

## DEVELOPMENT OF HOSPITAL RESERVATION INFORMATION SYSTEM WITH UDC METHOD AND SUS TESTING

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**Abstract** – Information system is a system that combines technology used to help human life. Not only helps facilitate information sistem activities, it also saves time, space and costs. Utilization of a website is useful in all fields because there are many and very broad and user-friendly features that can spoil the user's eyes. Activities that function to meet the needs of the general public are the meaning of public services as well as those related to other commodities such as goods, services and management provided by the organizers. In the health sector in public services, it is very necessary, especially in the service reservation process which still uses a queuing sistem in the form of taking queue numbers in the hospital lobby and waiting for hours, causing queues of visitors. The purpose of this study was to design a reservation information system at the hospital in order to increase the use of facilities and resources. The design of this hospital reservation information system is based on a website that was built using the user centered design method and tested using the SUS (Sistem Usability Scale) method which is in accordance with the criteria for the Sistem Usability Scale method which involves several respondents for information system acceptance.

**Keywords:** Information System, UDC, SUS, Hospital, Website

### I. INTRODUCTION

The increasing pace of development of computer technology, especially in the field of *software*, makes computers easier to use and a necessity for certain environments such as businesses. To do their job, they rely heavily on computers. nowadays computers are widely used to help make important decisions, such as information systems. An information system is a system that combines human activities and the use of technology to support management and operational activities. Along with the rapid development of technology, a number of applications were born to provide convenience and freedom for users in terms of time, place and cost. The Hospital Reservation Website utilizes information system technology that develops with a *website platform*. The *website* was chosen because the *website* has very wide features and is of course *user friendly*. The development of technology today, technology is utilized in the field of public services.

Public services are a number of activities within the scope of meeting the service needs of citizens and citizens for goods, services, and/or administrative services provided by public service providers. [1]. One of the public services is health services [2]. Improving public services in the health sector can be done by creating innovations in the form of *online* hospital reservations. Hospital *online* reservations are expected to be

speeding up services thereby increasing hospital patient satisfaction [3].

In this study, the use of technology was used for hospital reservations. The reservation information system is a component that manages booking data which aims to make it easier for you to register. Research on the system for reservations has been carried out before by Sinaga & Samsudin (2021) with the results of a reservation website that implements the Laravel framework so that it is simpler and lighter in its use [4]. Further research by Husni & Putra (2019) with the results of the Hospital Management Information System which includes the application of a medical record driver's license [5]. Research conducted by Alkhalidi et al (2018) proves that the existence of online reservations can increase the use of facilities and resources [6]. The next research by Rahmatya et al (2020) with the results in the form of a reservation system that can store booking and payment data in a *database* and facilitate reporting [7].

The method used in creating a website in this study is the UDC or *User Centered Design* method, using this method can make it easier to build a website. This is proven based on existing research, such as: analysis on the sriwijaya university website [8], creation of the MGBK portal website[9], re-establishment of the web portal of the



Department of Psychology FISIP[10], application film synopsis[11], for seminar applications[12], DMI Application Design[13] and many more.

The problemat this time is that the reservation service for a hospital provided is still ordinary or arguably still using the old way. namely, using a queuing system. visitors can make reservations anywhere, so visitors can know when they are going to the hospital. this can reduce the buildup and avoid complaints from visitors, besides this can speed up handling in the administrative department and reduce the operational costs of using hospital ATK.

## II. RESEARCH METHODOLOGY

The following is a framework of the stages of research carried out.

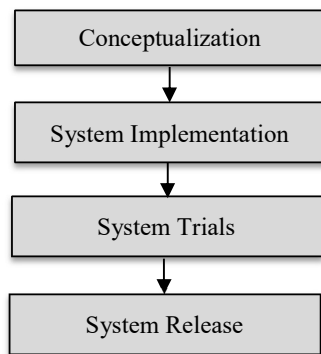


Figure 1. Research Framework

There are four stages in this study, namely:

### 1. Conceptualization

Planning the big picture system will be made by digging and searching a list of topics by studying concepts that have existed from various valid sources such as books, journals, theses and dissertations. The resulting concept is in the form of system analysis and design, application design.

