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Design and Implementation of a Tuition Payment Administration Information System Using the Laravel Framework at SMA Wachid Hasyim 1 Central Surabaya

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ABSTRACT

SMA Wachid Hasyim 1 is an educational institution under the Wachid Hasyim Foundation, established on January 31, 1967. Currently, tuition and book (LKS) payments at SMA Wachid Hasyim 1 are still processed manually by recording them in a payment logbook. In this research, the waterfall method is used, where the application is first designed and then implemented.

To address this issue, the author designed and built a web-based Tuition Payment Information System using the Laravel framework. This system aims to simplify the payment process by allowing transactions through the website, uploading proof of payment, and generating payment reports. The result of this application is to ease student payments and transaction record-keeping.

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1. INTRODUCTION

Computer technology supports the quality of education from the learning process to school management including the SPP payment system, which requires speed and accuracy so that services to students and parents can be provided professionally. SPP payment services often encounter problems owing to manual recording, which is prone to errors. Therefore, the designed SPP payment system is expected to help address these issues by accelerating the payment process and financial reporting at schools.

The problem formulation in this research is the design of an SPP Payment Administration Information System at SMA Wachid Hasyim 1 Pusat Surabaya using the Laravel Framework. The purpose of this study is to design a web-based SPP payment system using the Laravel Framework at SMA Wachid Hasyim 1 Pusat Surabaya to facilitate report generation and reduce data entry errors.

Literature Review:

Design

According to Pressman, design is the initial step in realizing a product or a system. According to Mohamad Subhan, design is the process of developing new specifications based on recommendations from system analysis results.

System

According to McLeod in Yakub, a system is a set of integrated elements used to achieve specific goals through interconnected procedures. According to Edhy Sutanta, a system is a collection of elements or subsystems that work together to form unity and perform functions to achieve objectives.

Information

According to McLeod, information is processed into a more useful and meaningful form for recipients. According to Hartono, information is processed into an important and useful form for decision-making.

Information System

According to Kroenke in Abdul Kadir's book, an information system adds value to processes, production, management, decision-making, problem solving, and business competitive advantage.

Blackbox

According to sources, blackbox testing is a software testing method that focuses on functional specifications without looking at the internal structure to find errors in functions, interfaces, data, performance, and initialization.

Administration

According to Lagin, administration is the entire work process between two parties that is carried out rationally to achieve predetermined goals.

SPP Payment

According to sources, SPP (Sumbangan Penyelenggaraan Pendidikan) is a monthly student fee that is mandatory to support the improvement of education quality and teaching and learning activities at school.

Flowchart

The flowchart describes the flow of data processes according to Rita Irviani and Rossi Oktaviani. According to Nanda and Maharlani, a flowchart is a flow design that logically describes the relationship between processes in a program.

SDLC

According to Rosa and Shalahuddin, the (system development Life Cycle) is the process of developing or changing software systems.

MySQL

According to Arief (2011), MySQL is a popular database server often used with PHP to build web-based database applications.

UML (Unified Modeling Language)

According to Sukamto and Shalahuddin, UML is a standard tool for defining requirements, analysis, design, and architecture in object-oriented programming (OOP).

Use Case Diagram: A technique to record system functional requirements and user interactions.

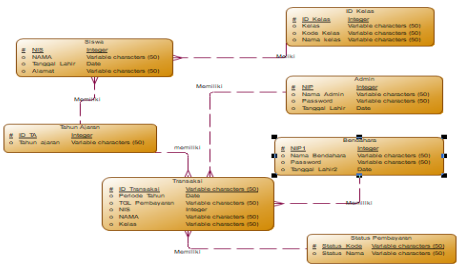
Activity Diagram: A technique to describe procedural logic, business processes, and parallel workflows.

2. RESEARCH METHOD

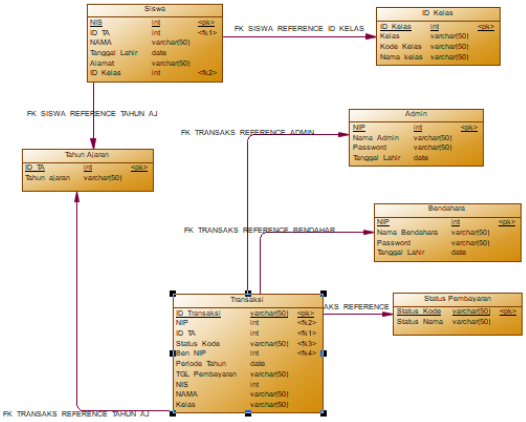
The research object is the SMA Wachid Hasyim 1 Pusat Surabaya, which still uses manual input for SPP payment data. This study aims to facilitate SPP payment administration and make it more efficient. This research uses the Laravel framework and the System Development Life Cycle SDLC software development method, which includes stages from analysis to implementation. Data collection was conducted through interviews, observations, and literature review. System analysis is conducted to identify and evaluate existing components and problems so that improvements can be proposed.

System design includes:

1. Conceptual Data Model (CDM): Overview of entities and relationships between entities and attributes.



2. Physical Data Model (PDM): Interrelated tables in the application database.



3. Database Tables

The database consists of several tables, including the admin table (storing admin data such as NIP, name, password, and date of birth), id_kelas table (storing student class data), student table (containing student information such as NIS, name, class, etc.), payment status table (recording student payment status), academic year table (storing academic year data), transaction table (tracking all student transactions), and treasurer table (holding treasurer data such as NIP, name, password, and date of birth).

