Designing Attractive Web-Based Covid-19 Information System

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Abstract. The World Health Organization (WHO) declared Coronavirus Disease 19 (COVID-19) to be a pandemic on March 13, 2020. Indonesia is one of the countries affected by COVID- 19, which spreads quite quickly. To support the government in making policies, an information system that can manage COVID-19 cases is needed. The purpose of this study is to design a prototype of an information system for Covid-19 cases in a city. This study employed descriptive analysis with a qualitative approach. In the meantime, the System Development Life Cycle Prototyping method of designing information systems employed an object-oriented methodology. The results show that information systems' development can provide actual information for the local government and society. This information system's main concept is to take advantage of the role of the puskesmas (Community Health Centers) from each sub-district to collect data directly from the community. After obtaining the data, it will be submitted to the sub-district officer in charge of inputting it into the system. The data that has been input will go through the verification stage by the surveyor. If appropriate, then the data will be published in the latest data update on that day to access the general public. The Covid-19 case information system's prototype can improve existing systems and provide input on renewable concepts in the procedures it carries out. In the end, this prototype of the information system exists as an actual and accurate, and reliable information medium to facilitate government decision-making at regional and national levels.

Keywords: Web based, Covid-19, Information System, Community Health Centers

1. Introduction

Coronavirus disease (COVID-19) made by the SARS- Cov-2 virus is a global health concern because of the virus's fast transmission [1]. Efforts to reduce the number of cases were carried out by the local government by minimizing crowds in their regular routines. This was based on ideas and proposals made by the expert team to reduce the number of cases added, which stated that contact between people must be minimized. Apart from this, if patients test positive for Covid-19, strict isolation is required to decrease the likelihood of transmission. [2,3]. In order obtain positive data on the Covid-19 case, the government will undoubtedly want technology to archive this data for future use as information. Therefore, the involvement of information systems is required. Therefore, the involvement of information systems is required [4,5]. This was done to assist the government's role in determining optimal policies; an information system media is needed that makes the Covid-19 information center accessible to the wider community [6].

A research initiative investigated the establishment of a GIS-based information platform to track COVID-19 cases and contribute to global decision-making. South Korea served as the case study [7]. Another study investigates the potential use of IoT in combating the Covid-19 epidemic. The design completed and the notion that needs to be mapped in combating a pandemic [8]. Despite studies investigating the use of information technology to aid in COVID-19 patient recovery, direct implementation is constrained by the uncertainty surrounding the virus's characteristics. [9,10]. However, based on various studies that previous researchers have conducted, there has been no research that discusses the design of a regional-scale Covid-19 case data center information system and can establish government-approved information portals and sources.

This study intends to create a data gathering information system for Covid-19 patients in a city. This study's research method is descriptive analysis using a qualitative approach, while information systems are developed utilizing an object-oriented approach with System Development Life Cycle prototyping. The findings demonstrate that the creation of information systems can provide useful information to the local administration and society.

2. Method

This research used a descriptive analysis method with a qualitative approach and focused on measuring the needs of a problem to construct an information system. Object-oriented development methodologies are used in conjunction with prototyping in system development. Therefore, this study's resulting design is in the form of a grand design for further development by adjusting the needs and requests of users, in this case, the government. This research will display some data such as positive case data, people under surveillance (ODP), patients under surveillance (PDP), data on deaths, and data recovered. Figure 1 depicts an overview of the prototyping process employed in this study.
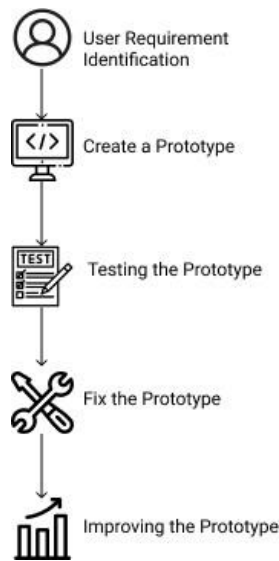
Figure 1. Prototyping Method

Based on the method in Figure 1, the stages carried out in system development are as follows:

1. User Requirement Identification

At this stage, collecting data regarding the needs of information system users is usually carried out, usually through direct observation and interviews.

2. Creating the Prototype

From the needs analysis results, a prototype is made with reference to revious data gathering findings. This phase is still an early prototype of the information system that will be utilized for user discussions.

3. Testing the Prototype

After finishing the prototype, the developer will consult with the user and test the early phases of manufacturing to evaluate whether they are appropriate or require further refinement.

4. Improving the Prototype

When a user evaluates or provides feedback, the developer must improve in response to user requests.

5. Upgrading the Prototype

If the prototype is complete and designed to meet the demands of the users, the following stage is to build on the existing information system. Development can be accomplished by adding functionality, display interfaces, and so on.

