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Information System Design for New Student Admission (PPDB) at SDN Sukmajaya Depok

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KEYWORDS
PPDB; Information System; System Design; SDN Sukmajaya V Depok; Administrative Efficiency

ABSTRACT
The New Student Admission (PPDB) process plays a crucial role in supporting the smooth running of academic activities at SDN Sukmajaya V Depok. However, the manual implementation of PPDB, from registration to data processing, creates a number of obstacles such as the risk of data loss, time inefficiency, and errors in recording. These conditions encourage the need for technology-based solutions to improve the efficiency and effectiveness of the PPDB process. This research aims to design a web-based PPDB information system to facilitate registration, student data management, and report generation. The research method includes data collection through observation, interviews, and literature review, with a system design approach using the Waterfall model. The research stages include requirements analysis, system design, implementation, and testing. The results showed that the PPDB information system designed was able to meet the needs of schools in the process of admitting new students. The system is equipped with main features such as online registration, automatic data validation, and fast report generation, which can reduce errors and speed up the workflow. With the implementation of this system, it is expected that the PPDB administration process at SDN Sukmajaya V Depok will be more efficient and provide convenience for prospective students and parents.

Introduction

The New Learner Admission (PPDB) process is an important part of school operations that requires proper management to support the smooth and accurate admission of new students each year . With today's technological advancements, more and more schools are shifting to digital enrollment systems designed to improve efficiency, speed and convenience in learner enrollment. This change to is particularly relevant, given the community's need for education services that can be accessed more flexibly and conveniently (ARC Group, 2024).

SDN Sukmajaya 5 Depok currently uses a manual registration method in the PPDB process, where prospective students and parents need to come directly to the school to fill out forms, submit

documents, and get information related to registration. This manual system has several disadvantages, such as long queues, potential errors in data recording, and limited time for parents who cannot come directly to the school (Yustiyanto & Budi Setia eko, 2023). In addition, this system also requires a lot of energy and time, both from the applicant and the school administration staff (Yudahana et al., 2023).

This research aims to develop a new student admission information system using the waterfall model, referencing the research of Hanifatus Syahdiah, Novila Irsandi, and Rahma Nur Fadila (2023). The system aims to improve efficiency and systematization, replacing manual processes that are prone to errors. Research shows that information systems can reduce data entry errors, improve access to information, and simplify the management of new student admissions.

Khulaimi and Hafizi's (2021) research shows that PPDB at DAR Al-Atiq IT Junior High School is still done manually, causing data errors. To overcome this, they developed a web-based PPDB system with a waterfall model, using PHP, HTML, and MySQL database. The system was tested with Black Box Testing, resulting in a successful PPDB process as expected.

The implementation of a website-based PPDB information system is expected to be a solution to these various obstacles. With a website-based system, the registration process can be done online, making it more efficient and flexible. This system also allows for automatic data verification, quick registration status, and more transparent reporting. For SDN Sukmajaya 5 Depok, the application of information technology has the potential to improve service quality, reduce administrative burden, and provide easy access for parents and prospective students.

Based on the above background, this research aims to design and develop a website-based PPDB information system that can meet the needs and characteristics of SDN Sukmajaya 5 Depok. Hopefully, this system can be a practical solution to improve the efficiency and quality of services in the admission of new students at this school. The purpose of this research is to design and develop a website-based New Student Admission (PPDB) information system that can assist SDN Sukmajaya 5 Depok in improving the efficiency and quality of new student registration services. This system is expected to replace the manual registration method currently used, by providing a faster, more flexible, and easily accessible registration process for prospective students and parents.

Materials and Methods

Data Collection Technique

This study conducted observations at SDN Sukmajaya 5 Depok. The things observed during the observation focused on the procedures of the system that was already running so as to identify problems that became the basis for developing a website-based PPDB system.

Interviews were conducted to gather information from administrative staff, principals, and parents of prospective students at SDN Sukmajaya 5 Depok regarding the PPDB process. Administrative staff revealed the constraints of manual processes, such as data management, document verification, and long queues that burdened their work (Buye, 2021). The principal highlighted the need for a more efficient system to support PPDB operations, while parents wanted flexible access to online registration and real-time status monitoring.

The results of this interview became a reference in designing a website-based PPDB information system with main features such as online registration and easy and efficient access to information.

This method supports the process of writing this thesis by looking for journal articles, books, and information on the Internet related to school information systems.

