INSYTECH JOURNAL

Information System and Technology
J O U R N A L
https://jurnal.umk.ac.id/index.php/insytech

Web-Based Management Information System at Puskesmas Dersalam Using The Pieces Method

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https://doi.org/10.24176/insytech.v1i2.146333

Received: January 19, 2025
Revised: January 21, 2025
Accepted: January 24, 2025
Available online: February 02, 2025

Keywords:
Service, PIECES, Health Center, Patient, Consultation, Web.

ABSTRACT

Puskesmas Dersalam, as one of the health institutions in Kudus Regency, faces challenges in improving patient services. Registration, examination, prescription issuance, and data management such as drug stock, patient history, medical records, and doctor data are still manually recorded in ledgers. Furthermore, patients face difficulties in conveying complaints if they cannot visit the facility directly, and the lack of an online information platform hampers access to important information. To address these issues, this study proposes an online information system solution utilizing the PIECES method to analyze system requirements. System modeling is conducted using UML, with a MySQL database and PHP programming language, accompanied by a service architecture design to support online patient data management and consultation services.

1. INTRODUCTION

UPTD Puskesmas Dersalam is one of the healthcare institutions in Kudus Regency, located on Jl. Raya Kampus UMK Dersalam, Bae District. UPTD Puskesmas Dersalam provides healthcare services to achieve optimal public health status.

The rapid advancement of information technology in line with the times, particularly in the field of healthcare technology, significantly facilitates activities in health centers, hospitals, and clinics. However, at UPTD Puskesmas Dersalam, many processes are still not well-computerized and remain largely manual. For example, patient registration requires patients to come directly to the health center to take a queue ticket (Abdul Rokim. 2023). The registration staff then calls patients according to their queue number, inquires whether they are new or returning patients, and processes payments. Patients with KIS (Health Insurance Card) or BPJS (National Health Insurance) can use these services for free, while others must pay in cash. After registration, patients proceed to the examination room for further consultation with a doctor. Following the consultation, patients submit a paper prescription to the pharmacy staff. These manual processes hinder the ability to deliver optimal service to patients. Moreover, patients often feel confused about how to communicate their complaints to UPTD Puskesmas Dersalam. Therefore, an information system is needed to manage and monitor patient complaint reports efficiently. (Halimah. 2023)

Medical record management at Puskesmas Dersalam is also not optimal, as records are still kept in large ledgers, which are time-consuming to write and prone to damage or loss. Retrieving medical records is also a lengthy process, as staff must manually search for individual patient data in the ledger. [3]. Similarly, inventory management of medication stocks remains manual, making it difficult for staff to determine the availability or depletion of medications. Patients who cannot visit the health center in person often face challenges in seeking consultations, as they must come directly to Puskesmas Dersalam without access to consultation schedules or remote options. [4]

Additionally, the absence of an online platform for publishing articles or news related to Puskesmas Dersalam complicates the dissemination of important information [5]. Currently, announcements are distributed through brochures around the health center and village halls in Bae District. This method is inefficient and limits the reach of information.

Health centers are required to provide optimal services to patients to meet the healthcare needs of the community effectively. An information system is designed to simplify patient registration, consultation management, and data storage and processing, ultimately producing information that supports healthcare activities using technological advancements (Putra. 2020). Proper utilization of information technology can enhance the quality of services at UPTD Puskesmas Dersalam, thereby increasing patient satisfaction. (Haniasti. 2023)

Based on the aforementioned issues, the author aims to address these problems using the PIECES analysis method, which focuses on analyzing the shortcomings of the current system. The PIECES method divides the analytical framework into six aspects: performance, information, economics, control, efficiency, and service. This study also aims to develop an information system to facilitate well-computerized service and [8]. management processes at Puskesmas Dersalam. The

results of this system development will also serve as the basis for the author's thesis, titled "Web-Based Management Information System at Puskesmas Dersalam Using the PIECES Method." This system is expected to optimize the performance of healthcare services at UPTD Puskesmas Dersalam.

2. RESEARCH METHODOLOGY

In research conducted by (Angga, dkk., 2020) The Pasar Rebo District Health Center has implemented an Electronic Medical Record (EMR) system at all levels of management. However, the system has not been fully utilized by some health center staff, as conventional methods of recording and retrieving medical records are still being used. This study was conducted to assess user satisfaction with the EMR system at the Pasar Rebo District Health Center. (PUTRA, 2018) The purpose of determining user satisfaction is to evaluate whether the EMR system is functioning well and meeting user expectations. Additionally, user satisfaction levels can serve as a reference for further development of the EMR system, allowing developers to identify areas where users are dissatisfied or less satisfied with the system.

