



# Design of Mobile-Based Parent-Student Contribution Payment Information System

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## A B S T R A C T

The background for this research is that schools are still manually processing payments for student parental contributions, which requires a lot of paper, resulting in many inaccuracies in collecting data on student parental contribution payments. This causes the process of paying parental contributions to be ineffective and inefficient, so it is necessary to have an information system for paying parental contributions at SMAN 12X11 Enam Lingkung. The research method used is the Research and Development (R&D) research method, which is a method for creating a product. The System Development Life Cycle (SDLC) is a model for developing this system and implementing it using the waterfall model which consists of communication, planning, modeling, coding, and Deployment. Based on the results of the research that the authors conducted, the authors were able to create an information system for paying student donations based on PHP as a programming language and MySQL as a database at SMAN 12X11 Enam Lingkung.

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## 1. Introduction

Technology is a necessary tool for facilitating any human work. Information technology is currently advancing at such a quick pace that it is influencing many areas of human existence in all activities and is necessary to be a supportive instrument that can assist the precise and efficient flow of information [1]. The advancement of science and technological sophistication in this era, gradually but surely proves that the verses of the Al-Quran are truly amazing. That is why science is important; knowledge may be accessed anywhere, including an educational institution. With the knowledge obtained from educational institutions, students are not enslaved by technology. To achieve educational goals, it is crucial to have components that are interconnected with one another in order to achieve the intended educational goals. Due to the results of human perception that is increasingly modern and developing advanced. An excellent system is one that is simple to use and that many people utilize. The developed method is widely used in a variety of professional fields [2].

One of them is in an educational institution. Educational institutions provide a variety of activities directly related to the institution. In the academic department, examples include the new student registration system, the system for paying parental contributions, the process of borrowing and returning library books, and the procedure of accepting new students. For this reason, educational institutions need a good system to manage all data in these institutions. In the teaching and learning process, each student

provides school administration funds which are called School Committee funds [3]. In general, there are three sources of school education administration funds, namely governmental, parental, and social [4]. The contribution of the parents of these students is a fund donated for the ongoing educational activities in an institution or educational institution [5]. Usually, the parents' contribution payment system still uses the old system, namely using a book as a payment record.

With the advancement of technology and the sophistication of computer technology, it is preferable for kids to use computers or laptops, as well as smartphones or mobile devices, as a tool or system for collecting contributions from their parents. So that technological developments have a good impact on schools by improving the existing system at the school.

One of the most recent parental donation payments is based on the Web. Apart from the web, payments for student parents' contributions can be mobile-based. This system is an information system, an information system is a set of systems that are integrated with each other to create information that can be useful to users. With an information system, data and information will be stored in a database so that the data becomes organized and makes it easier for users when the data is needed [6]. The mobile-based information system makes it easier for users because it can be accessed anywhere and anytime by the public on mobile devices or Android-based mobile devices [7]. Android is a mobile operating system based on a modified version of Linux [8]. PHP programming can be used to build an Android-based system. PHP (Hypertext Preprocessor) is a web-based programming language that can process and process data in real time. PHP is a server-side embedded script language, which implies that any syntax or program code you create will be performed by the server yet can be placed on a standard HTML page [9]. And use MySQL as database. Information systems that have been designed must be able to run well.

Where the research was carried out still using the manual, namely by recording manually using a book. So that there are many risks in recording these contributions. Examples of incorrect notes that have paid or lost proof of dues. Therefore, writer is interested in making an application for paying student contributions using PHP programming and MySQL as a database.

## **2. Method**

### **2.1. Type of Research**

This research belongs to the type of research and development (R&D). R&D is research that produces a particular product and tests the validity and effectiveness of the product in its application [10]. The R&D research step used refers to the software development life cycle (SDLC) model.

