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Design of a Responsive Website for the Ngasem Community Health Center Profile and Health Services with an Information Assistant Feature

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ABSTRACT

The advancement of information technology has encouraged healthcare institutions to improve the accessibility and quality of information services provided to the public. UPTD Puskesmas Ngasem still relied on conventional media and social platforms for disseminating information, making it difficult for the community to obtain accurate and up-to-date health service information in a centralized manner. This study aims to design and develop a responsive web-based health information system equipped with an information assistant feature to facilitate public access to health service information. The system was developed using the Waterfall method, which consists of requirements analysis, system design, implementation, testing, and maintenance stages. Laravel was utilized as the web development framework, MySQL as the database management system, and n8n workflow automation integrated through Laravel webhooks to support the information assistant feature. The system provides information related to health services, doctor schedules, health articles, service tariffs, health activities, and public feedback. System testing was conducted using the Black Box Testing method to evaluate functional suitability. The results indicate that all system functionalities operate according to user requirements and can be accessed effectively across desktop, tablet, and smartphone devices. The implementation of the information assistant feature also improves the efficiency of information delivery and helps reduce repetitive inquiries received by healthcare staff. Therefore, the developed system can support more effective, accessible, and responsive health information services for the community.

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1. INTRODUCTION

Advances in information technology have brought significant changes to various sectors, including the healthcare sector. The use of information technology in healthcare services extends beyond data management to provide fast, accurate, and accessible information to the public [1]. Community health centers,

as first-level healthcare facilities, are required to provide healthcare information that can be accessed by the public at any time and through various devices. Therefore, implementing a web-based information system is one solution that can support improving the quality of healthcare information services [2].

The Ngasem Community Health Center (Puskesmas) is a healthcare facility that provides basic health services to the community. In delivering information, most of it is still delivered through social media, posters, and direct communication with staff. This situation results in information not being centrally distributed, and the public often experiences difficulty obtaining information regarding service schedules, doctor schedules, service fees, operating hours, and health activities organized by the Puskesmas. A responsive website allows for optimal access to this information via computers, tablets, and smartphones [3][4].

Several previous studies have discussed the application of web-based information systems in the healthcare sector. Furthermore, the development of chatbot technology and information assistants is also beginning to be utilized to help users obtain information automatically without having to interact directly with staff [5]. These technologies have been proven to improve information accessibility, reduce service response time, and support healthcare institutions in providing more efficient and effective information services to the community.

Based on these problems, this study aims to design and develop a responsive web-based profile and health service information system for the Ngasem Community Health Center (UPTD) equipped with an Information Assistant feature. Existing healthcare information websites generally focus on providing static information, requiring users to manually search through multiple pages to obtain the information they need. This condition reduces the efficiency of information access, particularly for users seeking quick and accurate information regarding healthcare services, schedules, facilities, and service procedures. In addition, the limited level of interaction provided by conventional community health center websites may affect the effectiveness of information dissemination to the public.

The novelty of this research lies in the integration of an Information Assistant feature into a responsive community health center website. This feature enables users to obtain healthcare service information in a faster and more interactive manner through an automated information service mechanism. The system is developed using the Laravel framework with a MySQL database and utilizes n8n workflow automation integrated through Laravel webhooks [6]. Through this integration, the proposed system functions not only as an information delivery platform but also as an interactive medium that assists users in accessing healthcare information more effectively. Therefore, this study contributes to the development of community health center information systems by enhancing information accessibility and user interaction through automated information services.

System development is carried out using the Waterfall method, which consists of the stages of requirements analysis, system design, implementation, testing, and maintenance [4]. System testing is conducted using the Black Box Testing method to ensure that all system functions operate according to user requirements [7].

Through the developed system, it is hoped that the public will be able to obtain health service information more easily, quickly, and centrally, while community health centers (Puskesmas) can improve the effectiveness of information delivery to the public. This research also contributes to the development of a health service website equipped with an automated information assistant feature to support more effective and responsive health information services.

2. METHOD

This research uses the Waterfall method as the system development method. The Waterfall method was chosen because it has systematic and structured stages, making it suitable for developing information systems whose system requirements are known from the outset [8]. Furthermore, this method allows each development stage to be carried out sequentially, thus facilitating the process of system design, implementation, and evaluation. The stages of the Waterfall method consist of requirements analysis, system design,

implementation, testing, and maintenance, which are interrelated to produce a system that meets user needs [9].

