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DESIGN AND IMPLEMENTATION OF WEB-BASED REGISTRATION SYSTEM IN KLINIK MEDIKA ANTAPANI BANDUNG USING BLACK BOX TESTING

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ABSTRACT

Klinik Medika Antapani is a business entity that serves the community in providing public health services for the community. Currently the patient registration process at Klinik Medika Antapani still uses a stand-alone desktop based application with Microsoft access which still causes queues in the registration section and through conventional registration via Whatsapp. An information system is needed to implement a more effective and efficient service concept at Klinik Medika Antapani. Web-based patient registration applications is one of the best suitable sollution for implemented in Klinik Medika Antapani. Web-based Patient registration application are way more easier to access because they only require a LAN or WAN internet connection and can be accessed directly without having to install the application to the computer. This Web Based Registration System will be very effective if implemented in Klinik Medika Antapani which is still based on onsite registration and manual registration through Whatsapp.

Keywords *- Information System, Online patient Registration, Clinic*

INTRODUCTION

Technological developments in the past few decades have demanded the general medical business entity to work to improve health services by emphasizing public service to achieve optimal health status, and without neglecting the quality of service to each individual patient. A business entity that serves individual and community health services is expected to provide maximum service in the sense of being fast and precise.

Therefore, to improve health services to the community, Klinik Medika Antapani need to innovate and develop related to the management of patient data and information by using an online outpatient registration information system.

Klinik Medika Antapani is a business entity that serves the community in providing public health services for the community. Klinik Medika Antapani has various facilities to support Healthy Indonesia, including facilities such as Clinics with General Practitioners, Specialists, Laboratories, Collaborating with BPJS, Regular Pharmacy, BPJS Pharmacy, Chronic Medicines, BNN Patient Special Services (NAPZA), Midwife Independent Practice, etc. Currently the patient registration process at Klinik Medika Antapani still uses a stand-alone desktop based application with Microsoft access which still causes queues in the registration section and through conventional registration via Whatsapp. An information system is needed to implement a more effective and efficient service concept

at Klinik Medika Antapani. This information system will handle several processes including patient registration, changing and viewing medical record data, and making reports automatically and completely so that it can help the process of service to the visiting community.

LITERATURE REVIEW

As for some supporting literature to describe how to work in a web-based information system design.

A. System Definition

According to Jogiyanto (2005) systems approach that emphasizes the procedure of defining a system as a network of interrelated procedures and procedures, gathered together to carry out an activity or to accomplish certain objectives. [5]

B. Information System

According to O'Brien (2005: 5) about Introduction to Information Systems, information systems (information systems) are a combination of Users, Hardware, software, network communications, and data resources that collect, change, disseminate information within an organization. [8]

C. Monitoring

According to Sutabri (2012) Monitoring is also defined as a step to make what activities are carried out after fulfilling the objectives, identifying problems that arise so that they can be directly addressed, assessing whether management and actions used are appropriate to achieve the goals, by knowing the relationship between actions and objectives. [11]

D. Website

According to Ardhana (2012: 3) the World Wide Web or more commonly known as the web is an information presentation service that uses the concept of hyperlinks (links), which facilitates surfers (the term computer users who browse or browse information through the internet). This feature has made the web the fastest growing service. [2]

We can call it static if the content of website information is fixed, rarely changes, and the contents of the information are in the same direction only from the owner website. [2]

We can call it dynamic when the content of website information is always changing, and the contents of the information are two-way interactive from website owners and users. An example of a static website is to contain a company profile, while a dynamic website is like Facebook. During its development, static websites can only be updated by their owners, while dynamic websites can be updated by users and owners. [2]

E. Object Oriented Programming (OOP)

According to Riyanto (2013: 2) Object-oriented programming (English: object-oriented programming abbreviated as OOP) is an object-oriented programming paradigm. All data and functions in this paradigm are wrapped in classes or objects. Compare with structured programming logic. Each object can receive messages, process data, and send messages to other objects. [9]

F. Unified Modelling Language (UML)

According to Rosa A.S & M. Shalahuddin, Soft Engineering 2018: 137, Unified Modeling Language (UML) is a standardization of modeling languages for software development that is built using object-oriented programming techniques. [3]

G. Program Language

a. HTML

According to Sibero (2013: 19) HyperText Markup Language or HTML is the language used in web documents as a language for web document exchange. The structure of an HTML document consists of opening and closing. HTML version 1.0 was built by W3C, and continues to experience growth. Until now the last HTML was version 5.0. [4]

b. CSS (Cascading Style Sheets).