### **2.2. Research Procedure**

System Development Life Cycle (SDLC) is the process of developing or modifying a software system using models and methodologies that people use to develop previous software systems [11]. SDLC has several models in its process execution. Among the various available models, the author has applied the waterfall model. According to Pressman, the waterfall model is a systematic, sequential model for building software. The actual name of this model is the "Linear Sequential Model". And this model is often referred to as the "Classic Life Cycle" or the waterfall method [12]. Pressman's perspective in the Permadi Setiawan Journal suggests that the waterfall model envisions a systematic and sequential approach to system development. The system development begins by defining requirement specifications and proceeds through various stages of planning, modeling, construction, and deployment to customers or users, culminating in ongoing support for the resulting system [11]. This method is often used and called waterfall because each stage must be completed to proceed to the next stage [13]. The stages of this research can be described as in Figure 1.

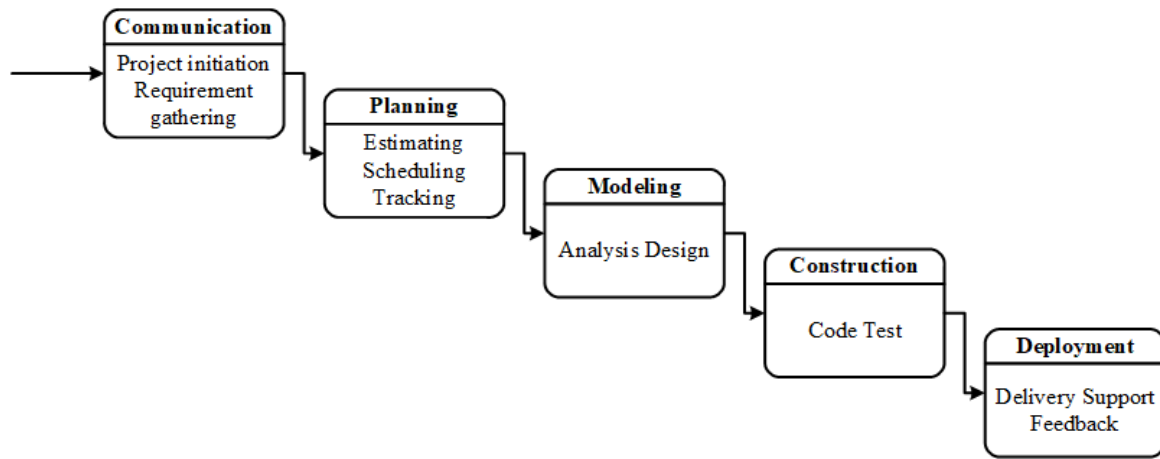


Figure 1. Research Stage

The description of the research stages based on Figure 1 above can be explained as follows [14] : (a) Communication, the purpose of the communication stage is to understand the goals of the project to be built and to determine the features and functions of the product. The communication phase begins with project initiation. In this stage, the author conducts interviews with potential users to ensure how the product or system model will be created, resulting in a beneficial product or system; (b) Planning, this stage is executed to understand all aspects of creating this information system. In this process, the author designs all aspects of the application creation. For example, gathering data that has been interviewed from sources, identifying all risks in the system creation process, and designing a system creation schedule so that the author is more focused and on track in the system creation process; (c) Modeling, this stage involves creating design models of the software to be developed. This stage makes the system creator feel more at ease in building the system. In this phase, the author designs the system model using UML (Unified Modeling Language) and Interface Design. This includes designing use case diagrams, sequence diagrams, activity diagrams, class diagrams, and designing the database; (d) Construction, this stage involves the process of creating code (code generation). Code is a programming language understood by the machine or computer. The coder, or programmer, creates code that will be understood by the computer, resulting in a system used by users. This stage is the actual work of creating a system. After program development in the system is done, the system is tested using Black Box testing. Black box testing is a way of testing whether the software meets the expected criteria and focuses on the functionality of the system itself. In this stage, the author creates the program using the PHP programming language and MySQL as the database; and (e) Deployment to Customers/Users, this process is considered complete when the software or system being developed is ready for use by users. After development and testing, the system can be distributed to users, and periodic or scheduled maintenance is performed. In this stage, the author provides the application to the school.

