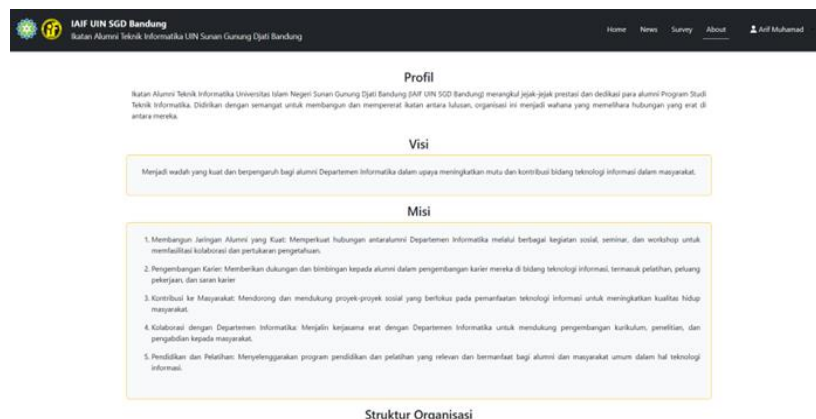


Figure 9. Client-Side About Page

3.1.5 User Profile

The user profile page displays user information and can be changed according to the user's wishes by having to do the authentication process first. Figure 10 displays User Profile Page that are shown in Client Side.

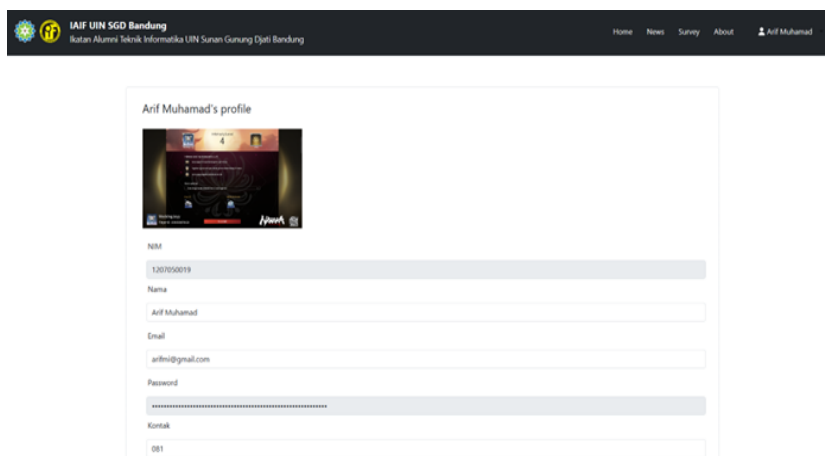


Figure 10. Client-Side User Profile Page

3.2. Admin-Side

3.2.1 Dashboard

The Dashboard Page depicts the information that contains the total alumni registered in the system and also a graduation graph that represents the number of graduates in certain years according to the variation of existing Alumni data. Figure 11 displays the picture of Dashboard Page that can be accessed on Admin Page.

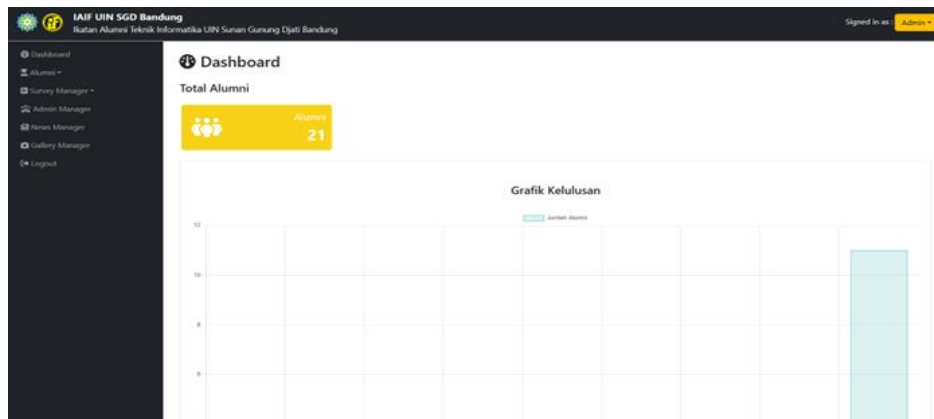


Figure 11. Dashboard Page on Admin-Side

3.2.2 Data Alumni

In this page contains the information of Alumni who registered in systems. Admin can perform several processes such as adding to deleting Alumni data. Figure 12 shows the Alumni Data Page on Admin-Side