According to Jubilee Enterprise (2016: 94) "CSS is a collection of code to design or enhance the appearance of web pages." In other words, by using CSS we can change the standard design produced by HTML into more complex variations. [6]

c. PHP

According to MADCOMS (2014: 2) "PHP (Hypertext Preprocessor) is a scripting language that can be embedded or inserted into HTML." PHP is widely used to create dynamic website programs. PHP is often also used to build a CMS (Content Management System). PHP is a server-side script programming language designed for web development. Called the server-side programming language because PHP is processed on the server computer. [7]

d. JAVA SCRIPT

According Sibero (2013: 150) "JavaScript is a scripting language Scripting Language) is a collection of instructions that are used to control some parts of the operating system scripting language form Javascript takes the writing model in C and JAVA programming, which consists of variables, functions and others. [4]

H. Database

According to Sukamto and Shalahudidin (2014: 43) a database is a medium for storing data so that it can be accessed easily and quickly. [10]

a. Database Management System (DBMS)

According to Sukamto and Shalahuddin (2014: 44) Database Management System (DBMS) is

often referred to as Database Management System is an application system used to store, manage and display data". [10]

b. SQL

According to Sukamto and Shalahuddin (2014: 46) suggested that "SQL (Structured Query Language) is a language used to manage data in RDBMS". SQL was originally developed at a time when relational algebra theory and SQL calculus began to develop in the 1977s. SQL began to be used as an official standard in 1986 by ANSI (American National Standards Institute) and in 1987 by ISO (International Organization For Standardization) and referred to as SQL-86. During its development, SQL was revised several times. [10]

I. Software Development Model

The method used in developing this software uses the "Waterfall" model. The SDLC model of a waterfall is often also called a sequential Linear model or a classic life cycle. According to Sukamto and Shalahuddin (2014: 28) "The waterfall model provides a sequential or software life-cycle approach starting from analysis, design, coding, testing, and supporting stages". [10]

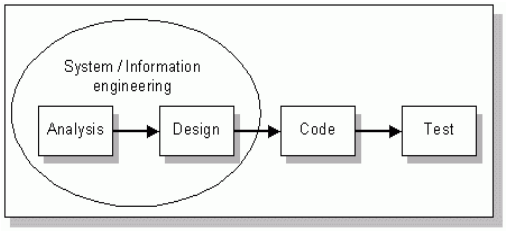

Figure 1: Illustration Model of Waterfall [11]

With a variety of weaknesses that have the waterfall model but this model has become the basis of other models in making improvements in software development. [10]

The waterfall model is suitable for customer needs and is well understood and the possibility of changing needs during small software development. [10]

The positive thing about the waterfall model is that the structure of the system development stage is clear.

J. Entity Relationship Diagram (ERD)

According to Sukamto and Shalahudin (2014: 50) "ERD was developed based on set theory in the field of mathematics. ERD is used for relational database modeling". [10]

K. Logical Record Structure (LRS)

In making a web, after making ER diagram the next step is to make LRS (logical Record Structure). According Andriansyah (2016: 53) provides a limitation that LRS is "a system model that is described by an ER-diagram will follow certain modeling patterns or rules in relation to the convention

to LRS". [1]

L. Web Testing

a) Integrity Testing

Integrity testing should be carried out in stages, not carried out in one step and ended immediately to avoid trouble tracking in case of errors (Sukamto and Shalahudin, 2014: 275). Integrity testing is a test of combining two or more units in a software device. After integrity testing, system testing is done where the process units that have been integrated are tested with an interface that has been made so that this test is intended to test the software system as a whole and tested as a system (not separated again). After system testing has been completed, it can be tested for software acceptance by the customer (customer) or user (software user). Acceptance testing is used to determine customer or user satisfaction with software that has been made. If the customer is satisfied with the software, the software can be submitted to the customer. [10]

b) Black box Testing

Black box testing is a system testing method that can be done without us having to know the internal structure of the code of the system. As the name suggests, when Black Box Testing is done, the system in the eyes of a tester is lik a black box that cannot be seen what is inside. With this method, we can try to look for errors that are in categories such as incorrect functions or not. there are, errors in the user's display, errors in the performance and behavior of a system. The advantages of testing with this method are: [10]

1. Testing carried out from the user's point of view can help in finding problems and errors that are not as expected.
2. Testers do not need to know how the system can run or mastering any programming language.

