

Design and Develop Student Processing Data and Finance Information System for Madrasah Ibtidaiyah (MI) Hidayatu Bayan

Merancang dan Membangun Sistem Informasi Pengolahan Data Siswa dan Keuangan bagi Madrasah Ibtidaiyah (MI) Hidayatu Bayan

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ABSTRACT

The rapid development of information and communication technology is currently a demand in the world of education to always adapt technological developments to efforts to improve the quality of education. Education is a human right so it has an important role in people's lives. As stated in article 31 paragraph (1) of the 1945 Constitution which states that: "Every citizen has the right to education. The implementation of this educational process is to educate and develop the nation's morals to be better and dignified. This is because the system performance at Madrasah Ibtidaiyah (MI) Hidayatul Bayan is currently still running slowly and lacking technological infrastructure. This research aims to manage and visualize a website-based data collection information system for Madrasah Ibtidaiyah (MI) students. The method used in writing the preparation of this manuscript includes three main parts, namely the data collection method, the data processing method and the system design method. The data collection of MI Hidayatul Bayan students currently uses a website-based information system. With the existence of a website-based student data collection information system implemented at Madrasah Ibtidaiyah (MI) Hidayatul Bayan, it provides easy access for administrative staff in managing student data collection that is visualized into a website-based information system and provides convenience for staff to enter data in a form that is easier to understand. The visualized system is still simple, especially on the website display and it is expected that there will be development in different versions.

Keywords: Student Data Collection; Education; Technology Development; Visualization; Website

ABSTRAK

Perkembangan teknologi informasi dan komunikasi yang sangat pesat saat ini menjadi tuntutan dalam dunia pendidikan untuk selalu menyesuaikan perkembangan teknologi terhadap usaha untuk peningkatan mutu Pendidikan. Pendidikan merupakan hak asasi manusia sehingga memiliki peran penting dalam kehidupan bermasyarakat. Sebagaimana tertera dalam pasal 31 ayat (1) Undang-



Undang Dasar 1945 yang menyebutkan bahwa: "Setiap warga negara berhak mendapat Pendidikan. Pelaksanaan proses pendidikan ini guna mencerdaskan dan mengembangkan moral bangsa agar menjadi lebih baik dan bermartabat. Hal ini dikarenakan bahwa kinerja sistem yang ada di Madrasah Ibtidaiyah (MI) Hidayatul Bayan saat ini masih berjalan lambat dan kurangnya infrastruktur teknologi. Penelitian ini bertujuan untuk mengelola dan memvisualisasikan sistem informasi pendataan siswa Madrasah Ibtidaiyah (MI) berbasis website. Metode yang digunakan dalam penulisan penyusunan naskah ini meliputi tiga bagian pokok yaitu metode pengumpulan data, metode pengolahan data dan metode perancangan sistem. Pendataan siswa MI Hidayatul Bayan saat ini sudah menggunakan sistem informasi berbasis website. Dengan adanya sistem informasi pendataan siswa berbasis website yang diterapkan di Madrasah Ibtidaiyah (MI) Hidayatul Bayan, memberikan kemudahan akses staff administrasi dalam mengelola pendataan siswa yang divisualisasikan kedalam sistem informasi berbasis website serta memberikan kemudahan staff untuk memasukan data dalam bentuk yang lebih mudah dipahami. Sistem yang divisualisasikan masih sederhana terutama pada tampilan website dan diharapkan adanya pengembangan dalam versi yang berbeda

Kata kunci: Pendataan Siswa; Pendidikan; Perkembangan Teknologi; Visualisasi; Website

INTRODUCTION

The rapid development of information and communication technology requires the world of education to continue to adapt to technological advances as an effort to improve the quality of learning (Alwi, Wulan, & Sulistiyani, 2020). Education is a human right and has a fundamental role in people's lives. This is in line with Article 31 Paragraph (1) of the 1945 Constitution which states that "Every citizen has the right to education." The implementation of education is a means to educate the life of the nation and shape the morals of the community to be better and dignified. This condition encourages the government to continue to improve the quality of education services (Solichin & Kutsi, 2019).

Madrasah is one of the interesting institutions in the context of contemporary education. Madrasah as part of the national education system has a strong closeness to the community and is considered easier to reach than several other formal educational institutions. Education experts consider that madrasahs have a strategic role in realizing PUS-EFA (Education for All), because they are relatively more affordable financially and able to reach grassroots communities. Therefore, madrasahs have great significance in the dynamics of modern education and make an important contribution to reducing illiteracy in Indonesia (Sirojudin, 2019).

MI Hidayatul Bayan is one of the Islamic basic education institutions located on Jl. Raya Puncak Km.79. Currently, most of the data management at MI Hidayatul Bayan is still done manually, both student data collection and payment recording. The limitation of technological infrastructure, the lack of computer devices and internet access, and the lack of ability of staff to operate information systems are the main factors that have not been implemented in this madrasah data collection system.