2. System implementation, the application of concepts that were previously made into a website-based *software* . The method used is UDC or User Centered Design. The UCD method is used because it presents the best approach if it outlines from the initial stages of an interactive process where design and evaluation steps are made from the beginning of the project to implementation [14] with stages such as the following:

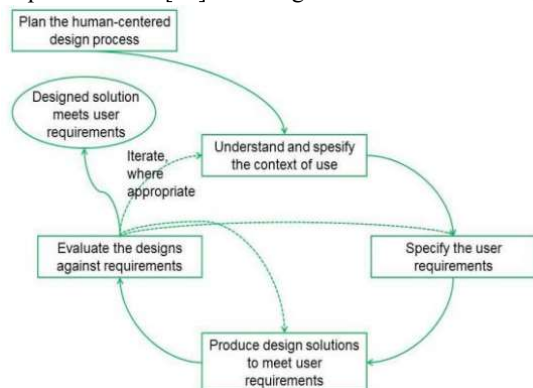


Figure 2. Stages of UDC

The process of the *User Centered Design* (UCD) Method has five processes, namely[15]:

- Plan the human-centered design process*, pthere this process we have to hold a discussion towards the people who will work on the project, to get a commitment that the process of building the project is user-centered or user-centered, It means that the project will have the time and task to involve the user or users in the beginning and end of the process or where they are needed. And also the people working on the project should know very well about the User method.
- Understand Specifying the Context of Use, dasar of any UCD process is to understand the users of the intended product and their usage environment. Therefore, the typical UCD process begins with identifying users, It also includes all stakeholders, or indirect users, all those related to the system. At this stage also, we identify the characteristics of the user and the user group, Characteristics possible, following the iso definition, skills, education, age.
- Specifying the User Requirements Basically at this stage is the stage of extracting information or data to collect the needs of the user, then after the information / data has been collected, the arrangement of information from the user's needs data is carried out, then the user's needs are described into various forms / techniques, such as narratives, images, or diagrams.
- Produce Design Solution In this step, the first design was created. Sketches, mockups, simulations and other forms of prototypes are used to make ideas visible and facilitate efficient communication with users. This prevents the possible need and high costs associated with reworking the product at the next step of the life cycle. When design solutions are presented to the user, they should also be allowed to carry out tasks. The collected user feedback should be included in the design solution improvements. This should iterate continuously until the design goals have been met.
- Evaluating The Design In subsequent activities, the design solution that was in the previous stage should be evaluated.. The goal is to generate feedback to further improve the product and to determine whether the design meets the specified user needs, usability goals and complies with general usability



guidelines. The UCD process cycle continues as long as the usability goals have not been met.

3. System Trial, ensuring that the software created runs in line with user needs. Prose testing is carried out with SUS. The stages are as follows:



Figure 3. Stages of SUS

4. System release, introducing the system to *the user*:

### III. RESULTS AND DISCUSSION

In the results and discussion section, several pores were carried out, while the process was as follows:

#### 3.1 Planning

The planning stage is carried out an analysis of the needs of the system by the method of observation, from this stage results are obtained:

1. The flow of the hospital reservation system.
2. Analysis of customer profile and purchasing power.
3. Analysis of service and proximity to customers.
4. Analysis of the potential of the hospital.

#### 3.2 Model Design Process

As for the modeling used is using UML, here is the diagram used:

1. Use Case Diagrams

From the results of the analysis, the needs of the system are made using a use case diagram, as shown in Figure 1.

