
Qualitative Analysis Of Medical Record And Health Information Officers' Experiences In Using Electronic Medical Records (EMR) Applications Based On The Delone And Mclean Model At Rsud Wangaya Denpasar City

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Abstract

The development of information technology in the healthcare sector has encouraged healthcare facilities to implement Electronic Medical Records (EMR) systems to improve service efficiency and patient data management. Wangaya Regional General Hospital in Denpasar has implemented EMR in accordance with the Indonesian Ministry of Health Regulation Number 24 of 2022. However, several challenges are still experienced by system users. This study aims to analyze the experiences of Medical Record and Health Information Officers (PMIK) in using the EMR application based on the DeLone and McLean Information System Success Model, which includes system quality, information quality, and service quality. This research employed a qualitative method with a phenomenological approach. Data were collected through in-depth interviews with seven PMIK officers at Wangaya Regional General Hospital. The results indicate that the system quality of EMR is considered relatively easy to use and helpful in supporting daily work activities. However, several obstacles were identified, such as occasional system errors, suboptimal diagnosis code searching, and slower system access when the network is unstable. The information quality is considered sufficiently complete and supportive of healthcare services, although there are occasional cases of duplicate medical record numbers or BPJS numbers and delays in data access under certain conditions. Meanwhile, service quality is perceived as fairly good as the system improves service efficiency and facilitates coordination between units, although training programs have not been evenly distributed and the response to technical issues still needs improvement. Overall, the implementation of EMR at Wangaya Hospital has provided benefits in supporting healthcare services; however, further system development and service support are required to optimize its utilization.

Keywords: *Electronic Medical Records, PMIK Experience, DeLone and McLean Model.*

INTRODUCTION

Advances in information technology have transformed many aspects of life, including the healthcare sector. The development of health information technology has significantly changed the way medical data and information are managed in healthcare facilities. One form of this implementation is the use of Electronic Medical Records (EMR), which has now become mandatory in all hospitals in Indonesia in accordance with Minister of Health Regulation Number 24 of 2022. EMR serves as a solution to improve service quality, work effectiveness, and support faster and more accurate clinical decision-making. The implementation of EMR enables healthcare workers to access patient information directly, reduce the likelihood of medical errors, and enhance collaboration among healthcare service units (Permenkes No. 24, 2022).

Medical record services are one of the supporting services in hospitals that serve as the foundation for assessing the quality of healthcare services provided. High-quality service is reflected not only in medical care but also in the proper management of medical records, which is an important indicator of hospital service quality. Medical records are a collection of facts about a person's life and medical history, including current and past illnesses and treatments, documented by healthcare professionals in providing care to patients (Irmawati et al., 2024).

The purpose of implementing Electronic Medical Records (EMR) is to improve effectiveness in managing medical records. EMR provides information that can be accessed more quickly and easily, enhances data integration between hospital management systems and other systems to minimize human error, reduces the physical storage space required for records, and offers various other advantages. However, several hospitals and healthcare facilities have not yet adopted electronic medical record systems and still rely on manual methods for recording medical data. Conventional

methods tend to be time-consuming, prone to errors, and less efficient. Several factors contribute to the lack of EMR implementation, including the need for time-consuming training and adaptation for healthcare workers, limited internet infrastructure, and unresolved issues related to data security and system integration (Ariani, 2023).

Wangaya Regional General Hospital in Denpasar is one of the government-managed hospitals in Bali. As a type B hospital, it collaborates with various educational institutions across multiple disciplines, both in healthcare and other academic fields. One of the technological needs at Wangaya Hospital is the implementation of an electronic medical record system. The hospital has begun implementing EMR in accordance with Minister of Health Regulation Number 24 of 2022, which mandates all hospitals to adopt this system no later than December 31, 2023 (Istia, 2025). However, in practice, several challenges remain, such as limited digital competencies among staff, differing perceptions of the system's benefits, and technical difficulties in operating the application. These challenges directly affect the experience of Medical Record and Health Information Officers (PMIK), who play a central role in managing medical record data in hospitals.

In the implementation of EMR in hospitals, system success is not determined solely by its technological functionality but also by how users—particularly PMIK officers—experience, evaluate, and interpret the system's quality in their daily work activities. The DeLone and McLean (2003) model explains that the success of an information system is measured through several key dimensions: system quality, information quality, and service quality. These three dimensions are interrelated and shape users' subjective experiences with the system.