The manual system poses various problems, such as the high potential for data input errors, data duplication, and the risk of data loss. The manual recording process also requires considerable time and effort, thus reducing efficiency and inhibiting the productivity of educators and administrative staff (Solichin & Kutsi, 2019).

Based on these conditions, this study aims to design and build a web-based student data collection information system at MI Hidayatul Bayan. The selection of this topic is based on the need for madrasahs for an information system that is able to improve the effectiveness of data management. Literature studies also show that information systems developed according to institutional needs can increase efficiency and reduce various administrative problems. However, several previous studies have shown mixed results, where there are information systems that have succeeded in improving performance, but some are not optimal because they are not in accordance with the needs of users. This shows the importance of designing an information system that is truly relevant to the conditions and needs of madrasahs.

PROBLEM STATEMENT

Based on this background, the formulation of the problem in this study is as follows:

1. How to design and implement the student data collection information system at Madrasah Ibtidaiyah (MI) which was previously managed manually into a digital system?
2. How to visualize student data into a website-based data collection information system so that information can be accessed and managed effectively and efficiently?

LITERATURE REVIEWS

Visual Studio Code

Visual Studio Code is a simplified code editor with support for development operations such as debugging, task execution, and version control. It aims to provide only the development needs of the tool for a fast code-build-debug cycle and leave more complex workflows to a more full-featured IDE, such as the Audio Visual IDE. VS code runs on macOS, Linux, and Windows.

Code igniters

Codeigniter is a framework developed in the open-source PHP programming language. Many developers use Codeigniter to develop dynamic websites. Codeigniter is one of the frameworks that uses the concept of MVC. MVC is a method of creating applications by separating data (Models) from their display and processing methods (Controller). This can be easily explained as follows:

M-Model=> Handle Database-related processes such as data retrieval, inserting, deleting, and updating data.

V-View => Is the layout that sets the display on the browser page.

C-Controller=> Is the bridge between the model and the display.

PHP

PHP (recursive abbreviation PHP: Hypertext Processor) is a scripting programming language. Unlike C/C++, program code in PHP does not need to be compiled and built into executable files (files. Exe if you work in a Windows environment). PHP code can be executed directly through a PHP translator, or better known as PHP Parser.

PHP is designed to be used in the web development process easily and quickly. For this purpose, PHP code needs to be stored on a server machine (web server) and executed when there is a request from the client machine (web browser). It is therefore often known as server-side programming (server-side programming or server-side scripting).

MySQL

MySQL is one of the RDBMS software, software that acts as a database server. With MySQL, we can create databases, tables, and other supporting components in the database. The tables that have been created can then be used as data storage as needed by the application.

Waterfall Method

Waterfall models are sometimes referred to as classic life cycles, which means a systematic and sequential approach to software development. Software development begins with the specification of user needs, and continues to the analysis, design, code, and testing stages that end with ongoing support for the resulting software system.

The following is an explanation of the stages of the waterfall model:

- Communication: Before technical work can begin, it is essential to communicate and collaborate with customers (and other stakeholders). The goal is to understand the objectives of the stakeholders in the project and to gather requirements that help define the features and functions of the software.
- Planning: Any complicated trip can be simplified if there is a map. Software projects are a complicated journey, and planning activities create a "map" that helps guide the team on the go. A map called a software project plan defines the software engineering work by describing the technical

tasks to be performed, the risks that may occur, the resources needed, the work to be generated, and the work schedule.

- **Modelling:** Whether you're a landscaper, a bridge builder, or an expert aviation engineer, carpenter, or architect, you work with models every day. You "sketch" an object so that you can understand the big picture—what it looks like architecturally, how the constituent parts fit into each other, and many other characteristics. If needed, you refine the sketch to be larger and more detailed in an effort to better understand the problem and how your circumstances will resolve it. A software engineer does the same thing by creating a model to better understand the software requirements and the design that matches those requirements.
- **Construction:** This activity combines code generation (either manual or automated) and testing required to uncover errors in code.
- **Implementation:** Software (as a complete entity or as a partially completed upgrade) is delivered to customers who evaluate product deliverables and provide feedback based on evaluations.

Software

Software is all the commands used to process information. Software can be a program or procedure that when executed provides the desired function and appearance, a data structure that allows the program to manipulate information and documents that describe the operation of the program's use. Software is not the same as a program (computer), because it consists of: programs, documents and data by presenting problems in the real world.

Use cases

A Use Case is a functional description of the system from the user's perspective. It works by depicting the typical interactions between the users of the system and the system itself through stories about how the system is used.

Use Cases can be used to describe system needs analysis from a top level through system functionality and interaction between actors. An actor is something that interacts with the system.