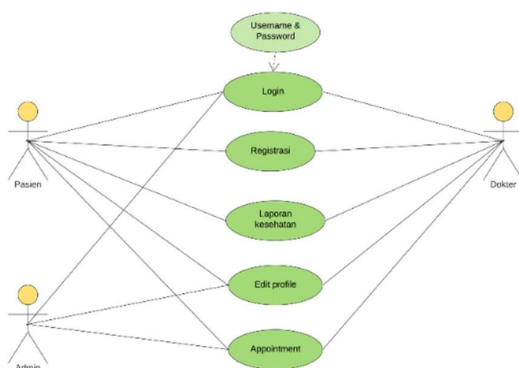


Figure 4. Use Case Diagrams

There are several *actors* and activities in figure 4.

- a. Patient: The patient is the person who will visit the hospital, do health care.
- b. Admin: The hospital officer who controls the recording of hospital reservations
- c. Doctor: hospital staff who will check the patient's health at the hospital

- d. Login: before accessing the *website*, there is a *login* activity by filling in the *username* and *password* obtained by registering
- e. Registration: is an activity of registering on the *website* to get an account that can access the *website*
- f. Health Report: patients who have done the examination, can see the results of the examination in the Health report which is filled out directly by the doctor who examined it.
- g. Edit profile: *the website* account can be updated. Website *accounts* are individual. Patients can only edit their own accounts, as well as doctors but admins can edit patient accounts and doctor accounts
- h. Appointment: is the main activity of online reservation. Patients will be presented on the day and time of the examination that is still available. The patient can choose the time and day of the examination. On the day and time of the examination, the patient who attends the examination to the hospital will be prepared by the admin and the doctor will know his patient to be examined.

#### 2. Class Diagram

Here is a design analysis of the *Class Diagram* of the hospital Reservations application.

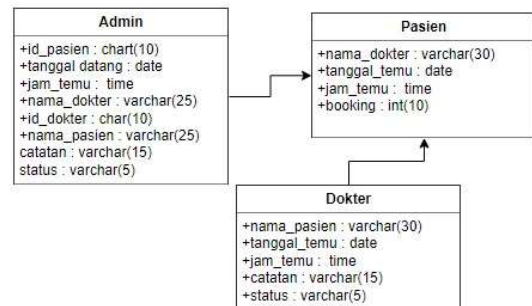


Figure 5. Class Diagram

Information:

There are 3 tables in the hospital Reservation including *tb\_admin*, *tb\_pasien* and *tb\_dokter* all *indices* are connected to each other, in *tb\_admin* *input* a *table* that goes to the *tb\_pasien*, and *tb\_pasien* *input* the *table* that connects the *tb\_dokter*.

#### 3. Sequence Diagram



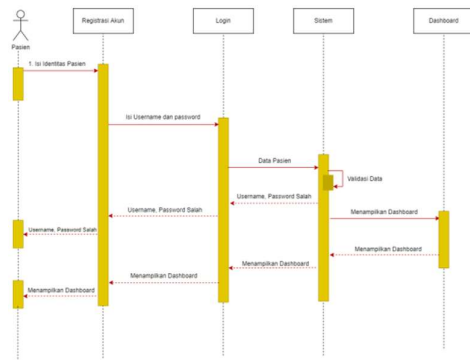


Figure 6. Patient *Sequence* Diagram

In the sequence diagram above, it is explained that there is one actor (patient) and four objects, namely account registration, login, system and dashboard. First of all the patient will be directed to the initial display to register / register an account by filling in the patient's identity. Then the patient is asked to log in by entering the username and password that have been previously registered. And the system will process, if the username and password are correct then it will enter the patient's dashboard to book the doctor.

4. *Statechart* Diagram

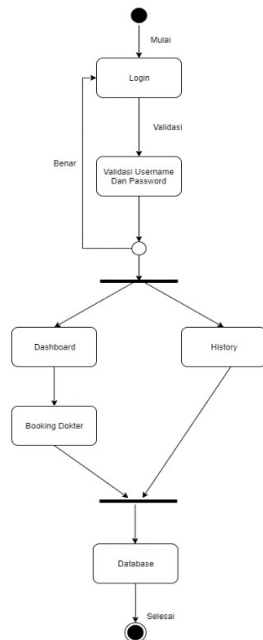


Figure 7. Patient Diagram Statechart

The statechart diagram above illustrates the doctor's booking system, where the first patient logs in if the username and password are correct, the patient will be directed to the main user display which contains a dashboard and history doctor's previous bookkeeping . On the dashboard menu, patients can directly book the available doctors and later the book history will go to the database.

