



Design of New Student Registration Information System at SMPN 3 Kecamatan Payakumbuh

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A B S T R A C T

In this research, the author encountered some problems with PPDB (admission of new students) in SMP N 3 Kecamatan Payakumbuh, as there was no website for new student registration. As a result, the announcement about the PPDB was announced through brochures. Sometimes, this makes a problem, such as a brochure was lost or torn. Therefore, there were obstacles to administration and information about the PPDB, it made inefficient. Another problem was that there was no data stored in the database, which made data vulnerable to lose and easily burned. Research and Development (R&D) with the system development model used is SDLC (System Development Life Cycle), which consists of 5 stages, namely Communication, Planning, Modeling, Construction dan Deployment. When planning, the ACON student information system was built using PHP/MySQL. The research was tested using a validity test with three validators, and the system was declared valid with an average of 0.78. Furthermore, the system was declared very practical with an average of 0.97 after being tested on three teachers. At last, the effectiveness test was conducted on 5 students, and the system received a very high effectiveness score of 0.87 on average.

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1. Introduction

Education is divided into formal education and informal education. Formal education is education received in a school setting, whereas informal education is education received through a government-sponsored program. The transformation of information in the twenty-first century is so quick that unaffected by space and time [2]. Formal and informal education begin with the registration process for new students who want to enter school. Admission of new students is the registration process, the selection of new students in one of the desired schools with several school-determined requirements. Every new academic year, one of the obligations of the school and the education office is to admit new students [3].

Designing information systems is a common utilization of computer technology in schools [4]. According to Verzello and John Reuter III, information system is the stage following the analysis of the system development cycle, defining functional requirements and preparing for design implementation, or describing how a system is formed [5]. The national education system encompasses all educational components that are interrelated to achieving national education purposes [6].

SMPN 3 Kecamatan Payakumbuh is one of junior high school where in Jorong Dalam Koto Taeh Baruah sub-district. SMPN 3 Kecamatan Payakumbuh does not yet have a special website for new student

admission information systems, and the school still uses the manual method, in which prospective new students fill out registration forms. And prospective students must come directly to school. If the system is still manual, the administrative process for new student admissions is frequently delayed, because data for newly registered students have not been properly integrated and managed. Based on the result of two teacher interviews, with Mrs. Rita (principal) and Mrs. Nelpidawati (Student Representative).

Interview with student representative, Mrs. Nelpidawati, "she said that there were numerous obstacles that the school and prospective students must overcome when accepting students, such as the registration form provided by the school and administration was slow". The announcement of new student admission was announced on the school's wall, therefore the student must come to school to see their name on the list that many participants had difficulty seeing the results because they were jostling each other.

The interview result found that the problem in the PPDB system applied in SMPN 3 Kecamatan Payakumbuh was not effective and efficient. To save time, effort, cost, and effectiveness in the process of accepting new students, admission to SMAN 3 Payakumbuh should be done online. Through the design of this system, students don't need to come to school to fill out forms and share the results of the selection of new students. All information can be accessed online at any time and from any location due to the system's design. This design system is based on technology using the PHP/MySQL programming language. Based on all of the problems mentioned above, the author wants to develop an information system-based website, with the hope that it will assist and facilitate the teacher or PPDB committee in the process of accepting new students.

2. Method

The research applied the Research & Development research method. Research & Development is the research used to create a specific product, as well as the testing of that product's effectiveness. R&D (Research and Development) is methods of research used to develop and validate educational and learning products [7].

In this research, the system development model adopted from the SDLC (System Development Life Cycle) is Waterfall model. Waterfall model is a classic model, sistematis and sequential in building software. This model is also referred to as the "Linear Sequential Model". Winston Royce introduced one of the generic models of software engineering around 1970, so it is often considered ancient. However, it is the most commonly used model in software engineering (SE). On the model of a systematic and sequential approach. It is called a waterfall because the stages that follow it must wait for the previous stages to finish before continuing. [8]

Stages in the waterfall model according to the pressman's reference, as in Figure 1 below.