System development method

The model used in the development of this system is the waterfall model. The Waterfall model is divided into five stages, namely: (Abdul-Wahab et al., 2021)

1. System Requirements Analysis: At this stage, system requirements are identified and documented in detail. Analyze to understand the existing PPDB process at SDN Sukmajaya 5 Depok, as well as identify the problems faced in the current manual procedures. The result of this analysis was a system requirement specification, which included desired features such as online registration, file verification, prospective student data management, and access for admin and external users (prospective students and parents). All these requirements were written down in a requirements specification document as a guideline for the next stage of development.
2. System Design, In the design stage, the specifications generated from the requirements analysis are translated into a system design that will be developed. This design includes system architecture design, database design, user interface, and process flow for each feature to be developed. Diagrams such as Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD) are also created to describe the interaction of data in the PPDB system. This design aims to provide a complete picture of the appearance, structure, and flow of data in the system, so that developers have a clear reference when creating program code.
3. Code Generation: The author uses programming languages such as PHP (Hypertext Processor), HTML (Hyper Text Markup Language), and CSS (Cascading Style Sheets), and for the database, MySQL (My Structured Query Language).
4. Testing: After the coding stage is complete, the system is tested to ensure all features function as needed and there are no errors or bugs. Testing is done online to evaluate whether each component of the system runs according to specifications without seeing the internal code. Testing is also done by inviting potential users, namely the PPDB committee and prospective students or parents, to ensure the system can be operated easily and intuitively. Test results were recorded to ensure there were no features that hindered overall system performance.
5. Support, At this stage the author checks the data, if an error is found in the functions, the author will make improvements to the application system and ensure that the New Student Admission application is able to operate smoothly.

Scope

The scope of this thesis writing is limited to the Design of a New Learner Admission Information System (PPDB) at SDN Sukmajaya 5 Depok, which consists of two parts, namely the Front End (user/user main page), and the Back End (Admin Page).

The Front End (user/user main page) includes the main page/homepage, account list, login, main menu, formula data, file upload, payment, and proof of payment. The back End (Admin Page) contains a page (dashboard) used by the admin to manage the website's appearance and content along with participant and administrative data (Wellington Capital Advisory, 2022).

Results and Discussion

Design the Proposed System and Program

Software Requirements Analysis

The new student registration system is a web-based online registration system where prospective students and admins do not meet face-to-face. The following is a specification of the needs of the new learner registration system:

Functional Requirements Admin (PPDB Committee)

1. Admin can log in with the registered account
2. Admin can manage school data/profile
3. Admin can create edit committee accounts for login access
4. Admin can verify whether a prospective student is accepted or not
5. Admin can verify payment status
6. Admin can view prospective student data
7. Admin can print reports on Payment, Requirements Files, Forms and PPDB data

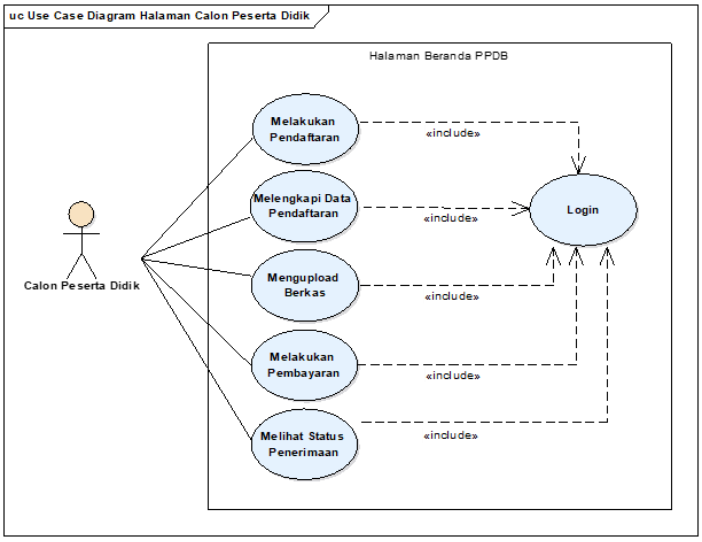
Functional Requirements for Prospective Students

1. Prospective students can fill out the registration form to log in
2. Prospective students can complete registration data
3. Prospective students can upload the specified files
4. Prospective students can view payment data
5. Prospective students can print proof of payment

Design

System Modeling Design

1. Use Case Diagram Modeling of Prospective Student Page



Use Case Diagram of Prospective Student Page

Table 1. Use Case Description of Prospective Student Registration Diagram

Use Case Name	:	Student Candidate Registration
Use Case Description	:	Prospective students create an account to log in
Actors	:	Prospective Students
Pre-Condition	:	Prospective students access the PPDB web
Post-Condition	:	The system displays the registration form page
Fault Condition	:	Prospective students cancel creating an account
Main Scenarios	Serial No.	Step
Prospective Students	1	Prospective students access the PPDB web
	2	Prospective students fill out the registration form
	3	The system displays the login page
Extensions *	2a	Student Candidate Name at least 5 Characters
	2b	The verification code must be filled in according to the image; if it is wrong, then the system will display an error message