In general, the purpose of a Use Case diagram can be explained as follows:

- a. It is used to gather the needs of a system.
- b. To get a view from outside the system.
- c. To identify the factors that affect the system both internally and externally.
- d. To show the interaction of the system actors.

Use Cases are the best tool to stimulate potential users to talk about the system from their point of view.

Sequence Diagram

In this study, a sequence diagram was used to describe the flow of the interaction process between objects in the web-based student data collection information system at MI Hidayatul Bayan. Sequence diagrams help explain how users—such as madrasah operators and admins—communicate with the system while performing activities, such as entering student data, managing payments, or displaying reports. By displaying the order in which messages were sent chronologically, this diagram provides a clear understanding of the workflow of digital systems designed to replace previous manual processes. Sequence diagrams also ensure that the entire logic of system interactions is well structured before the implementation stage.

Class Diagram

In the development of this student data collection information system, class diagrams are used to describe the static structure of the system, including the required classes such as Students, Payments, Users, and Reports. Each class has attributes and methods that represent the processes that run in the system. Classroom diagrams help researchers in designing a more systematic system architecture, starting from student data management, payment data storage, to relationships between the objects involved. Thus, the diagram class ensures that the system is built with a clear, neat, and easy structure to develop further.

XAMPP

In this study, XAMPP was used as a local server environment to build and test student data collection information systems. XAMPP contains Apache as a web server, MariaDB for student database management and payments, and PHP as the primary programming language used to process system logic. The use of XAMPP greatly supports research needs because it allows developers to perform tests and debugging without the need for online servers, as well as providing flexibility for the initial development of the system before it is fully implemented in the madrasah environment.

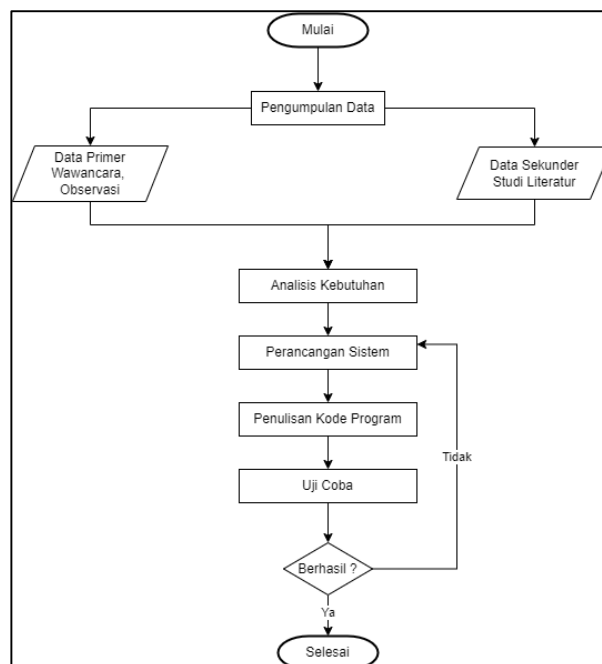
Framework

The framework used in this study serves to accelerate the process of developing a student data collection information system. The framework provides a well-organized collection of structures, functions, and modules so that researchers don't have to build all the components from scratch. With the framework, the process of creating features such as student data HUD, input validation, user account management, and interface appearance becomes more efficient and consistent. The framework also helps ensure that the information system built is modular, scalable, and easy to maintain by the madrasah in the future.

METHODOLOGY

The method used in writing the preparation of this manuscript includes three main parts, namely the data collection method, the data needs analysis method and the system design method.

Figure 1: Research Stages



Data Collection Methods

At this stage, the researcher collects data to facilitate data analysis and system design. The data collection techniques used by the researcher are as follows:

Primary Data

Primary data is data obtained from researchers directly from original sources, namely:

1. In this interview method, the author conducted an interview with MIS principal Hidayatul Bayan to obtain information about manual-based information systems.
2. Observation In this observation method, the author makes observations at the research site while taking manual-based data from the madrasah.
3. Observation is one way to obtain madrasah data from the Web-Based Student Data Collection Information System at MIS Hidayatul Bayan.

4. This madrasah data is in the form of student data, teacher data and madrasah profiles which can contain establishment history and administrative data obtained from MIS Hidayatul Bayan.
5. The data collected are teacher identity data and student identity data.

Secondary Data

Secondary data is data obtained by researchers from sources that are already available and related to research through literature with reference to 5 journals.

Requirement Analysis Method

At this stage of requirement analysis, it defines the requirement needed by the system. This stage consists of identifying existing problems and processing the data that has been obtained so that it can be used for system design.

System Design Methods

Waterfall models are sometimes referred to as classic life cycles, which means a systematic and sequential approach to software development. Software development begins with the specification of user needs, and continues to the analysis, design, code, and testing stages that end with ongoing support for the resulting software system.