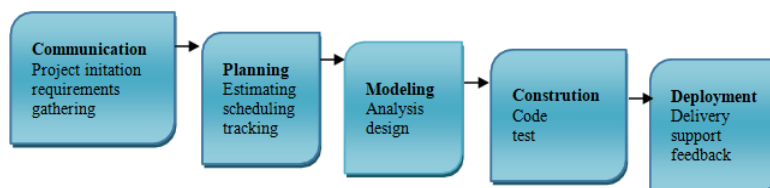


Figure 1. Waterfall Presman [9]

The following is an explanation of the Figure above regarding the stages carried out in the Waterfall Model according to Pressman [10]: (1) Communication, the first step is to communicate with customers or users. This stage includes an analysis of software requirements as well as data collection through meetings with customers and additional data gathered from journals, articles, and the internet. (2) Planning is a continuation of the communication process (need analysis). This stage will generate a user requirement document, or data relating to the user's wishes in developing software, including plans to be carried out. (3) Modeling is the process of translating requirements into a software design that can be estimated before coding. This procedure is concerned with the design of data structures, software architecture, interface

representation, and procedural details (algoritma). This stage will result in a document known as software requirements. (4) Construction is a code generation process. Coding is the process of translating a design into a computer-readable language. The transaction requested by the user will be translated by the programmer. This is a real stage in the development of software, which means that the use of computers will be maximized at this stage. After the coding is finished, it will be tested on the previously created system. Testing aims to find errors in the system so that it can be fixed. And (5) Deployment, this is the final stage in the development of software or a system. The finished system will be used by the user after it has been analyzed, designed, and coded. As a result, the software that has been created must be regularly maintained.

The researcher goes through several processes or stages during the research stage:

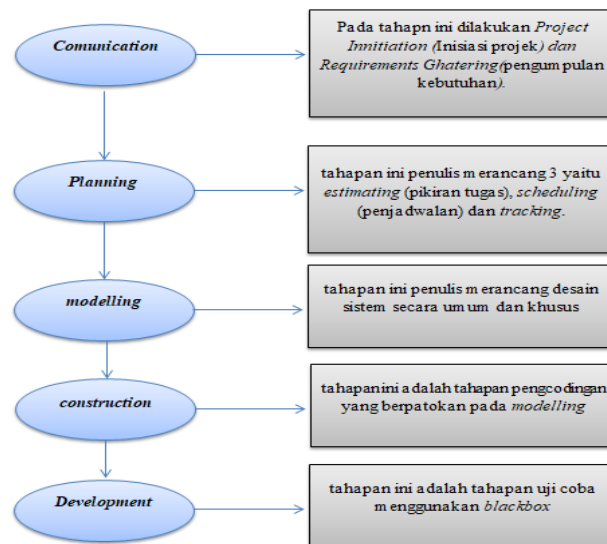


Figure 2. Research Stage Scheme

The product design that has been made cannot be used immediately but must be tested first. The goal of product testing is to determine whether or not the application is suitable for use. The authors conducted three product tests in this research: validity testing, practicality testing, and effectiveness testing.

2.1. Validity Test

Validity is a standard measure that indicates a product's accuracy. A validity test is performed to determine the level of product validity. A product is declared valid if the product functions properly. In this research, the researcher performed a validity test to determine whether the resulting product was of high quality and ready for testing. The validity test used in this study is based on the statistical formula of Aiken's V, which is as follows [11]:

$$V = \frac{\sum s}{[n(c-1)]} \text{ [Aiken's V] } \dots\dots(1)$$

Description:

V = Validity Test

$s = r - lo$

r = number given by rater

lo = the lowest validity research score

n = number of raters

C = the highest number of validity research

2.2. Practical Test

The practicality test is carried out after the validity test. The practicality test is useful for learning about the examiners' thoughts and assessments of the new student admissions information system, as well as product evidence from the practicum. According to the Big Indonesian Dictionary, practicality means

practical, meaning easy and convenient to use. The kappa moment formula is used to process the practicality test, as shown below [12]:

$$\kappa = \frac{\rho - \rho_e}{1 - \rho_e} \dots\dots(2)$$

K : moments kappa which show practicality product

P_o: The proportion that is realized, calculated by dividing the total value given by the examiner divided by the maximum number

P_e: The unrealized proportion, calculated by subtracting the maximum number of scores by the total number given by the examiner divided by the maximum number of scores

