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EVALUATION OF THE IMPLEMENTATION OF AN INPATIENT ELECTRONIC MEDICAL RECORD SYSTEM USING THE DELONE AND MCLEAN METHOD

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ABSTRACT
Sumber Waras Hospital is committed to enhancing the quality of healthcare services through the implementation of an Electronic Medical Record (EMR) system. EMR is an essential tool for managing patient health data to improve service efficiency and effectiveness. However, its implementation still encounters various challenges, such as limited user training, interoperability issues, and inconsistent data quality. Therefore, this study aims to evaluate the success of the inpatient EMR system implementation at Sumber Waras Hospital using the Delone and McLean model approach. This research applied a descriptive quantitative method with a cross-sectional design. The study population consisted of 344 healthcare personnel, with a total of 77 respondents selected using the Slovin formula at a 10% margin of error. Data were collected through a questionnaire compiled based on the Delone and McLean model variables and analyzed using descriptive statistics. The evaluation showed that system quality was categorized as moderate with an average score of 2.86. Information quality was also in the moderate category with a score of 3.15, followed by service quality at 3.14. System use was categorized as moderate with a score of 3.47, user satisfaction was categorized as good with a score of 3.50, and net benefits were categorized as moderate with a score of 3.30. The implementation of the inpatient EMR system at Sumber Waras Hospital is generally running quite well, although improvements are still required, particularly in system quality, information quality, and service quality aspects. The evaluation results are expected to serve as a reference for system improvements and user training efforts to enhance the overall quality of healthcare services.

Keywords: delone and mclean; electronic medical records; information system evaluation

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INTRODUCTION

A hospital is a healthcare service institution that provides comprehensive individual health services, including inpatient care, outpatient care, and emergency services(Undang - Undang No 17, 2023). Hospitals primarily focus on delivering services that encompass medical care, medical support, and non-medical support. These three components complement and support one another to achieve the main goal of providing high-quality and sustainable healthcare services to patients, ultimately improving the quality of the health facility itself. One crucial medical support facility is the medical record. Medical records serve as a highly valuable data source for supporting clinical decision-making processes(Belrado et al., 2024). A medical record is a document that contains patient identity information, examination results, therapies, medical procedures, and other services provided to the patient(Aulia & Sari, 2023). Medical records not only function as patient data logs but also as comprehensive documents that capture the entire process of healthcare delivery from patient identification to the evaluation of treatment outcomes(Kemenkes RI, 2024).

In this digital era, the government has been striving to build an integrated health information system to enhance the efficiency and effectiveness of healthcare services. As part of the effort to integrate health data and improve service quality, the government has issued regulations mandating that all hospitals and health facilities implement electronic medical records (EMR) no later than the end of

2023(Yunisa & Gunawan, 2024). Electronic Medical Records (EMRs) are digital systems that integrate various patient medical information into one place, allowing healthcare professionals to access, analyze, and update patient data quickly and accurately(Firdaus et al., 2024). To function effectively, an EMR system must at least include patient registration, health data recording, medical information processing, data storage, and data management for insurance claims(Astuti & Fahyudi, 2023). Besides providing convenience for patients, EMRs play a crucial role in improving the quality of healthcare services, offering information that can be used to evaluate the performance of healthcare workers and enhance the service quality at health facilities(Suhendro, 2017).

To realize the full potential of EMRs, the electronic systems used must have high interoperability capabilities. Compatibility and interoperability enable patient data to be smoothly accessed and exchanged across various systems, supporting healthcare provider performance evaluations and improvements in service quality. One of the main objectives of implementing EMRs is to improve the efficiency and effectiveness of patient health data management. These systems enable faster and easier information access, reduce the risk of human error, and integrate data more effectively with other systems. Unlike manual methods, which tend to be slow and error-prone, electronic medical records offer a more modern and efficient solution for enhancing healthcare service quality(Kristina, 2024).
According to a study by Firdaus et al., (2024) on the "Evaluation of the Success Level of Electronic Medical Record Implementation Using the DeLone and McLean Method at Undaan Eye Hospital, Surabaya," the evaluation was based on several aspects including system quality, information quality, service quality, use, user satisfaction, and net benefits. The results showed a success rate categorized as "successful" with an overall score of 83%. However, the information quality (57%) and user satisfaction (60%) were highlighted as the lowest-scoring aspects. These shortcomings were attributed to several challenges, such as incomplete data, discrepancies with manual records, and suboptimal real-time access. Additionally, training limitations and system feature constraints also affected user experience.