Table 2. Description of Use Case Diagram of Completing Registration Data

Use Case Name	:	Complete Registration Data
Use Case Description	:	Prospective students complete registration data
Actors	:	Prospective Students
Pre-Condition	:	Prospective students have logged into the PPDB web
Post-Condition	:	The system displays the dashboard Prospective students
Fault Condition	:	Students delay completing the data
Main Scenarios	Serial No.	Step
Prospective	1	Prospective students login using NISN and password

Students		during registration
	2	Prospective students complete the registration data on the Form Data menu
	3	Data is successfully saved into the database
Extensions *	2a	Invalid NISN the system displays an error message
	2b	Invalid password system displays an error message

Table 3. Description of Use Case Diagram of Uploading Files

Use Case Name		:	Uploading Student Candidate Files
Use Case Description		:	Prospective students upload the required files
Actors		:	Prospective Students
Pre-Condition		:	Prospective students have logged into the PPDB web
Post-Condition		:	The system displays the dashboard Prospective students
Fault Condition		:	Students delay uploading files
Main Scenarios	Serial No.		Step
Prospective Students	1		Prospective students login using NISN and password during registration
	2		Prospective students upload files on the File Upload menu
	3		Data is successfully saved into the database
Extensions *	3a		Files are jpg, png, pdf files

Table 4. Description of Use Case Diagram of Making Payment

Use Case Name		:	Making
Use Case Description		:	Prospective students make registration payments
Actors		:	Prospective students
Pre-Condition		:	Prospective students have logged into the PPDB web
Post-Condition		:	The system displays the dashboard Prospective students
Fault Condition		:	Prospective students have not made payment
Main Scenarios	Serial No.		Step
Prospective Students	1		Prospective students login using NISN and password during registration
	2		Prospective students upload proof of payment on the Payment menu
	3		Data is successfully saved into the database
Extensions *	3a		Files are jpg, png, pdf files

Table 5. Description of Use Case Diagram of Viewing Acceptance Status

Use Case Name		:	View Acceptance Status
Use Case Description		:	Prospective students make registration and payment
Actors		:	Prospective students
Pre-Condition		:	Prospective students have logged into the PPDB web
Post-Condition		:	The system displays the dashboard Prospective students
Fault Condition		:	Prospective students cancel view admission status
Main Scenarios	Serial No.		Step
Prospective Students	1		Prospective students login using NISN and password during registration
	2		Prospective students view their acceptance status

	3	The system displays the acceptance status page
Extensions *	1a	Invalid password system displays an error message

2. Use Case Diagram Modeling

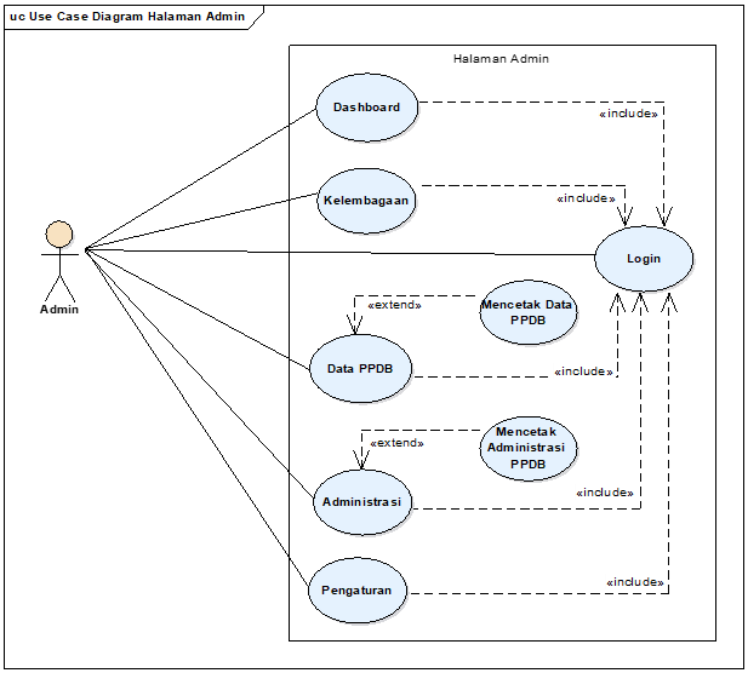


Figure 2. Use Case Diagram of Admin Page

Table 6. Use Case Description of Admin Dashboard Diagram

Use Case Name	:	Admin Dashboard
Use Case Description	:	Admin can change profile, Institution Address, Contact, principal data
Actors	:	Admin
Pre-Condition	:	Admin accesses the PPDB web
Post-Condition	:	The system displays the dashboard page
Fault Condition	:	Admin does not change profile, institute address, contact, principal data
Main Scenarios	Serial No.	Step
Admin	1	Admin accesses the PPDB web
	2	Admin manages profile, institution address, contact, principal data
	3	The system displays the dashboard page