### 3. Results and Discussion

This research yielded a product in the form of an information system for collecting contributions from students' parents at SMAN 1 2X11 Enam Lingkungan, created with the PHP/MySQL programming language and made available online. This method can be used by the school to keep track of parental contribution payments. The existence of this information system is expected to help the school track parental contribution payments at SMAN 12X11 Enam Lingkungan more efficiently and effectively. The parental contribution information system was created with the PHP programming language and a high-quality MySQL database. System development refers to the following waterfall stages :

### **3.1. Communication**

In this communication stage, the author needs to understand what is required to solve the issues related to the product or information system for collecting contributions from students' parents. This stage involves several needs, including:

#### **3.1.1. Project initiation**

Before developing the system, the authors interviewed financial holders at SMAN 12X11 Enam Lingsung by requesting data and interviewing parental contributions.

#### **3.1.2. Requirement gathering**

This stage consists of two requirements, namely functional requirements and non-functional requirements. Functional requirements, these are necessities that encompass various processes and information created by the system. Some of these requirements include: (a) The system should provide information to assist and facilitate teachers in viewing data of students who have made parental contribution payments; (b) Manage user administration, used as a data repository detailing parental contribution payment information.

Non-functional requirements, these requirements consist of properties stored by the system. For the successful implementation of the generated system, two components of information technology are required: hardware and software.

### **3.2. Planning**

#### **3.2.1. Estimating**

The first stage involves the author gathering the necessary data to build this system. This data includes student information, teacher information, and the procedure for parental contribution payments. In the second stage, the author designs the required system logics, including input and output logics. Moving on to the third stage, these logics are translated into the PHP programming language using a framework. The fourth stage involves creating a system interface that aligns with the expected requirements. In the fifth stage, testing is conducted. The sixth stage encompasses the process of rectifying various errors that may not have been detected during the system development.

#### **3.2.2. Scheduling**

In creating a system, the author needs to design a schedule or scheduling to ensure that the system operates on time. To achieve this, the author conducted initial interviews, analyses, and field surveys in early October 2022. Subsequently, in the third week of October 2022, the author interviewed the school personnel, gathering data and information about the application to be developed. From November 2022 to December 2022, the author undertook system design, database design, system architecture, and system development. In January 2023, the author conducted system testing, operational procedures, and system maintenance. Upon completing the design and development phases, the system will be handed over to the school.

#### **3.2.3. Tracking**

The process of this information system is carried out, the steps taken are the process of making the system using the bootstrap CSS (front end) framework and using sublime text, then hosting it so that it becomes online and can be accessed by many people and can make mobile applications.

### 3.3. Modelling

#### 3.3.1. Analysis

The first stage in building an information system for paying parental contributions is analysis. At this stage, problems encountered throughout the payment process are identified, and solutions are developed.

#### 3.3.2. General design

Use case diagram. This diagram is useful for managing and modeling the required system behavior and obtained by the user. A use case represents a relationship between actor and system [15]. Figure 2 is a use case diagram for this research.

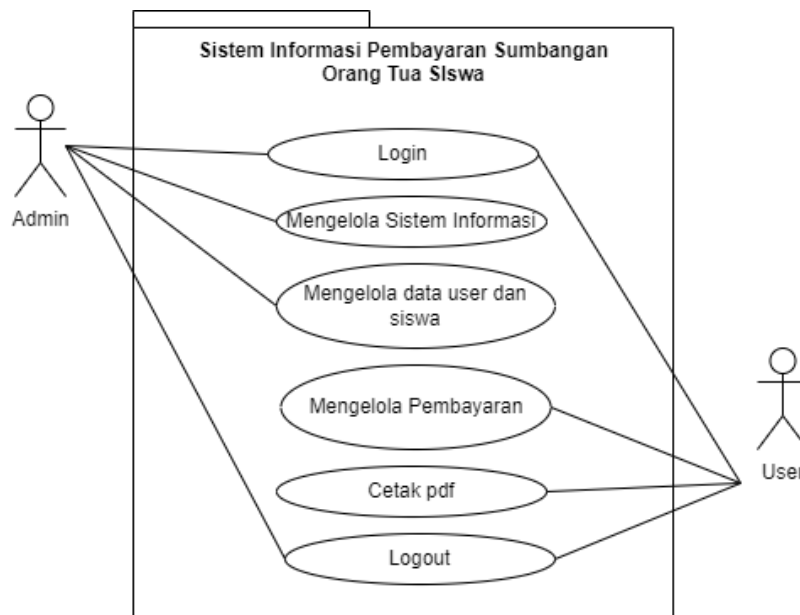


Figure 2. Design Use Case Diagram

Activity diagram. This diagram will explain all activities in the system being designed. Figure 3 and Figure 4 are a activity diagram for this research.

