

Implementation of the Waterfall Model for the Development of the Independent and Pinunjul Posyandu Application (Si Ayu Maju) in Kuningan Regency

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Abstract. Posyandu is one of the health services, the development of infants and toddlers is very important to continue to be monitored. Monitoring the growth and development of infants and toddlers is carried out through monthly services at the posyandu. Posyandu in the city of Kuningan, precisely in the village of Gandasoli, all Posyandu activities still use the manual system. The manual system in question is that in posyandu service activities, posyandu officers record the presence of infants and toddlers, record data, and record infant and toddler weight in the form of paper records. As a result of the manual system, the work of posyandu officers is very slow, and the risk of posyandu data will be lost or data redundancy will occur so that the resulting data is less accurate and takes a long time to search for data. Software Engineering Process (Software Process) is a statistic that has the objective of developing or modifying software [1]. Process Engineering is a solution in solving work process problems by utilizing advances in technology and information. An effective and efficient selection system development method is needed in the engineering process, so that user needs can be immediately met. The waterfall method is a method of working in sequential and systematic phases [2]. This method was chosen because it has an ordered process, so that work can be scheduled properly and easily. and is very suitable for system development with low complexity (predictability).

Keywords: Waterfall Model; Posyandu Application; Toddler

1 Introduction

Information systems as part of the development of information technology are needed to help organizational performance. Organizing information that is carried out regularly, clearly, precisely, and quickly and can be presented in a report, of course, greatly supports the smooth operation of the organization's operations and makes the right decisions.

Posyandu is one of the health services, the development of infants and toddlers is very important to continue to be monitored. Monitoring the growth and development of infants and toddlers is carried out through monthly services at the posyandu, posyandu cadres will record the results of weighing children at the posyandu, children's height, immunizations that babies and toddlers have received and what services babies and toddlers have received.

Posyandu in the city of Kuningan, precisely in the village of Gandasoli, all Posyandu activities still use the manual system. The manual system in question is that in posyandu service activities, posyandu officers record the presence of infants and toddlers, record data, and record infant and toddler weight in the form of paper records.

The result of a manual system greatly slows down the work of posyandu officers, and the risk of posyandu data being lost or data redundancy occurs so that the resulting data is less accurate and takes a long time to search for data.

Software Engineering Process (Software Process) is a set of activities that have the aim of developing or changing software [1]. Process Engineering is a solution in solving work process problems by utilizing advances in technology and information. It is necessary to select an effective and efficient system development method in the engineering process, so that user needs can be met immediately. The waterfall method is a work method that emphasizes sequential and systematic phases [2]. Another reference states that the Waterfall Model or so-called classic Life Cycle is a classical model that is systematic, sequential in building software. At this stage, project initiation will be carried out, such as analyzing existing problems and the objectives to be achieved. [3]

The application of the waterfall model in the independent and pinunjul posyandu application engineering is due to the sequential and systematic engineering process, so that at the time of development it can be adjusted based on user needs.

2 Methodology

2.1. Software Engineering Process

Software Engineering Process (Software Process) is a set of activities that have the aim of developing or changing software. [1]

The software engineering process is carried out during software development, starting from analysis, planning, implementation and testing. The development process can be done repeatedly, until the software meets the needs of the customer or user.

The stages of good software engineering are indispensable in building software that meets user needs.

In general, the software process consists of:

1. Specific Collection (Spesification)
Knowing what a software system should and can do and the limitations of software development.
2. Development (Development)
Software development to produce software systems.
3. Validation
Checking whether the software meets the customer's wishes (customer)
4. Evolution
Change the software to meet changing customer needs (customer) platform upgrade.

2.2. System Analysis and Design

System Analysis is to define the requirements related to the system to be developed. The final stage/output of the system design analysis is a document that describes the information system requirements specification or SRS (Software Requeriment Specification). The analysis

stage is carried out before the system design process, where the system design process is a system design process using a structured approach or an object-oriented approach.