5. *Deployment* Diagram

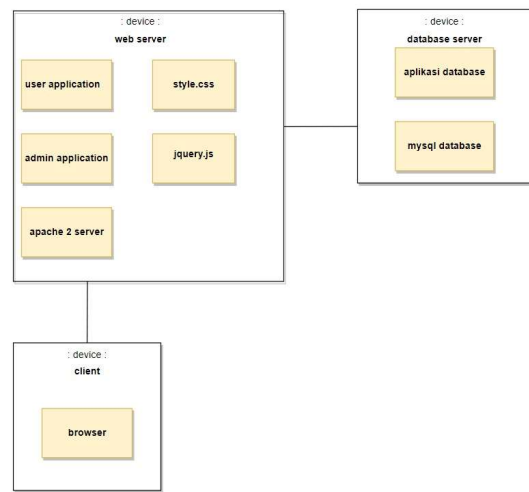


Figure 8. Deployment Diagram

The Deployment Diagram above shows that the website for the booking doctor device for the web server itself has a user application, admin application, apache 2 server, style.css and jquery.js. then for the database using a database application and mysql database while the device for the client to access can use a browser.

6. *Activity* Diagram

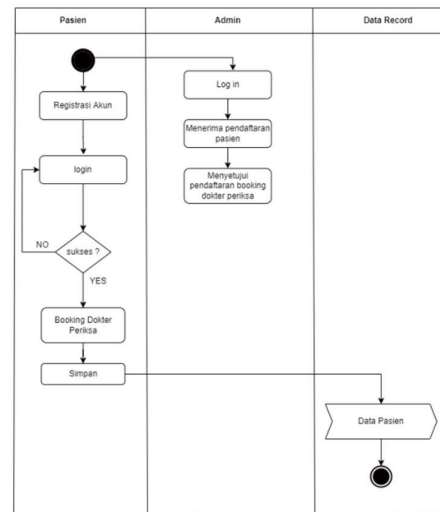


Figure 9. Activity Diagram

The diagram above is a visual form of the work flow that contains the activities or actions of patients and admins on the use of the website. Which in the first patient registers an account then logins, if the username and password are wrong, it will be directed back to the login menu, if the login is successful the patient will be directed to the dashboard menu to book a doctor. While in the admin, the admin will log in to approve the doctor's book and the booking data will be stored in the patient data / on the patient history menu.

3.2. **Website Interface**

Here is a look at the hospital reservation system.



1. Page view via *admin user*

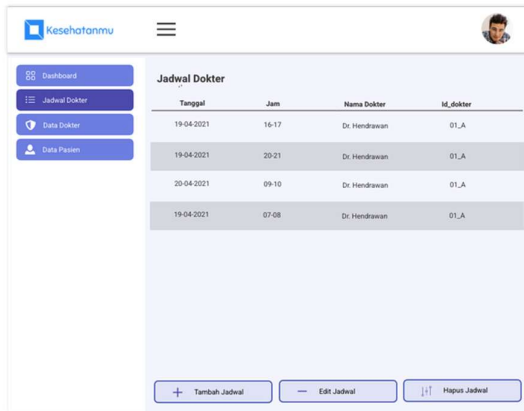


Figure 10. Admin

On the Doctor's Schedule menu in the *admin user*, there are several features that can be used, including adding a schedule, editing a schedule, and deleting a schedule whose results are contained in a table containing dates, hours, doctor names, and Id\_dokter.