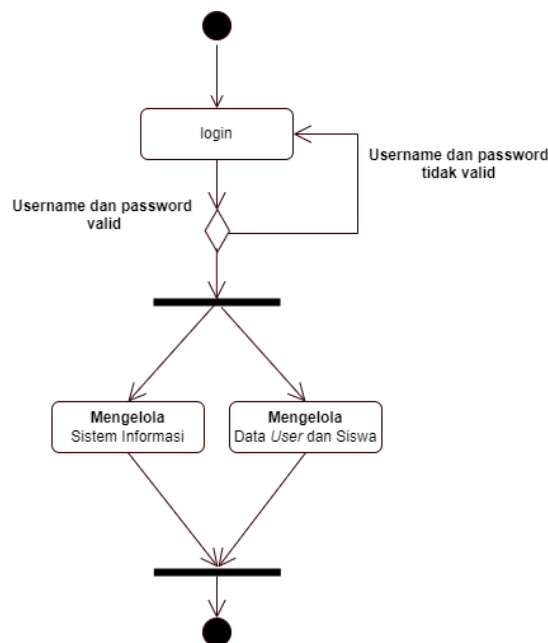


Figure 3. Activity Diagram Admin

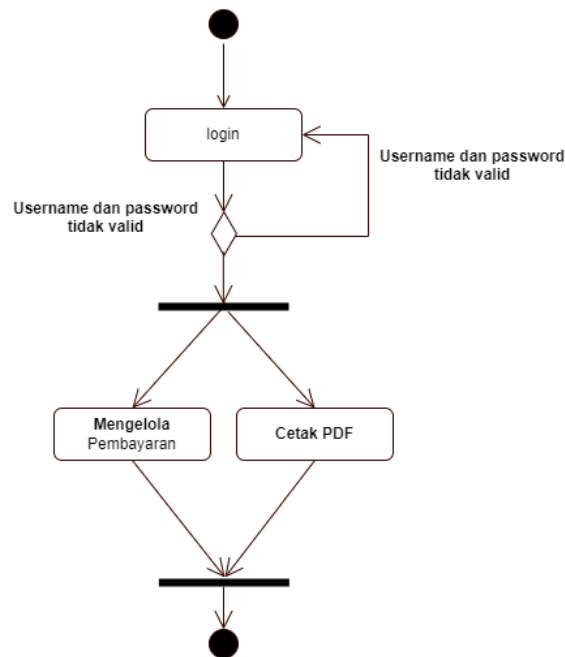


Figure 4. Activity Diagram User

Sequence diagram. This diagram a subset of interaction diagrams. They explain the objects involved in the use case as well as the messages that are sent between them over time [15]. Figure 5 is a sequence diagram for this research.