No.	NIM	Nama	Email	Kontak	Tahun Masuk	Tahun Lulus	Jabatan	Foto	Aksi
1	17462704	tebing alfa jet	tebing	174624	2018	2019	Anggota		
2	120702001	abdullah	abdullah@gmail.com	98981202027	2020	2024	Anggota		
3	120702002	Adhya Muhammad Maulana	adhya@gmail.com	988	2020	2024	Bendahara I		
4	120702003	Adhya Pratama Yu'ri Nurjanan	adhya@gmail.com	987	2020	2024	Bendahara I		
5	120702004	Ahyan Putra Pratama	ahyanputra@gmail.com	986	2020	2024	Sekretaris I		
6	120702005	Agus Tri Adiana	agus triana@gmail.com	985	2020	2024	Sekretaris I		
7	120702010	Alif Hafid Mahrom	alifhafid@gmail.com	983	2020	2024	Titip		

Figure 12. Alumni Data Page on Admin-Side

3.2.3 Manage Administration and Position

This figure 13 displays information from the admin page for managing alumni management in the Informatics Alumni Association, UIN Sunan Gunung Djati Bandung.

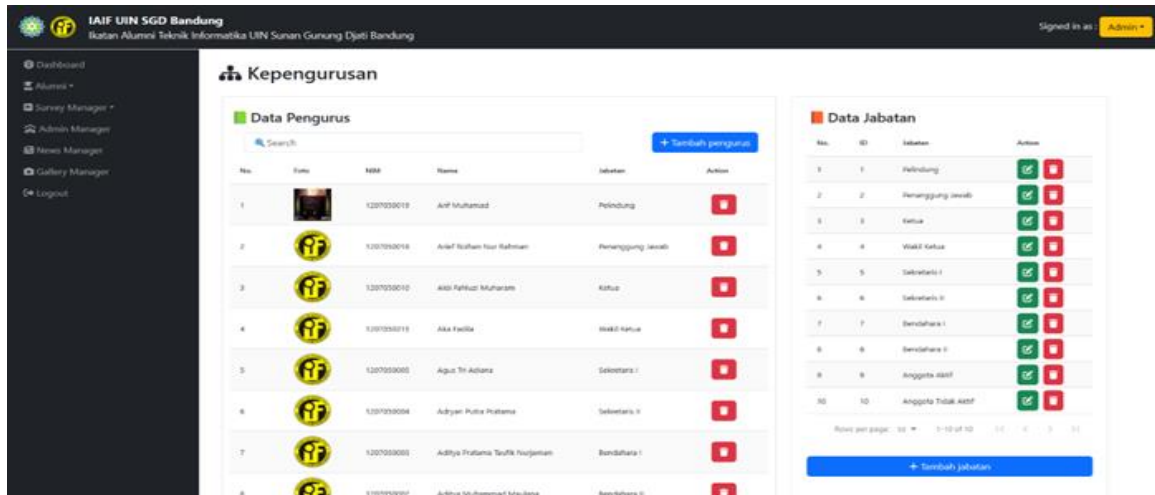


Figure 13. Management of organization Page on Admin-Side

3.2.4 Manage Survey

Figure 14 and 15 shows the Survey Page. In this page, admin can create the survey and manage question by adding, changing, and deleting the surveys. Apart from that, on the survey settings page there are several options which are attributes of the survey such as the name of the survey in the question and also the question options.