2.3. Effectiveness Test

Analysis of the effectiveness of designing a new student registration information system at SMPN 3 Kecamatan Payakumbuh, as evidenced by the evaluation of student questionnaires. The effectiveness test questionnaire results were analyzed using Richard R. Hake's statistical formula (G-Score), as shown below [12]:

$$\langle g \rangle = \frac{(\% \langle Sf \rangle - \% \langle Si \rangle)}{(100 - \% \langle Si \rangle)} \dots\dots(3)$$

Description :

<g> : G- Score

<Sf>: Final score

<Si>: Initial score

The test sheet's criteria for each indicator are as follows [7]:

"High-g" high effectiveness if it has $\langle g \rangle > 0,7$;

"Medium-g" moderate effectiveness if you have $0,7 > \langle g \rangle > 0,3$;

"Low-g" low effectiveness if it has $\langle g \rangle < 0,3$

3. Result and Discussion

3.1. Communication

There are two components at this stage: Project Initiation and Requirement Ghatering (needs gathering). At this point, the author describes the issue and evaluates the demands.

3.1.1. Project Innitiation

Admission of new student in SMPN 3 Kecamatan Payakumbuh is still doen manually, and school doesn't yet have a website where students may register online or access information. Information about the start of registration is distributed to prospective new students by word-of-mouth, brochures, and banners.

3.1.2. Requirements Ghatering

There are two users in this system, the first user in this system is the administrator, who is a teacher at SMPN 3 Kecamatan Payakumbuh and is responsible for overseeing the entire information system. To access the Student Information System admin section, an administrator needs a computer and an internet connection. A student information system user is someone who uses a student information system, such as prospective students or parents of students. The requirements needed are an internet network and a laptop. The author continue to suggest using a laptop because it has a better display than a smartphone and will ensure that data is not a concern.

System requirements are divided into 3: (1) Functional needs. Login is used as the user's entrance to access a more comprehensive ACON student information system. The Insert button is used to add data/information needed in the ACON student information system. The Update (edit) button is used to change the data/information needed in the ACON student information system. The Delete button is used to delete data/information that is not needed in the ACON student information system. (2) Non-Functional

Needs. The Acon Student Information System requires a variety of computers, laptops, and smartphones that can connect to an internet network as well as storage media and RAM that is at least 1 GB. As for software, in order for the Acon Student information system to run smoothly, any web browser software is needed, be it Google Chrome, Mozilla Firefox, UC browser, Opera Mini and so on, as well as PDF opening software such as Foxit Reader. necessary, if on a smartphone. WPS, PDF viewer drive [14]. The Upload button is used by users (prospective students) to upload important data during the online registration process. A print button that enables users to produce documents in the pdf format in both text and Figure form. The Register button is used as a button to save data/information to the student account information system database. The Search button is used to help users find the data/information needed in the ACON student information system. And (3) Human Resource Needs, We require personnel like: (a) Admin, admin is able to operate computers, laptops and smartphones properly and correctly. (b) User (student), able to operate a laptop, especially on website access, able to operate a smartphone properly and correctly, and understand how to use the Acon Student information system .

3.2. Planning

The planning stage consists of estimating (task thinking), scheduling (scheduling) and tracking.

3.3. Modeling

3.3.1. Use case diagram

At this point, the use case diagram acts as a functional system description. Presentation of interactions between actors and systems can be facilitated by it. Use case information about student actions is as follows [15]:



Figure 3. Use Case Diagram of Acon Student Information System

From the Figure 3 above, it can be seen that there are two actors, namely admin and user. There are 15 use cases, those are viewing PPDB info, registering, filling out and uploading forms, printing proof of registration, getting username and password, logging in, managing SI, managing data, managing files, determining graduation, doing CRUD, graduation info, printing graduation, view and change data. The description of the actor is as follows in Table 1.

Table 1. Actor

No	Actor	Description
1	Admin	Admin is a person who has duties and has access rights to carry out operations on the system.
2	User	The user is the person who has the task of registering to the system by following the steps that have been determined.