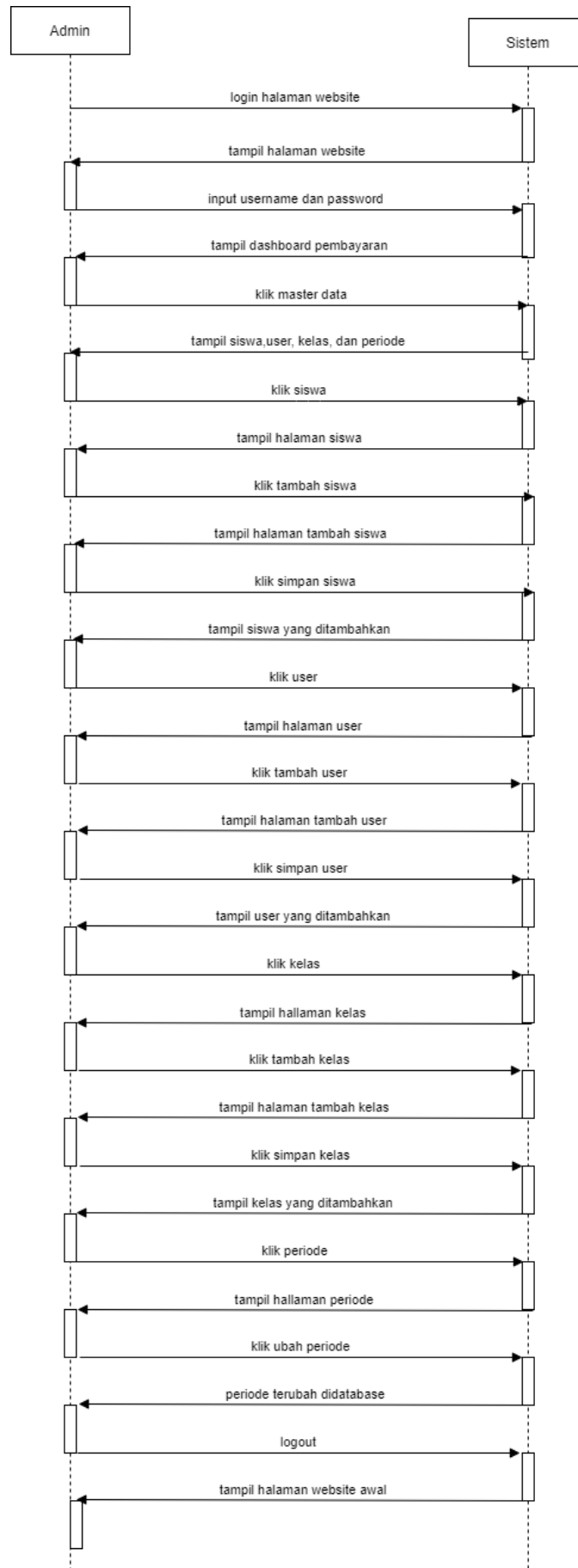


Figure 5. Sequence Diagram

### 3.3.3. Display design

The main page, as well as the login page, will appear on the first page. User can input a username and password on this screen to access the application or dashboard page. Figure 6 is the login page.

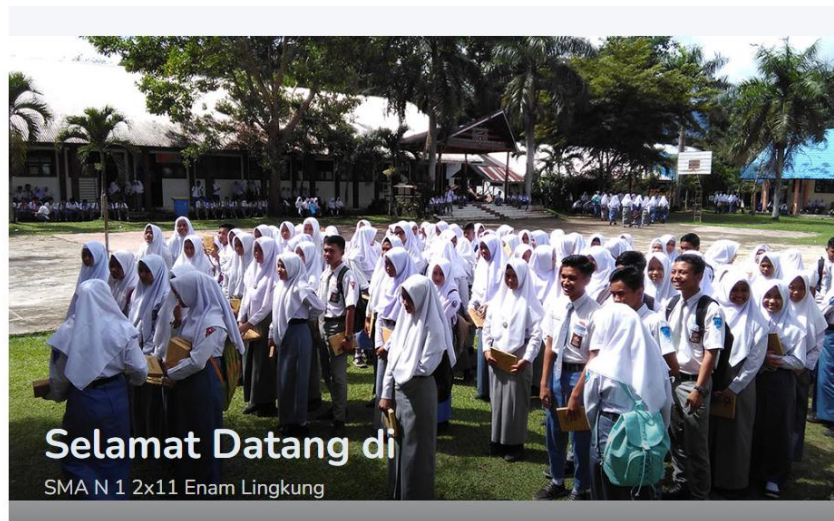
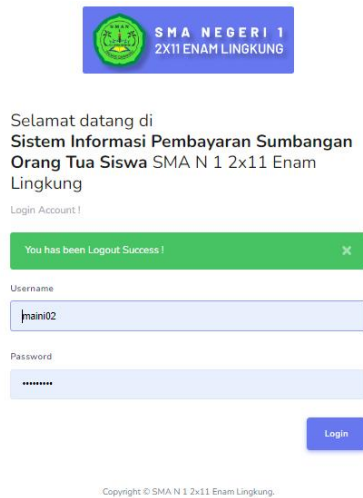


Figure 6. Login Page

After entering the username and password, the admin can add a user whose user is a teacher and add student names. Figure 7 is the admin dashboard.