System quality refers to the technical capability of the system to support users in completing their tasks efficiently and effectively. According to DeLone and McLean (2003), system quality includes hardware and software performance, policies, and procedures that ensure the system operates stably and responsively. Research by Dwi Indriani and Tika Sari Dewi (2025) shows that system quality can be measured through indicators such as ease of use, reliability, response time, flexibility, and system security. In the context of PMIK officers, system quality is often perceived through how easy the EMR application is to understand and use, how rarely it experiences errors, and how quickly and securely patient data can be accessed. A system is considered "high quality" when it facilitates workflow without adding technical burdens.

The second dimension is information quality, which describes the extent to which the data or information generated by the system meets users' needs in terms of completeness, accuracy, and relevance. According to Dwi Indriani and Tika Sari Dewi (2025), indicators of information quality include completeness, format, relevance, accuracy, and timeliness. The DeLone and McLean theory emphasizes that the information produced by the system is a primary factor influencing users' perceptions of its usefulness.

The final dimension, service quality, was added in the updated DeLone and McLean model (2003) to assess technical support and interactions between users and system providers. Service quality highlights how user experience is influenced by responsiveness, empathy, and assurance provided by developers or IT teams. Dwi Indriani and Tika Sari Dewi (2025) explain that service quality includes five main indicators: reliability, responsiveness, assurance, empathy, and tangibles. In the context of PMIK officers, service quality can be observed through how developers or IT teams respond to user complaints, how quickly technical problems are resolved, and the extent to which users feel supported and involved in system improvements. Positive experiences with technical support can increase trust and overall satisfaction with the EMR system.

Based on studies by Agsari et al. (2024) and Dewi (2025), PMIK officers' experiences with EMR implementation are strongly influenced by system quality, information quality, and service quality, as described in the DeLone and McLean (2003) model. These studies indicate that user-friendly systems, accurate information, and responsive technical support contribute to positive user experiences and improve PMIK performance.

Research by Astuti (2023), titled “User Satisfaction of Electronic Medical Record Information Systems at RSUD Tugurejo Semarang,” states that the success of EMR implementation depends not only on technology but also on users’ perceptions and comfort in operating the system.

User experience, particularly among PMIK officers, plays a significant role in determining the success of EMR implementation. PMIK officers with longer work experience generally have a better understanding of workflows, medical data requirements, and the accuracy needed in documenting patient information. This aligns with findings by Mirsanda and Subianto (2025), which show that user experience has a substantial impact on the effectiveness of EMR use at Ciremai Hospital, Cirebon. Furthermore, Saryadi, Listyorini, and Arini (2025) emphasize that the duration of work experience helps PMIK officers adapt to new systems and evaluate system, information, and service quality. According to DeLone and McLean’s theory, work experience acts as a mediating factor influencing users’ perceptions of system quality, information quality, and service quality, which ultimately affects EMR usage. Therefore, understanding PMIK officers’ work experience is essential to evaluate the success of EMR implementation from the user’s perspective.

Although the implementation of EMR at Wangaya Regional General Hospital Denpasar has been carried out in accordance with national policies and has shown relatively satisfactory results, several issues may still affect user satisfaction. It is not yet fully understood how PMIK officers experience the system in their daily work context. Preliminary studies indicate that some healthcare workers still feel burdened by the EMR system due to its complexity and heavy application workload.

It is also unclear whether system quality, information quality, and supporting services meet user expectations, or whether there are technical and non-technical barriers such as limited training, insufficient technical support, or system access issues during busy periods. These challenges may reduce effectiveness and motivation among healthcare workers in using the system.

Given these issues, this study raises the following questions: Are PMIK officers’ experiences in using the EMR application at Wangaya Hospital optimal based on the DeLone and McLean theory in terms of system quality, information quality, and service quality? What challenges do they face? How do they perceive the benefits and limitations of the application? The findings are expected to serve as a reference for hospital management to improve the quality of health information systems to be more efficient, effective, and user-oriented.

Based on these phenomena, this study aims to explore PMIK officers’ experiences in using the EMR application from the perspectives of system quality, information quality, and service quality, to understand the extent to which the system meets their needs and to identify obstacles that may affect their performance at Wangaya Regional General Hospital Denpasar. By obtaining a comprehensive understanding of EMR usage experiences, the results of this study are expected to serve as evaluation material and recommendations for improving system, information, and service quality to better meet user needs.

This study applies the DeLone and McLean theoretical framework, which emphasizes system quality, information quality, and service quality as the basis for analysis (DeLone & McLean, 2003), in order to provide a comprehensive understanding of PMIK officers’ experiences and perceptions in using the EMR application.

