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Implementation of a New Web-Based Student Admission Information System at Smp Pelita Nusantara Using the Rapid Application Development (Rad) Method

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A B S T R A C T

The process of accepting new students at school often faces challenges in terms of effectiveness and efficiency. This research aims to overcome this problem by implementing an information system for accepting new students using the Rapid Application Development (RAD) method. The Rapid Application Development (RAD) method is used because of its flexibility in fast and iterative system development, where this method goes through a four-stage process, namely requirements plan, user design, rapid prototyping & feedback, then implementation. In this research, a web-based information system was developed to make it easier for prospective students and schools in the registration process. This system allows prospective students to register online. This research also aims to minimize data input errors and optimize the registration process time. The research results show that the implementation of a new student admission information system using the RAD method can increase the effectiveness and efficiency of the new student admission process at school.

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INTRODUCTION

In the field of education, technological advances related to information on new student admissions are still limited. For this reason, we often hear about the implementation of information systems for new student admissions by various schools, both public and private, from kindergarten to tertiary level. This system is often used to collect data or documents from prospective students so that the information can be easily verified or utilized when needed.

Considering the rapid advances in technology that have penetrated various fields and the fairly high level of social progress, web-based information systems are a tool with great potential to improve the provision of information. The use of this technology can speed up the data processing process, enable more accurate decision making, and save costs and time, among other benefits.

SMP Pelita Nusantara is a private school that is developing, located on Jalan Raya, Karyamakmur, Batujaya District, Karawang Regency, West Java Province. The facilities and infrastructure at this school are sufficient to support technological advances, with facilities such as a computer laboratory and Wi-Fi network provided by the school.

The procedure for accepting new students at SMP Pelita Nusantara is currently not running effectively and efficiently. Acceptance of new students is still done manually, where prospective students must come to the school to take the registration form provided by the admin. The form is filled in manually and submitted again along with the required files. This kind of registration process often causes problems, such as unclear information, incomplete requirements files, and long queues that take a long time. Therefore, a computerized new student registration system is needed so that prospective students can register from anywhere.

Therefore, this research designed and created an Online New Student Admission Information System (PPDB) using the Rapid Application Development (RAD) Method. The Rapid Application Development (RAD) method is an approach to software development that emphasizes speed and flexibility in the development process.

The main goal of the Rapid Application Development (RAD) method is to produce a system or application that is able to meet needs in a short time without sacrificing quality. By using the Rapid Appication Development (RAD) method, development time can be accelerated according to changing user needs, and project risks can be reduced by detecting and addressing problems from the early stages of development.

It is hoped that this website will make it easier for schools and parents or guardians of prospective students to carry out the New Student Registration (PPDB) process.

THEORETICAL REVIEW

Information Systems

Information systems consist of two words, namely "system" and "information". The system itself means a combination of several components that

work together to achieve a goal. Information means something that is easily understood by the recipient. An information system means a system that aims to display information(Fauziah et al., 2024).

Website

A website or web is a collection of pages that contain information in the form of digital data, such as text, images, video, audio and other animations, which are available via the internet. More clearly, websites are pages that provide useful information for their users(Yulianti, 2023).

Rapid Applicationt Development (RAD)

"Rapid Application Development (RAD)" is an incremental software development process model, especially for projects with short processing times. Application development with this method uses an iterative (repeated) approach to building the system. The goal is to create a working model of the system in the early stages of development, which is then refined or eliminated. This working model becomes the basis for the final system design and implementation(Pratama, 2023).

XAMPP

XAMPP is a collection of PHP and MySQL packages on an open source basis that functions as a tool in developing PHP-based applications. XAMPP is an application package consisting of various diverse software(Yuanita & Al Azhar, 2023).

MySQL

MySQL is a relational database management system (RDBMS) that is capable of managing databases at high speed, capable of handling large amounts of data, and can be accessed by a large number of users simultaneously(Nugroho & Septiani, 2024).

