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Information System Design and Implementation Web Based New Student Admissions (PPDB) Using the Waterfall Method (Study Early Childhood Kindergarten Dharma Women's Case of Kebur Village)

Dina Precilia[1], Apriansyah[2], Karnadi[3], Dedi Haryanto[4]
[1,3,4]Department of Information Technology, University of Muhammadiyah Palembang, South Sumatra
[2]Information Technology Study Program, Faculty of Engineering

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ABSTRACT
Information technology continues to grow in response to societal needs, including the education sector which increasingly depends on digital systems. One of the essential processes in school administration is the Admission of New Students (PPDB), which serves as the first stage of school services to the public. At PAUD TK Dharma Wanita Kebur Village, the PPDB process is still conducted conventionally, requiring parents or guardians to come directly to the school, resulting in inefficiencies in time, effort, and data management. This study develops a web-based PPDB information system as a solution to improve the accuracy, speed, and convenience of the admission process. The Waterfall method is used in system development, consisting of sequential stages including requirements analysis, design, implementation, testing, and maintenance. Data collection was conducted through literature studies and analysis of existing registration procedures. The designed system includes features such as user login, online registration, prospective student data input, validation, and automated registration processing. The final result is a web-based PPDB system that is expected to make the student admission process more efficient, structured, and accessible for both schools and prospective students, while supporting better data management in educational institutions.

Corresponding authors:
Dina Precilia
Department of Information Technology
University of Muhammadiyah Palembang
South Sumatra, Indonesia
e-mail : dinaprecilia@gmail.com

1. Introduction

The development of technology is currently developing very rapidly over time so the need for fast and efficient information is mandatory. With the rapid development of technology, it is possible for a technological system to take part in a process. One of the most widely used forms of information technology for sharing information is *the website* which is a method to display information on the internet, either in the form of text, images, sounds, or interactive videos and has the advantage of linking one document with another document that can be accessed through a browser. New Student Admissions (PPDB) is one of the processes in educational institutions such as schools that are useful for screening prospective students who are selected according to the criteria determined by the school to become their students. In general, the

process of accepting new students is carried out through the stages of registration, selection tests, and student admission announcements. Because the admission of new students is carried out conventionally, the conventional PPDB system that has been implemented for many years has the characteristic of a face-to-face approach [1]. This process involves a series of manual stages, starting from taking forms, filling out data, verifying files, to announcing the selection results. Although the system has been proven to work, various obstacles such as long queues, file stacking, manual recording errors, and limited service time are still significant problems [2]. In addition, conventional systems also require more human resources and adequate physical storage space for document archiving [3]. So there is still a lot of data shortage, conventional data processing takes a long time so it is not efficient in data processing [4]. For this reason, an information system is needed that can help in the process of accepting new students and in terms of making reports to be fast and timely [5] On the other hand, the development of the online PPDB system is present as an alternative solution that promises higher efficiency. This system allows the registration process to be carried out digitally through a web-based platform that can be accessed anytime and anywhere.

This system is designed to implement automatic techniques in New Student Admissions (PPDB) which is carried out online and based on real-time (*realtime*), The computer-based PPDB information system helps manage and store prospective student data properly, as well as facilitate communication between educational institutions and prospective new students with the general goal of improving the quality of educational services, Creating an integrated, accurate, and transparent new student admission system, carrying out new student admissions more practically and efficiently.

2. Research Methods

2.1 System Development Methods

Information systems development is a complex and structured process that aims to design, build, and implement information systems that meet the specific needs of an organization. Information systems themselves are a combination of hardware, software, data, procedures, and human resources that work together to collect, store, manage, and distribute information that supports organizational decisions and operations.

Methods are the stages or rules for doing something. *System Development Life Cycle* (SDLC) is a logical process used by a system analyst to develop an information system that involves *requirements*, *validation*, *training*, and system owners. *System Development Life Cycle* (SDLC) is the process of creating and modifying systems as well as the models and methodologies used to develop these systems. SDLC is also a pattern for developing software systems which consists of the stages of planning, analysis, design, implementation, *testing*, and maintenance.

The system development method used in this study is the waterfall system development method. The waterfall model development method or often called the waterfall method is often called the *classic life cycle*, where it describes a systematic and sequential approach to software development, starting with the specification of user needs and then continuing through the stages of *planning*, *modeling*, and construction), as well as the delivery of the system to customers/users (*deployment*), which ends with support for the complete software produced.