RESEARCH METHODS

This study employed a qualitative research design with a phenomenological approach to explore and understand the lived experiences of Medical Record and Health Information Officers (PMIK) in using the Electronic Medical Record (EMR) application at RSUD Wangaya, Denpasar. The theoretical foundation for this analysis is the DeLone and McLean Information System Success Model, focusing on three key dimensions: system quality, information quality, and service quality. The research was conducted at RSUD Wangaya, a Type B regional general hospital, which served as

the primary setting for evaluating the transition to digital health documentation in compliance with national regulations.

The informants for this study were selected using a purposive sampling technique, involving seven PMIK officers who possess direct experience and technical responsibility in operating the EMR system. Data were gathered through in-depth interviews, allowing the researchers to capture nuanced perspectives on system usability, data accuracy, and technical support. To ensure the validity and reliability of the data, the researchers utilized data triangulation by cross-referencing interview transcripts with direct field observations and relevant hospital documentation. The collected qualitative data were then analyzed using a thematic analysis process, where the informants' statements were categorized into core themes aligned with the DeLone and McLean framework. This methodological structure ensured a comprehensive evaluation of both the technical performance of the system and the human factors influencing its successful implementation.

RESULTS AND DISCUSSION

System Quality: The EMR System Is Relatively Easy to Use but Still Requires Improvement and Optimization

Based on interviews conducted with 7 informants using 7 questions, a key theme emerged: the EMR system is relatively easy to use, but still requires improvements and optimization. The following are key statements from informants:

“For the application... for now it is still quite easy for us to operate. The obstacles we face can still be handled. So for daily use, we can still follow the workflow and it is not too difficult.”

Informant 1

“Sometimes searching for diagnosis codes is a bit difficult if the database is not complete or not synchronized. For example, we already know the diagnosis, but when we search in the system, the term does not immediately appear as we type it. So we have to try several keywords until it appears. That can take time. In addition, some features are actually available but not used every day, so we are less familiar with them.”

Informant 4

“Yes, it has happened. In a week, there can be about two to three issues. Usually, the application suddenly closes or shows an error so it cannot be used. If that happens, the computer must be restarted before it returns to normal. Sometimes, when the network is unstable, the system becomes slow.”

Informant 1

“In my opinion, the interface can still be improved to be more attractive and more user-friendly. The text or font could be enlarged and made clearer because currently it looks quite crowded with columns and text. Functionally it is sufficient, but the display could be enhanced.”

Informant 6

“If possible, the workflow should be simplified further. So to access one piece of data, it does not require too many steps. That way, work can be faster and more efficient.”

Informant 2

“From a managerial perspective, what needs to be improved is having a clear timeline from the vendor when there are requests for changes or additional features. So when the hospital needs revisions or feature additions, there is certainty about when it will be done and completed. That way, planning for user socialization can also be more structured.”

Informant 7

Based on the interview results, it was found that the quality of the EMR system is considered fairly easy to use in daily service activities, as users are still able to follow the system workflow and operate its features to support their work. However, several issues remain, such as difficulties in searching for diagnosis codes due to incomplete or unsynchronized databases, occasional system errors or unexpected application shutdowns, and slow performance when network connectivity is unstable. In

addition, some informants noted that the system interface needs improvement to be more user-friendly, and that the workflow could be simplified to allow faster and more efficient data access. From a managerial perspective, a clear timeline from the vendor is also needed for system improvements and feature development. Therefore, although the EMR system is already helpful in supporting work processes, further improvements are still required in terms of technical aspects, interface design, and feature development to optimize system usage.

Information Quality: The Information Produced Is Relatively Complete but Data Inconsistencies Are Still Found

Based on interviews conducted with 7 informants using 4 questions, a theme emerged that the quality of information in the EMR system is relatively complete and supports services, although inconsistencies such as duplicate medical records and unsynchronized diagnosis codes still occur. The following are key statements from informants:

“In general, the information is quite appropriate and can be used for service needs. Patient data is usually complete for registration and checking medical history. However, there have been cases of duplicate medical records, where one patient has two medical record numbers. But this does not happen often.”

Informant 1

“Yes, it has happened. When many users access the application at the same time, data access becomes slower. Especially if the computer used is old, the delay becomes more noticeable.”

Informant 6

“If there is data that cannot be accessed due to access restrictions, we usually confirm with the medical record department or IT to ensure whether access should be opened or not.”