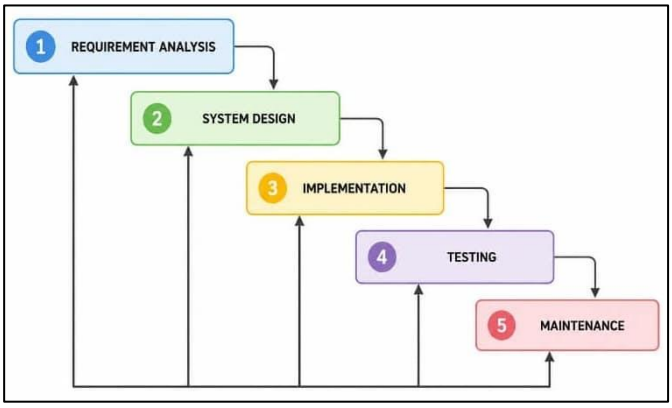

Figure 1. Waterfall Model

During the needs analysis phase, researchers conducted observations and interviews at the Ngasem Community Health Center's Technical Implementation Unit (UPTD) to identify user needs and issues encountered in the delivery of health service information. The interviews were conducted using a semi-structured approach involving administrative staff and healthcare personnel responsible for managing and disseminating healthcare information. The interview process focused on identifying existing information delivery procedures, challenges encountered in serving public information requests, and expectations regarding the proposed system. The analysis revealed that the public requires a fast, centralized, and easy-to-use information platform to obtain information about health services, service schedules, and activities. In addition, healthcare personnel reported that information was often distributed through multiple channels, resulting in repetitive inquiries and difficulties in maintaining consistent and up-to-date information. Based on the findings, several functional requirements were identified, including healthcare information management, service schedule management, health article management, gallery management, feedback management, and an Information Assistant feature capable of providing automated responses to user inquiries. Furthermore, non-functional requirements included responsive accessibility across desktop, tablet, and smartphone devices, user-friendly navigation, administrator authentication for data security, and reliable system availability to support continuous access to healthcare information [10].

The next stage is system design, which includes the system architecture, database structure, business processes, user interface design, and Information Assistant workflow. The system is developed using the Laravel framework as the web application platform, MySQL as the database management system, and n8n workflow automation integrated through Laravel webhooks to support automated information services [11].

In The Information Assistant feature is designed as an intermediary communication mechanism between users and the healthcare information database. When a user submits a question through the website interface, the request is first sent to the Laravel application. Laravel then forwards the user's query to an n8n workflow through a webhook endpoint. The n8n workflow processes the request by analyzing the submitted query and retrieving relevant information from the healthcare information database, including healthcare services, service schedules, facilities, health articles, and other information managed by the system. After the required information is obtained, n8n generates an appropriate response and returns the result to Laravel through the webhook connection. Finally, Laravel delivers the response back to the website interface, where the information is displayed to the user in real time.

In addition, responsive web design principles are implemented to ensure that all system functionalities, including the Information Assistant feature, can be accessed effectively across desktop, tablet, and smartphone devices [12]. The overall system architecture and Information Assistant interaction process are illustrated in Figure X.[12].

After the design phase was completed, the system was implemented using PHP, HTML, CSS, and JavaScript. The system was developed using the Laravel framework with a Model-View-Controller (MVC) pattern. The information assistant feature was integrated with n8n workflow automation to process user inquiries and provide automated responses based on available system data [13].

System testing was conducted using the Black Box Testing method to evaluate whether each system function operated according to the specified requirements [14]. The testing process involved executing predefined test scenarios for every major system module, including the homepage, health service management, service schedule management, health article management, gallery management, feedback and suggestion management, administrator login, administrator dashboard, website display, and Information Assistant feature. For each test case, input data were provided and the actual system output was compared with the expected output to determine whether the functionality operated correctly.

In addition to functional testing, compatibility testing was performed to evaluate system accessibility across different devices and web browsers. The system was tested using Google Chrome, Mozilla Firefox, and Microsoft Edge browsers on desktop devices, as well as Android and iOS mobile devices. The results indicated that all website pages, navigation components, and Information Assistant functions operated correctly without significant display or functionality issues across the tested platforms.

