



Design and Build a Health Test Payment Application at UPTD Banjarmasin City Health Laboratory

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ABSTRACT

Efficient and transparent health services are essential to improve the quality of services in health institutions. The Banjarmasin City Health Laboratory UPTD is currently still using a manual payment system which is prone to administrative errors and takes a long time. This research aims to design and develop a web-based application for a health test payment system to improve efficiency and transparency. The method used in this study is a system design and development approach, where the process begins with needs analysis, design, development, and system testing. The results show that web-based applications are able to speed up the payment process, reduce recording errors, and make it easier to create transparent payment reports. This application also increases patient satisfaction by providing easy access to payments. However, there are gaps in this study related to large-scale system testing and the implementation of more sophisticated security protocols to optimally protect patient data. Further research needs to overcome these shortcomings by improving the data security aspect and conducting further evaluation of the use of the system in daily operations.

INTRODUCTION

Health services are a very vital sector in creating community welfare. In recent years, the sector has undergone a variety of significant changes, including the adoption of information technology to improve the efficiency, quality, and accessibility of services. In Indonesia, technological developments in the field of health services are very important, especially to support the implementation of a more integrated and efficient health system in the digital era. The digital transformation in healthcare, spurred by the COVID-19 pandemic, has prompted many institutions to adopt web-based applications to speed up administrative processes and provide better services to the community (Mutiarani, 2023).

UPTD Banjarmasin City Health Laboratory, as one of the health institutions in Indonesia, still faces obstacles related to the use of a manual payment system. Not only is this system time-consuming, but it is also prone to human error, both in payment recording and transaction verification processes. In addition, non-transparent transaction recording causes difficulties in financial reporting and budget supervision. This inefficiency hinders the smooth administration process and services to the community. With a more structured and easy-to-monitor payment system, it is hoped that it can improve the quality of services and ensure the accuracy of administration in health services (Prabhata, 2024).

The use of web-based applications in payment systems in the healthcare sector provides various benefits, including improving operational efficiency, reducing reliance on manual transactions, and making it easier to record transactions in real-time. The app allows patients to make payments independently through a platform that can be accessed anytime and anywhere, reducing the waiting times that often occur at payment counters (Walker Ferniansa & Chotijah, 2023). In addition, the security of transactions can be better assured with data encryption and the implementation of a strong authentication system, which is certainly more secure than manual payment systems that are prone to manipulation or administrative errors (Adianto, 2020).

The implementation of web-based applications can also increase transparency in the administrative process. Every transaction made can be automatically recorded in an integrated database, making it easier to monitor and report finances. By utilizing this application, the Banjarmasin City Health Laboratory UPTD is expected to provide faster, more efficient, and transparent services to the community, as well as improve administrative processes and more accurate financial reporting (Sany & Arifin, 2023).

Therefore, this research aims to design and build a web-based application that can facilitate a health test payment system at the Banjarmasin City Health Laboratory UPTD. With the development of this application, it is hoped that effective and efficient solutions can be created in solving problems related to manual payment systems, as well as improving the quality of services to the community.

THEORETICAL REVIEW

A web-based information system is an application that utilizes internet technology to manage and convey information effectively. This system provides

flexibility in data accessibility, so that it can be accessed anytime and anywhere by users. Another advantage of web-based systems is better data integration, allowing the administrative process to be more efficient and accurate (Fitria, Iryanie, et al., 2023).

Digitalization of healthcare services has become a global trend that aims to improve service quality and operational efficiency. Research by Nugraha and Sari shows that the application of digital technology, such as web-based applications, is able to reduce administrative errors and speed up the transaction process. This is especially relevant in the healthcare sector, where speed and accuracy are top priorities (Selvan S.C.B & Nagarajan, 2023).

Security is becoming an important element in the development of web-based applications, especially in the healthcare sector that handles sensitive data such as patient information. The implementation of security protocols such as Secure Sockets Layer (SSL) and user authentication can prevent data leaks and protect information from cyber threats. A system design that pays attention to security aspects can increase user confidence in the application developed (Mehrtak et al., 2021).

User interface (UI) design plays a crucial role in ensuring the ease of use of web-based applications. An intuitive and simple UI can drive the level of adoption of the technology among users. In addition, good design improves the user experience and speeds up the application learning process (Miya & Govender, 2022).

The use of digital technology has been proven to be able to improve administrative efficiency in various sectors, including health. Studies by Lestari and Santoso show that web-based applications can reduce administrative process time by up to 40% compared to manual methods. This efficiency not only increases productivity but also provides higher satisfaction to service users (Widcaksono & Silmina, 2023).

METHODOLOGY

Software Development Methods

This research uses a Waterfall-based software development method because it offers a systematic and structured approach in every stage of development. The Waterfall model is suitable for projects that have clear requirements from the start and require complete documentation. The stages in this model include needs analysis, design, implementation, testing, and maintenance (Fitria, Khalid, et al., 2023).

