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Medical Record Information System with Rapid Application Development (RAD) Method

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ABSTRACT

Computer technology that is increasingly developing has created a situation that demands everything to be computerized. Science from technology has also changed the way of life of most Indonesians. The presence of information and communication technology affects the technology applied in information systems, especially the input and output mechanisms. One of them is at the Clinic which requires computer technology in its operations. The design of this website also uses 3 stages of Rapid Application Development (RAD) system design, the result of which is a website for a medical record information system. In order for clinical activities to run smoothly at the Clinic, an information system using the Rapid Application Development (RAD) method is needed because the software development process model is classified as an incremental technique and emphasizes short, short, and fast development cycles. Blackbox and UAT testing is done for system testing.

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1. INTRODUCTION

Computer technology that is increasingly developing has created a situation that demands everything to be computerized. Science from technology has also changed the way of life of most Indonesians. The presence of information and communication technology affects the technology applied in information systems, especially the input and output mechanisms[1][2]. The clinic is engaged in community services in the health sector. The complexity of a health service lies in the clinic because it has various services for the community.

Medical records are a source of information as well as a means of communication between patients and health care providers [3]. The information system for recording medical activities is a series of examination data information which includes recording the patient's identity, examination of disease, and actions taken by doctors. Through recording medical records, it can make it easier for doctors to determine follow-up actions for services to patients or further medical actions [4].

According to previous research, it is stated that the Rapid Application Development (RAD) method can be carried out on a teaching and learning scheduling system[5][6] and the RAD model has been applied in the design of multimedia learning media[7]. In addition, RAD research was also carried out on library information systems [8][9][10]. Previous research builds and manages clinical information systems and makes it easier for admins and doctors to manage existing data. Website design using RAD for Medical Record Information System.

The Rapid Application Development or RAD method is an effective method in software development [11], this is because in software development there is no need to design from scratch [12][13]. The Rapid Application Development (RAD) method is used because the stages are structured [14], system development is faster and occurs in short cycles [15], the developed software

can be seen without waiting a long time because the process is divided into modules and can be applied to small-scale system.[16][17].

2. RESEARCH METHOD

2.1. Research Framework

It is an activity step in conducting research [18]. Each stage is a part that determines the next stage and is interrelated with one another. This stage is carried out so as not to deviate from the main discussion of the research.

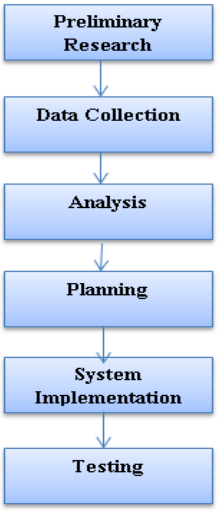


Figure 1. Research Framework

2.2. Description of Research Framework

2.2.1. Previous Research

It is the first step to carry out a research. This step is done by first analyzing the problem to be developed where the aim is to determine the problem that is currently happening [19]. It is hoped that this research can produce the most optimal problem solving.

The problem identified is regarding the strategy of selling computer equipment at the Mitra Sandona Clinic which is still done traditionally. So with this situation there are several shortcomings and limitations faced in the transaction process in a wider area. Therefore, it is necessary to apply a clinical application based on a computer network and a web as a solution to the problems that occur.

2.2.2. Study Literatur

In this case, the author conducted a literature study, the point of which is that problem solving does not go out of the way of research and can be justified in theory [20]. At this stage, the search for theoretical foundations was carried out from various journals and sources from various articles. After obtaining journals and other sources, they will be used to complete concepts and broaden theoretical understanding, so that they have a good and appropriate scientific foundation.

2.3 System Definition

The system is a set of elements that integrate with each other to achieve a certain goal where the system is also a structured work network in carrying out activities [21][22].

2.4 System Development Life Cycle (SDLC)

SDLC is used to build a system so that it can run as expected. SDLC has several steps, namely planning, analysis, design, implementation, testing and maintenance [23][24].

2.5 Rapid Application Development (RAD)

RAD is a system process model that emphasizes short processes. RAD is a short adaptation that adapts to the waterfall model with a system component approach. The development of a medical record information system using the Rapid Application Development (RAD) development model can be seen in Figure 2 [25][26].