HTML (Hypertext Markup Language)

HTML is short for Hypertext Markup Language, a standard web language maintained by the W3C. HTML is used to arrange elements on website pages. HTML files are saved with the .html extension and can be written using a text editor such as Notepad or special applications such as Notepad++, Sublime Text(Nuraeniah et al., 2024).

CSS (Cascading Style Sheet)

CSS (Cascading Style Sheet) is a feature introduced since HTML version 4.0 which is tasked with managing the appearance of elements in HTML, such as font type, size and color, text position, margins or text boundaries, background color, and so on(Hasan & Muhammad, 2020).

PHP (Hypertext Preprocessor)

PHP is a programming language that is popular among programmers for building systems that are under development, be they applications or websites. PHP is included in the category of high-level programming languages that can be inserted into HTML documents(Hanny et al., 2023).

Blackbox Testing

Black box testing is an evaluation of software quality that focuses on its functionality. The purpose of this testing is to detect functions that are not running correctly, errors in the interface, inappropriate data structures, performance problems, and errors in the initialization and termination processes. In black box testing, a tool is used to collect data known as a user acceptance test. This document contains indicator descriptions of software functionality testing procedures(Setiyani, 2019).

Framework Codeigniter

CodeIgniter is a PHP framework that is open and uses the MVC (Model, View, Controller) approach to help developers or programmers build web applications without needing to create everything from scratch(Sallaby & Kanedi, 2020).

METHODOLOGY

The method used in this research is Rapid Application Development, the Rapid Application Development method has 4 stages as in the picture below:

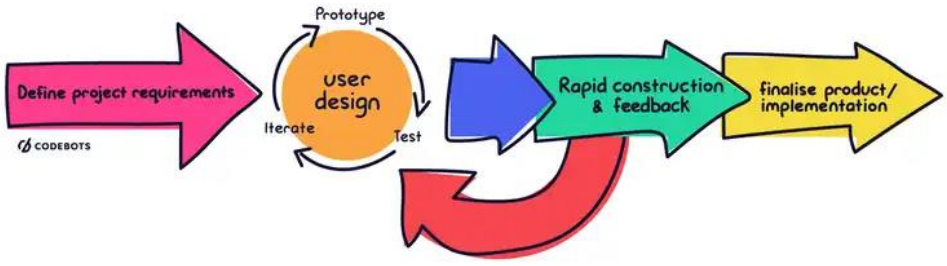

Figure 1. Rapid Application Development method Workflow

1. Requirements Plan (Planning requirements)

At this stage, we analyze all system and user needs referring to the results of observations, interviews and literature studies. Based on the results of the needs analysis, it will be used at the system design and implementation process stages.

2. User Design

This stage is the stage where the researcher carries out UML design, user interface design and prototyping, at this stage the user plays an active role. Where the researcher will design the system, the researcher will make improvements if the system design does not match the user's needs.

a) UML Design
   UML design involves creating case diagrams and activity diagrams. The case diagram provides an explanation of the access rights owned by the admin and students, while the activity diagram describes the registration process starting from registration, logging in, filling out the registration form, uploading registration documents, to printing proof of registration.
b) User Interface Design
   User interface design is a stage in the process of creating a website appearance where the user interface design will be carried out to implement the analysis results that will be made into an application.
c) Prototype
   A prototype is a step in designing a system that has been adapted to user needs. After creation, the prototype is handed over to the user to receive feedback. In the refinement process, the prototype is adjusted based on user feedback and iterated until the user's needs are met.

3. Development and Feedback Gathering Stage (Rapid Prototyping & Feedback)

At this stage, the prototype that was designed in the previous stage is developed into a beta and final version. This stage also involves testing to gather feedback for necessary improvements.

4. Implementation

This stage is the completion stage of the system that has been created, where all deficiencies and improvements made in the previous stage have been approved by the user. At this stage, testing is carried out on the system that has been built by running the program that has been developed. If errors are found in the system, repairs will be carried out so that the system can operate properly. This testing process uses a black box testing method which focuses on the input and output specifications of the system that has been built, with the aim of detecting whether there are bugs or errors on the website that has been developed.