The system analysis process is an activity to look at the system that is already running, see the weaknesses and strengths of the system and then document the needs that will be met/proposed in the new system.

2.3. Data Collection Techniques

Data collection techniques are defined as procedures for collecting, measuring, and analyzing accurate insights for research using standard validated techniques.

Data collection techniques in system analysis can be done in various ways including:

1. Interview Techniques

Interview is a technique of analyzing data which is done by asking questions directly to respondents or sources. In the interview, there is an instrument, namely a description of the research which is presented in the form of a list of questions.

2. Observation Techniques

Observation is a data technique that is carried out in a way that you want to research or through experiments (experiments). The method of observation is usually in the form of observations in the form of an instrument checklist. Observation is widely used in qualitative research methods.

3. Questionnaire Technique

Questionnaire is a data collection technique that is done by giving a set of written questions to respondents.

2.4. Waterfall Model

According to Rosa and Salahuddin (2015: 28) the waterfall SDLC model is often also called a linear sequential model or classical life cycle. The waterfall model provides a sequential or sequential software life flow approach starting from the analysis, design, coding, testing, and support stages. [4] Here is a picture of the waterfall model:

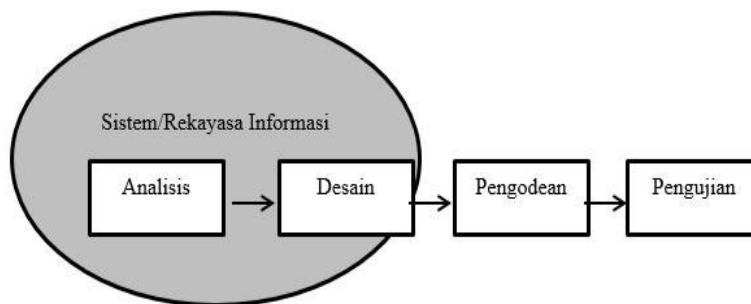


Figure 1. Waterfall Model According to Rosa and Salahuddin (2015:28)

1. Analysis

The process of gathering requirements is carried out intensively to specify software requirements so that users can understand what kind of software is needed by the user.

2. Design

Software design is a multi-step process that focuses on the design of a software program including data structures, software architecture, interface representations, and coding procedures. This stage translates software requirements from the requirements analysis stage to a design representation so that it can be implemented into a program at a later stage.

3. Coding

The design must be translated into a software program. The result of this stage is a computer program in accordance with the design that has been made at the design stage.

4. Testing

Testing focuses on the software logically and functionally and ensures that all parts have been tested. This is done to minimize errors and ensure that the output produced is as desired

Advantages and Disadvantages of the Waterfall Model :

a. **Excess**

1. Has a sequential process, from analysis to support
2. Each process has its own specifications, so that a system can be developed according to what is desired (right on target)
3. Each process cannot overlap each other.

b. **Weakness**

1. The process carried out tends to be long and also long.
2. The cost of using the method tends to be expensive.
3. Requires a lot of research and also supporting research to develop a system using the waterfall method.

3 Result and Discussion

3.1. Waterfall Model Implementation

This study applies the waterfall model as software engineering for the development of the Mandiri Posyandu and Pinunjul (Si Ayu Maju) Applications in Kuningan Regency. The results of the application of the waterfall model According to Rosa and Salahuddin (2015: 28) described by the system design model are as follows:

1. **Analysis Stage**

In this stage, analyze and identify user needs in developing the Mandiri and Pinunjul Posyandu application systems which are divided into two parts, namely data requirements and tool requirements to be used.

Data requirements are adjusted to the information needs to be displayed, namely the system must be able to display data :

- a. Maternal health records
- b. Child Immunization Data
- c. Child's Kms Data
- d. Family planning data
- e. Posyandu activity report.

From this data, it is developed and used as a form in the system.

2. **Desain Stage**

- a. Modeling stages

Data modeling in this study uses Data Flow Diagrams (DFD) to describe user interactions with the system and process flow as shown in Figure 2 below..