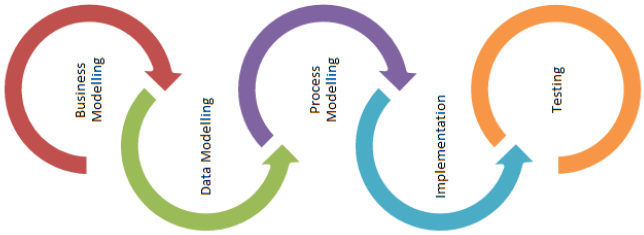


Figure 2. Stages of RAD

a. Business Model
This stage looks for activities that will be carried out by the system regarding who will use the system and how the business process flows in the medical record system.
b. *Data Modeling*
Activities carry out data collection of data objects needed in business model activities.
c. *Process Modelling*
Activity description of system processes that will be made starting from changing, adding, deleting data. In this modeling process, UML design is carried out.
d. *Implementation*
This stage is the process of executing the model that has been designed using a programming language.
e. *Testing*
This stage is the testing step of the system.

3. RESULTS AND DISCUSSION

Produce a medical record information system application that serves to facilitate the recording of the patient examination process on a regular basis. This makes it easier for doctors to perform and provide further action to patients.

3.1 *Business Modelling*

In general, the description of the business modeling systemcan be described in Figure 3.

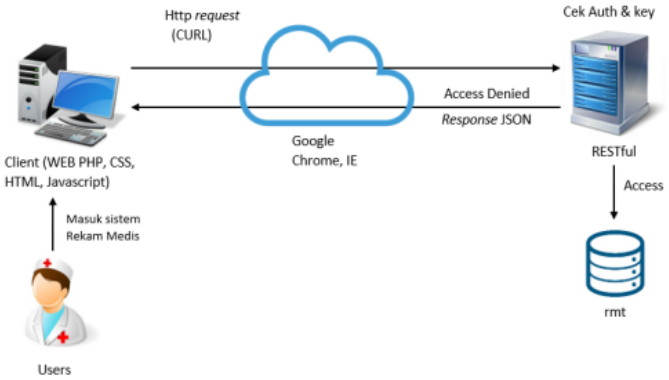


Figure 3. System Structure

The system structure is the design of the system work that can be done through the main computer connected to the internet and the data is processed using a database

3.2 *Data Modelling* (Elicitation of Needs)

Activities to explore system requirements through interaction with users. Table 1. The following is the result of the data required by the system from the medical record officer:

Tabel 1. User Needs Analysis

Functional	
No	Needs Analysis
1	Home (Masuk)
2	Medical Registration
3	Medical Records
4	Data Entry

3.3 *Process Modelling*

In the process modeling stage, the system design is described in doing the modeling. The system design uses the Unified Modeling Language (UML) tool. Is a language used to visualize in order to design a software. UML uses diagrams for visual systems to be built.

a. *Use Case Diagram*

A use case can describe the relationship between the use case and the actor. The following is a use case diagram of a computer network-based clinical information system, which can be seen in Figure 4:

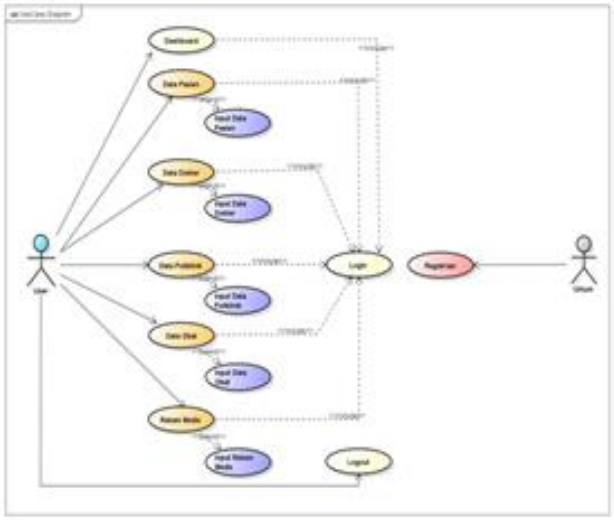


Figure 4. Use Case Diagram

b. *Class Diagram*

Class diagrams describe the types of objects in the system that are connected to one another. Class diagrams have class names, attributes, and operations. The following is a class diagram of a clinical information system in Figure 5.