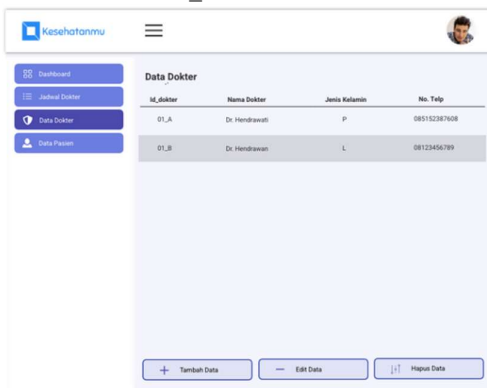


Figure 11. Physician data admin

On the Doctor Data menu in the *admin user* there are several features in the form of adding data, editing data, and deleting data whose results are contained in a table containing Id\_dokter, Doctor Name, Gender, and Phone Number.

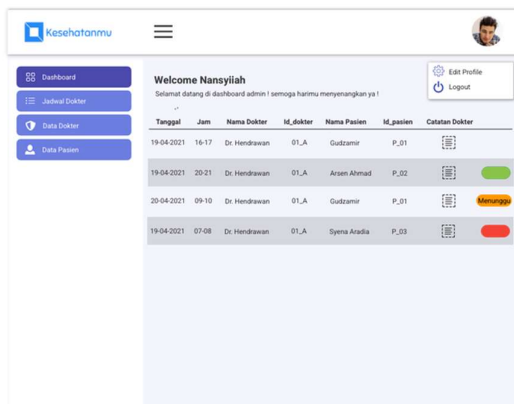


Figure 12. Admin dashboard

On the Dashboard menu in the admin user can display a table containing information about some patient status. The green color indicates the status is running, in orange it indicates the status is waiting, while the red color indicates the status is absent.

2. Page view through *patient user*

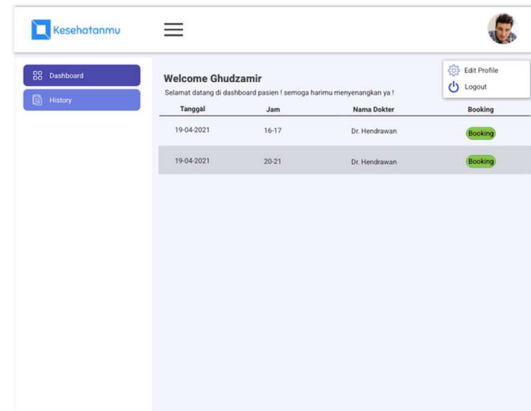


Figure 13. user

On the Dashboard menu, the patient user can display table information containing the date, time, doctor's name, and the status of the examination booking.

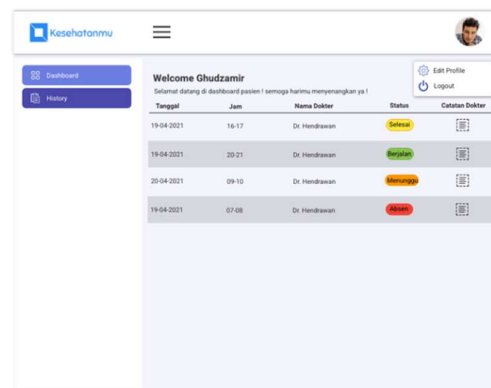


Figure 14. user history

On the *History* menu in the *patient user* can display examination history information containing the date, time, doctor's name, status, doctor's note.

3. Page display through *doctor user*





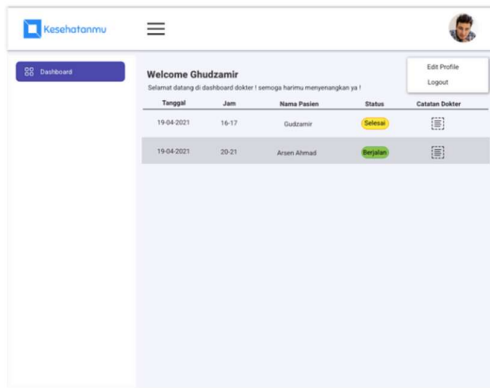


Figure 15. Doctor

On the Dashboard menu in *the doctor user* can display a table containing information on the date, time, patient name, status, and doctor's notes.