A. Code (Program Code Writing)

The activity at this stage is system coding. Program code writing is the stage of translating a system design that has been created into a form of command that is understood by a computer using a programming language. This stage is a real stage in working on a system. The programming languages used in this system are Hypertext Processor Program (PHP) and Codeigniter.

B. Design (Evaluation)

The Composite Performance Index is used to determine the assessment or ranking of several criteria so as to produce alternative index values. The CPI calculation can be seen as follows:

C. Testing

This last stage is carried out a system testing process using the black box method to test the functionality of each menu created.

FINDINGS AND DISCUSSION

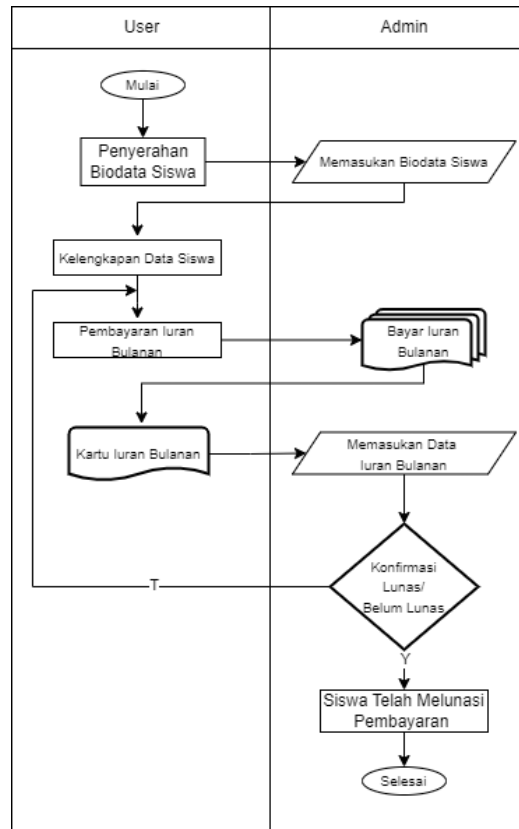
System Requirement Analysis

In this report, there are several analyses including system requirement analysis, running system analysis, proposed system analysis, functional requirement analysis and non-functional requirement analysis, and user analysis because the Student Data Collection Information System is managed manually and developed on the website.

1. Running System Analysis

The analysis of the running system explains the process of collecting student data at MIS Hidayatul Bayan. An analysis of the running system can be seen in Figure 2.

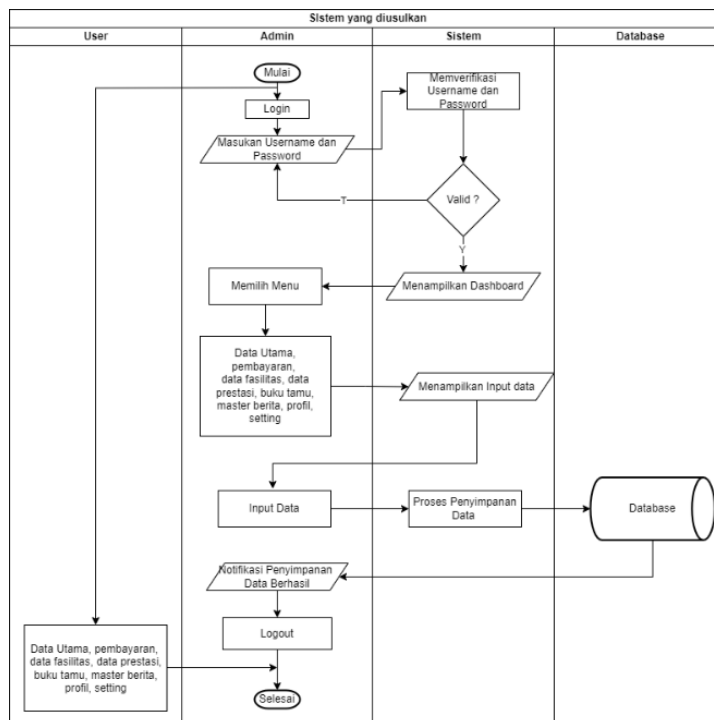
Figure 2: Running system analysis



2. Proposed System Analysis

The proposed system analysis is an overview of the new system to be created, this analysis is useful so that the system design stages can be focused and directed to the main functions and needs of the system. The analysis of the proposed system can be seen in Figure 3.

Figure 3: Proposed system analysis



Functional Requirement System Analysis

Functional requirement analysis is the process of identifying and defining the characteristics, functions, and capabilities that a system needs to meet user goals.