3. Results and Discussion
3.1 User Requirement Identification

At the stage of identifying user needs, the developer gets several information regarding the actors involved in the system and activities carried out. Use Case Diagram is used to present the design of actors who play a role in an information system [11]. The Web-Based Covid-19 Information System is used by 4 actors with their tasks and roles, namely District Officer, Surveyor, Public User, and Admin Government, as shown in Figure 2.
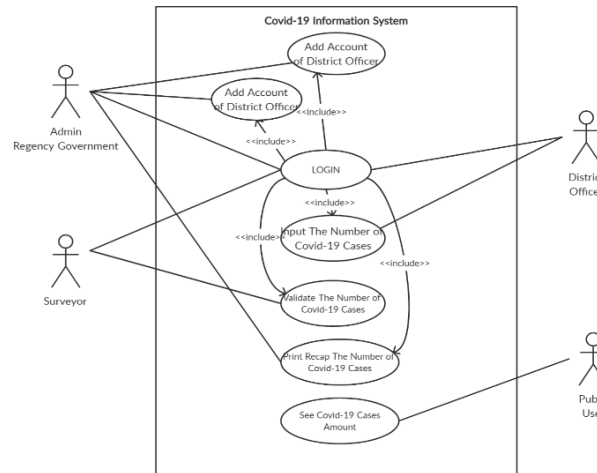
Figure 2. Use Case Diagram Web-based Covid-19 Information System

From Figure 2, each actor has their tasks. The Government Admin is in charge of setting up accounts from District Officers and also surveyors. Because this information system is restricted in its management, it is directly managed by the city government's admin. After the Surveyor and District Officer's accounts have been made, the Sub-district Officer can carry out their respective duties. The work sequence on each actor's job desk begins with the district officer inputting data on the number of Covid-19 cases starting from positive cases, ODP, PDP, died, and recovered. After entering the data into the system, the next task will be validate by the surveyor, a special team selected by the Regency Governments to confirm that the data entered is correct. If the data is incorrect, it will be rejected and then returned to the District Officer to be changed according to the surveyor's direction or deleted for re-input. Validated data will be entered into the Admin page's main data and integrated into the main page of the website to be accessed by Public Users.

3.2. Creating The Prototype

Figure 3 shows the homepage of the Covid-19 Information System website. Anyone can access this primary page, which provides the most recent data about Covid-19 instances in that region. This main page presents the district's overall data. Meanwhile, the daily data will be given in graphical format. This graph represents shifting information about the Covid-19 case in the Regency. As a result, every positive case input provided by Sub-district officers will be added and structured according to the dependencies depicted in the chart.

Figure 3. Home Page

3.3. Testing the Prototype

The implementation of prototype testing is carried out by the user. In this case, the local government, as the main user, operates the system to get an evaluation that the system developer will fix. Figure 4 displays the login pages for District Officers (See Figure 4a); and Surveyors (See Figure 4b). Therefore, a registered account in the Covid-19 Information System has to carry out each actor's duties. This is due to the public-restricted access that is closed to the public.

(a)

(b)

Figure 4. Login Page District Officer and Surveyor

The workflow for the Covid-19 Information System starts with the District Officer, who inputs data on the Covid-19 cases in their respective Districts. The data is inputted by district officers based on data obtained from the respective puskesmas (Community Health Centers). This information system aims to maximize the role of the lowest level of government unit, specifically the sub-district, and its cooperation with the health department, in this case the puskesmas. Figure 5 depicts the data input page for Covid-19 cases conducted by sub-district officials (see Figure 5a). After inputting the data, it will be entered into the data table that has not been verified by the Surveyor (See Figure 5b).

(a)

(b)

Figure 5. District Officer Page

The data submitted will be carried out by the surveyor's verification process to determine whether the data is suitable or not with real data in the field obtained by the surveyor directly from the district's health center. Figure 6 presents the Surveyor page for verification of each data input from all districts. If the submitted data are not suitable, the surveyor can reject the data and be returned to the sub-district officer to be changed or re-submitted.