The first stage is the needs analysis, where information is gathered to determine the specifications of the system to be built. Furthermore, at the design stage, the design of the system and user interface are compiled using tools such as flowcharts. Implementation is carried out by developing applications using web-based technologies, such as HTML, CSS, JavaScript, and frameworks. After that, testing is carried out to ensure the application works according to the specifications (Kristeria et al., 2020; Septiana & Khristianto, 2022).

Data Collection Methods

Data collection was carried out through three main approaches, namely interviews, observations, and literature studies. Interviews are conducted with related parties, such as administrative staff and patients, to understand the needs of the system and the constraints faced in the payment of health tests. Observation was carried out at the Banjarmasin City Health Laboratory UPTD to directly observe the manual payment process that is currently running (Hayat et al., 2019; Syaharman, 2021).

The literature review is conducted by reviewing a variety of scientific sources, including journals, books, and research reports relevant to the development of web-based applications in the health sector. The data obtained is analyzed to ensure that the development of web-based applications can answer user needs and improve administrative efficiency (Rabbani & Najicha, 2023).

RESEARCH RESULTS

The payment process at the Banjarmasin City Health Laboratory begins with patients coming to register and submit complaints to the service department. After that, the patient makes the payment according to the set fee, then waits for the service department to make a receipt as proof of payment. The receipt issued consists of two copies, one to be archived by the service department and the other to be handed over to the patient as valid proof of payment. After that, the service department makes a payment report that includes details of the transactions that have been made, which are then submitted to the leadership for examination.

The laboratory leader receives the payment report from the service department and checks the report to ensure that the recorded transactions are in accordance and that there are no administrative errors. With this system, it is hoped that the entire payment process can be carried out more transparently and efficiently, reducing the possibility of errors in payment recording and reporting.

The author proposes a solution in the form of developing a web-based application for a health test payment system at the Banjarmasin City Health Laboratory UPTD. This application system is designed to overcome the limitations that exist in the manual systems used today, with the aim of improving efficiency, accuracy, and transparency in the management of health test payments. This application is expected to facilitate all payment transactions more quickly and accurately, as well as produce more timely and accountable financial statements.

In order to support the implementation of a more structured system, the authors suggest an update to the network of procedures that make up the payment system. The first procedure that needs to be implemented is the transaction procedure, which will involve the service of patients who come to perform examinations in the laboratory. This procedure includes patient registration, health checks, and payment receipts, all of which are recorded in the application system. This step aims to ensure that all transactions made by patients can be recorded in real-time and without errors, and can be accessed by relevant parties for monitoring purposes.

The second procedure that must exist is the transaction acceptance procedure, where the administration or cashier receives payment from the patient after the examination is carried out. At this stage, the payment transaction is recorded in the system, and the patient is provided with a valid proof of payment. Automatic recording in this system will simplify transaction management and minimize the risk of errors that often occur in manual processes, such as errors in payment amounts or late recordings.

To further clarify and facilitate understanding of the process flow, the author also suggests a document flow chart that describes the steps in the process of paying for health tests at the Banjarmasin City Health Laboratory in figure 2. This flowchart will cover every stage, from patient registration, payment, issuance of receipts, to the preparation of reports submitted to leaders for examination. With this flowchart, it is hoped that it can provide clear guidance for all parties involved in the payment process, as well as accelerate the implementation and adoption of this new system in daily operations.

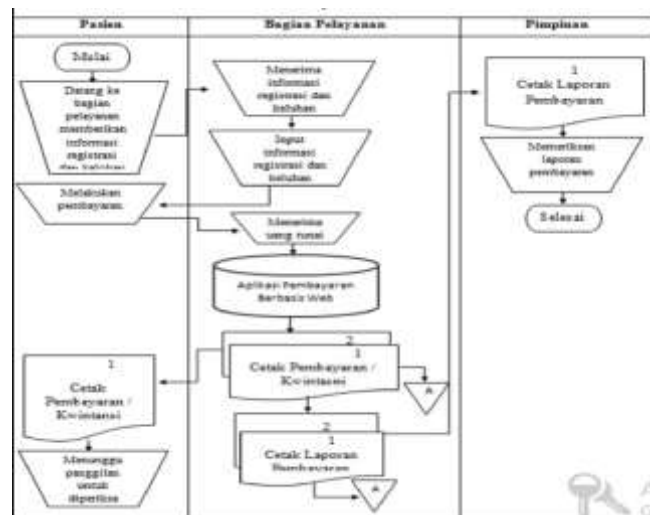


Figure 1. Recommended System Flowchart

The website design consists of several forms related to the payment procedure at the Banjarmasin City Health Laboratory UPTD in accordance with the recommended system needs.