Table 1: Functional Requirement System Analysis

No	Functional Requirement	Description
1	Login Function	This function is used for admins to log in to the system before managing data and student data as needed.
2	Logout Function	This function is used for admins to log out of the system.
3	Dashboard Functions	This function is used for admins to view and input data, both student data, teachers, and other data.
4	Student Data Function	This function is used for admins to enter data and complete data for incomplete student data.
5	Teacher Data Function	This function is used to enter data and supplement data for incomplete teacher data.
6	Monthly Contribution Function	The monthly dues function is used for facility and utility maintenance
7	Facility Data Function	This function is used to find out the inventory of equipment and goods in the school, such as computers, projectors, and other equipment.
8	Performance Data Function	This function is to evaluate school performance, monitor student achievement.
9	Guest Book Function	This function is used for communication and school information about who has visited the school and when they came.
10	Function of News Categories	This function is used to group news by topic or similar.
11	News Tag Function	This function is used so that users can quickly find news that suits their interests or needs.
12	News Function	This function is used for information and communication including announcements, changes to the schedule of important events, and various other relevant information.
13	Historical Profile Function	This function is used to review the historical track record of information about the founder, the year of establishment, the physical development of the building, and the changes that occur over time.
14	Vision Profile Function	This function is used to view statements in identifying the school's main priorities and focuses.
15	Mission Profile Functions	This function is used to see the school's goals, values, and commitment to student education and development.
16	User Profile Settings Function	This function is used to find out who users can control the system.
17	Change Password Setting Function	This function is used to change the old password with a new one.

Non-Functional Requirement System Analysis

Non-functional requirement analysis describes the process of activities that will be carried out in a system and describes the needs that the system needs so that the system can run properly and according to needs. Here are the requirements of the non-functional system:

1. The truth

The student data collection information system is created as appropriate to see the teacher's biodata and student biodata to be reported to the principal.

2. Reality

This student data collection information system can only be accessed at school by admins.

3. Integrity

The student data collection information system is an important aspect to maintain the reliability and accuracy of the data stored and managed by the system. refers to the quality of data that is uncorrupted, unchanging, and remains consistent throughout the life of the data.

4. Testing

The student data collection information system can be tested by collecting student data according to biodata.

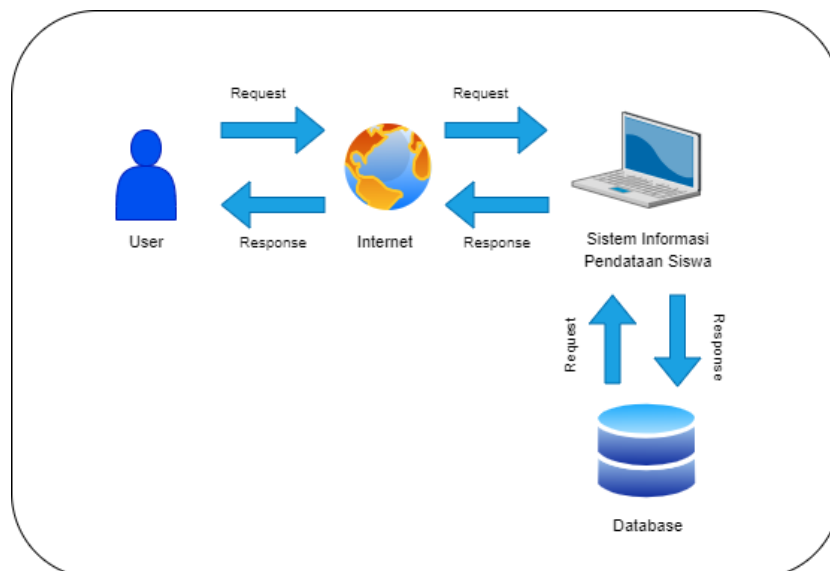
5. Usage

This student data collection information system provides an easy-to-use view for the school administration department for student data collection.

System Architecture Analysis

The analysis of the architecture of this system aims to provide an overview of the design of the system to be built to be developed and to understand the flow of information and processes in this system. The following system architecture can be seen in Figure 4.