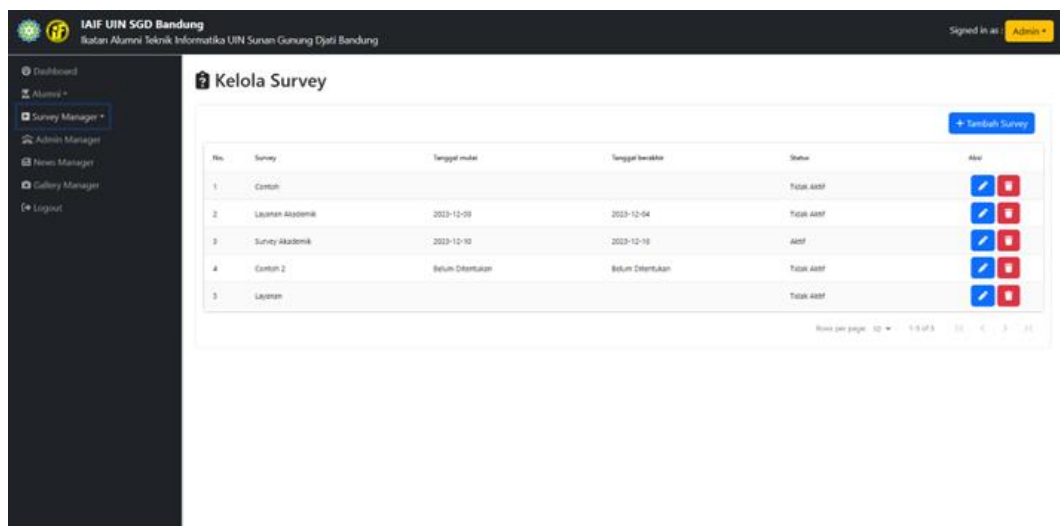


Figure 14. Manage Survey Page on Admin-Side

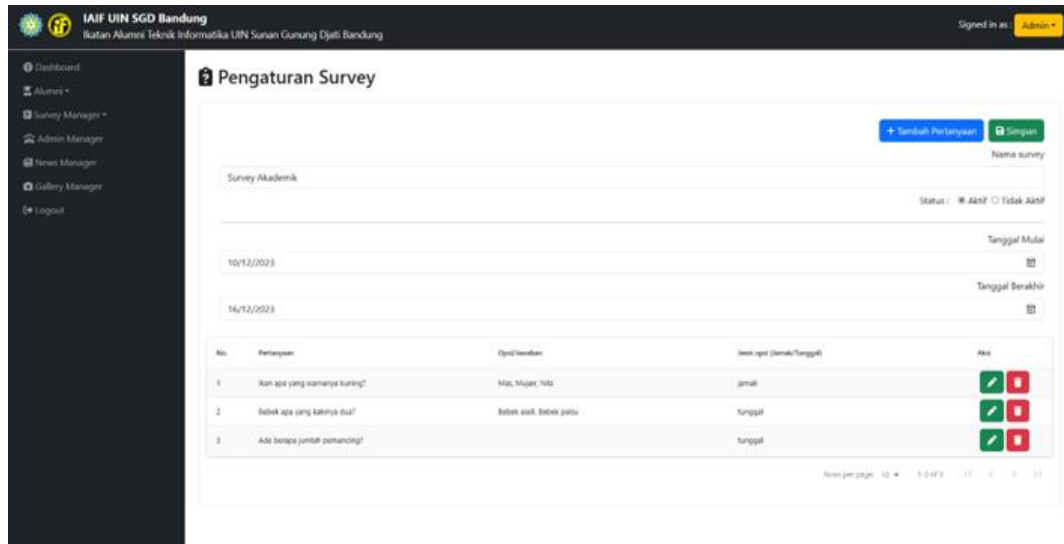


Figure 15. Admin-Side Manage Survey Questions page

3.2.6 Manage Survey Response

The Manage survey response page is a page that contains response data from respondents who took part in the survey. This page displays the results of responses given to alumni in a certain time period. Besides that, on this page there is an export to excel feature to export data to excel format. The display of the survey response management page can be seen in figure 16 and 17.