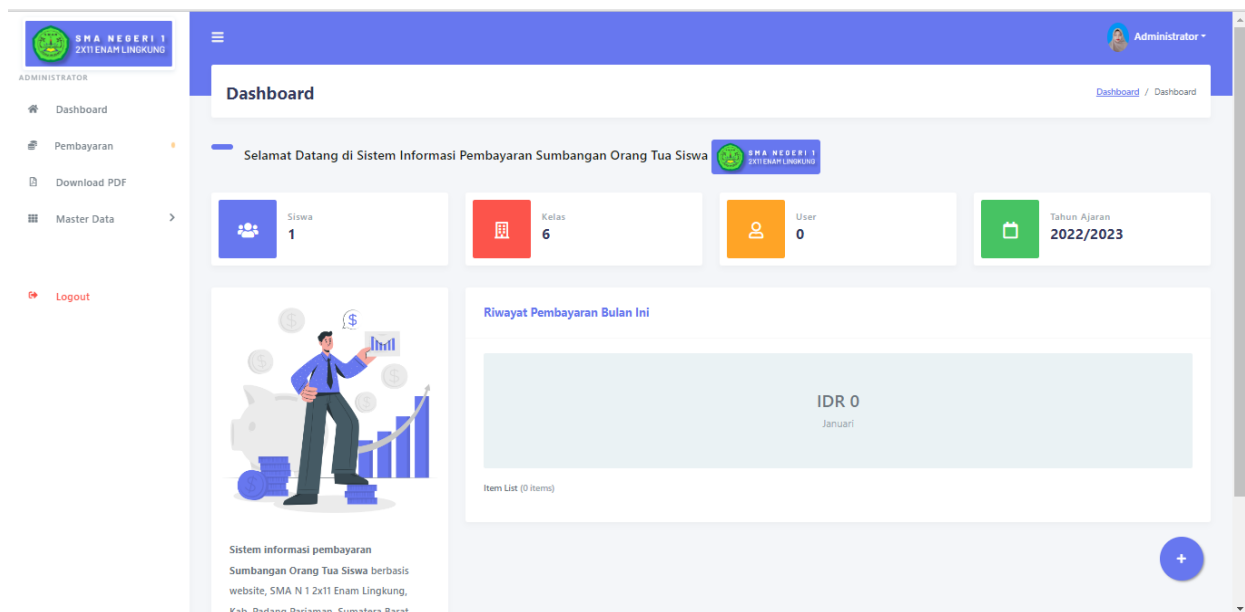


Figure 7. Admin Dashboard

On the payment page, the student's nis/nisn is required to find out the student's name, class, payment period. The next thing user can do is payment. Figure 8 is payment page.