Figure 4: System Architecture Analysis

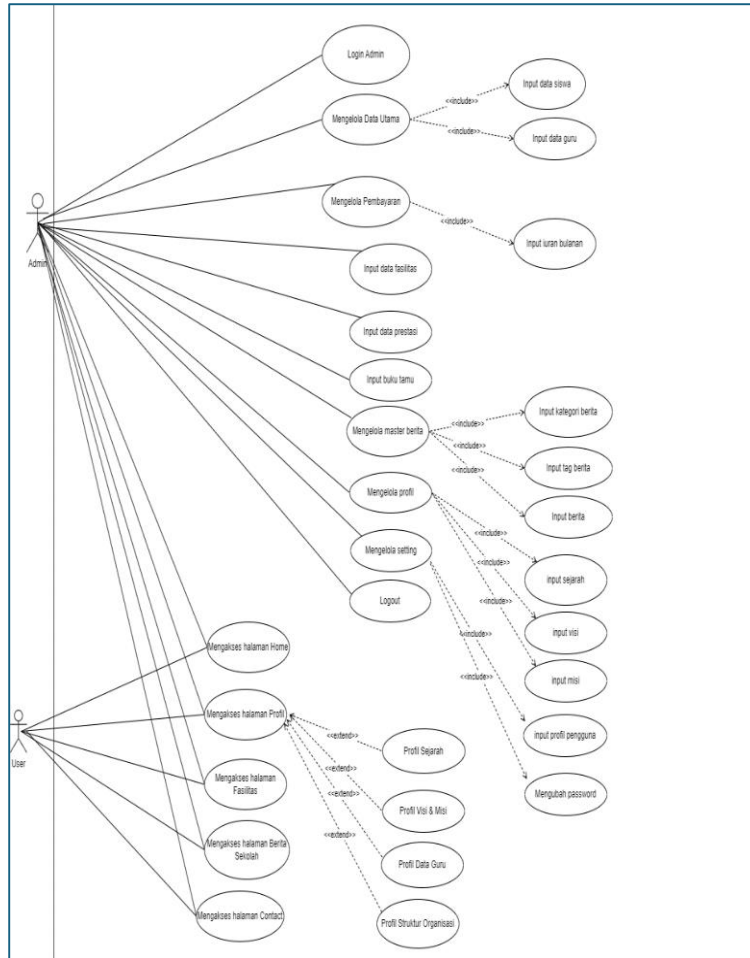


A. System Planning

1. Planning Use Case Diagrams

The Use Case diagram describes the interaction between the actor and the system to be created. The Use Case Diagram can be seen in Figure 5.

Figure 5: Use a case diagram



B. Implementation and Testing

1. Home Page

The home page is the main page display that introduces the school's profile in the form of a website to the user who accesses the page. The view of the home page can be seen in Figure 6.

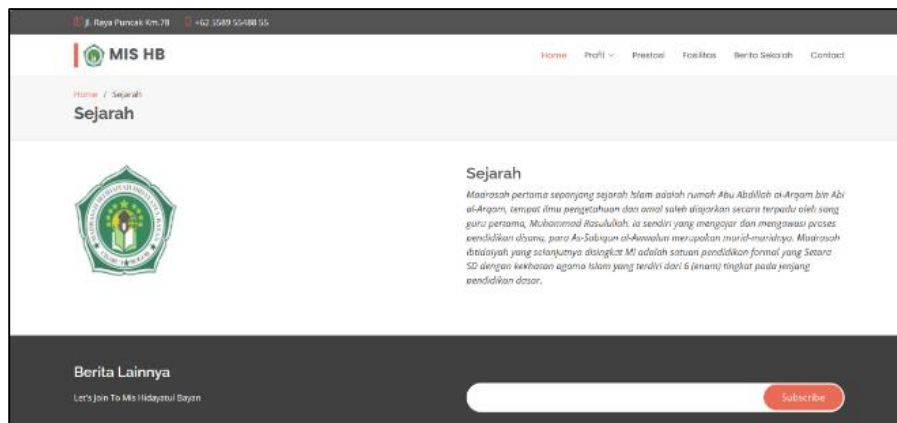
Figure 6: Home page



2. History Profile Page

The history profile page is a page view that introduces the story of the school's timeline in the form of a website to users who access the page. The view of the history profile page can be seen in Figure 7.

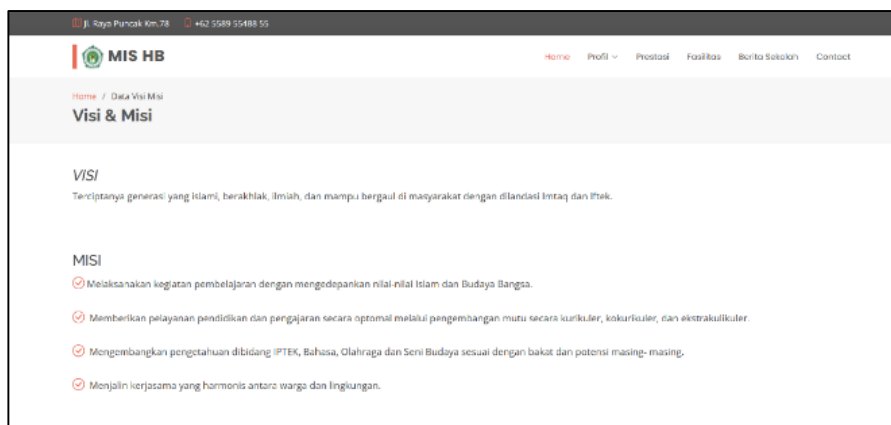
Figure 7: History Profile Page



3. Vision and Mission Profile Page

The Vision and Mission profile page is a page view that introduces the school's goals in the form of a website to users who access the page. The vision and mission profile page view can be seen in Figure 8.