Furthermore, the study by Salim et al., (2022) on the “Evaluation of the Implementation of Electronic Medical Records (EMR) in Outpatient Services at Queen Latifa General Hospital, Yogyakarta,” revealed that the EMR implementation was rated as “good” across all variables, including system quality, information quality, service quality, usage, user satisfaction, and net benefits. User satisfaction reached 97.5%, indicating that nearly all users were satisfied with the EMR system's performance, especially regarding ease of use, access speed, and the reliability of the presented information. Nevertheless, challenges such as slow internet connections that delayed patient data access and incomplete data that posed clinical decision-making risks were still observed. Additionally, a lack of user guidance caused difficulties for some users, especially new or less tech-savvy individuals.

Sumber Waras Hospital is a private type B general hospital that has successfully implemented EMRs since early December 2022. However, preliminary studies have shown several challenges in the implementation process. Some issues include many forms not yet integrated into the system, leading to inefficient data recording processes and frequent system disruptions. Moreover, not all users have fully utilized the EMR system, and various obstacles have emerged during its use. These conditions indicate the need for a comprehensive evaluation to assess the effectiveness of EMR implementation, so that its use can be optimized to support improvements in the quality of healthcare services. Therefore, this study aims to evaluate the Implementation of the Inpatient Electronic Medical Record System Using the DeLone and McLean Method at Sumber Waras Hospital in 2025.

METHOD

This study employed a descriptive quantitative approach with a cross-sectional design(Indrawan & Jalilah, 2021). The research population included all healthcare workers in the hospital's inpatient unit, totaling 344 individuals. A sample of 77 respondents was selected using the Slovin formula with a 10% margin of error. Data were collected through a questionnaire developed based on the variables of the DeLone and McLean model and analyzed using descriptive statistics. The data consisted of numerical values derived from actual conditions.

RESULT

Table 1.
The characteristics of respondents

Category	f	%
Gender		
Male	42	54.55
Female	35	45.45
Age		
<30 years	23	29.87
30–40 years	38	49.35
41–50 years	12	15.58
>50 years	4	5.91
Latest Education		
High School (SMA)	5	6.49
Diploma (D3)	39	50.65
Bachelor's Degree (S1)	31	40.26
Master's Degree (S2)	2	2.60
Length of employment		
1-10 years	23	30
11-20 years	54	70

The study involved 77 respondents, with the gender distribution showing that the majority were male (54.55%), while females constituted 45.45% of the participants. In terms of age, the largest group of respondents were aged between 30–40 years (49.35%), followed by those under 30 years (29.87%), 41–50 years (15.58%), and a smaller portion aged over 50 years (5.91%). Regarding educational background, most respondents held a Diploma (D3) degree (50.65%), followed by those with a Bachelor's Degree (S1) at 40.26%. A smaller number had completed only high school (6.49%), and a minimal proportion held a Master's Degree (2.60%). With respect to length of employment, the majority of respondents had 11–20 years of work experience (70%), while the remaining 30% had been employed for 1–10 years.

Table 2.
The aspects of the system

Aspects Assessed	Average Score	Category
System Quality	2,86	Average
Information Quality	3,15	Average
Service Quality	3,14	Average
System Usage	3,47	Average
User Satisfaction	3,50	Good
Net Benefit	3,30	Average

The results show that most aspects of the system were rated in the moderate category. System quality scored 2.86, indicating that the system is functioning but still needs improvements in stability and features. Information quality scored 3.15, suggesting the information provided is fairly useful but can be enhanced. Service quality received a score of 3.14, showing that support is available but not optimal. System use scored 3.47, meaning the system is being used, but not yet to its full potential. User satisfaction stood out with a score of 3.50, which is considered good, showing that users are generally happy with the system. Net benefits received a score of 3.30, meaning the system brings advantages, but there is still room for improvement. Overall, although

most components are rated as moderate, the high user satisfaction indicates that the system is well accepted. However, improvements in system quality, user training, and data integration are needed to make the system more effective and beneficial.