A total of 25 test cases were executed during the evaluation process. All test cases successfully met the expected results, resulting in 25 passed cases, 0 failed cases, and an overall success rate of 100%. The testing results were subsequently used as the basis for evaluating the effectiveness and readiness of the proposed system for implementation at UPTD Puskesmas Ngasem.

The final stage is system maintenance, which aims to correct errors discovered during use and update data and features as needed by the Ngasem Community Health Center (Puskesmas UPTD). Maintenance is performed periodically to ensure the system continues to function properly and the information presented remains relevant to users.

3. RESULT AND DISCUSSION

This section presents the implementation and evaluation results of the web-based health service information system developed for the Ngasem Community Health Center (UPTD). The system was developed using the Laravel framework with a MySQL database and incorporates an Information Assistant feature integrated through n8n workflow automation [15]. The implementation results demonstrate that the system successfully provides health service information, community health center profiles, service schedules, healthcare facilities, and administrative information through a responsive web interface accessible on desktop, tablet, and mobile devices

The responsive design implementation enables users to access information conveniently across different screen sizes without significant changes in functionality. This finding supports previous studies which reported that responsive web technologies improve accessibility and usability of healthcare information systems by providing a consistent user experience across multiple devices. However, unlike conventional healthcare profile websites that primarily serve as static information portals, the proposed system integrates an Information Assistant feature that allows users to obtain information more interactively and efficiently.

From a functional perspective, the integration of workflow automation through n8n enhances the system's capability to deliver automated information services. Users can obtain information without manually navigating through multiple web pages, thereby reducing the time required to access healthcare service information. This approach extends the functionality of traditional healthcare information systems by introducing an automated interaction mechanism between users and the system.

System testing was conducted using the Black Box Testing method [16]. The testing results indicate that all primary functions, including information management, content display, user interaction, and Information Assistant services, operated according to the specified requirements. These results demonstrate that the developed system meets functional requirements and can support digital information services at the Ngasem Community Health Center.

Compared with previous studies that focused primarily on healthcare information dissemination and online service management, this research contributes by integrating workflow automation and an Information Assistant feature into a responsive healthcare information system. This integration not only improves information accessibility but also enhances user interaction and service efficiency. Therefore, the proposed system provides an advancement over conventional community health center websites by offering a more interactive and user-oriented digital health information service.

3.1. System Implementation Results

3.1.1. Home Page

The homepage is the first page users see when accessing the website. This page serves as an information center, displaying a brief profile of the Ngasem Community Health Center (UPTD), health services, service schedules, facilities, service rates, and various other important information. The homepage allows users to access all available features on the system more easily and quickly.

Figure 2. Home Page Implementation Results

3.1.2. Admin Login Page

The admin login page serves as an authentication tool to ensure that only authorized users can access the administration system. Administrators are required to enter a valid username and password before accessing the system dashboard. This mechanism is implemented to maintain data security and prevent unauthorized access to the system.

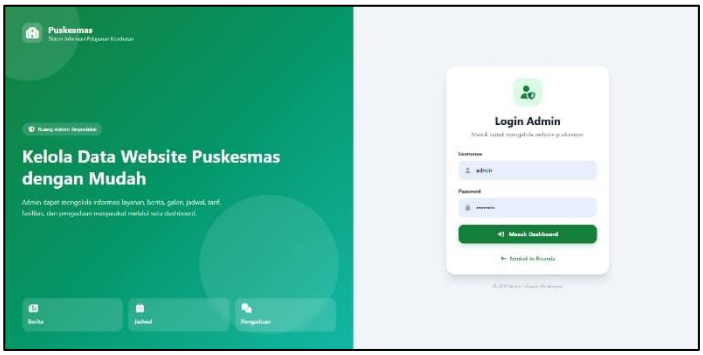

Figure 3. Admin Login Page Implementation Results

3.1.3. Admin Dashboard Page

The admin dashboard is the main page displayed after the administrator successfully logs in. This page provides various data management options, including healthcare services, schedules, health articles, galleries, the latest information, feedback and suggestions, and user data. The admin dashboard is designed to simplify information management, allowing all data displayed on the website

to be updated centrally and efficiently.