Figure 2. Login View

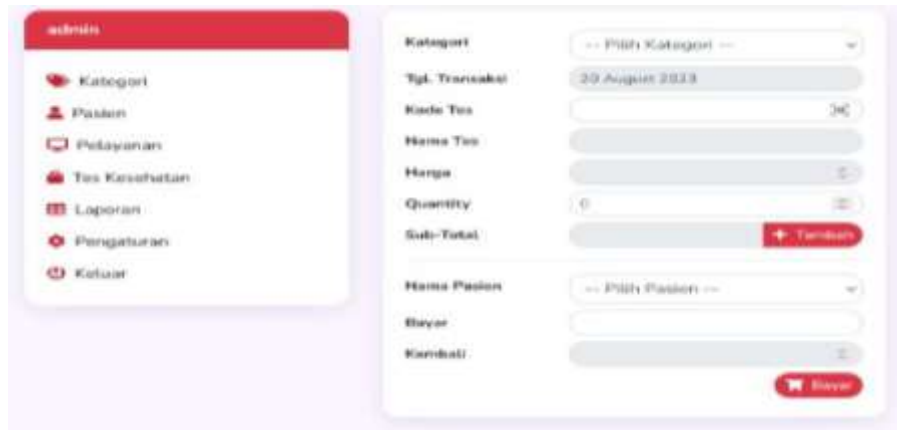


Figure 3. Dashboard

The dashboard form contains information related to the menus available in the system, making it easier for users to find the features they need.

DISCUSSION

Table 1 shows the results of the comparison between the running system and the recommended system.

Table 1. System Comparison

Aspects	Running System (Manual)	Recommended Systems (Web-Based)
Payment Process	It is done manually with handwritten notes.	Payments are recorded automatically in the application system.
Process Time	It takes longer due to manual processes.	The process is faster and more efficient due to the automation of record-keeping.
Recording Accuracy	Vulnerable to administrative errors and double logging.	Higher accuracy with automatic, real-time recording.
Transparency	Lack of transparency in recording transactions.	More transparent with accessible and monitored reports.
Report Management	Reports are created manually and separately.	Automated reports that are directly generated by the system.
Data Accessibility	Data is difficult to access and manage.	Data can be accessed easily and quickly by related parties.
Data Security	Vulnerable to loss or corruption of physical data.	Security is more assured with user encryption and authentication.
User Satisfaction	Long wait times and complicated administrative processes.	Users (patients and attendants) can enjoy a faster and easier process.

In the manual system, the payment process is carried out by handwriting, which takes longer because it depends on administrative activities carried out manually. This makes the process vulnerable to errors, such as recording errors or double recording. On the other hand, web-based systems allow payments to be automatically recorded in the app, speeding up processes and increasing efficiency by reducing manual intervention (Ichsan & Fitria, 2021).

In terms of recording accuracy, manual systems run the risk of administrative errors, which often lead to inaccurate or duplicate data. In contrast, web-based systems offer higher accuracy because recording is done automatically and in real-time, reducing the likelihood of such errors occurring (Fitria, Iryanie, et al., 2023; Septiana & Khristianto, 2022). Transparency is one of the important issues in the manual system, where transaction recording is not clear and difficult to monitor. Web-based systems, on the other hand, offer a higher level of transparency with reports that can be easily accessed and monitored by relevant parties at any time. Integrated and automated reports make web-based systems superior in terms of report management compared to manual systems, which require longer time and separate reports.

Data accessibility has also become easier with web-based systems. In manual systems, data is often difficult to access and manage, whereas with web-based systems, data can be accessed easily and quickly by authorities, ensuring the necessary information is available when needed. Data security is a very important aspect of information management. Manual systems are particularly vulnerable to loss or damage to physical data, while web-based systems have a higher level of security thanks to the use of encryption and user authentication, which keeps data safe.

Finally, when it comes to user satisfaction, manual systems often lead to long wait times and complicated administrative processes. In contrast, web-based systems offer a faster and easier experience for users, whether they are patients or staff, with more efficient processes and minimized wait times

CONCLUSIONS AND RECOMMENDATIONS

This research aims to design and build a web-based health test payment system at the Banjarmasin City Health Laboratory UPTD. From the results of the study, it can be concluded that the implementation of this web-based system can significantly improve efficiency, accuracy, and transparency in the health test payment administration process. With this new system, the entire process from patient data input, recording payment transactions, printing payment invoices, to making payment reports submitted to leaders can be done more quickly and in a structured manner. Manual processes that were previously time-consuming and error-prone can now be replaced with more automated and integrated systems, which not only reduce the workload of officers, but also minimize the risk of errors in transaction recording and financial report management. In addition, by using a web-based application, patients also get the convenience of making payments and receiving proof of payment quickly without having to queue at the counter, which will certainly increase service satisfaction.

FURTHER STUDY

As a follow-up step, it is highly recommended to conduct regular evaluation and monitoring of the system that has been implemented to ensure that the system functions properly and can optimally meet the needs of users. Regular testing is essential to detect and fix potential technical issues that may arise after implementation. In addition, it is important to involve all relevant

parties in the application use training process, both service officers and leaders, so that they can make the most of this application and improve operational efficiency. To keep patient data and sensitive transactions secure, it is recommended to strengthen security protocols, such as the use of more advanced encryption and the implementation of two-factor authentication to protect data from potential threats. In the long term, system development and updates also need to be carried out on an ongoing basis, both to accommodate changing operational needs and to keep up with the latest technological developments. With continuous improvements, it is hoped that this system can continue to function optimally and support the improvement of the quality of health services at the Banjarmasin City Health Laboratory UPTD.

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