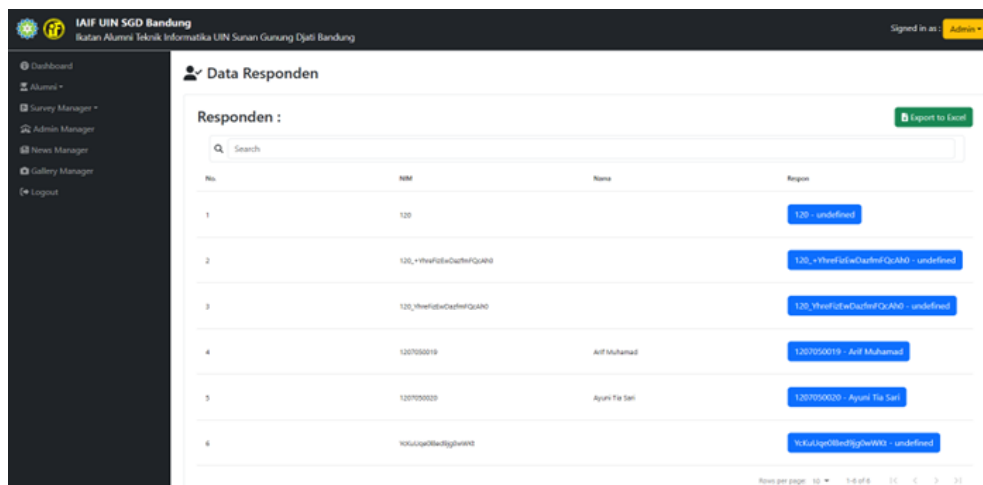


Figure 16. Manage Survey Response Page on Admin-Side

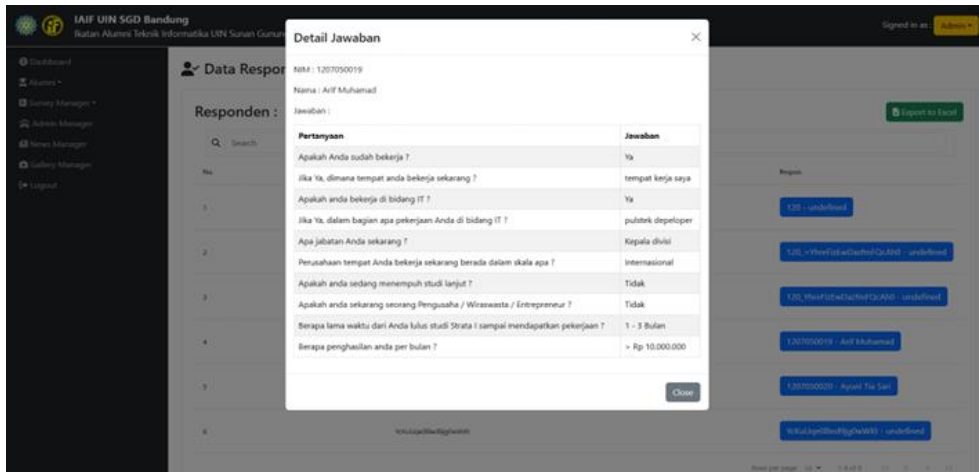


Figure 17. Answer Detail Page on Admin-Side

3.2.7 Admin Manager

This page contains a display of the admin management page which displays registered admin data. Admin can add admin data and delete admin data. This page are displayed on Figure 18.

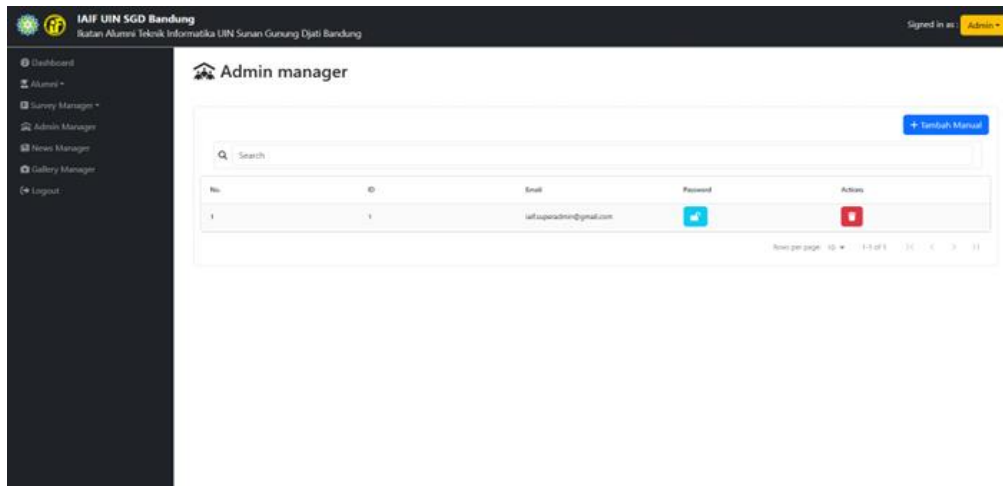


Figure 18. Admin Manager page on Admin-Side

3.2.7 News Manager

This page contains pages for managing news that are displayed on the client side. Admins can perform several operations including adding, changing and deleting news. Figure 19 shows the features for managing news that can be operated by the administrator.