In research conducted by (Haniasti, dkk., 2023) SIMPUS is a Public Health Center Management Information System that manages diagnoses and medication dispensing, with the data eventually serving as an information report for the health center. (Devid, Dian, & Dewi, 2018) The Management Information System used by Kunciran Health Center is called e-Puskesmas. e-Puskesmas is a web-based and mobile Public Health Center Management Information System designed to assist in health center services and management, ranging from patient registration, polyclinic services, to reporting at the city/regency and provincial health department levels.

In research conducted by [10] E-Puskesmas is a web-based puskesmas management information system, used to assist in services starting from patient registration, and poly services, to reporting to the health office level online and integrated using the Ministry of Health's Puskesmas Information System standards. The purpose of this research is to determine the level of officer satisfaction in using the e-Puskesmas system and know what things need to be improved using components from the PIECES Framework. The research model is observational descriptive using the PIECES (Efficiency, Information, Economics, Control and Service) framework approach to measuring satisfaction levels. The results of the study stated that of the six variables owned by the PIECES framework, they had an average value, namely performance value (3.80), information (3.77), economics (3.89), control (3.21), efficiency (3.89), and security (4.04). It can be concluded that the implementation of the website version of the e-Puskesmas when viewed from the PIECES analysis can be stated to be good, efficient, and effective because the satisfaction value of each variable can be categorized as satisfied. However, the control and security aspects are still in doubt.

In research conducted by [11] The service process at each puskesmas takes a long time if it is done manually, so it needs web- based management, one of which is by using the e-puskesmas application. E-Puskesmas is a manifestation of the implementation of a puskesmas management information system that is able to make a major contribution to excellent service to patients. The purpose of the study was to determine the utilization of e-Puskesmas information system services using the PIECES method (performance, information, economics, control, efficiency, service). This type of research is a descriptive survey. The research sample was 29 health workers who were obtained using a total sampling technique. Data were collected using a questionnaire and analyzed descriptively. The results showed that aspects with good categories were performance (51.7%), information (55.2%), and service (55.2%), while aspects with less good categories were economics (51.7%), control (72.4%), and efficiency (55.2%). It is recommended for the West City Health Center to implement e-Puskesmas services in accordance with the Decree of the Minister of Health.

In research conducted by (Fitriana, dkk., 2020) The Tanah Sareal Health Center is a public health service facility in Bogor that implemented the Public Health Center Management Information System (SIMPUS) in mid-2015.

(Tarigan & Maksum, (2022)) This study aims to analyze the implementation of the Public Health Center Management Information System (SIMPUS) using the Human Organization Technology (HOT)-Fit model at the Tanah Sareal Health Center in Bogor City. (Niyalatul, Laitafud, Atma, & Efri, 2023) This research is a quantitative descriptive study with a cross-sectional design involving a sample of 35 respondents. The sample was obtained using a Nonprobability Sampling technique. Data collection was conducted using a questionnaire instrument and analyzed univariately and bivariately using the Chi-Square test (Silfa, Daniel, laela, & Deasy, 2023). The Chi-Square analysis results showed a significant relationship between system quality variables (p=0.009), system usage (p=0.035), and user satisfaction (p=0.025) with SIMPUS performance. The performance of the Public Health Center Management Information System at the Tanah Sareal Health Center in Bogor City has been functioning well. The researcher recommends that SIMPUS be fully implemented across all service areas to ensure its benefits can be utilized by all staff at the Tanah Sareal Health Center in Bogor City.

2.1 Data Collection Methods

Data collection techniques are the most strategic step in research because the primary goal of research is to obtain data (Assyakurrohim, dkk, 2022). To obtain truly accurate data, the author collects data sources as follows.

1. Primary Data Sources
   Primary data refers to data directly provided to the data collector. This primary data includes.
   a. Observation
      Data collection is conducted through observation and recording of management activities, such as reviewing and analyzing data, identifying various emerging issues, and seeking solutions.
   b. Interview
      Interviews are a data collection method involving face-to-face interaction and direct dialogue between the researcher and the respondent. Data is collected through direct meetings and question-and-answer sessions with the authorities at Puskesmas Dersalam
2. Secondary Data Sources
   Information obtained from literature or other sources than the object of research is directly referred to as secondary data. Secondary data sources include.
   a. Doctentation Studies

The study of documentation involves gathering information from various sources such as literature, documents, and internet media. This data is then analyzed and used as a reference in research

b. Literature Studies
Literature study involves gathering information from books relevant to the research topic in order to gain a deeper understanding. The main goal is to analyze the available literature in order to gain a deeper insight into the research topic being discussed

2.2 System Development Methods

In research conducted by (Yurindra, 2017) The system development method is a method with a process that is important for the creation of a system. In the development that will be applied this research is the waterfall method. Waterfall provides a sequential approach to the software lifecycle starting from analysis, design, coding, testing, and the support stage.