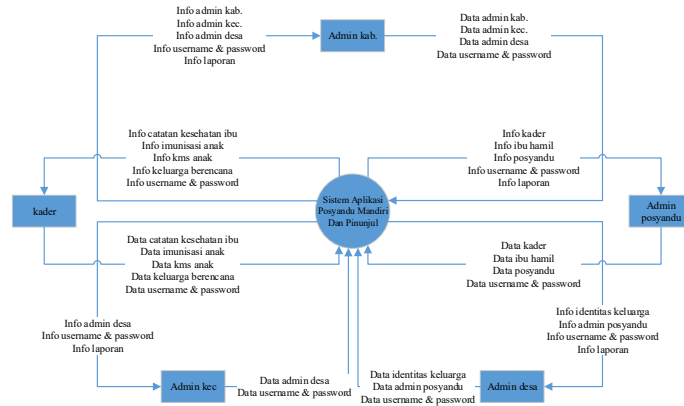


Figure 2. Context Diagram

Figure 2 is a context diagram proposed by the researcher, and explains that there are 5 users who can access the system, each user has its own function, namely:

- 1) District Admin: Functions to add district admins, sub-district admins, village admins and view monthly and annual reports.
- 2) District Admin: Serves to add village admins and can also view reports.
- 3) Village Admin: Serves to add master data for activities such as data on family heads and family members, village admins can also add posyandu admins and can view reports on posyandu activities in the village.
- 4) Posyandu Admin: Serves to add master data for pregnant women at the posyandu, complete the posyandu profile, add posyandu cadres and can view reports on activities at the posyandu.
- 5) Cadre: Serves to record every activity that has been carried out at the posyandu such as health records for pregnant women, child immunizations, child KMS, and family planning.

The interaction between the user and the independent posyandu and pinujjul application systems can be seen in Figure 3. How the user interacts and the information obtained from the system. Users are divided into 2, namely users from the center (District Admins, District Admins, Village Admins) and users from posyandu (Posyandu Admins, cadres). Users from the center can add users, view reports on posyandu activities and add master data for family heads and family members in each village. Meanwhile, third-party users can collect data on pregnant women per posyandu, complete posyandu profiles, collect data on cadres and record posyandu activities..

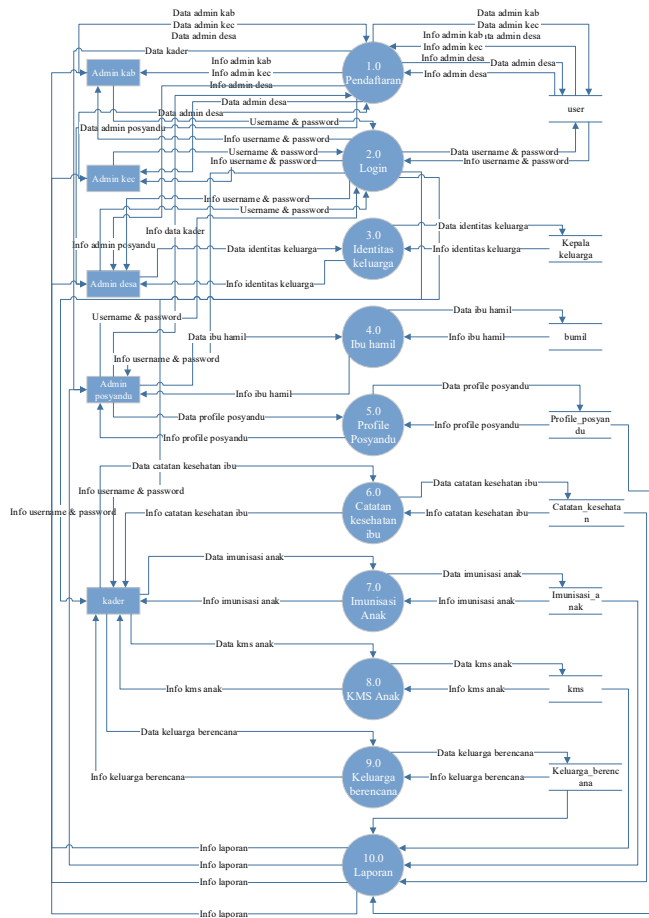


Figure 3. Data Flow Diagram of Posyandu and Pinunjul Application Systems

b. Interface Design Stages

In the design section of this system, the author divides the design into several parts which will be described as follows::