Table 2. Use Case Description

No	Use Case	Description
1	Viewing PPDB Info	Is a process where administrators and users can see PPDB information.
2	Register	Is the process for registering a user on the system.
3	Fill out and Upload Form	The user must complete a registration form and upload registration files to complete this process..
4	Print the Registration Proof	Is a process where users can print proof of registration in the form of PDF
5	Get Username and Password	Is a process whereby the user registers, receives a username and password, and prints a proof of registration.
6	Login	Is a process for the entry of admins and users to the system
7	Managing SI	Is the process of managing the information system by the admin.
8	Managing Data	Is the process of managing student data who have registered through the information system by the admin
9	Managing Files	Is a process where the admin checks the completeness of the registration file attached by the user
10	Determining Acceptance	Is a process where the admin determines whether the user passes or not after selecting the data and files
11	Doing CRUD	Is a process where the admin can create, Read, Update, and delete data.
12	Acceptance Information	Users can see information about their academic performance through this approach.
13	Print Acceptance	The process by which the user can print acceptance proof.
14	Viewing and Changing Data	The procedure by which system users can see and edit data.
15	Logout	Is a process to exit the system page.

3.3.2. Activity diagram

Activity diagram will describe all activities in the designed system. How the activity begins, the decisions that may occur, and how the activity ends. Below is an activity diagram of a constructive information system.

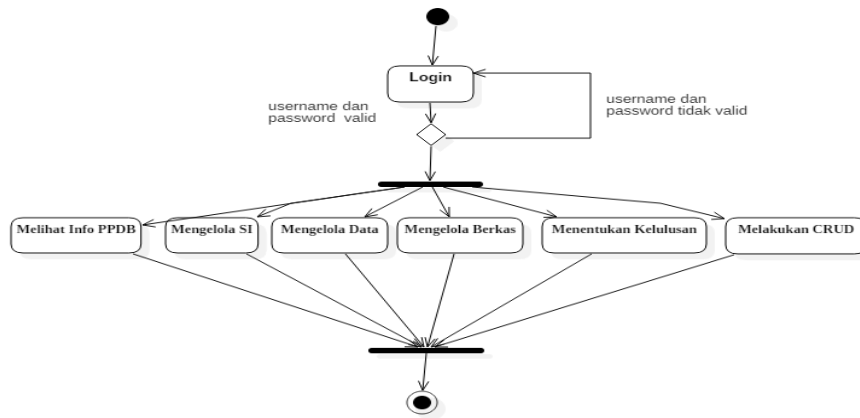


Figure 4. Activity Diagram of Administrator

On the basis of the picture above, it can be seen that the admin logs in using the username and password after logging in. The admin's tasks include viewing PPDB information, managing SI, managing data, and managing files, determining acceptance and doing CRUD.

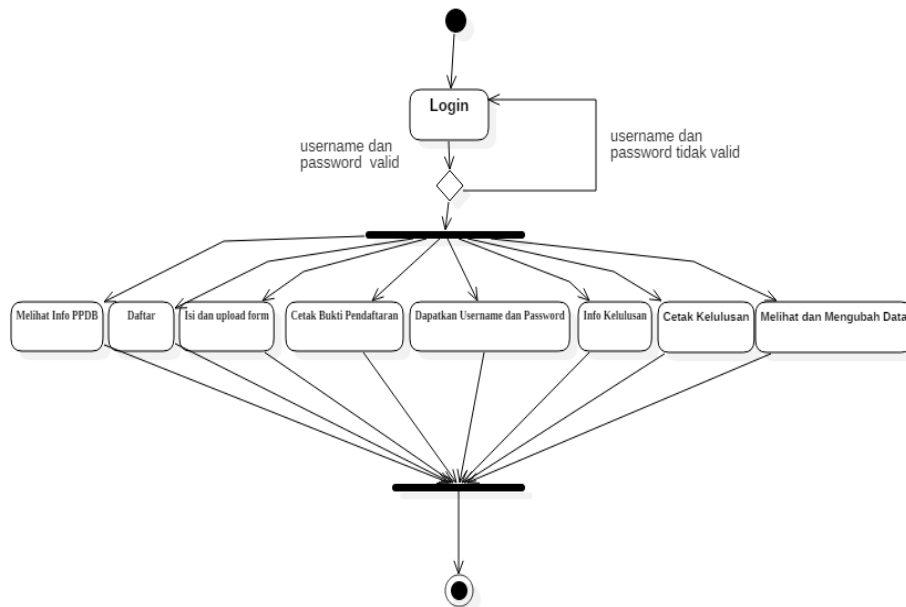


Figure 5. User Activity Diagram

3.3.3. Sequence diagram

Sequence Diagram is used to describe scenarios or sequences. Starting with what initiates the action, what internal processes and changes take place, and what results are produced. An illustration of the Acon student information system's flow may be found below.