2.3 System Actor Analysis

Actors represent all users of the system. The actors in the Web-Based Patient Registration and Service Information System at Puskesmas Pancur are as follows:

1. Information System Team (Administration)
   The Puskesmas Information System Team has access rights to manage user data
2. Patients/Patient Representatives
   The patient has access rights to register, view registration and service schedules at the Puskesmas, view outpatient doctor schedules, inpatient doctor schedules, and midwife schedules, view medical history and prescriptions by entering the Medical Record Number (No.RM), check payment details, and make payments. If the patient is an inpatient, they will receive a WhatsApp notification regarding their follow-up schedule three days after discharge from the Puskesmas
3. BP Staff
   The BP staff has access rights to view and input outpatient patient data, create outpatient examination reports, view and create medical records, issue prescriptions, and document the patient's medical history. If the prescribed medication is not available in the required quantity, the BP staff will receive a warning that the stock does not meet the prescribed amount. The BP staff also has the right to create referral letters, which are sent to the referred hospital (RS)
4. Service Staff
   The Service staff has access rights to view outpatient registration data, inpatient registration data, and maternity registration data. They also have the authority to create outpatient visit reports for patients
5. Doctor
   The doctor has access rights to view the results of patient examinations
6. Nurse
   The nurse has access rights to view and input patient data, create daily examination reports, generate medical records, view and input patient prescriptions, create referral letters, make inpatient care activity reports, and create control schedules
7. Midwife
   The midwife has access rights to view and input patient data, create medical records, write prescriptions, create referral letters, view and generate monitoring and evaluation results for services, create reports on maternal and newborn monitoring, and create reports on referred patients
8. Pharmacy Service Staff
   The pharmaceutical staff has access rights to view and create medication data, manage and view the stock condition of medications, view patients' e-prescriptions, and generate reports on the usage of medications by patients
9. Cashier (Finance)
   The cashier (finance) has access rights to monitor the transaction process at the Puskesmas, view the payment history made by patients, and generate payment reports for patients
10. Head of Puskesmas
    The head of the Puskesmas has access rights to view all reports from inpatient care, outpatient care, maternity services, medication services, and payments. The head of the Puskesmas can also print the reports generated from each service, and all these reports can be archived for the Puskesmas

3. RESULTS AND DISCUSSION

3.1 System Design

A use case system describes the individuals or entities involved in the system (actors) and the actions or functionalities the system provides (use cases). Based on the business processes, the system's use case can be illustrated using a use case diagram [14]. This diagram provides a visual representation of the relationships between actors and use cases, as shown in Figure 1 below:

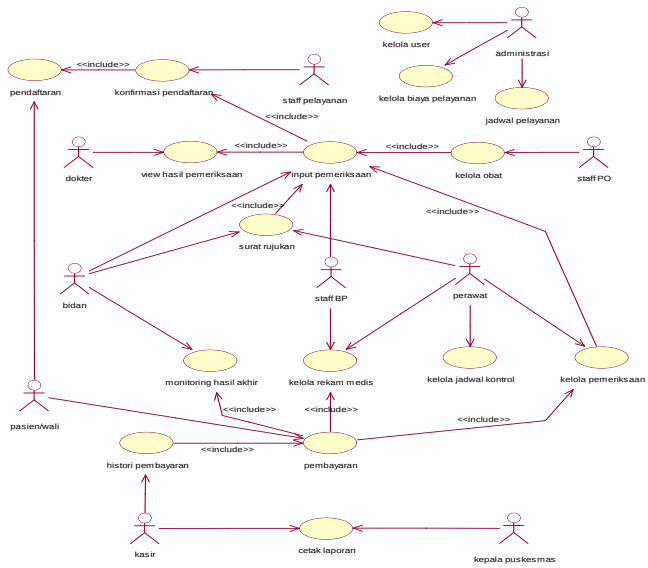

Figure 1. Use Case System for the Web-Based Management Information System at Puskesmas Dersalam Using the PIECES Method.