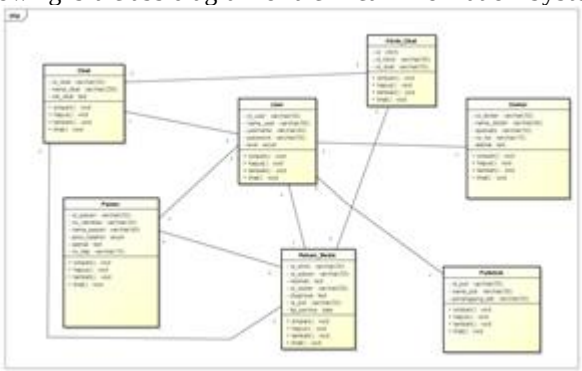


Figure 5. Class Diagram

3.4 *Implementation*

Implementation is a process of ensuring the system works properly in accordance with the appropriate policies.

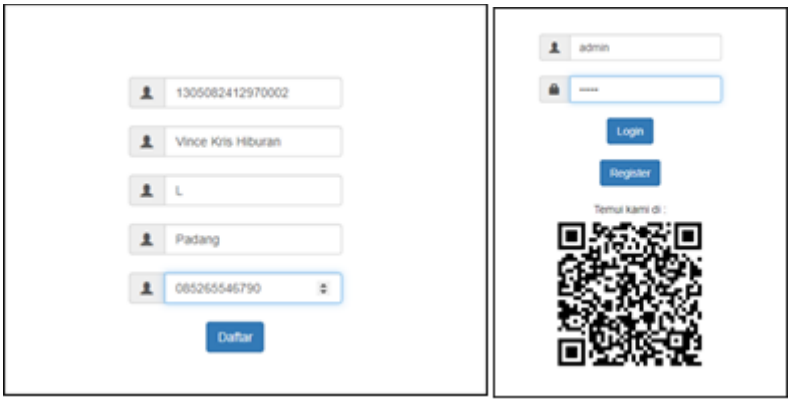
a. Homepage View

The start page or homepage of the clinical medical record information system is shown in the image below

Gambar 6. Tampilan Home

b. Display of Registration and Login Form

The list form display is a form display that will be used by the public to process the list become a patient in the clinic. The list display form can be seen below:



Gambar 7. Halaman Daftar dan Login

c. Medical Record Information Display

Is a menu that can be managed by the admin. So, with this menu the admin can manage medical record data. The activities carried out by the admin can be seen in the image below:

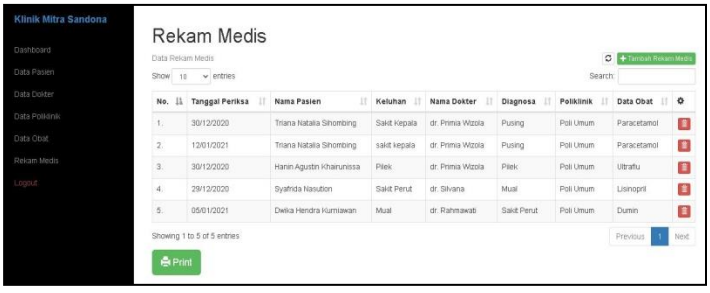


Figure 8. Medical Record Data Page

3.5 Testing Stage

Blackbox Testing is the system test phase of the manual component structure. UAT testing on the level of conformity and reliability as a system requirement to be accepted by users.

The results of the Blackbox test and UAT testing are shown in the table below:

Table 2. Blackbox Testing

No	Test Type	Expected Result	Result Test
1.	Add Registration Data	Add Patient Registration Data	✓

2.	Add Medical Records Data	Add Medical Record Data	✓
3.	Add Doctor	Add Doctor Data	✓
4.	Add Admin	Add Admind Data	✓
5.	Print Medical Record Report	Print Medical Record Report	✓

Table 4. User Acceptance Test Results

No	Test Description	Test Procedure	Expected output	Results Obtained	Test Result Accepted
1.	Medical Record Data	1. Press Menu Medical Record 2. Press the Add Medical Record button 3. Enter the date of inspection 4. Enter Patient Code 5. Click Check Medical Record Data 6. Click Print Medical Record Report	Add Overall Medical Record Data Successful	Succeed	✓

4. CONCLUSION

Based on the results of the analysis, and the discussion of the previous chapters, the authors can draw conclusions that need to be stated. So the website at Mitra Sandona Clinic can provide useful information for those in need. With this Clinic Information System website, it can help staff and admins in carrying out medical records of patient data. With this system, it is easy to make reports on patient data, doctor data, polyclinic data, drug data, and medical record data. With this website, the clinical information system at Mitra Sandona Clinic can be accessed via a computer network. By testing the medical record system, the implementation of Black Box Testing and User Acceptance Test (UAT) results in an accurate system and minimizes error rates.

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