Table 7. Institutional Use Case Diagram Description

Use Case Name	:	Managing Institutions
Use Case Description	:	Admin can manage institution profile settings, user access
Actors	:	Admin
Pre-Condition	:	Admin accesses the PPDB web
Post-Condition	:	The system displays the dashboard page
Fault Condition	:	Admin cancel the institutional page
Main Scenarios	Serial No.	Step

Admin	1	Admin accesses the PPDB web
	2	Admin manages Institution profile and user access
	3	The system displays the institutional page

Table 8. Description of Use Case Diagram of PPDB Data

Use Case Name	:	PPDB Data
Use Case Description	:	Admin can manage PPDB data
Actors	:	Admin
Pre-Condition	:	Admin accesses the PPDB web
Post-Condition	:	The system displays the dashboard page
Fault Condition	:	Admin cancels PPDB data
Main Scenarios	Serial No.	Step
Admin	1	Admin accesses the PPDB web
	2	Admin manages PPDB Registrant Data
	3	Admin manages the acceptance status of prospective students
	4	Admin edits prints PPDB data
	5	The system displays the PPDB Data page

Table 9. Use Case Description of PPDB Administration Diagram

Use Case Name	:	PPDB Administration
Use Case Description	:	Admin can manage PPDB Administration
Actors	:	Admin
Pre-Condition	:	Admin accesses the PPDB web
Post-Condition	:	The system displays the dashboard page
Fault Condition	:	Admin cancel PPDB Administration
Main Scenarios	Serial No.	Step
Admin	1	Admin accesses the PPDB web
	2	Admin manages PPDB Administration information
	3	Admin can view the status of prospective student payment data
	4	Admin can print the payment report
	5	The system displays the PPDB Administration page

Table 10. Use Case Description of Settings Diagram

Use Case Name	:	Settings
Use Case Description	:	Admin can manage PPDB Settings
Actors	:	Admin
Pre-Condition	:	Admin accesses the PPDB web
Post-Condition	:	The system displays the dashboard page
Fault Condition	:	Admin cancel PPDB Settings
Main Scenarios	Serial No.	Step
Admin	1	Admin accesses the PPDB web
	2	Admin manages PPDB schedule and Whatsapp admin settings
	3	Admin manages general settings such as Institution name, school name, School NSS, School letterhead, school logo, signature, PPDB logo

4	Admin can manage announcement data information
5	The system displays the PPDB Settings page

User Interface Design

The following is an interface page on the web-based New Student Admission (PPDB) application system design, which consists of:

Main Page Design

1. Home Page Design

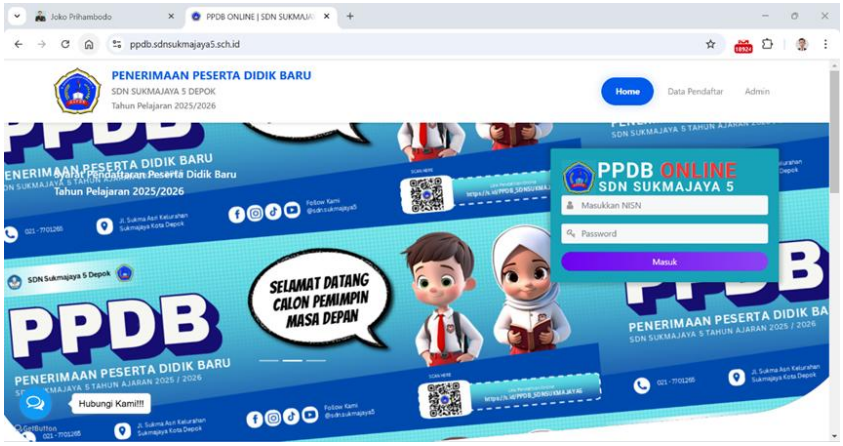


Figure 3. Home page

2. Registrar Data Design

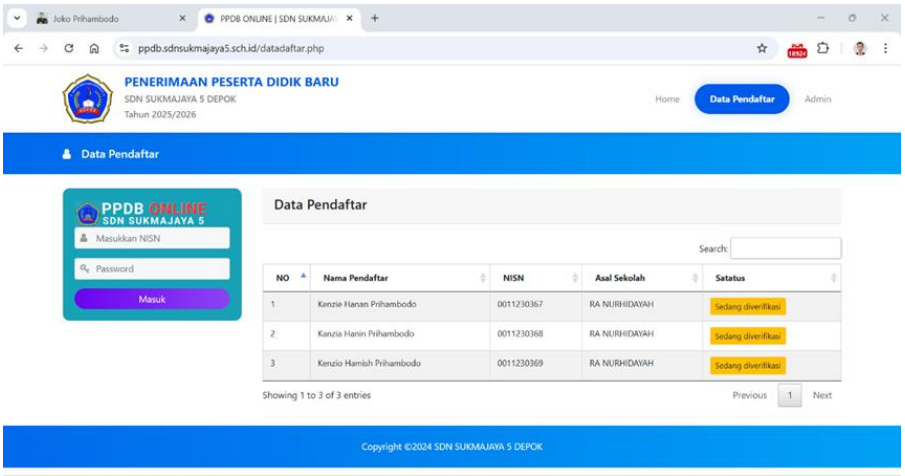


Figure 4. Registrant Data Page

Admin Page Design

1. Admin Login Page Design

Figure 5. Admin Login Page

2. Admin Dashboard Page Design

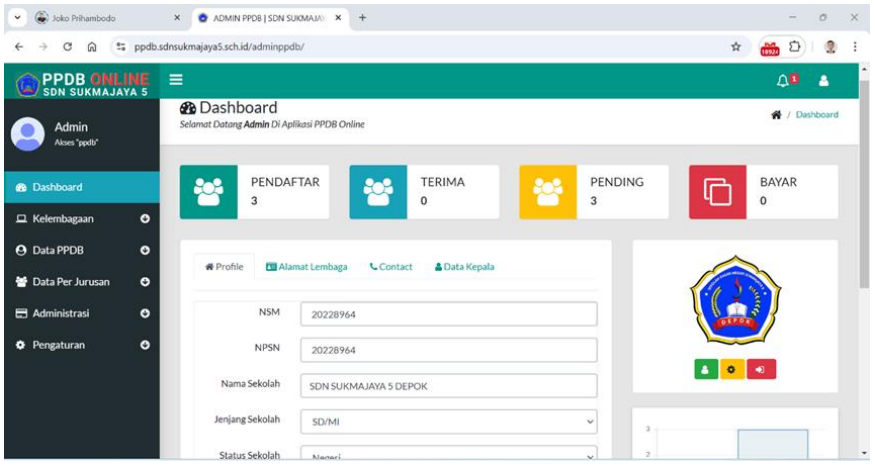


Figure 6. Admin Dashboard Page

Student Candidate Page Design

1. Prospective Student Registration Page Design

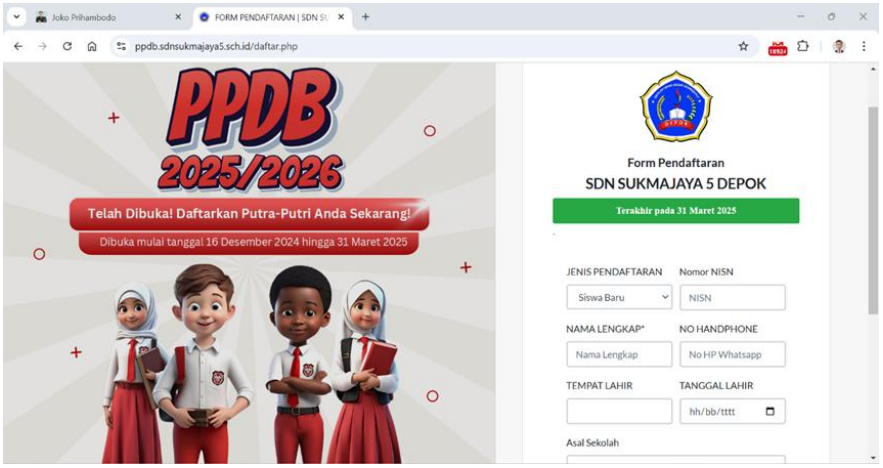


Figure 7. Prospective Student Registration Page

2. Prospective Student Login Page Design