RESULTS

Use Case Diagram

Use case diagrams are a type of diagram in the Unified Modeling Language (UML) which are used to describe system functionality from the perspective of users or external actors. This diagram emphasizes the interaction between actors (both users and external systems) with the system, with the aim of understanding and documenting the system's functional requirements.

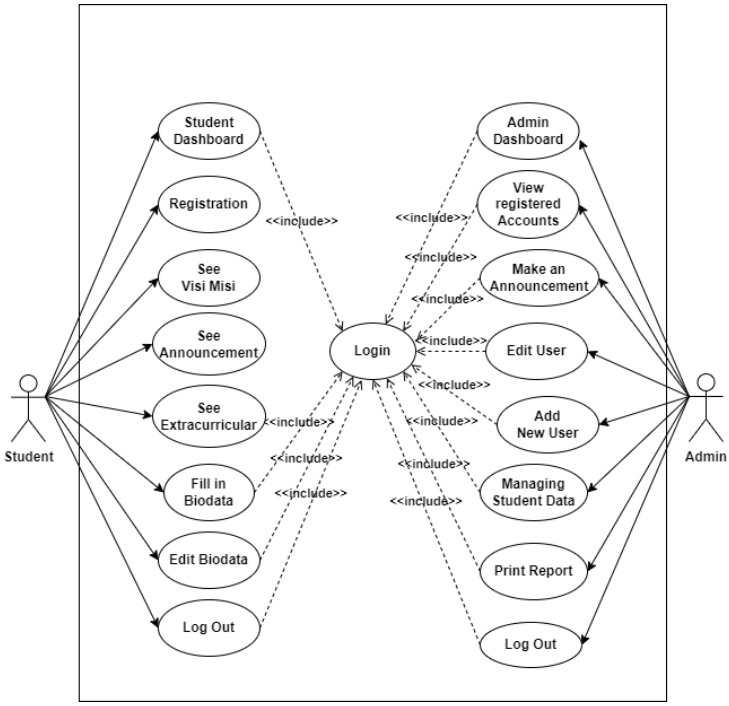

Figure 2. Use Case Diagram in this system

Class Diagram

A class diagram is a diagram that depicts the structure and description of classes, packages, and objects, along with the relationships between them such as containment, inheritance, associations, and others. Class diagrams also explain the relationships between classes in a system that is being developed and how they collaborate to achieve goals. Based on the results of the needs analysis, the class diagram formed for the system to be created is as follows:

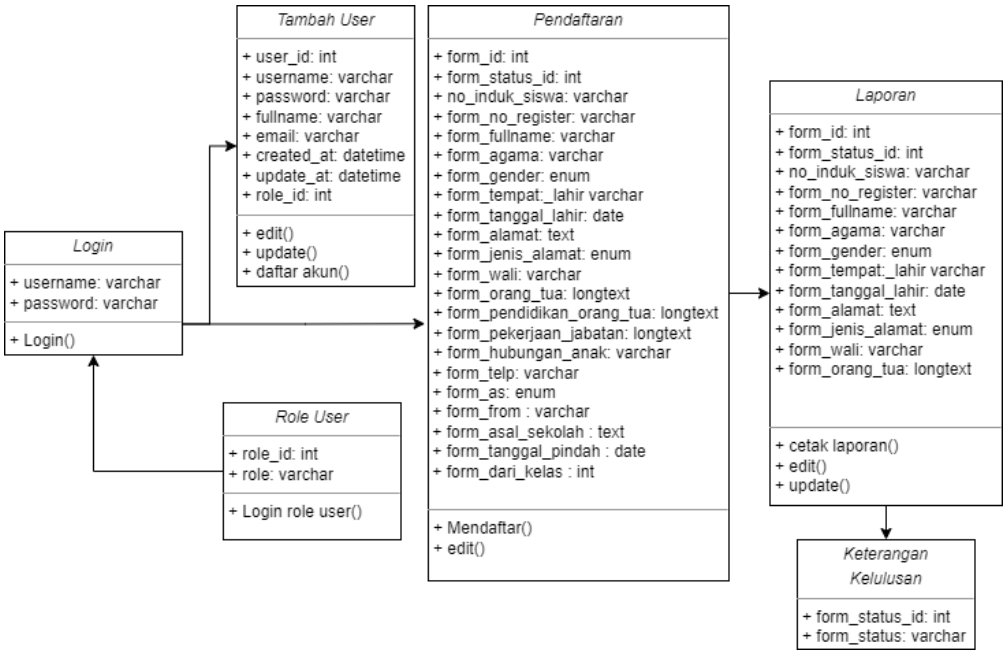

Figure 3. Class Diagram in this system

Implementation User Interface

The user interface is the visual component of a website that determines how users interact with the system. It combines visual and interaction design concepts, and ensures that the system can meet user needs. When designing a user interface, it is important to pay attention to several principles in order to build it well and ensure its usefulness in achieving goals. Below is an explanation of the user interface used in this program:

1. Implementation of the initial registration user interface

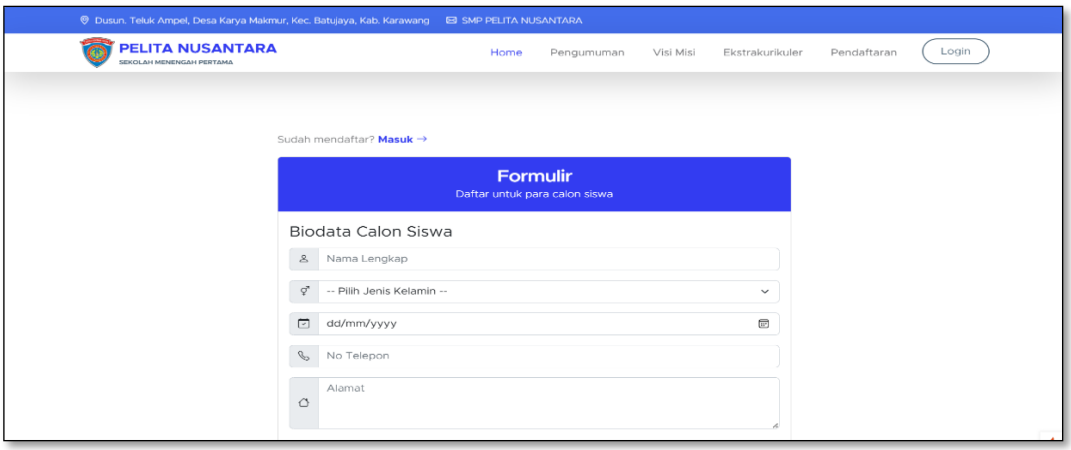

Figure 4. Registration Form

The image above shows an image of the registration user interface, fill in the initial form, where new users are asked to complete initial biodata.

2. Implementation of new account registration user interface

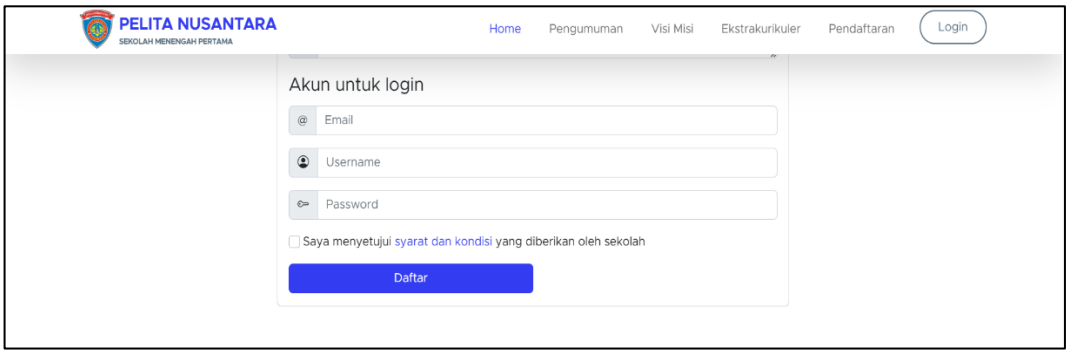

Figure 5. New Account Registration Form

The image above shows a picture of the implementation of the new account registration user interface where the user is asked to fill out a form to register an account.