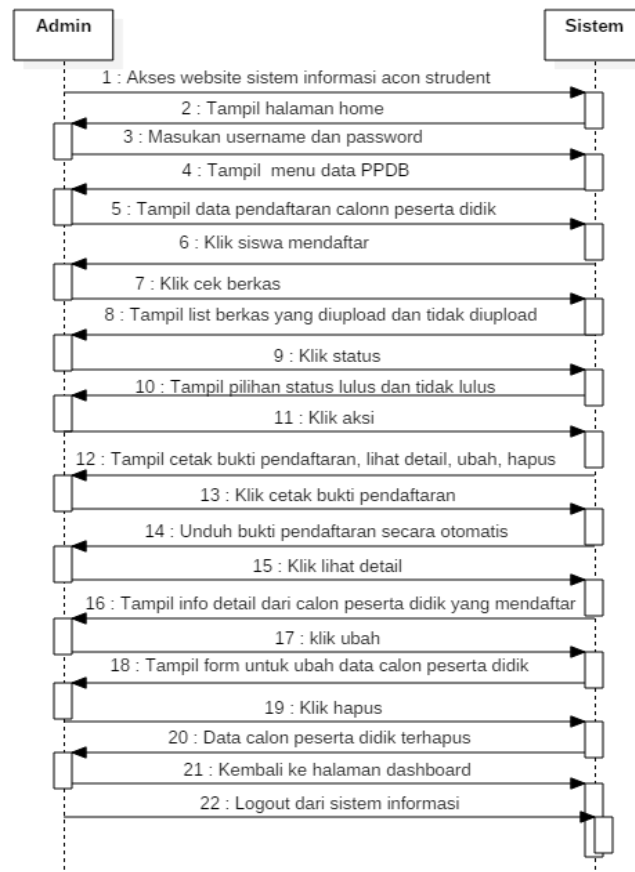


Figure 6. Sequence Diagram of Admin

Based on the diagram above, it is completely obvious that the admin's interaction with the system is accompanied by a reciprocal interaction by the admin on the system.

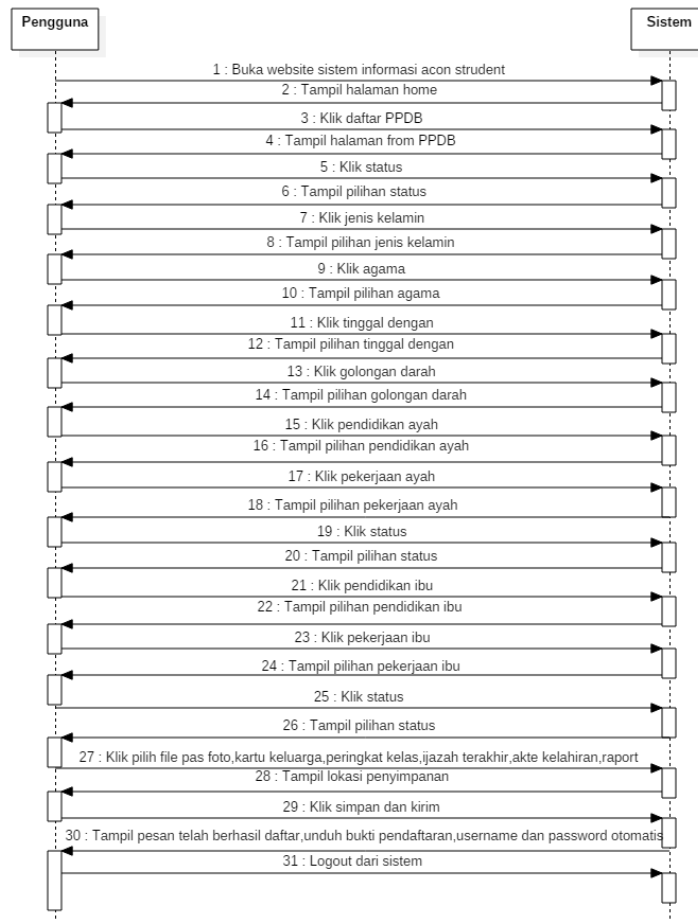


Figure 7. Sequence Diagram of User

The interaction between the user and the system used is depicted in the user sequence diagram above, as is the reciprocal interaction made by the system user.