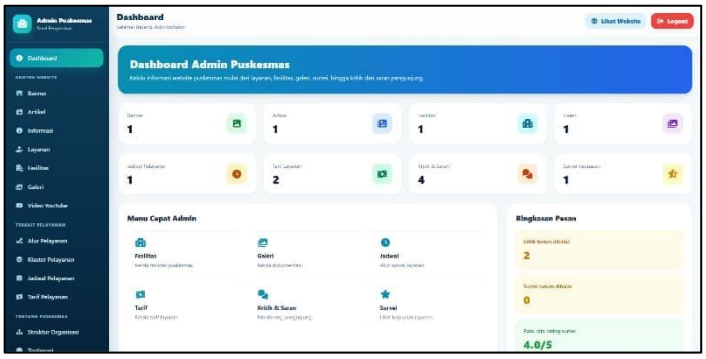

Figure 4. Admin Dashboard Page Implementation Results

3.2. Implementation of Information Assistant Feature

3.2.1. BPMN System Proposed Information Assistant Feature

The process flow of the proposed Information Assistant system is shown in Figure 5. The process starts when the administrator logs into the dashboard and manages healthcare service data. The data are stored in a MySQL database and subsequently displayed on the website. Users can access the website to view healthcare information or interact with the Information Assistant feature. When a user submits a question, the request is sent from the website to the Laravel application, which forwards the query to the n8n workflow through a webhook. The n8n workflow processes the request, retrieves relevant information from the database, and generates an appropriate response. The generated response is then returned to Laravel and displayed on the user interface. Through this workflow, users can obtain healthcare service information quickly and efficiently while all information remains centrally managed through the system database.

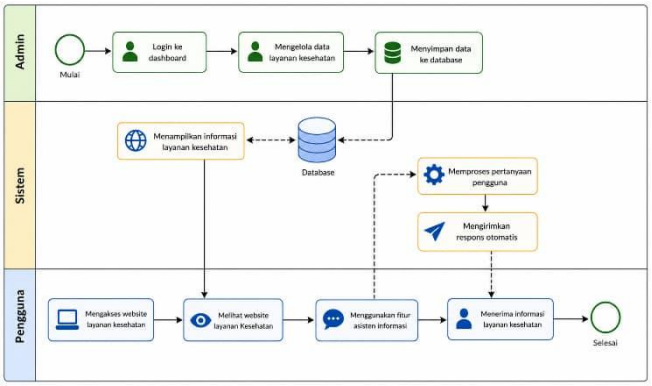

Figure 5. BPMN System Proposed Information Assistant Feature

3.2.2. Information Assistant Feature Display

Implementation results show that the information assistant feature functions effectively in responding to user inquiries. Users can obtain healthcare information more quickly and easily through the website. In addition to improving public access to information, this feature also helps reduce repetitive questions received by service personnel, thereby making the information delivery process more effective.

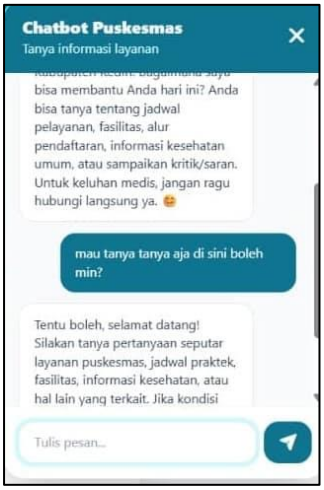

Figure 6. Information Assistant Feature Display

3.3. Responsive Website Implementation

Implementation results show that all website pages display well on desktops, tablets, and smartphones. The page layout automatically adjusts to the screen size, ensuring that information remains neatly organized and easily understood by users.