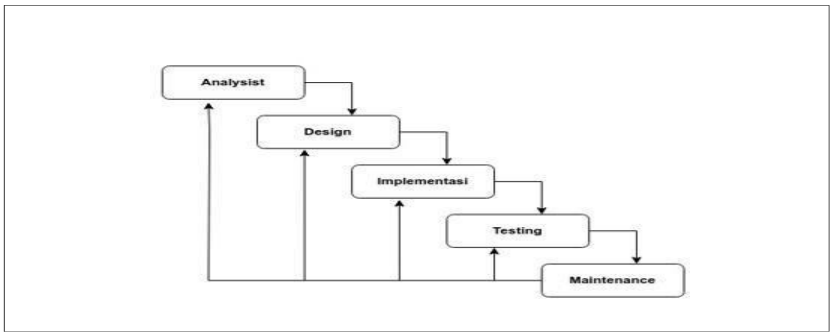

Figure 1. *Waterfall Method*

1. Analysis

The process of collecting needs is carried out intensively to specify the needs of the software so that the software can be understood as needed by the user. In this needs analysis, it aims to analyze the needs needed in the design both in the form of documents and other sources that can help in determining solutions to existing problems.

2. Design

Software design is a multi-step process that focuses on the design of software program creation including data structures, interface architectures and coding procedures. In addition, design is also a flow of a detailed software and algorithm.

3. Implementation

At this stage the design must be translated into the software program codes. The result of this stage is a computer program according to the design that has been designed in the previous design stage.

4. Testing

Testing focuses on the software in terms of logic and functionality to ensure that all parts have been tested. This is done to minimize errors and ensure that the output produced is in accordance with what is cooled. Program testing is carried out using BlacBox Testing in the hope that the design that has been made can run according to desire.

5. Maintenance

The last stage, the support or maintenance stage, can repeat the development process from specification analysis to changes to existing software, but not to create new software.

2.2 Data Collection Methods

In the discussion of the methodology of this research, there are several data collection techniques that will be discussed in this study, namely:

1. Observation is a data collection technique carried out by researchers directly observing the research area to closely observe the activities being carried out. Direct observation at the Early Childhood Kindergarten Dharma Wanita Kebur Village to find out the existing problems.
2. Literature Study is a data collection technique that is carried out by studying and collecting information from reference sources of books, journals and other sources that are directly related to the discussion of this research.
3. Interviews are a method of data collection that is carried out by asking individuals or groups directly to get their information, opinions, or experiences about a certain topic. Interviews are often used in various fields, such as research, journalism, psychology, and human resources. The author conducts an interview or question and answer method to parties related to the process of midwife's independent practice service to obtain data.

2.3 Research Time and Place

This research was carried out for 4 months from September to December 2024 and the location of this research will be carried out at Dharma Wanita Kindergarten in Kebur Village, West Merapi District, Lahat Regency, South Sumatra Province.

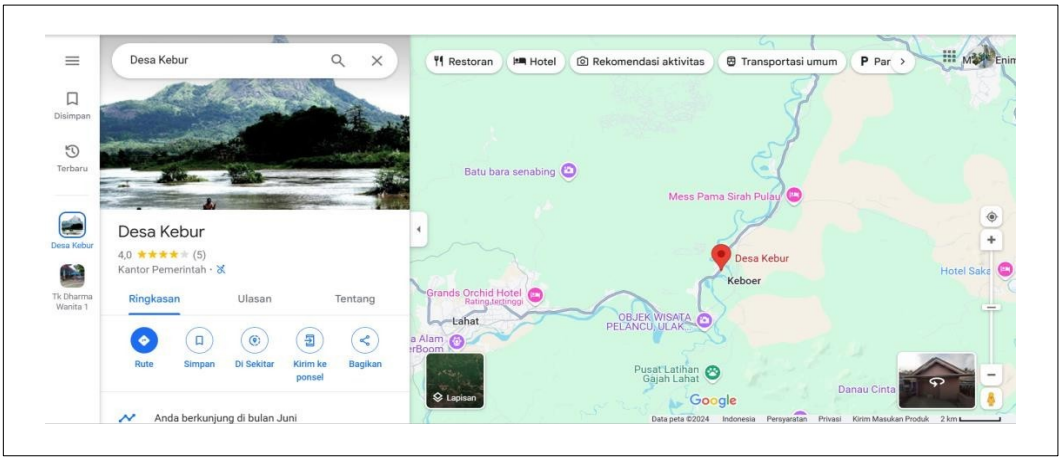

Figure 2. Research Place

3. Results and Discussion

This research succeeded in producing a website for the Registration of New Students (PPDB) of Early Childhood Kindergarten Dharma Wanita Desa Kebur, using the waterfall method, the process starts from the design and user with a simple and elegant appearance according to the needs of the user, this design includes the main features such as the registration of new students.