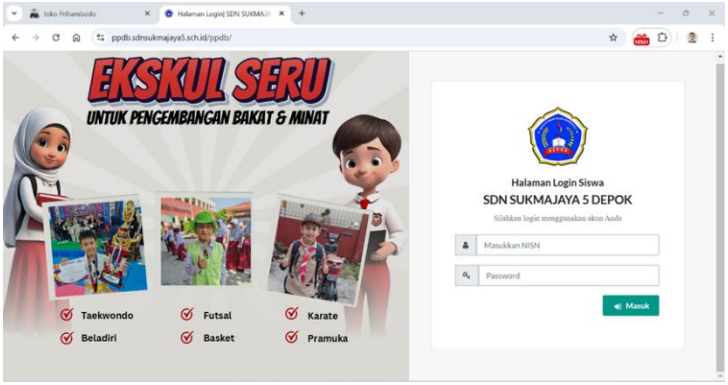


Figure 8. Prospective Student Login Page

3. Prospective Student Dashboard Page Design

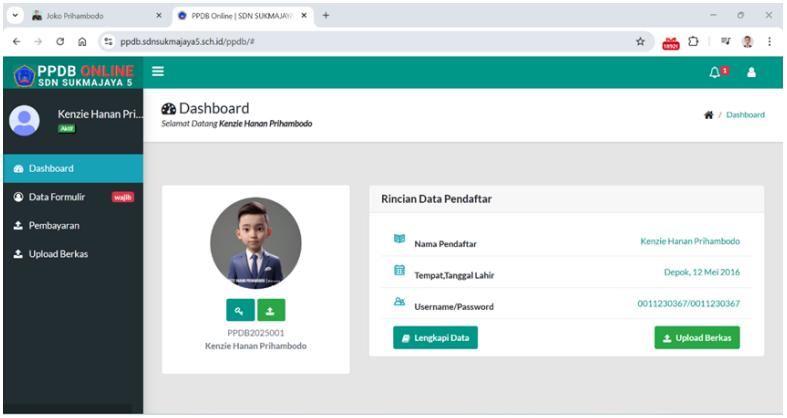


Figure 9. Prospective Student Dashboard Page

4. Payment Page Design

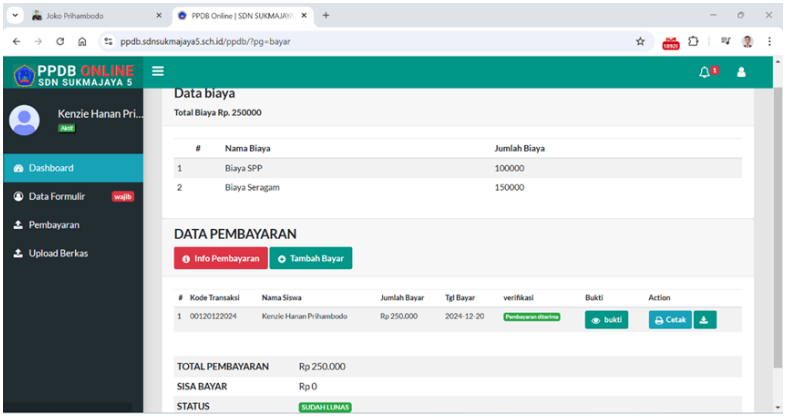


Figure 10. Prospective Student Payment Page

5. File Upload Page Design

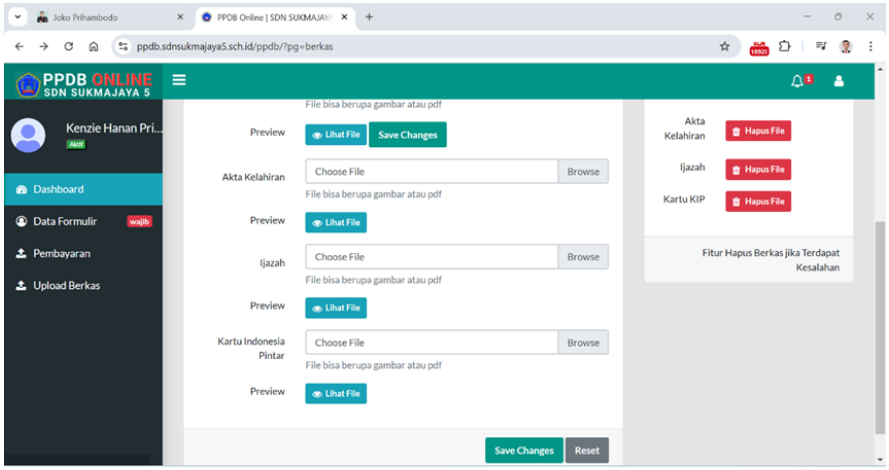


Figure 11. Prospective Student File Upload Page

Code Generation

The following is an example of a source code display for the main page in PPDB Online using the editor application Visual Studio Code.