3.3.4. Class diagram

The Figure below illustrates the system's attributes and actions. This system includes the classes account, student, registration, file upload, parents, and the previous school.

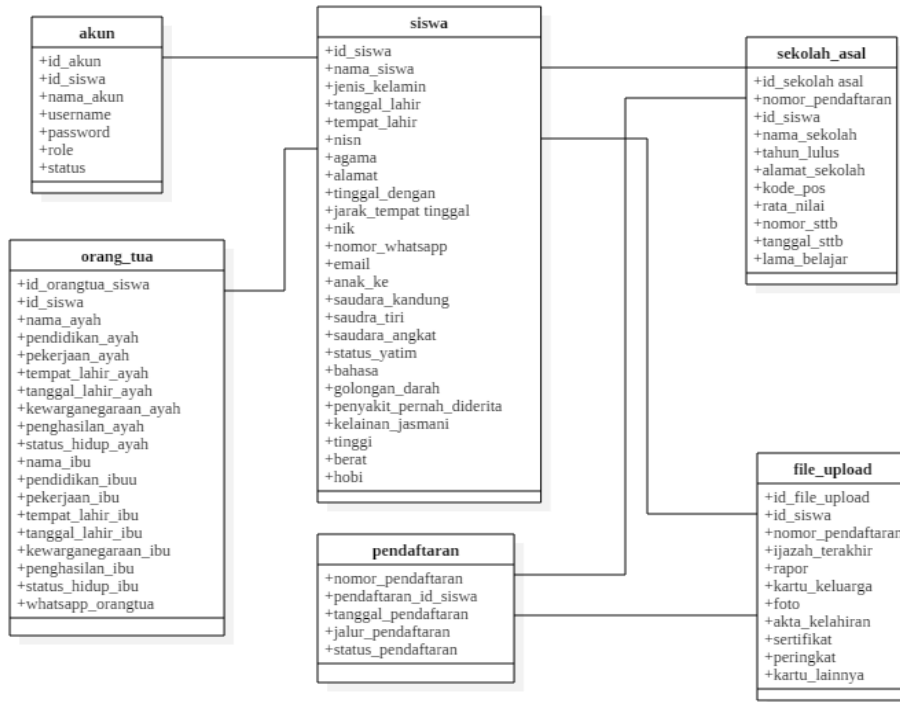


Figure 8. Class Diagram of Student Account

The class diagram in the figure above represents attributes and actions found in the application. This system includes the classes account, parent, student, registration, previous school, and file upload.

3.3.5. User interface

Output is the result of a process and can take the form of a report or a capacity based on information needs. Information systems can output data to output media such as printers with good instructions from a button.


UPTD SMPN 3 KEC. PAYAKUMBUH
 DATA PESERTA PPDB
 TAHUN AKADEMIK 2021/2022

Nama	No. Reg	Asai Sekolah	Status		Aksi
Z varchar (100)	Z Int (11)	Z varchar(100)	Z Varchar(50)	Z varchar (50)	Cetak Laporan

Tempat, dd-mm-yyyy
Panitia PPDB

(----->)


Figure 9. PPDB Participant Data Output Design


**UPTD SMPN 3 KEC. PAYAKUMBUH
 DATA PESERTA LULUS SLEKSI PPDB
 TAHUN AKADEMIK 2021/2022**

Nama	No. Reg	Asal Sekolah	Status	Aksi
varchar (100)	Int (11)	varchar (100)	Lulus	<input type="button" value="Cetak Laporan"/>
varchar (100)	Int (11)	varchar(100)	Varchar(50)	

Tempat, dd-mm-yyyy
Panitia PPDB

Figure 10. The Participant's Data Output Design Did Not Pass The Selection


**UPTD SMPN 3 KEC. PAYAKUMBUH
 DATA PESERTA TIDAK LULUS SLEKSI PPDB
 TAHUN AKADEMIK 2021/2022**

Nama	No. Reg	Asal Sekolah	Status	Aksi
varchar (100)	Int (11)	varchar (100)	Tidak Lulus	<input type="button" value="Cetak Laporan"/>
varchar (100)	Int (11)	varchar(100)	Varchar(50)	