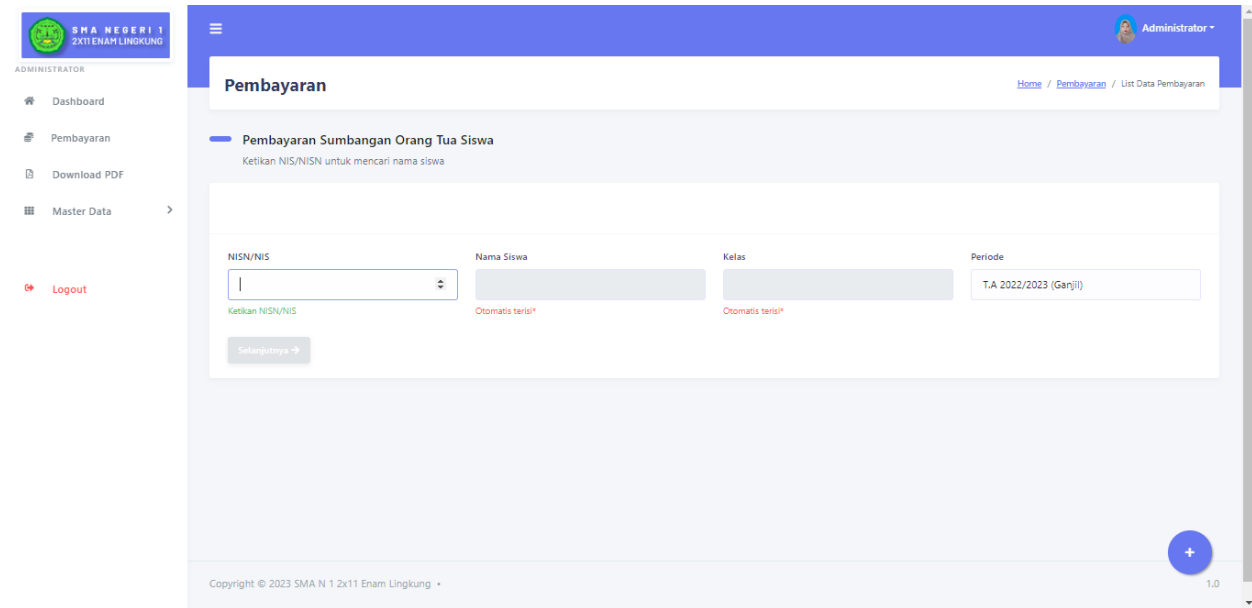


Figure 8. Payment Page

In this system, user can download reports/recaps as requested. For example reports that have not paid for a certain month or class reports. Figure 9 is download page.

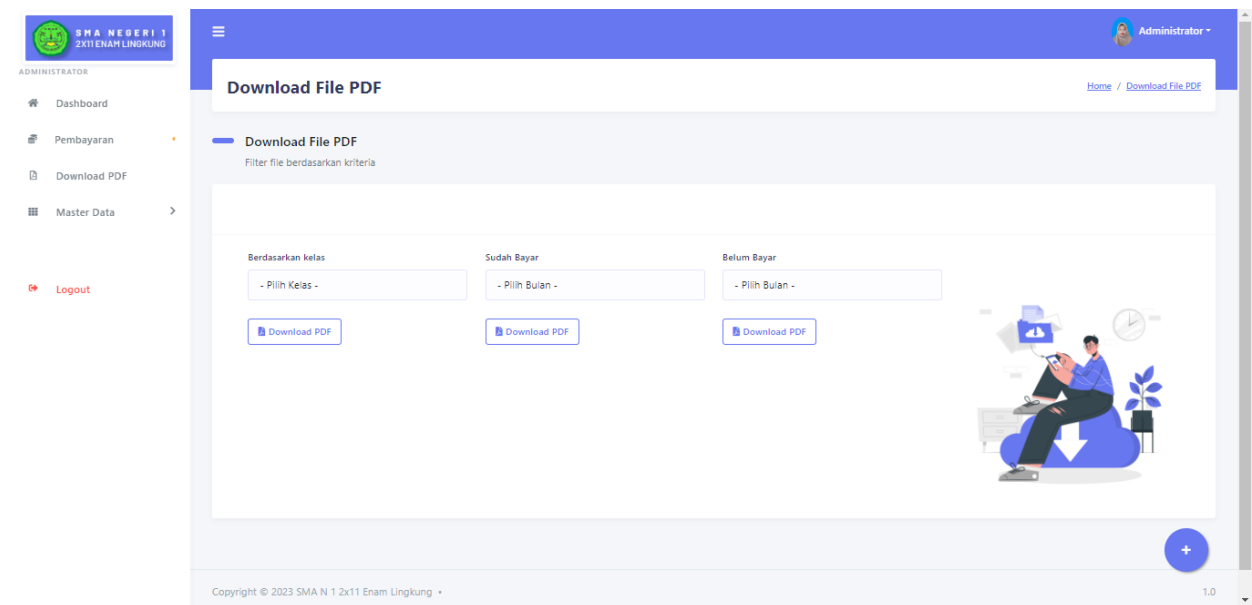


Figure 9. Download Page

### 3.3.4. Table design

The table design is a table in this research database. This table data is used to facilitate making the application. Table 1 is user table.