3. Implementation of the login user interface

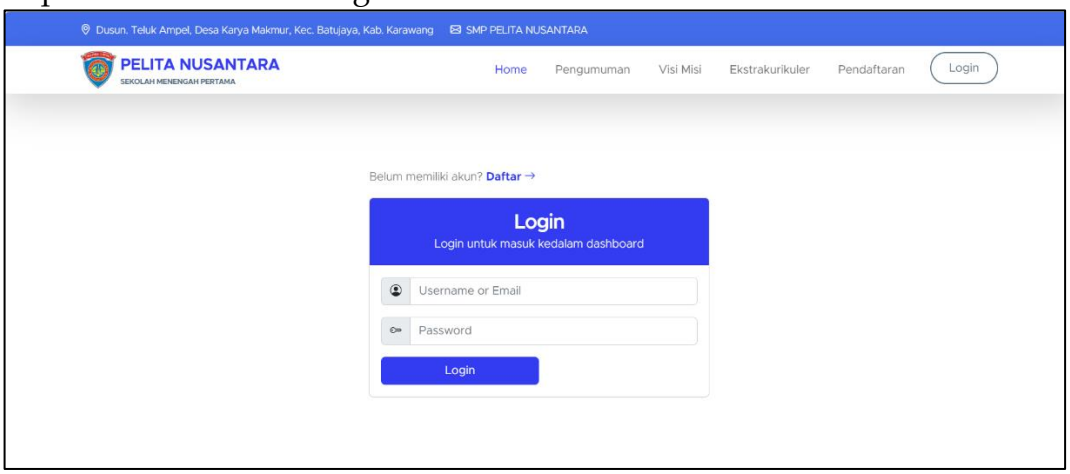

Figure 6. form login

The image above shows a picture of the implementation of the login user interface, where in this dashboard, new users and admins can log in to access the dashboard for each role.

4. Implementation of admin dashboard user interface

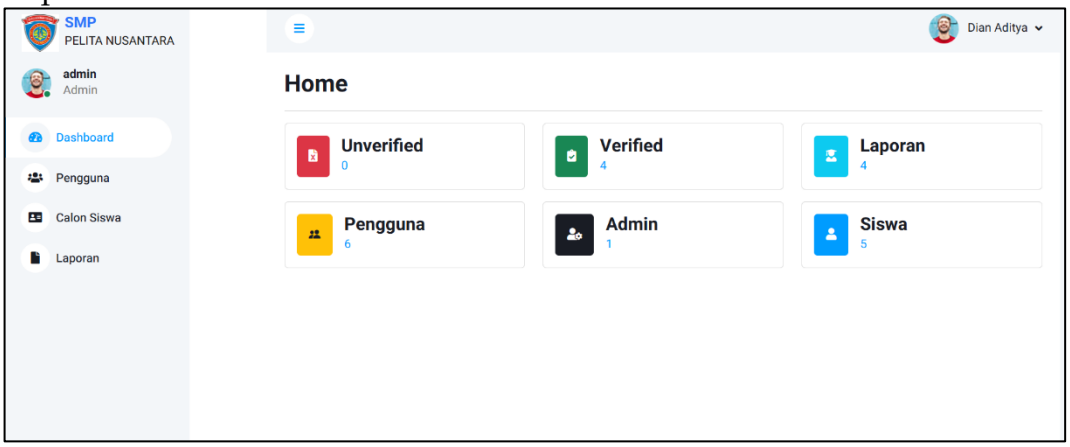

Figure 7. Dashboard Admin

The image above shows a picture of the implementation of the admin dashboard user interface, which contains menus such as the user menu, prospective students, and reports.