Tempat, dd-mm-yyyy
Panitia PPDB

Figure 11. Student Data Display Design (Personal Data)

Informasi Kelulusan PPDB Tahun Akademik 2021/2022

Selamat!. Kamu lolos dalam tahap seleksi PPDB 2021 kali ini

Figure 12. Acceptance Info Display Design

Input Design such as the following:

Login ×

Figure 13. Login Display Design

FORM PENDAFTARAN PESERTA DIDIK BARU

KETERANGAN DATA CALON SISWA

Nama Lengkap	Jenis Kelami	Tempat Lahir
Tanggal lahir	Agama/ Varchr	Nagari/Kelurahan
NISN	NIK	Anak ke
Saudara Kandung	Saudara Tiri	Saudara Angkat
Status	Bahasa Sehari	

KETERANGAN TEMPAT TINGGAL CALON SISWA

Alamat Siswa	Whatsapp	Email	Tinggal dengan
Alamat Siswa			

Pendidikan Calon Siswa Sebelumnya

Sekolah Asal	Tahun Lulus	Rata Nilai Raport	
Alamat Sekolah	Kode Pos	Nomor STTB	Tanggal STTB
Lama Belajar			

KETERANGAN ORANG TUA

Nama Ayah	Tanggal Lahir Ayah	Status Ayah
Nama Ibu	Tanggal Lahir Ibu	Status Ibu
Pendidikan Ayah	Penghasilan Ayah	Whatsapp Orang Tus
Pendidikan Ibu	Penghasilan Ibu	

UPLOAD BERKAS

Pas Foto	Ijazah Terakhir	Rapor Kelas V VI
Kartu Keluarga	Akta Kelahiran	Sertifikat
Rangking Kelas V VI	KIP/KPS/KKS/PIKH	

Figure 14. Student Data Input Form Design

3.4. Construction

Coding admin such as the following.

```
Admin program
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
class Admin extends CI_Controller {
public function __construct()
{
parent::__construct();
$this->load->helper(array('form', 'url'));
$this->load->model(array('AutoNumber_model'));
$this->load->library(array('session', 'upload'));
}
}
```

Coding dashboard such as the following.

```
Dashboard program
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
class Dashboard extends CI_Controller {
public function __construct()
{
parent::__construct();
$this->load->helper(array('form', 'url'));
}
```

```
$this->load->model(array('AutoNumber_model'));
$this->load->library(array('session', 'upload'));
}
```

Coding home such as the following.

```
Home program
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
class Home extends CI_Controller {
function __construct(){
parent::__construct();
$this->load->helper('captcha');
$this->load->library('form_validation');
}
```

3.5. Deployment

Following the coding stage, the author performed an experiment to ensure that there were no errors, and the results were in accordance with the needs that had been determined. The author conducted the following test using blackbox testing.

Table 3. Results of Acon Student Website Testing Using Blackbox Testing

Cases and Test Results			
Input Data	Expected reaction	Observation	Conclusion
Main page menu	Main page accessible	Show main page	Succeed
Login Button	Displays the login page directly to the main admin page	Show page to dashboard	Succeed
Click the home menu	Display home page	Show home page	Succeed
Click the dashboard menu	Display dashboard page	Show dashboard page	Succeed
Click the student register menu	Displays the data of prospective students who register	Show data of prospective students who register	Succeed
Click the accepted student menu	Displays the data of prospective students who are accepted	Show the data of prospective students who are accepted	Succeed
Click the menu for students not accepted	Displaying the data of prospective students who were not accepted	Show data on prospective students who were not accepted	Succeed
Click the check file button	Displays files uploaded and not uploaded by prospective students	Show files that are uploaded and not uploaded by prospective students	Succeed
Click the status button	Displays the status of accepted and not accepted	Show the status of accepted and not accepted	Succeed
Click the action button	Display change, delete, print proof of registration and view details	Show change, delete, print proof of registration and view details	Succeed
Click the change button	Display the student data change form	Show the student data change form	Succeed
Click the delete button	Display delete student data	Show delete student data	Succeed
Click the print proof of registration button	Display a printed proof of registration	Show a printed proof of registration	Succeed