Behind the advantages, this method has the following disadvantages:

1. Testing is done with limited coverage because only a small portion of the test can be done.
2. Without clear specifications, it will be quite difficult to design test scenarios.

c) White box testing

Differ to Black box Testing, White box testing is carried out by a tester who really knows about the internal structure of the system, from the system's ability to its programming. Just like the name suggests, when White Box Testing is done, the system in

the eyes of the tester is like a white or transparent box, which we can clearly see the contents inside. The advantages of testing with this method are: [10]

1. Testing can be done at an early stage, no need to wait for the User Display or User Interface to be ready or not.
2. Testing can be done more deeply so that it can be possible to find hidden errors.

Meanwhile, the weaknesses of this method are:

1. Because some testing scenarios can be very complicated, we need a tester who has high knowledge of the system being tested.
2. Making a test scenario can be hampered if changes to the system are often done.

METHODE

The research methodology used is consists of two types namely software development methods and data collection methods. The method used in software development uses a water fall model. Data collection methods are carried out by means of observation, interviews and literature study.

Observation was carried out to collect data and information by reviewing and observing directly how the outpatient registration service system in the hospital. The interview method is a method of finding information directly by way of face-to-face with the Clinic that manages the information system of the Klinik Medika Antapani and patient registration service officers at Klinik Medika Antapani. Literature Study, this method is carried out by studying literary theories and books and service provider sites as a basis for reference.

IMPLEMENTATION AND RESULT

User Needs Analysis in the registration application are consists of three users who interact with each other, namely patients, registration officers and medical records officers. These three users have different roles. Patients do not immediately become users of this registration application. Patients provide data in the form of self-identification information and treatment goals when the input process for outpatient registration is done. The registration officer will input the patient's data and register the patient for treatment. The medical records officer can log in the system to view patient data that has been registered and get a patient registration report that has entered the system by the outpatient registration department. Users or users have the characteristics of interaction with different systems and have different

information needs, such as the following:

a) Scenarios for Registration Officer Needs, namely: Managing patient data, Conducting patient registration, Managing doctor data, Managing poly data, Managing user data, making outpatient patient registration reports, managing patient data printing, managing patient registration number printing, managing doctor data printing.

b) Scenarios for Patient Needs, namely: Patients get printed proof of registration number, Patients can get a printed doctor data to the registration officer, and Patients can get a printed patient data to the registration officer.

c) Scenario Needs of the Medical Record Section, namely: The medical record section can view and print outpatient registration reports, Print patient data.

A. System Needs Analysis

To implement the information system design for this online registration, the main points needed for this system are as follows:

a. The user must log in first to be able to access this application by entering a username and password.

b. The user must log out after finishing using the application

B. Use Case Diagram

Use Case Diagram of web-based patient registration application made by the author as follows:

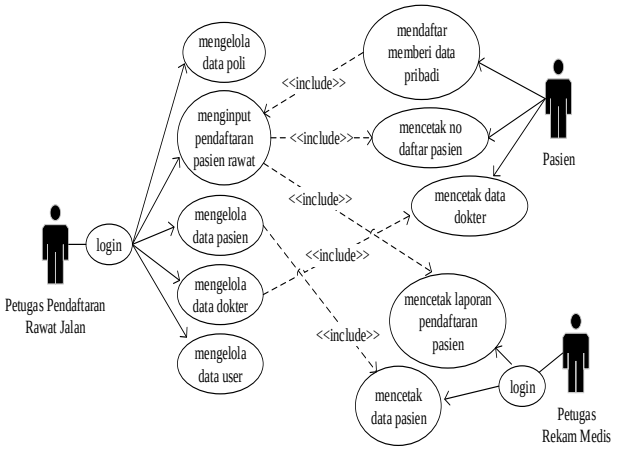

Figure 2: Use Case Diagram of Web-Based Patient Registration Application

C. Database Design

Entity Relationship Diagram of web-based patient registration application made by the author are as follows:

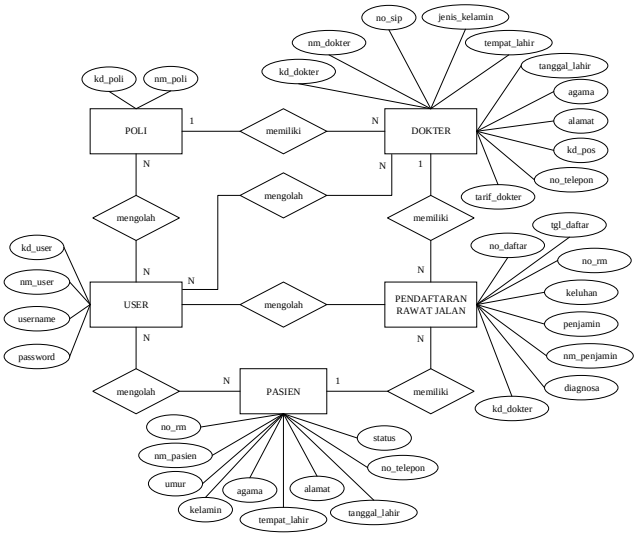

Figure 3: Entity Relationship Diagram of Web-Based Patient Registration Application

D. System Implementation

In implementing the system, the Web Registration Application for Klinik Medika Antapani is divided into several menus, including:

1. Location Options

   In Location Options, patient can choose their location and it will automatically recorded in the Registration Form.

Figure 5: Choosing Locations

2. Choosing Services time

   In Choosing Services time menu, patient can choose their service time and it will automatically recorded in the Registration Form. This menu will affected the doctor in charges of the patient.

Figure 6: Choosing Services Time

3. Selecting Poly Destination

In Selecting Poly Destination menu, patient can choose their destination poly.

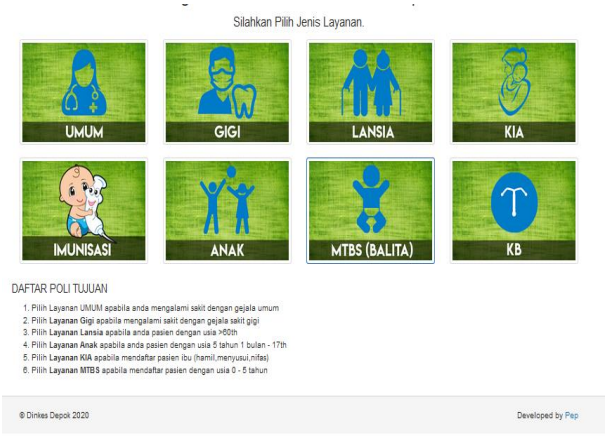

Figure 7: Select Poly Destination

4. Choosing Patient Type

Choosing Patient type are divided into New Patient and Old Patient. This action needed, to make sure what is the next action of medical registration officer take of the patient.

Figure 8: Choosing Patient Type

5. Registration Form of Old Patient

When choosing Old Patient Type, Patient must fill the Registration form of old patient. Old Patient usually has a treatment record or historical and of course it will get diffrerent step of services than new patient.

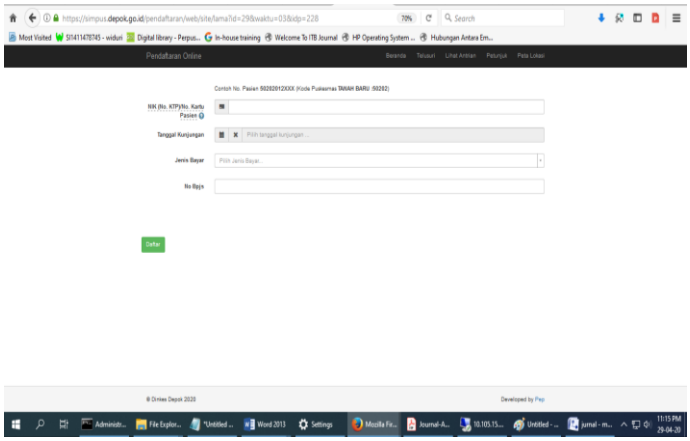

Figure 9: Registration form of Old Patient

6. Registration Form of New Patient

When choosing New Patient Type, Patient must fill the Registration form of new patient. New patient registration form is more complex than the old patient form.