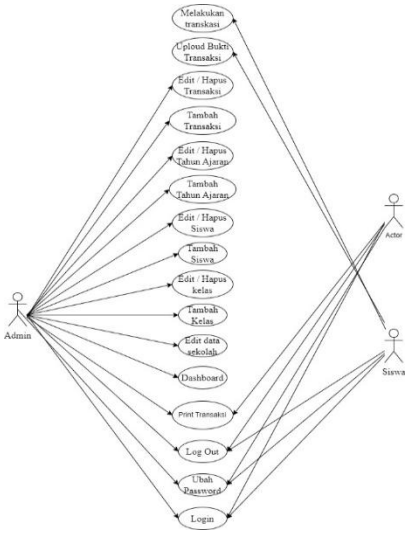
4. Flowcharts

The system flowcharts include the Payment Document Flowchart (illustrating the flow of SPP payment documents from admin to students), Login Flowchart (describing the login process for admin, students, and treasurers), Academic Year Flowchart (where admin can add, edit, and delete academic year or class data), Student Flowchart (allowing admin to manage student data), Class Flowchart (for managing class data), Admin Transaction Flowchart (depicting admin management of student transactions), Student Transaction Flowchart (showing how students make payments and submit transfer proof), and Treasurer Transaction Flowchart (where the treasurer views and prints student transaction data).

Implementation is carried out by building the system into small modules, which are then integrated and the function of each module is checked. Testing was performed after all the modules were integrated to ensure that the system worked as intended and to identify any errors. After the system is used, maintenance is carried out to ensure that the system continues to run well, to fix any errors found, and to improve the performance as needed by users.

3. RESULTS AND DISCUSSIONS

A use case diagram was created to illustrate the main functions of the SPP payment system.



The Activity Diagram describes the system with three user roles Admin, Student, and Treasurer. In the login process, users enter their NIS or NIP and password, and if the credentials are valid, they are granted access otherwise, they remain on the login page. The Academic Year Menu allows the admin to edit and delete academic year data. The Student Menu enables the admin to manage student records, including adding, editing, and deleting data. The Class Menu provides similar functions for managing class data. In Admin Transactions, the admin handles student transaction activities. In Student Transactions, students select transaction types that choose payment methods and upload proof of transfer, which are then processed automatically by the system. In Treasurer Transactions, the treasurer can view and print student transaction data.

The Interface Design includes a Login Form where users input NIP or NIS and password based on their access rights an Admin Dashboard for managing class, student, academic year, and transaction data with add, edit, and delete features a Student Dashboard displaying student and class data accessed by the admin an Academic Year Dashboard for admin to manage academic year data an Admin Transaction Dashboard for handling student transactions a Student Home Dashboard that presents the latest school information a Student Transaction Dashboard showing outstanding payments, available payment methods, and a feature to upload proof of transfer and a Treasurer Page for viewing and printing student transaction lists.

After the system was built, the next step was the system testing. In this test, the Blackbox Testing method was used to test the validity and detect any errors in the system during use. The following are the system testing tables using the blackbox testing method:

Blackbox Testing Table

Testing Scenario	Testing Details	Expected Results	Expected Results
The student logs in by entering their Student ID (NIS) and password	Login page	Able to display the web page after successful login	Valid
The student makes a transaction on the transaction page	Transaction page	Able to make a transaction	Valid
The student uploads proof of payment transfer	Transaction page	Able to upload proof of payment and successfully complete the payment	Valid
The student enters the Home menu	Menu home	Able to display the Home menu and successfully enter the Home menu	Valid
The student enters the About menu	About menu	Able to display the About menu and successfully enter the About menu	Valid
Siswa The student logs out Logout	Logout menu	Able to log out of the system	Valid

Advanced Blackbox Testing Table

Testing Scenario	Testing Details	Expected Results	Expected Results
The admin logs in by entering their NIP and password	Login Page	Can display the web page after a successful login	Valid
The admin accesses the school page to add school data	School Page	Can add and edit school data successfully	Valid
The admin accesses the class page to add class	Class Page	Can add and edit class data successfully	Valid

data			
The admin accesses the student page to edit and add student data	Student Page	Can add and edit student data successfully	Valid
The admin accesses the academic year page to edit and add academic years	Academic Year Page	Can edit and add academic year data successfully	Valid
The admin accesses the transactions page to edit and add transaction records	Transaction Page	Can edit and add transaction records successfully	Valid
The admin logs out of the system	Logout Menu	Can log out of the system successfully	Valid

Second Phase of Blackbox Testing Table

Testing Scenario	Testing Details	Expected Results	Expected Results
The admin logs in by entering their NIP and password	Login Page	Can display the web page after a successful login	Valid
The admin accesses the school page to add school data	School Page	Can add and edit school data successfully	Valid
The admin accesses the class page to add class data	Class Page	Can add and edit class data successfully	Valid
The admin accesses the student page to edit and add student data	Student Page	Can add and edit student data successfully	Valid
The admin accesses the academic year page to edit and add academic years	Academic Year Page	Can edit and add academic year data successfully	Valid
The admin accesses the transactions page to edit and add transaction records	Transaction Page	Can edit and add transaction records successfully	Valid
The admin logs out of the system	Logout Menu	Can log out of the system successfully	Valid

4. CONCLUSION

Based on the research results, the web-based SPP payment information system can be used for SPP and other payments such as LKS or books, send digital payment receipts, generate payments and billing reports, and help save time while reducing errors in financial data entry.

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