Informant 6

“In general, the information is complete and supports both service and reporting processes. There have been cases of duplicate medical record numbers or BPJS numbers, but they are very rare, maybe only two or three times a year. So overall, it can still be considered accurate.”

Informant 7

Based on the interview results, it was found that the quality of information in the EMR system at Wangaya Regional General Hospital Denpasar is fairly complete and supports both service delivery and reporting processes. Information such as patient identity and service history is considered adequate for registration and data tracking. However, several issues remain, including occasional duplication of medical record numbers or BPJS numbers, although such cases are rare. In addition, all informants reported that data access can become slow when the system is used simultaneously by many users or when outdated devices are used. Access restrictions also limit direct data availability, requiring confirmation from the medical records department or IT team. Therefore, although the information quality is generally good, improvements are still needed in data management, access control, and system optimization to ensure that information is more accurate, consistent, and easily accessible.

Service Quality: Service Quality Is Fairly Good and Improves Efficiency

Based on interviews conducted with 7 informants using 5 questions, a theme emerged that IT and management support is fairly good, and the use of EMR improves service efficiency. The following are key statements from informants:

“It is very helpful in service delivery. With an electronic system, administrative processes are faster and there is no need to search for paper records. Medical staff can immediately view patient data without waiting for files to be delivered.”

Informant 2

“Coordination between units is faster because patient information is already available in the system. So if something needs to be checked, we just open it on the computer without requesting files from other departments.”

Informant 3

“There is training, but usually only certain representatives attend. After that, the information is shared again with other staff in each unit.”

Informant 4

“If there is a problem, we contact IT. Sometimes the response is quick, sometimes we have to wait depending on the type of issue. But there is always follow-up from them.”

Informant 6

“The impact is significant in improving service quality. With EMR, medical record completion is more controlled because there is a close billing system that enforces completion within 24 hours. So the discipline of medical staff also improves.”

Informant 7

“I hope this system does not stop at its current state but continues to develop in line with regulatory changes and service needs. The important thing is that all parties are willing to cooperate and accept change, because the ultimate goal is to improve hospital service quality.”

Informant 7

Based on the interview results, it was found that the service quality of the EMR system is considered fairly good and contributes to improving service efficiency in the hospital. The system accelerates administrative processes, reduces the need for manual record retrieval, and allows healthcare workers to access patient information directly. In addition, integrated information facilitates coordination between service units, as data can be accessed without waiting for physical file transfers. However, some aspects still need improvement, such as uneven training distribution among users and technical support responses that can sometimes be delayed. Nevertheless, overall EMR implementation has a positive impact on improving service quality, as it helps control the completeness of medical records and enhances the discipline of healthcare staff. Therefore, continuous system development and strong support from all stakeholders are essential to further optimize service quality *النتيجة* from EMR implementation.

Here is your translated and refined English version:

Discussion

A. EMR System Quality is Relatively Easy to Use but Still Requires Improvement and Optimization

Based on interview results, the EMR system used at Wangaya Regional Hospital has been able to support daily service activities and is relatively easy for staff to operate. Observations show that once users become familiar with the system, its operation becomes easier as the workflow has been adapted to the service processes at Wangaya Regional Hospital, Denpasar City. This finding indicates that the system has a fairly good level of usability, supporting staff in delivering healthcare services. This result is consistent with research by Umar and Maksum (2022), which states that good system quality—such as ease of use, flexibility, and integration—can improve the effectiveness of healthcare workers.

The ease of use is also reflected in the system’s ability to help staff access patient data and support administrative processes. With EMR, staff no longer need to manually search for medical records, making work faster and more efficient. Informants generally stated that the system is helpful, although some limitations remain. This indicates that EMR implementation has improved efficiency and supported healthcare services.

However, despite being relatively easy to use, several challenges were identified. Common issues include technical problems such as system slowdowns, errors, or unexpected application closures, especially when many users access the system simultaneously or when internet connectivity is unstable. Additionally, outdated computer specifications were reported to affect system performance.

Another challenge is that the system workflow is considered too lengthy for accessing certain data. Some menus are overly complex, requiring multiple steps to retrieve patient information, which reduces efficiency, particularly in high-volume service units such as registration. Some rarely used features are also difficult for users to recall. These findings align with Wardana and Licia (2025), who identified internet connectivity issues, system speed, and incomplete menu development as key challenges in EMR implementation.