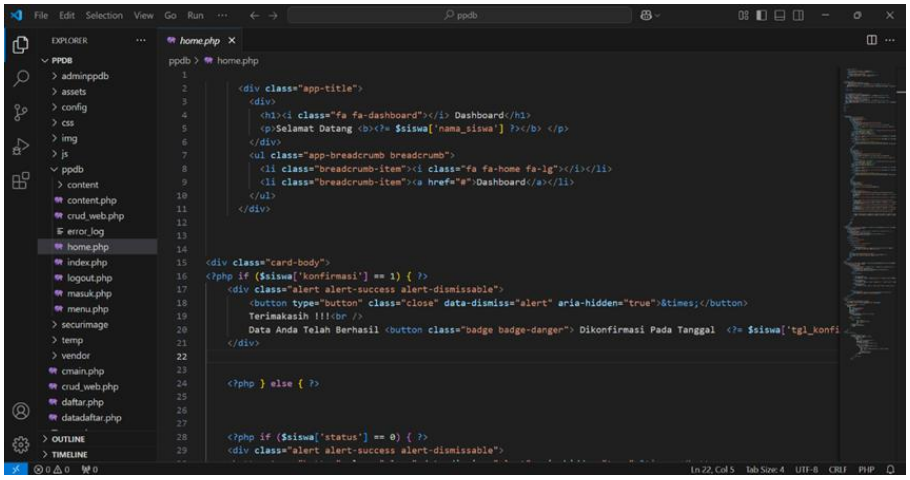


Figure 12. Source Code Display Using Visual Studio Code

Testing

The Testing stage is important to ensure that the website created can run as expected.

1. **Performance Testing**

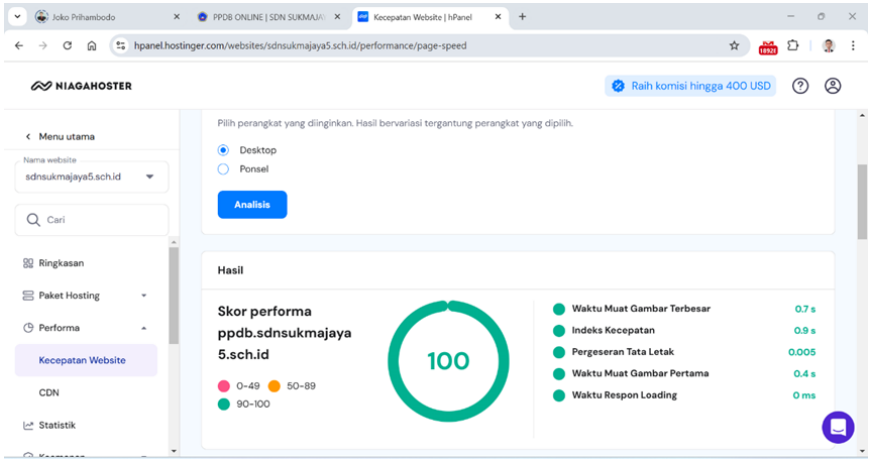


Figure 13. Performance Testing Using Niagahoster Tools

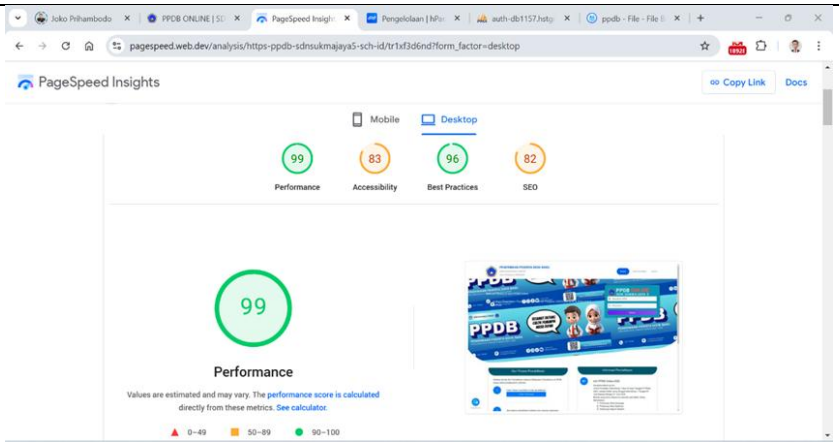


Figure 14. Performance Testing Using Page Speed Insights

Referring to Figures 15, the tests carried out show the results of the website Performance Testing https://ppdb.sdnsukmajaya5.sch.id/ with a value of 100 and 99, respectively.