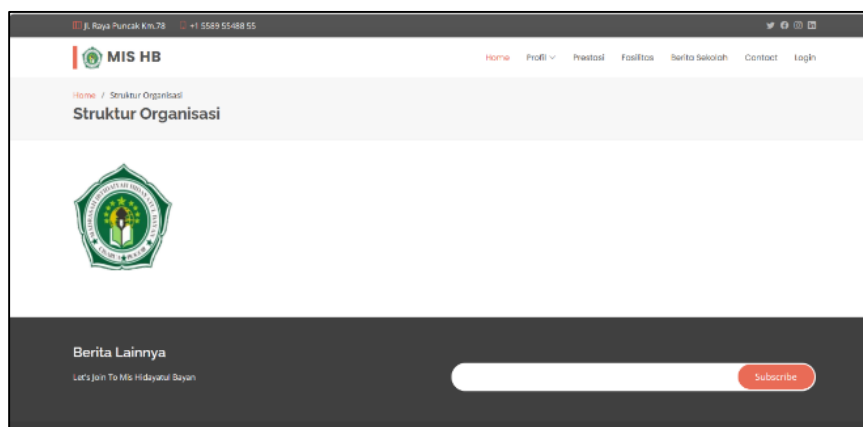
Figure 8: Vision and Mission Profile Page



4. Organizational Structure Profile Page

The organizational structure profile page is a page display that introduces the logo of the school institution in the form of a website to users who access the page. The view of the organizational structure page can be seen in Figure 9.

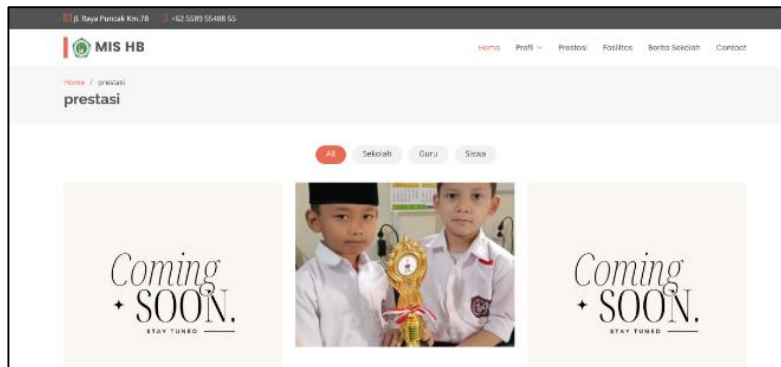
Figure 9: Organizational Structure Profile Page



5. Achievements Page

An achievement page is a page display that shows school achievements in the form of a website to users who access the page. The view of the achievement page can be seen in Figure 10.

Figure 10: Achievements Page



6. School News Page

A school news page is a page view that shares information about the school in the form of a website to users who access the page. The view of the school news page can be seen in Figure 11.

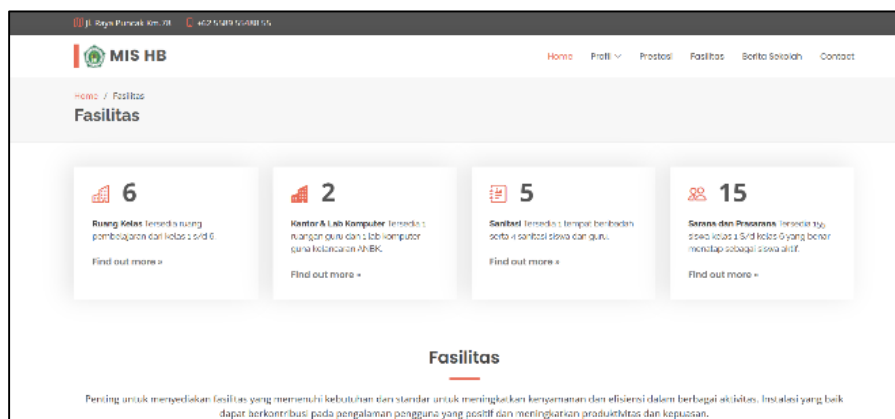
Figure 11: School News Page



7. Facilities Page

The facilities page is a page display that shares information about school facilities and infrastructure in the form of a website to users who access the page. The view of the facilities page can be seen in Figure 12.