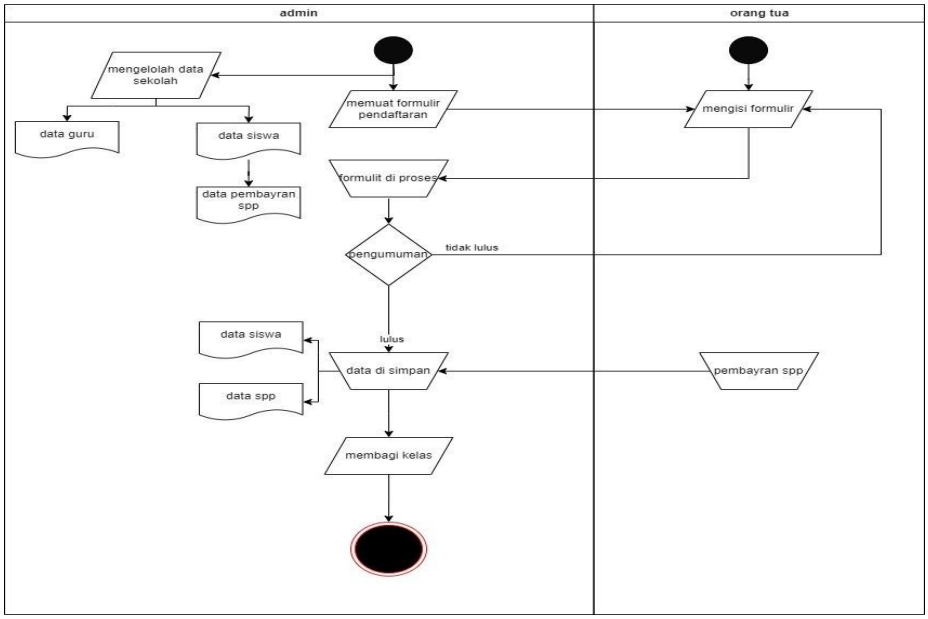

Figure 3 Running System

The picture above explains the process of Registration of New Students (PPDB) in a conventional manner where the process is carried out, namely parents come directly to the Dharma Wanita Kindergarten in Kebur Village. Parents fill out the registration form and complete the requirements, the forms that have been filled out and the requirements are collected and submitted to the school. The admin receives the registration form and checks the completeness of the data. Student data is conventionally recorded in a book or spreadsheet, which increases the risk of error. The selection process is carried out based on the specified criteria, the selection results are announced orally or through an announcement board. Accepted student data is stored in physical files, which are susceptible to loss or damage. Tuition payments are also recorded conventionally, which can lead to errors in the recording. After the selection results, the admin divides the students into classes conventionally, which takes time and effort.

An overview of the running system is:

1. Overview of the New Student Registration System (PPDB) for Early Childhood Kindergarten Dharma Perempuan.
2. There are 2 actors who carry out activities in the system, including Admins and Parents.
3. Data processing can only be done by admins.
4. Transactions can only be made in person.

3.1 System Planning

System design is a design process to design a system or improve an existing system so that the system becomes better and can do the job effectively and efficiently description of the system. In the design of this website, Unified *Modeling Language* (UML) is used. UML is a visual language for modeling and communicating about sostems using diagrams and supporting texts.

Use case diagram In the system design that the author made, there are 2 actors who can access the system determined by the account level, including:

1. Admin

Admins have access to Login, Manage Master Data (News, Gallery, Period, Profile, Requirements, Teacher, and Student) and Manage Reports (Teacher Data, Registrant Data, and Student Data).

2. Parents/Guardians

Parents/Guardians have access to Login, View Menu (Profile, Gallery, News, Registration, Registered Candidate Data, Announcements, Learner Requirements) and Make Registration.