Table 1. User Table

| Field Name | Data Type    |
|------------|--------------|
| Id_guru    | Int (11)     |
| Nip        | Varchar (25) |
| Nama_guru  | Varchar (50) |
| Hp         | Varchar (25) |

|      |               |
|------|---------------|
| foto | Varchar (128) |
|------|---------------|

Tabel 2 below is a student table.

**Table 2. Student Table**

| Field Name    | Data Type     |
|---------------|---------------|
| Id_siswa      | Int (11)      |
| Id_kelas      | Int (25)      |
| Nama_siswa    | Varchar (50)  |
| Jenis_kelamin | Varchar (25)  |
| Tanggal_lahir | Date          |
| foto          | Varchar (128) |

Table 3 below is a payment table.

**Table 3. Payment Table**

| Field Name         | Data Type     |
|--------------------|---------------|
| Id_pembayaran      | Int (11)      |
| Id_siswa           | Int (11)      |
| Id_guru            | Int (11)      |
| Jumlah             | Varchar (50)  |
| Tanggal_pembayaran | Date          |
| Bulan              | Varchar (50)  |
| Periode            | Varchar (128) |
| Keterangan         | Text          |

Table 4 below is a class table.

**Table 4. Class Table**

| Field Name | Data Type    |
|------------|--------------|
| Id_kelas   | Int (11)     |
| Nama_kelas | Varchar (50) |

### 3.4. Construction

This stage contains the syntax used in making the system. At this stage, the author checks to see if the system is working properly. When the program is completed and data has been entered so that the system can run effectively, the program is sent to the field. The following is the procedure for testing the Black Box method. Table 5 below is the result of black box testing.

**Table 5. Black Box Testing Result**

| No | Input Data                                  | Expected reaction  | Observation                        | Conclusion |
|----|---|--|------------------------------------|------------|
| 1  | Home page Payment of parental contributions | Function to display the home page for student's parental contribution payments accurately. | Display home page                  | Succeed    |
| 2  | Admin and user login page                   | Function to correctly display the admin and user login pages.                              | Display admin and user login pages | Succeed    |

|    |                            |  |  |         |
|----|----------------------------|--|--|---------|
| 3  | Admin dashboard page       | The function to display the admin dashboard page is running correctly      | Display admin Dashboard page           | Succeed |
| 4  | Student data page          | Function to display student data correctly                                 | Display Student data page              | Succeed |
| 5  | Add student data page      | Function to display the added student data page correctly                  | Display The added student data page    | Succeed |
| 6  | User data page             | Function to display user data correctly                                    | Display The user data page             | Succeed |
| 7  | Add user data page         | Function to display the added user data page correctly                     | Display The add user data page         | Succeed |
| 8  | Class data page            | Function to display class data correctly                                   | Display The class data page            | Succeed |
| 9  | Add class data page        | Function to display the add class data page correctly                      | Display The add class data page        | Succeed |
| 10 | Admin and user login page  | Function to display admin and user login pages correctly                   | Display The admin and user login pages | Succeed |
| 11 | Student payment page       | Function to display student payments correctly                             | Display The student payment page       | Succeed |
| 12 | Report page                | Function to correctly display the paid report page in pdf format           | Display Report page                    | Succeed |
| 13 | Update user and admin data | Function to display the update page / change user and admin data correctly | Display updating user and admin data   | Succeed |

### 3.5. Deployment

#### 3.5.1. Delivery

The installation of the system at the school will be done through social media, specifically using WhatsApp. It will be in the form of a RAR file that will be directly installed by the SMAN 1 2X11 Enam Lingkungan school.

#### 3.5.2. Support

This system provides benefits to SMAN 1 2X11 Enam Lingkungan in the process of collecting contributions from students' parents. The system is user-friendly, efficient, and accessible online.

#### 3.5.3. Feedback

The author has updated the system and addressed various shortcomings through multiple stages of testing and system evaluation.

## 4. Conclusion

The system developed is an information system for collecting contributions from students' parents that employs PHP as the programming language and MySQL as the database. It is used at SMAN 1 2X11 Enam Lingkungan to help with the recording of parental contribution payments. The system is online and can be accessed via desktops or Android smartphones. The application offered to the school greatly aids in the recording of reports and data linked to parental contribution payments, removing the need for manual methods or books.

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