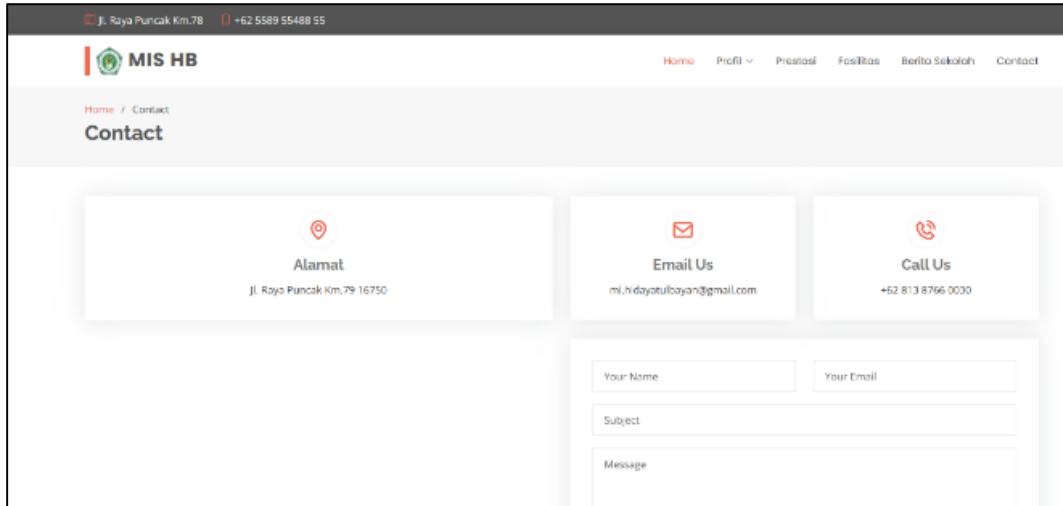
Figure 12: Facilities Page



8. Contact Page

A contact page is a view of a page that shares information about contacts and school addresses in the form of a website to users who access the page. The view of the school's contact page can be seen in Figure 13.

Figure 13: Contact Page



9. Login Page

The login page is a page view for admins to access and on a dashboard page to add data. The login page view can be seen in Figure 14.

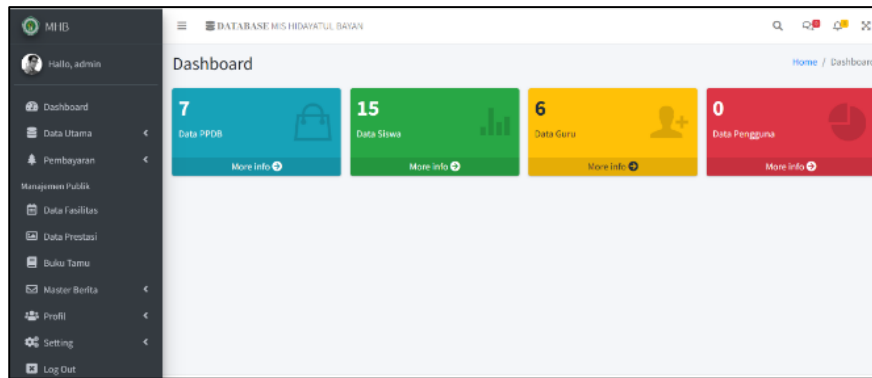
Figure 14: Login Page



10. Dashboard Page

Dashboard pages are a page view for admins to process and add data from schools, students, and teachers. The dashboard page view can be seen in Figure 15.

Figure 15: Dashboard Page



System Testing

Table 2: System Testing

No	Test class	Test description	Initial conditions	Test scenarios	Expected results	Test results
1	House	Showing the main page	Home page	Enter the localhost url in the browser	Display home page	Appropriate
2	Historical Profile	Displays information about the school's founding history	Profile page	Select the history profile menu	View your profile history page	Appropriate
3	Vision and Mission Profile	Display information about the school's ideas and goals	Profile page	Select the vision and mission profile menu	View vision and mission profile page	Appropriate
4	Organizational Structure Profile	Display information about research	Profile page	Select the organizational structure profile menu	View your organizational structure profile page	Appropriate
5	Achievement	View achievement information	Achievements page	Select the achievement menu	Display the achievements page	Appropriate
6	School News	Display school news information	School news page	Select the school news menu	Display school news page	Appropriate
7	Facilities	View facility information	Facilities page	Select the facilities menu	Display a amenities page	Appropriate
8	Login	View your login	Login page	Select the login	View the	Appropriate

No	Test class	Test description	Initial conditions	Test scenarios	Expected results	Test results
		information		menu	login page	
9	Dashboard	View dashboard information	Dashboard page	Select the dashboard menu	Display dashboard page	Appropriate
10	Contact	View contact information	Contact page	Select the contact menu	Show contact page	Appropriate

CONCLUSION

Based on the discussion and implementation carried out, several conclusions can be drawn: The management of student data at MI Hidayatul Bayan currently uses a web-based information system. With the implementation of a web-based student data information system at Madrasah Ibtidaiyah (MI) Hidayatul Bayan, it provides easy access for administrative staff to manage student data visualized in a web-based information system and makes it easier for staff to input data in a more understandable format.

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