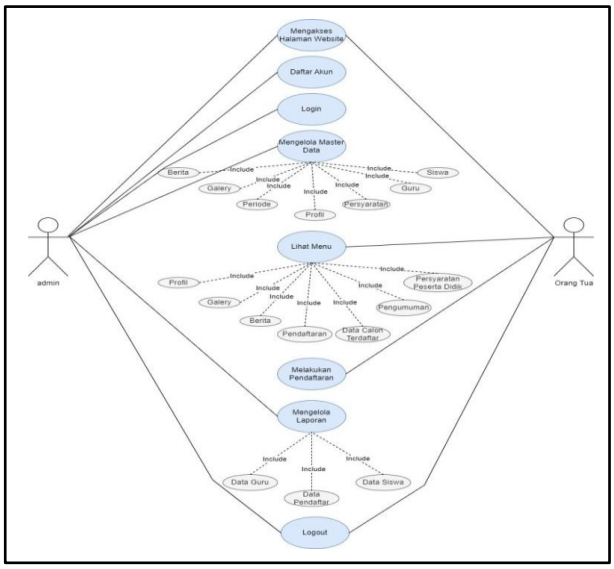

Figure 4 *Use Case Diagram*

4. Website Design Results

At this stage, the implementation of the website design system for New Student Registration (PPDB) of Early Childhood Kindergarten Dharma Wanita Kebur Village was explained. The system built will help the school in registering new students.

4.1 Admin Login Page

Figure 5 Admin Login Page

4.2 Home User Admin Page

This page is the main page of the Website.

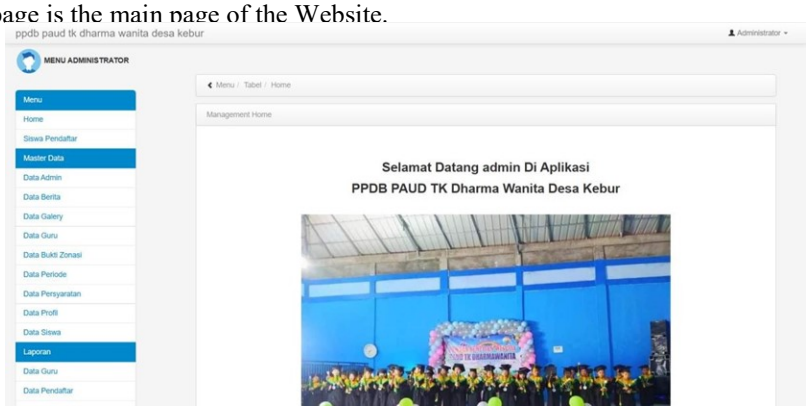

Figure 6 Home Page.

4.3 Black Box Test Results

Before this application can be used, testing must be carried out first. Some testing was done by the author himself. The testing of the new student registration website was carried out using the black box testing approach. Testing is required as one of the stages of implementation to test the minimum level of error and accuracy of the designed software. The test was carried out using the black box testing method. Black box testing is a test that allows software engineers to obtain a set of input conditions that fully utilize all the functional requirements for a program.

Table 1 *Black Box Testing*

No	Description of Testing	Testing Procedure	Input	Outputs that Expected	Results Obtained	Kesimp Rain
1	Registration Page n	Access the registration page n	References Registration Page N	Registration page appears	The registration page n appears with true	Appropriate
2	Prospective Student Data Input	Fill out the registration form n	Name, date of birth, and photo	Data saved successfully	Saved data and confirmation appear	Appropriate
3	Input Validation	Invalid data content	Blank name	Error message appears	An error message appears "please fill out"	Appropriate
4	Process Registration n	Click "Register" button	Valid data in the form	Confirmation Registration Successful	Confirmation i managed to appear	Appropriate
5	Login Page	Page access Login	References Login page	Appear page Login	Login page Appear correctly	Appropriate
6	Logout	Click the login button	-	Back to main page	Back to page main	Appropriate

5. Conclusion

Based on the discussion that has been described in the previous chapters, the conclusion that can be drawn from this study is that the Web-Based New Student Admission Information System at PAUD Dharma Wanita Kindergarten Kebur Village is able to make it easier for parents / guardians to register prospective new students anywhere as long as they are connected to the internet and accessed according to a predetermined schedule. The menus in this system are made to make it easier for parents / guardians of new students to register. The school will not bother in entering data for prospective new students so that it is more efficient, saves time, saves operational costs, saves paper use and is fast in making announcements of selection results.

6. Suggestion

The New Student Admission Information System is still not perfect, there are still many things that can be done to develop this system to be even better, including the following:

1. Web-Based New Student Admission Information System (PPDB) built only for Early Childhood Kindergarten DHarma Wanita Kebur Village. Maybe in the future it will be developed to handle the Admission of New Students in one district.
2. Further development that can be done in this study is the addition of a menu for class division based on the age limit that has been set between Early Childhood and Kindergarten, the creation of abscesses based on class division and the division of homeroom teachers in each class.

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