1) Login Form

This login form is used by the central admin, and posyandu users. In other words, this form is used to determine the priority of the user based on the priority of the entered user identity. The results of this form will also be used to determine access rights.

2) Registration Form

This registration form is used by the central admin. This form is used to register users with lower levels, such as, district admins registering sub-district admins and village admins, sub-district admins can register village admins, and village admins can register posyandu admins.

3) Data Input / Data Collection Form

This form can be seen and used by central admin users, but not all central admins can use this form, this form is only used by village admins for data collection of family heads and family members or Master Data. Not just anyone can enter data so that the truth of the data and data security can be maintained.

The screenshot shows the 'Catatan Kesehatan Ibu Hamil' (Pregnant Women's Health Record) form in the Posyandu system. The form is titled 'Desa Tugumulya' and includes the following fields and options:

- Nama Lengkap:** 8795462384723842 -- Siti
- Keluhan:** Keluhan
- Usia Kehamilan:** Usia Kehamilan (Minggu)
- Berat Badan:** Berat Badan (kg)
- Tekanan Darah:** / mmHg
- Lingkar Lengan Atas:** Lingkar Lengan Atas (cm)
- Tinggi Fundus:** Tinggi Fundus (cm)
- Letak Janin:** -- Pilih Letak Janin --
- Detak Jantung Janin:** Detak Jantung (bpm)
- Imunisasi:** -- Pilih Imunisasi --
- Tablet Tambah Darah:** Ya Tidak
- Lab:** Laboratorium
- Analisa:** Analisa
- Tata Laksana:** Tata Laksana
- Konseling:** Ya Tidak
- Apakah Data Sudah Benar?:**

Buttons for 'Simpan' (Save) and 'Kembali' (Back) are visible at the bottom right. The footer contains the text: 'Copyright © 2021 Sistem Informasi Posyandu. All Rights Reserved.'

Figure 4. Data Input / Data Collection Form

4) Report

This form is used to print data on posyandu activities in Kuningan district, each central admin level has its own print category, such as district admins can print for district, sub-district, and village levels, but for admin levels such as district admins, and village admins can only print print based on the category level, namely for sub-districts it can only print posyandu activities at the sub-district level, and the same for villages can only print reports on activities in that village.

3. Coding Stages

At this stage, the design must be translated into a software program. The result of this stage is a computer program in accordance with the design that has been made at the design stage. The tool requirements are the requirements used in the system creation process consisting of the need for design tools, Programming Languages, Databases and Reporting tools.

4. Testing Stages

Testing focused on software in this study was tested in terms of logical and functional and ensured that all parts have been tested. This is done to minimize errors and ensure that the output produced is as desired.

Researchers conducted testing by directly testing the system that had been built into the object of research so that the deficiencies in the system built could be immediately noted and carried out the repair process in accordance with the waterfall model applied in this study.

4 Conclusion

Based on the field research that the author did, the author in general can conclude the following:

1. User needs in implementing the waterfall model for developing independent and pinunjul posyandu applications such as posyandu data processing, inputting data for pregnant women, family identity data and so on can be analyzed from the beginning with data collection techniques by observation and interviews.
2. The design stages in the waterfall model in this study, are described by the D-Context and DFD models to facilitate the next stage, namely the coding stage.
3. Testing the system with the waterfall model in this study was carried out directly to the object of research and users, to find out firsthand the suitability of system development with user needs.

References

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