A class diagram is a diagram used to display several classes within the system or software being developed [15]. The class diagram provides an overview of the system and the relationships that exist. The class diagram can be seen in the following figure 2:

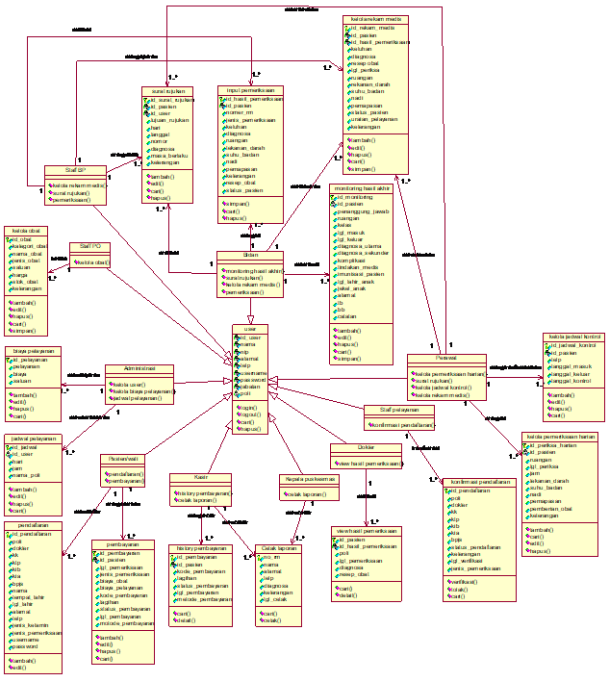

Figure 2. Class Diagram of the Web-Based Management Information System at Puskesmas Dersalam Using the PIECES Method.

3.2 Database Design

In research conducted by [16]. The table relationships formed in the database for the creation of the Web-Based Management Information System at Puskesmas Dersalam Using the PIECES Method can be seen in the following figure 3:

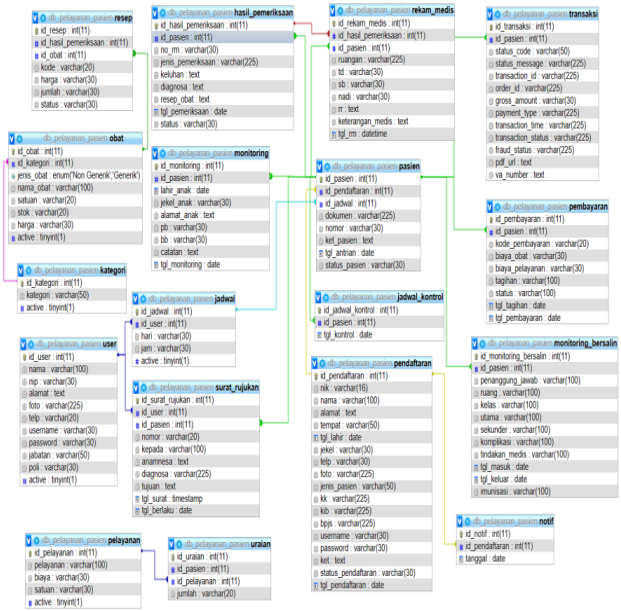

Figure 3. Table Relationship for the Web-Based Management Information System at Puskesmas Dersalam Using the PIECES Method.

4. CONCLUSION

4.1 Conclusion

Based on the results of the analysis and design, the author can draw the following conclusions:

1. Produces a Web-based Management Information System at Puskesmas Dersalam using the PIECES method
2. This information system is equipped with WhatsApp notifications to provide patients with information regarding medical record numbers, payments, and follow-up schedules
3. This information system is also equipped with a Payment Gateway from Midtrans, allowing patients to make online payments securely and conveniently through the system
4. This information system can manage data on service schedules, service costs, user data, medication data, medical records, examination data, childbirth monitoring data, and payment data
5. The output generated by this information system includes medical record reports, patient data reports, medication usage reports, payment reports, childbirth monitoring reports, and referral letter reports

4.2 Advice

In developing and implementing systems like the Puskesmas Information Management System, it is crucial to focus on continuous user feedback and ensure that the system remains flexible and scalable. As healthcare settings evolve, integrating additional features, updating security protocols, and maintaining the reliability of data handling can contribute to the system's long-term success. Collaboration with the relevant stakeholders, such as healthcare staff and IT professionals, is essential to ensure that the system meets the users' needs efficiently. Regular system updates and training for end-users can also enhance the effectiveness and adoption of the system.

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