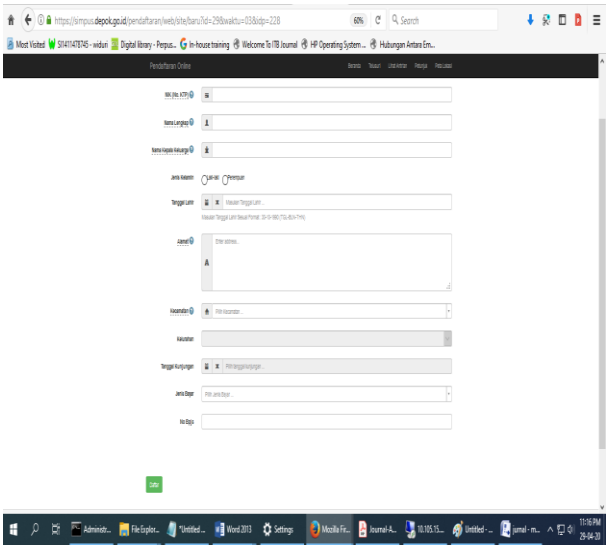

Figure 10: Registration Form of New Patient

7. The Registration Flow of Web Registration

The implementation of the web registration application at Klinik Medika Antapani is also summarized through a simple flow of registration, as follows:

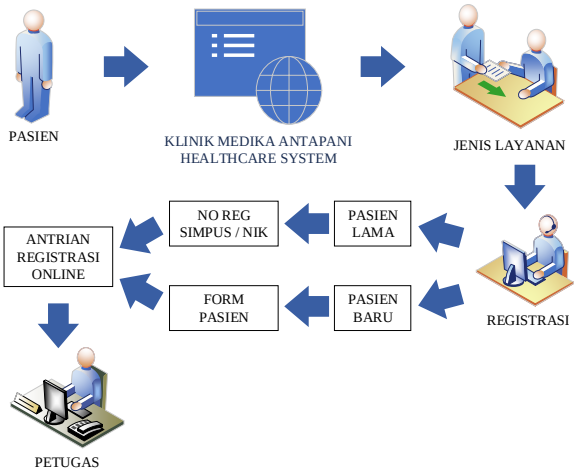

Figure 11: Registration Flow of Web Registration System

8. Testing

Unit Testing, Testing of programs created using blackbox testing that focuses on the program input and output process.

Table 1: Black Box Testing Test Results Old and New Patient Registration Pages

No.	Skenario pengujian	*Test case*	Hasil yang diharapkan	Hasil pengujian	Kesimpulan
1.	User Id dan password tidak diisi kemudian klik tombol *login*	*User Id* : (kosong) *Password*: (kosong)	Sistem akan menolak akses user dan menampilkan "Data Username tidak boleh kosong, silahkan lengkapi !","Data Password tidak boleh kosong ,silahkan lengkapi !"	Sesuai harapan	Valid
2.	Mengetikkan user ID dan password tidak diisi atau kosong kemudian klik tombol *login*	*User* ID: admin *Password* : (kosong)	Sistem akan menolak akses user dan menampilkan "Data Password tidak boleh kosong ,silahkan lengkapi !"	Sesuai harapan	Valid
3.	User ID tidak diisi (kosong) dan password diisi kemudian klik tombol *login*	*User Id*: (kosong) *Password*: admin	Sistem akan menolak akses user dan menampilkan "Data Username tidak boleh kosong, silahkan lengkapi !"	Sesuai harapan	Valid
4.	Mengetikkan salah satu kondisi salah pada user ID atau password kemudian klik tombol *login*	*User* ID: admin (benar) *Password*: admin1 (salah)	Sistem akan menolak akses user dan menampilkan "*Login* Tidak diterima".	Sesuai harapan	Valid
5.	Mengetikkan user ID dan password dengan data yang benar kemudian klik tombol *login*	*User* ID: admin (benar) *Password*: admin (benar)	Sistem menerima akses *login* dan kemudian langsung menampilkan menu utama.	Sesuai harapan	Valid

CONCLUSION

Based on the explanation above, the authors draw a conclusions, including:

1. Web-based patient registration applications are easier to access because they only require a LAN or WAN internet connection and can be accessed directly without having to install the application to the computer. This Web Based Registration System will be very effective if implemented in Klinik Medika Antapani which is still based on onsite registration and manual registration through Whatsapp.
2. Provide a more varied application appearance so that the application will be more attractive in user interface.
3. Web-based registration applications will be easier to update because with web-based system updates are chain without having to log out of the application.

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