5. Implementation of the report user interface

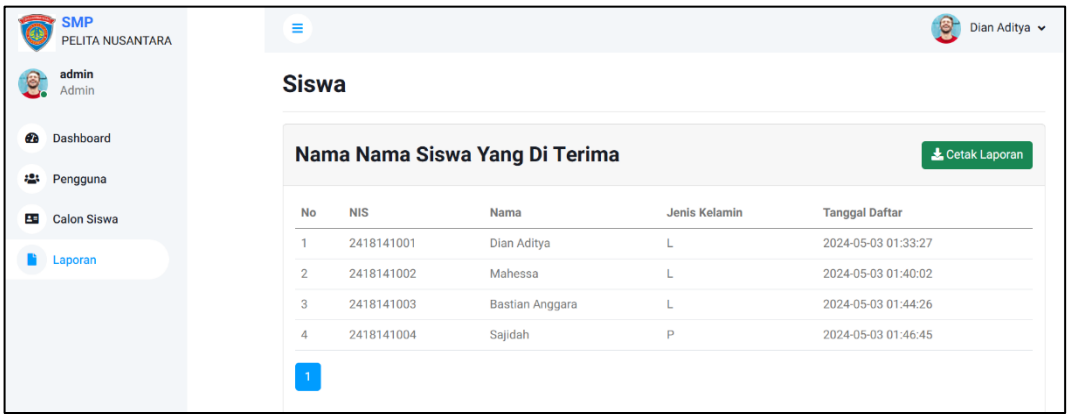

Figure 8. Report

The image above shows a picture of the implementation of the report user interface, where the dashboard contains the names of students who have been accepted, then the admin can print the report by pressing the print report button.

Framework

The framework used in this system is the CodeIgniter framework, because this framework is very suitable for creating websites and is also easy to learn, especially for developers who are familiar with PHP. This framework has comprehensive and clear documentation, which helps developers understand and implement its features.

DISCUSSION

By observing the process analysis and running procedures shown above, the author found results that will later be used to test the suitability of applications, especially computer devices. This device will later be used to run the system with the help of a user (human) as the system user and tested using black box testing

Blackbox Testing

Black-box testing is a software testing method in which testers assess the functionality of an application without examining its internal structure or source code. The main purpose of this testing is to ensure that the system operates in accordance with established specifications and requirements.

Table 1. Blackbox Testing

No	Function	Testing	Results	Blackbox
1	Registration form	Access the registration menu	Displays the registration form	Valid
2	New account registration	Access the registration menu	Displays the new account registration form	Valid
3	Login	Access the login menu	Displays the login form	Valid
4	Admin login	Access the login menu	Displays the admin dashboard	Valid
5	Report	access the report menu in the admin dashboard	Displays the names of accepted students and prints a report	Valid

CONCLUSIONS AND RECOMMENDATIONS

Based on research conducted at SMP Pelita Nusantara which discusses the implementation of an online-based new student admission system, several conclusions can be drawn, namely:

1. The system created in this research uses the Rapid Application Development (RAD) method which has gone through four stages, namely requirements plan, user design, rapid prototyping & feedback, then implementation and using the CodeIgniter framework for application development
2. This system is designed and can be used by two users, namely school staff who act as admin users and also prospective student registrants who act as general users.
3. With the existence of a web-based new student admission system using the Rapid Application Development (RAD) method, it aims to make it easier for prospective students to register and assist teachers or schools in computerized student data input.

FURTHER STUDY

This research certainly still has many shortcomings. Therefore, the author provides several suggestions so that this application can continue to be developed and used for more complex needs. The author's suggestion is to add a file upload feature, so it is hoped that this application can be developed further.

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