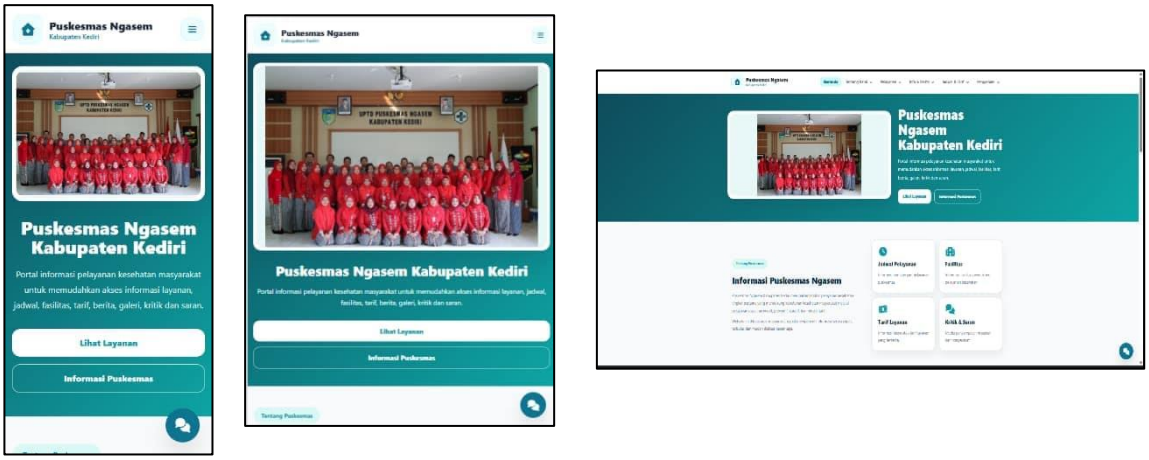

Figure 7. Implementation of Responsive Websites on Desktop, Tablet, and Smartphone Devices

Based on display testing results on various devices, the website is able to adapt its page structure, element sizes, and navigation responsively. This demonstrates that the system is easily accessible to users across multiple devices without compromising the functionality or quality of the website's display.

3.4. System Test Results

System testing was conducted to ensure all features and functions within the healthcare information system function according to user needs. The features tested included the admin login page, healthcare data management, service schedule management, healthcare article management, gallery management, feedback and feedback management, website appearance, and information assistant features. Testing results demonstrated that all features functioned according to the system's defined requirements.

Table 1. Black Box Testing Results

No	Tested Feature	Expected Result	Test Result	Status
1	Admin Login	Administrator successfully accesses the dashboard	Valid	Passed
2	Health Service Management	Health service data can be added, edited, and deleted	Valid	Passed
3	Service Schedule Management	Service schedule data can be managed properly	Valid	Passed
4	Health Article Management	Articles can be added and displayed successfully	Valid	Passed
5	Gallery Management	Gallery data can be managed properly	Valid	Passed
6	Feedback and Suggestions	Feedback data can be submitted and stored successfully	Valid	Passed
7	Website Display	Information is displayed correctly to users	Valid	Passed
8	Information Assistant Feature	The system provides responses to user queries	Valid	Passed

Based on the black box testing results, all system features successfully operated according to the established functional requirements. The testing confirmed that the administrator login process, health service management, service schedule management, article management, gallery management, feedback management, website display, and Information Assistant feature functioned as expected. These results indicate that the system is technically capable of supporting healthcare information services at the Ngasem Community Health Center (Puskesmas UPTD).

However, black box testing primarily evaluates whether system functions operate correctly according to predefined requirements and does not directly measure user satisfaction, usability, user experience, or the effectiveness of the system in real-world usage scenarios. Therefore, although the testing results demonstrate that the developed system is functionally valid, they do not fully represent how users perceive the ease of use, usefulness, and overall quality of the system during actual operation.

One limitation of this study is that the system evaluation was limited to functional testing using the Black Box Testing method. Future research may complement functional testing with user-centered evaluation methods, such as User Acceptance Testing (UAT), System Usability Scale (SUS), or other usability evaluation techniques, to obtain a more comprehensive assessment of user satisfaction, system usability, and the effectiveness of the Information Assistant feature in supporting healthcare information services.

4. CONCLUSION

This research successfully developed a web-based health service information system at the Ngasem Community Health Center (UPTD) using the Laravel framework and MySQL database. The developed system provides various health information features, such as health services, service schedules, health articles, service rates, galleries, and an information assistant feature integrated through the n8n workflow automation. Furthermore, the implementation of a responsive web design concept allows the system to be accessed easily from desktops, tablets, and smartphones.

Based on the results of testing using the Black Box Testing method, all system features operate according to the established functional requirements. Implementation of this system can help the delivery of health service information become faster, more centralized, and more accessible to the public. Furthermore, the information assistant feature can also assist in providing automated responses to user inquiries, thereby increasing the effectiveness of information services at the Ngasem Community Health Center (UPTD).

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