Figure 6. Surveyor Page

3.4 Fix the prototype

At this stage, the prototype that the user has evaluated will be equipped with the system developer as needed, such as the data that has been entered into the system will be more procedurally done. The Surveyor's verified information will be entered into the main data field on the Admin page. Figure 7 depicts the features of the admin page, including the latest data (See Figure 7a), total case data (See Figure 7b), and daily data charts (See Figure 7c) as evidence of Covid-19 case data in the district. The admin is also responsible for configuration, monitoring, problem-solving, and system maintenance. Therefore, the information system's interface is designed as much as feasible to enable access and its tasks [12,13].
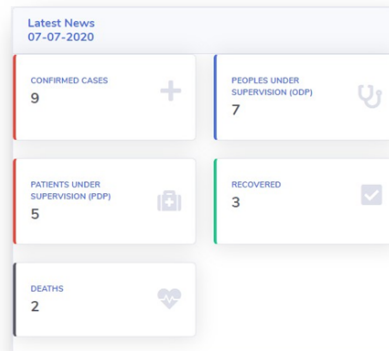
(a)
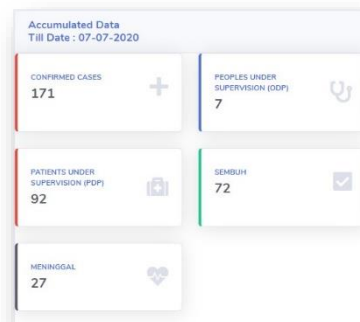
(b)
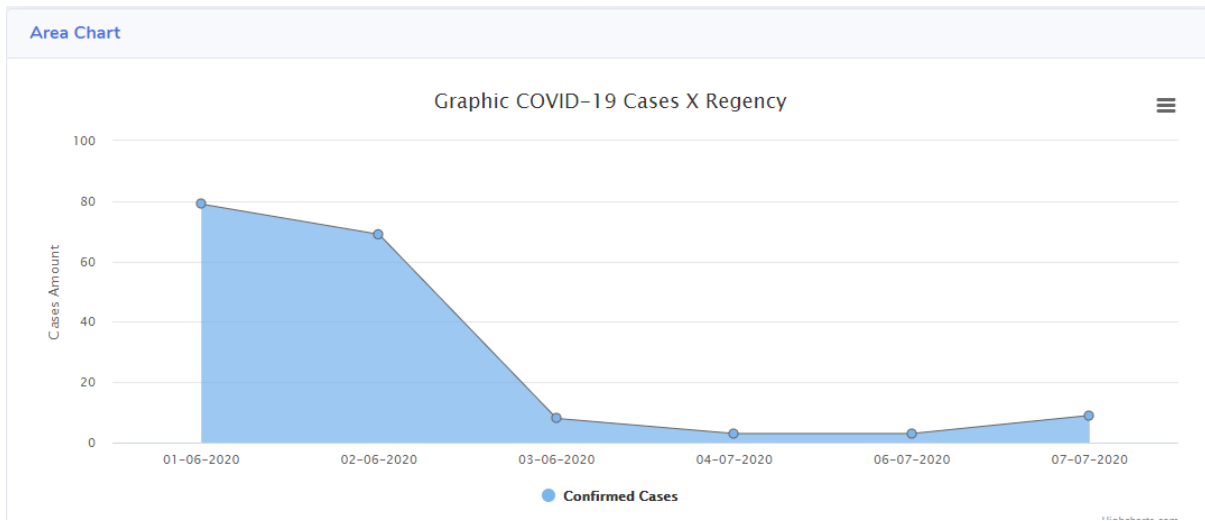
(c)

Figure 7. Admin Page

The admin can add accounts for sub-district officers and surveyors in addition to the overall data and the latest data. Registration of this account cannot be done directly by surveyors or sub-district officers with the aim that the direct admin controls this system to prevent all viewers from registering. If Figure 8 shows the account data of district officers that the Admin has registered, Figure 9 shows the surveyor account data page used by the surveyor to access this information system. In addition, when a surveyor or sub- district officer wants to change the password or forget the password, the surveyor or officer must contact the admin because only the admin can see and modify all account data.

Figure 8. Account Surveyor Page

Figure 9. Account District Officer Pages

3.4. Improving the prototype

To further develop the system prototype design, the developer added the network architecture of the Covid-19 information system. The network architecture design was adjusted to the type of network used, which is the Client- Server. The client-server network system allows one or more centralized functions and applications. To put it simply, the file server is at the heart of its security system. Client computers can access data on the server [14,15]. From the client's perspective, this information system will be accessed using existing devices such as laptops, smartphones, or PCs. The internet is accessible using cellular or WiFi networks in which there is a firewall on the system to prevent and anticipate unwanted activity for optimal security of the designed information system. After that, the request will be forwarded to the router and forwarded to the web services, which will forward it to the database then returned to the router to be forwarded to the client (see Figure 10).
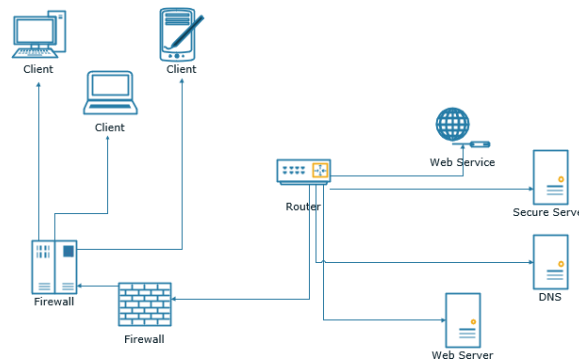

Figure 10. Network Architecture Covid-19 Information System

The designed Covid-19 information system prototype is a further innovation from existing designs [7-10]. Changes in procedures carried out in the design of this information system are a further development and are expected to improve designs that have been made by previous studies [16-18]. Besides, this information system design can provide input to other research to contribute to information technology during the Covid-19 period.

4. Conclusion

The implementation of technology in the world of government is required to communicate accurate information to the public. The Covid-19 Information System design is an early model that will be implemented directly by district governments. The elements included in this information system can meet the first requirement for presenting Presentation of true information is extremely useful within the government's scope to take decisive steps to determine further policy. The design of the Covid-19 information system is specifically for district areas to receive accurate information from the tiniest units of government institutions, namely sub- districts. Because in this information system, the district's role is maximized in gathering data directly from the community so that the data collected can be clear and by the authentic evidence available at the puskesmas in each district. Henceforth, this information system can be developed to meet the demands of the regional administration.

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