Click the view details button	Display complete data of prospective students	Show complete data of prospective students	Succeed
Click the PPDB menu	Display the PPDB registration form	Show the PPDB registration form	Succeed
Click the status button	Display status options	Show status options	Succeed
Click the gender button	Display gender selection	Show gender selection	Succeed
Click the religion button	Display religion options	Show religion options	Succeed
Click the living with button	Display living options with	Show living options with	Succeed
Click the blood type button	Display blood type options	Show blood type options	Succeed
Click the father's education button	Display father's last education choice	Show father's last education choice	Succeed
Click on father's job button	Display father's job options	Show father's job options	Succeed
Click the mother's education button	Display mother's last education choice	Show mother's last education choice	Succeed
Click on mther's job button	Display mother's job options	Show mother's job options	Succeed
Click the select photo file button	Display photo files	Show the location of the photo file storage that will be selected	Succeed
Click the select family card file button	Display family card file	Show the location of the family card file storage that will be selected	Succeed
Click the button select the last diploma file	Display the latest diploma file	Show the location of the last diploma file storage that will be selected	Succeed
Click the button select the birth certificate file	Show birth certificate file	Show the location where the birth certificate file will be saved	Succeed
Click the select KIP,KPS,KKS,PKH files button	Display KIP,KPS,KKS,PKH files	Show the location of the KIP, KPS, KKS, PKH files storage that will be selected	Succeed
Click the select report file button	Display report files	Show the location of the report file storage that will be selected	Succeed
Click the select certificate file button	Display certificate file	The location of the certificate file storage appears to be selected with the button	Succeed
Click the save and send button	Display registration result information and requests that proof of registration be printed.	Show registration result information and requests that proof of registration be printed.	Succeed
Logout Menu	Exit the information system, and the main page window appears.	Exit the information system, and the main page window appears.	Succeed

3.6. Product Test

The purpose of the validity test is to examine the product's content in order to determine the accuracy of the product's content. The product validity test is carried out by consulting and asking for an assessment from experts in the field of computer systems. The author obtained an average of 0.78 from the three validators in the validity test using the formula from Aiken's V statistics. This means that the system has been declared valid.

The practicality test was obtained from the results of research through a questionnaire on the design of the new student registration information system, implementation to determine whether or not the product made was simple to use. The practicality test was performed on three practicality testers, and the average practicality value in the kappa moment formulation was 0.97. As a result, the researchers' design of the New Student Registration Information System at SMPN 3 Kecamatan Payakumbuh was very practical.

The effectiveness of the design of the new student registration information system at SMPN 3 Kecamatan Payakumbuh was determined by locating a questionnaire filled out by students. After being calculated by referring to the formulation of Ricard R. Hake, the final value is 0.87. then the value of this system is high effectiveness.

Based on the product test results, the validity value of computer experts was 0.78 with valid criteria, the practicality test results from 3 teachers obtained an average result of 0.97 with a very practical category, and the effectiveness test results were 5 people. Students with an average score of 0.87 in the very high category. These findings indicate that the SMP Negeri 3 Kecamatan Payakumbuh Student Registration Information System, which utilizes R&D research with the SDLC (System Development Life Cycle) system development model, namely waterfall, can be used in new student admissions because it is valid, practical, and efficient.

This research is similar to and very relevant to the author's research, where in this study the PPDB committee teachers and students were greatly aided in terms of dissemination and acquisition of information, data required by schools, and data filled out by students, and reduce costs, both paper costs and the cost of attending school to obtain information.

4. Conclusion

Based on the results of research, it produces a product in the form of a New Student Registration Information System at SMP Negeri 3 Kecamatan Payakumbuh that is valid, practical, and effective. It can be accessed on the web URL <http://smpn3kecpyk-ppdb.epizy.com>. This system was developed using the PHP programming language, and was created using supporting software Visual Studio Code and Code Framework Igniter (CI), as well as a MySQL database.

This system is intended to make it easier for schools, particularly PPDB committee teachers, to deal with the issue of new student admissions. Furthermore, this information system can assist the PPDB committee and make the registration process easier for prospective new students.

According to the results of the product validity data test conducted on three lecturers of information technology experts, the system is valid with an average number of 0.78. A practicality test was also conducted on three teachers, and the product was found to be very practical with an average score of 0.97. The system had a very high effectiveness score with an average of 0.87 in the last test, which was performed on 5 students.

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