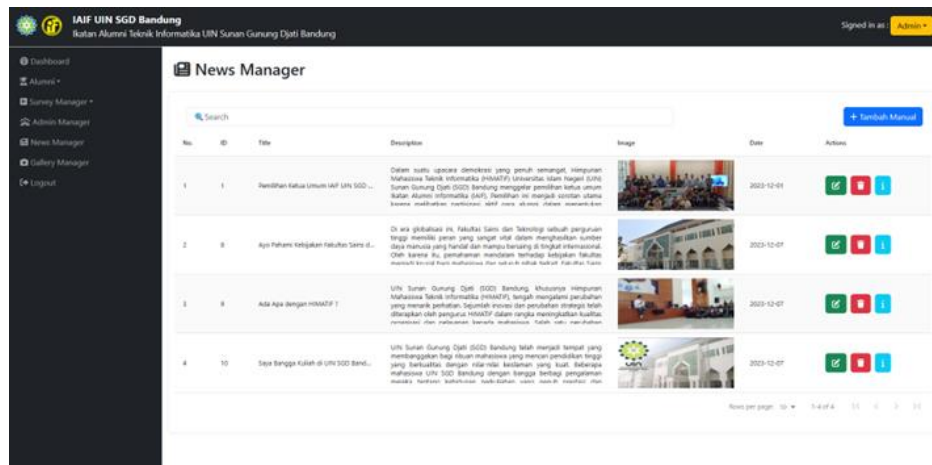


Figure 19. News Manager page on Admin-Side

3.2.7 Gallery Manager

This page is a page for gallery management. This gallery can be accessed by user to display activities which illustrated by images from the Alumni Association. Administrator can add, change and delete gallery data. Figure 20 shows the gallery management page that carried out by the admin.

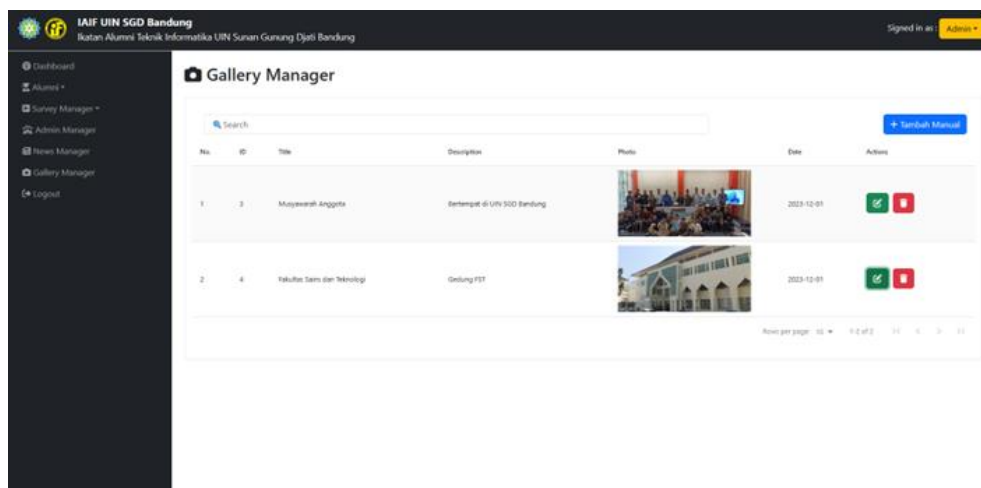


Figure 20. Gallery Manager page on Admin-Side

4. CONCLUSION

The results of this research show that the Informatics Alumni Association website can be built using a Software Development Life Cycle approach with several stages, namely Planning, Analysis, Design, Development, Testing, Maintenance. This SDLC development stage approach resulted in the need for a website that was in line with the Alumni Association's expectations for informing work programs, tracking alumni data and managing surveys. The development process is carried out using a front-end development stack with ReactJS and back-end with NodeJS Express, making the website run quite well optimally.

Further developments that can be carried out in this research include developing the authentication process on the admin side to make it more secure, making the website display responsive, and adding statistical information to the website display and admin dashboard to make it more varied.

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