DISCUSSION

The findings of this study reveal that most aspects of the system were rated in the moderate category, with only one aspect, user satisfaction, falling into the good category. The highest average score was recorded for user satisfaction (3.50), indicating that, overall, the system has been well accepted by the users. This is a positive outcome, as user acceptance is one of the key indicators of success in implementing information technology in healthcare services. However, the scores for system quality (2.86), information quality (3.15), service quality (3.14), system use (3.47), and net benefits (3.30) remain within the moderate category. This suggests ongoing challenges in the technical and functional performance of the system, possibly due to limited features, lack of system stability, or insufficient user training and support to enable optimal usage.

The relatively low score for system quality reflects issues in technical aspects such as system speed, interface design, navigation ease, and system integration, which may not fully meet user expectations(Amin et al., 2021). The moderate information quality score may be due to the content being outdated, inaccurate, or difficult to understand(Muhlizardy & Meisari, 2022). Likewise, the moderate rating in service quality suggests that the support services both technical and administrative may not yet be sufficiently responsive or effective(Swari & Verawati, 2022).

The system use score, while close to the upper limit of the moderate category, indicates that although the system is actively used, it may not yet be utilized to its full potential(Azzara Ram Ardyanti et al., 2023). Contributing factors may include a lack of training, resistance to technological change, or misalignment between system features and the daily workflow of users(Pinerdi et al., 2020). Similarly, the moderate score for net benefits suggests that while users perceive some advantages from the system, its impact on work efficiency, productivity, and service quality remains limited and could be enhanced further(Darmawan & Hendyca Putra, 2020).

This study presents a novel contribution by highlighting a unique pattern in the evaluation of digital systems within the healthcare setting, where user satisfaction is high despite other system components being rated only moderately. Unlike previous studies that often report parallel improvement across all system dimensions when digital health systems are accepted, this research identifies a divergence between perceived satisfaction and actual system performance(. & Andry, 2018; Rahayu & Sutabri, 2024).

This finding suggests that healthcare workers may value the presence and accessibility of a digital system, even if technical or service-related aspects are not fully optimized(Apriliana & Nawangsari, 2021; Widianawati et al., 2025). Moreover, the study underscores the critical role of user perception in driving system acceptance, independent of system quality or informational depth. These insights contribute to the growing literature on health information systems by emphasizing the importance of user-centered metrics over purely technical evaluations, especially in resource limited settings(. & Andry, 2018; Andriani et al., 2024; Oetari et al., 2022; Sudiarti et al., 2019). Thus, the study calls for a shift in system development priorities from solely improving technical features to also investing in usability, training, and emotional engagement with end-users In summary, although user satisfaction is relatively high, there is still a significant need for improvements in system quality, information accuracy, service support, and overall system benefits. The main recommendation from this study is to optimize the system through improved infrastructure, comprehensive user training, and the development of enhanced features and data integration to ensure the system provides maximum support for service delivery.

CONCLUSION

This study concludes that while most aspects of the digital system—such as system quality, information quality, service quality, system use, and net benefits—were rated in the moderate category, user satisfaction was notably high, indicating a strong acceptance of the system among users. This highlights that satisfaction can remain high even when technical and informational aspects are not yet optimal. The findings suggest that user perception, usability, and access to digital systems play a critical role in driving system acceptance in healthcare settings. However, to maximize the benefits and ensure sustainable use, improvements are needed in system stability, feature development, user training, and data integration. These enhancements can help move other aspects from moderate to high performance levels, ultimately improving service delivery quality. The study offers new insights into how perceived satisfaction can precede technical excellence, providing a valuable reference for future digital system development in health services.

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