2. **Website Security Testing**

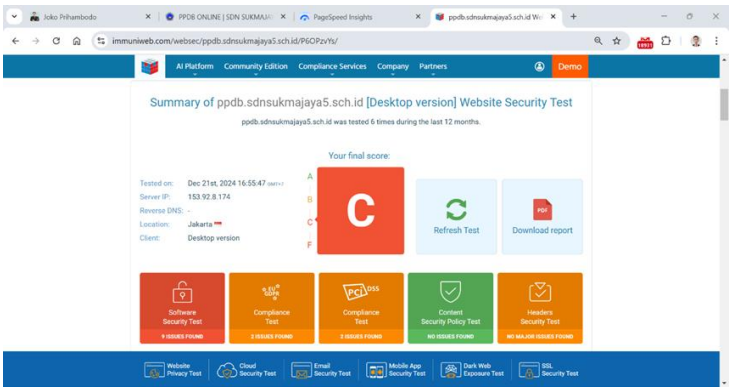


Figure 15. Website Security Testing Using Immuniweb

Support

1. **Web Publication**

The New Learner Admission Information System (PPDB) at SDN Sukmajaya V Depok is then published online using hosting from niagahoster.co.id, and the domain used is https://ppdb.sdnsukmajaya5.sch.id/

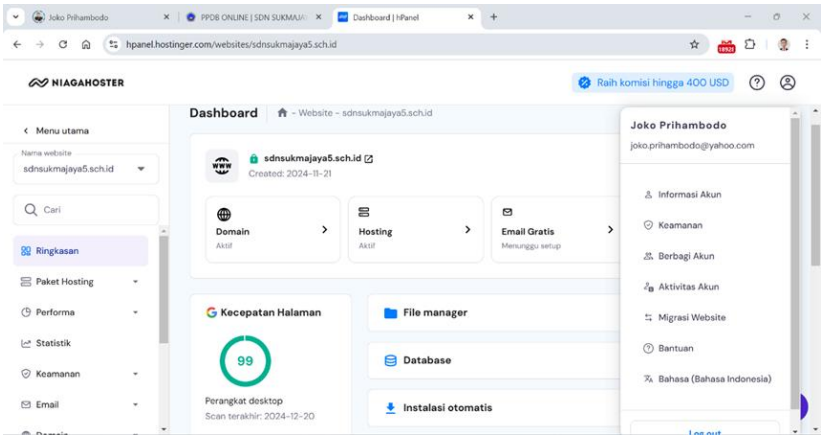


Figure 16. Web Publication Image

2. **Hardware and Software Specifications**

Hardware Requirements

Table 11. Server Hardware Requirements

Item Server	Server Item Requirements
Disk Space	1GB
Storage	SSD
Bandwidth	Unlimited
OS	Linux
Protocol	HTTP3

Software Requirements

Table 12. Server Software Requirements

Framework	Code Igniter
Interpreter	PHP Interpreter
Database Management System	MySQL
Database Administration Tool	phpMyAdmin
Script Language	PHP 7.4.13

3. **Proposed System Document Specifications**

A. Document Name : Registrar Data Form
Function : As Proof of Registration
Source : Registrar
Destination : Administration Section

Media : View
Frequency : Every time you register
Format : Appendix B1

B. Document Name : Payment Receipt
Function : As Proof of Registration Payment
Source : Administration Section
Destination : Prospective Students
Media : Paper
Frequency : Every time Registration Payment Occurs
Format : Appendix B2

Conclusion

This research aims to design a web-based new student admission information system (PPDB) at SDN Sukmajaya V Depok to overcome various obstacles found in the manual PPDB process. Based on the results of research and implementation, the designed system has successfully overcome the main problems, namely reducing the risk of data loss, increasing time efficiency, and reducing errors in data processing.

The PPDB information system developed has a number of advantages, such as easy access for prospective students through the online registration feature, automation of the data validation process, and the ability to generate reports quickly and accurately to support school administration. These features not only make it easier for schools to manage data, but also provide convenience for parents and prospective students during the registration process.

However, this system still has some shortcomings. One of the main obstacles is its dependence on the internet connection, which can hamper its operation in the event of a network disruption. In addition, school staff needs training to operate and maintain the system properly.

Overall, the designed PPDB information system has successfully met the research objectives and can be an effective solution for SDN Sukmajaya V Depok in improving the efficiency and quality of new student admission administration. Further development is needed to enhance this system in the future.

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