4. Initial Look

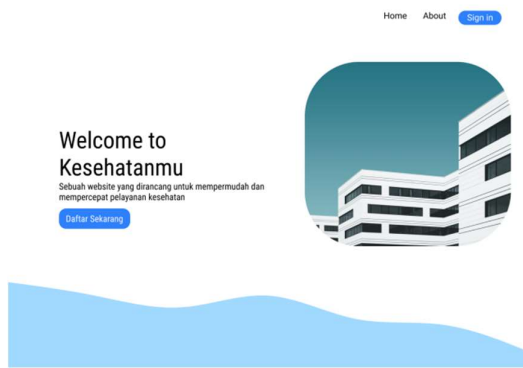


Figure 16. Initial view

In the initial display, there are *Home*, *About*, *Sign in*, and *Register Now* menus.

5. Login page display

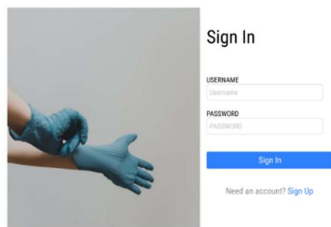


Figure 17. Login view

The *Sign in* display is a process to enter a *user* account that must fill in the *Username* and *Password* fields, then the user can press the *Sign in* button to enter.

6. Display of the account registration page

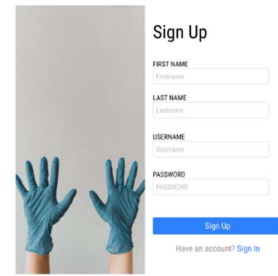


Figure 18. Account registration view

The *Sign up* display is a user registration process to be able to log in to an account, there are several things that must be filled in the existing fields, including *first name*, *last name*, *username*, and *password*. Then *the user* can press the *Sign up* button to create an account.

3.3. Sus Method Test Results

To measure the *level of usability* of a website system for the bookkeeping of doctors, an assessment is carried out using the SUS method. The following are the results of the SUS questionnaire ku e:

Table 1. SUS Test Results

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Pembobotan
Responden 1	4	0	4	0	4	1	5	0	4	0	100
Responden 2	4	1	4	0	3	0	4	0	4	0	95
Responden 3	3	2	3	0	3	2	5	0	4	2	80
Responden 4	3	1	3	0	3	1	3	1	3	1	77.5
Responden 5	4	1	4	0	4	0	4	0	4	2	92.5
Responden 6	2	1	4	0	4	0	3	0	3	1	85
Responden 7	4	1	4	0	4	0	4	0	4	1	95
Responden 8	3	2	4	1	3	3	3	2	4	3	65
Responden 9	3	0	3	0	4	1	5	0	4	1	92.5
Responden 10	4	0	4	0	3	1	3	0	3	1	87.5
<i>Score</i>											<b>87</b>

From the calculation results using the SUS method on the examination doctor's bookkeeping website, it gets an average score of 87 out of 10 respondents, it can be categorized as *acceptable* with *grade B* and this website is included in the *excellent* category acceptable to users

IV. CONCLUSION

This research, designing an online reservation website, visitors can make reservations anywhere, so that visitors can know when they are going to the hospital. this can reduce the buildup and avoid complaints from visitors, besides this can speed up handling in the administrative department and reduce the operational costs of using hospital ATK. By using the UCD method, the website development process is easier because it can adjust based on the wishes of the user. And by using testing with SUS, you can find out the calculation results with the SUS method on the hospital reservation website, this hospital gets an average value of 87 out of 10 respondents, it can be categorized as *acceptable* with *grade B* and this website is included in the *excellent* category that can be accepted by users.



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