These findings are consistent with the DeLone and McLean Information Systems Success Model (2003), which emphasizes that system quality—including usability, response time, reliability, and functionality—is a key determinant of system success. A high-quality system enhances user experience and work efficiency. Previous studies in Indonesia also support this finding, indicating that while EMR improves effectiveness, challenges such as network disruptions and hardware limitations persist. Meilani et al. (2025) also found that EMR improves documentation and monitoring effectiveness but requires strong infrastructure support.

Overall, the EMR system quality at Wangaya Regional Hospital is fairly good and facilitates staff performance. However, improvements are still needed in network stability, hardware performance, and system interface simplification to enhance usability and service efficiency.

EMR Information Quality is Relatively Complete but Still Contains Data Inconsistencies

Interview results indicate that most informants believe the information provided by the EMR system adequately supports healthcare services. Observations show that patient identity, medical history, and administrative data are accessible to staff, indicating that the system provides essential information. This finding aligns with Meilani et al. (2025), who state that good information quality is characterized by completeness, relevance, and accessibility.

Despite this, several issues remain, particularly data duplication in medical record numbers or BPJS numbers. Although rare, such cases can affect data accuracy and service processes. These issues are typically caused by registration errors or insufficient patient identity verification. This finding is consistent with Triyanto et al. (2021), who found that duplication can disrupt patient history management and BPJS claims processing.

Additionally, delays in data retrieval were reported, especially during unstable network conditions or high system usage. This affects service speed and efficiency. Nabila et al. (2023) emphasize that information quality is influenced not only by completeness and accuracy but also by timeliness, which depends on system performance and network stability.

In conclusion, while EMR information quality is generally good, improvements are needed in data verification processes and system stability to ensure accuracy, consistency, and timeliness. Ananda et al. (2024) also highlight the importance of strengthening data management procedures, improving staff competence, and enhancing system integration.

IT and Management Support is Adequate and EMR Improves Service Efficiency

Interview and observation results show that EMR implementation positively impacts healthcare services by accelerating patient data access and improving inter-unit coordination. Informants stated that electronic systems speed up administrative processes and allow medical staff to access patient data directly without waiting for physical files. Observations confirm that EMR enhances efficiency by enabling real-time data access. This aligns with Cahyani et al. (2024), who found that EMR improves service efficiency through fast and integrated data access.

EMR also improves coordination and communication between service units such as outpatient, inpatient, and emergency departments. Informants reported that system integration allows all units to access the same patient data, facilitating better coordination. This supports findings by Meilani et al. (2025), who note that EMR enhances service quality through real-time information exchange.

However, some limitations remain, particularly in technical support and system stability. Informants reported delays in IT support when system issues occur, which can hinder workflow. This is consistent with Wardana and Licia (2025), who identified technical issues such as network disruptions as ongoing challenges.

Additionally, EMR training is not conducted regularly for all users. Training is often limited to selected representatives, who then relay information to others. This results in uneven understanding among users. Zenobia et al. (2024) emphasize that successful EMR implementation depends not only on technology but also on human resource readiness, training, and management support.

Overall, service quality in EMR usage is fairly good, improving efficiency, speeding up access to patient information, and facilitating communication. However, improvements are needed in technical support responsiveness, regular training, and system stability to optimize EMR utilization and enhance healthcare service quality.

CONCLUSION

Based on the results of interviews with seven informants regarding the experiences of PMIK staff in using the electronic medical record application, the following conclusions can be drawn:

Electronic Medical Record (EMR) System Quality

The quality of the EMR system at Wangaya Regional Hospital is relatively easy to use and supports healthcare services. However, several issues remain, such as system errors, suboptimal code search features, and a less user-friendly interface. In addition, the system may slow down when the network is unstable. Therefore, improvements are needed to optimize system usage.

Electronic Medical Record (EMR) Information Quality

The quality of EMR information is considered relatively complete and capable of supporting healthcare service processes. However, there are still issues such as data duplication and delays in accessing information. These problems are influenced by errors in data input processes and system limitations. Therefore, improvements are needed in data verification and management processes to ensure that the information produced is more accurate, consistent, and timely.

Service Quality in the Use of Electronic Medical Records (EMR)

The service quality in the use of EMR is considered quite good and has improved the efficiency of healthcare services through faster administrative processes, easier access to patient data, and better coordination between units. In addition, support from IT teams and management helps address technical issues. However, further improvements are still needed in the implementation of training and responsiveness to system-related problems to ensure more optimal EMR utilization.

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