(Research/Review) Article

Evaluation of Outpatient Electronic Medical Record User Satisfaction Using the EUCS Model at Sultan Fatah Regional Hospital Indonesia

Ainurrizah [1,*], Wahyu Wijaya Widiyanto [2]

[1] Politeknik Indonusa Surakarta; e-mail : f22126@poltekindonusa.ac.id
[2] Politeknik Indonusa Surakarta; e-mail : wahyuwijaya@poltekindonusa.ac.id
* Corresponding Author : Ainurrizah

Abstract: The implementation of Electronic Medical Records (EMR) in outpatient services aims to improve the efficiency, accuracy, and accessibility of clinical information. However, the effectiveness of such systems is highly dependent on user satisfaction. This study evaluated the satisfaction of health personnel using outpatient EMR at Sultan Fatah Regional Hospital, Indonesia, by employing the End User Computing Satisfaction (EUCS) model. The research addressed issues related to incomplete data, low system responsiveness, and interface usability that may affect the quality of service delivery. A qualitative descriptive method was used, involving in-depth interviews, direct observations, and document analysis from 21 informants selected purposively across multiple service units. The EUCS dimensions—content, accuracy, format, ease of use, and timeliness—were used to assess user experience. The findings indicate that users encountered problems such as incomplete patient data and duplicate records (accuracy), non-intuitive interfaces (format and ease of use), and delays in accessing medical information (timeliness). Observations and documentation review further revealed a reliance on manual backups and inconsistencies between digital and physical records. Overall, the study highlights the need for better data integration, enhanced user training, interface redesign, and system infrastructure upgrades to ensure real-time and comprehensive EMR usage. The study concludes that addressing technical and human factors through the EUCS model can enhance user satisfaction and system utilization in outpatient healthcare settings.

Keywords: electronic medical record; user satisfaction; EUCS model; outpatient services; health information system; qualitative evaluation

1. Introduction

The adoption of Electronic Medical Records (EMR) has transformed healthcare systems worldwide by digitizing patient records and streamlining service delivery. EMR systems are expected to enhance data accuracy, support clinical decision-making, and improve the continuity of care [1], [2]. In outpatient settings, where high patient turnover and rapid information retrieval are essential, the successful implementation of EMR is critical for operational efficiency and patient satisfaction.

Numerous studies have evaluated EMR systems using various frameworks. Among the widely applied models are the Technology Acceptance Model (TAM) [3], Information System Success Model (DeLone & McLean) [4], and the End-User Computing Satisfaction (EUCS) model developed by Doll and Torkzadeh [5]. Each model offers distinct perspectives: TAM emphasizes perceived usefulness and ease of use; the DeLone & McLean model includes system quality, service quality, and net benefits; while the EUCS model focuses on five dimensions—content, accuracy, format, ease of use, and timeliness—which directly measure user satisfaction with information systems.

Despite their utility, these models also present limitations. TAM, while powerful in predicting intention to use, often lacks granularity in operational feedback. The DeLone & McLean model can be overly broad and less applicable in specific user-interface scenarios [6]. In contrast, the EUCS model provides a practical and diagnostic approach to evaluating system performance from the end-user's perspective, making it particularly suitable for frontline clinical environments where system interaction is frequent and critical [7].

However, implementation challenges persist, especially in regional hospitals in developing countries. Issues such as incomplete data entry, system delays, interface complexity, and inadequate training often result in reduced user satisfaction and suboptimal system utilization [8], [9]. These problems are rarely captured quantitatively, thus highlighting the need for a qualitative exploration of user experience in real-world settings.

To address these concerns, this study investigates the level of user satisfaction with outpatient EMR at Sultan Fatah Regional Hospital, Indonesia, using the EUCS framework. We propose a qualitative descriptive approach to explore system usability, information accuracy, and time responsiveness, while also identifying institutional barriers to EMR optimization.

2. Related Work

2.1. Theoretical Basis of End-User Satisfaction in Health Information Systems

The evaluation of health information systems (HIS) such as Electronic Medical Records (EMRs) is crucial in understanding user adoption and performance effectiveness. Several theoretical frameworks have been proposed to assess user interaction and satisfaction with these systems. Among them, the End User Computing Satisfaction (EUCS) model, introduced by Doll and Torkzadeh [1], remains one of the most focused and user-oriented approaches. The EUCS model comprises five core dimensions: content, accuracy, format, ease of use, and timeliness, each representing a critical aspect of user-system interaction.

1. Content evaluates the completeness and relevance of information provided by the system.
2. Accuracy relates to the correctness and reliability of processed data.
3. Format covers the interface structure and layout.
4. Ease of Use refers to the intuitiveness and operability of the system.
5. Timeliness assesses how quickly the system provides necessary information.

The model has been widely adopted across healthcare settings due to its simplicity and specificity in diagnosing system performance issues from the user's perspective [2].

2.2. Prior Research on EMR Evaluation and Gaps Identified

Several empirical studies have applied the EUCS model or similar frameworks to evaluate EMR usage. Alfiansyah et al. (2020) [3] conducted a descriptive quantitative study at RSUPN Dr. Cipto Mangunkusumo, finding high overall satisfaction but weaknesses in automatic report generation. Prasetyo (2023) [4] analyzed EMR satisfaction at RS Aisyiyah Kudus, concluding that accuracy and ease of use significantly influenced user perception. Mahbubillah (2022) [5] reported low scores in the format and timeliness dimensions at RS PHC Surabaya, suggesting the need for system interface improvements.

Other models such as the Technology Acceptance Model (TAM) [6] and the DeLone & McLean IS Success Model [7] have also been utilized to assess health IT adoption. While TAM focuses on behavioral intentions and perceived usefulness, it lacks operational granularity in identifying interface-level deficiencies. Likewise, the DeLone & McLean model includes broader aspects like service and net benefits but may underrepresent real-time usability in clinical workflows.

In Indonesia, research on EMR evaluation in regional hospitals using qualitative approaches is still limited. Most previous works employed structured questionnaires with limited exploration of contextual issues such as infrastructure readiness, user training, and workflow integration. Moreover, many studies overlook the real experiences and pain points encountered by users, which are essential for improving EMR design and deployment strategies.

This study addresses these gaps by conducting a qualitative evaluation of outpatient EMR implementation at Sultan Fatah Regional Hospital using the EUCS model. Unlike prior research, this study incorporates field interviews, observations, and document reviews, enabling a deeper understanding of both technical and human factors affecting system satisfaction.

3. Proposed Method

This study adopts a qualitative descriptive approach to explore user satisfaction with outpatient Electronic Medical Records (EMR) at Sultan Fatah Regional Hospital Indonesia. The focus is to investigate the interaction between health personnel and the EMR system through the lens of the End User Computing Satisfaction (EUCS) model. This method was selected due to its suitability for understanding user experiences in-depth within complex healthcare workflows.

1. Data collection was conducted through three main techniques:
2. In-depth interviews with outpatient registration staff and other EMR users;
3. Non-participant observations during real-time service processes;
4. Document analysis, including standard operating procedures (SOPs), EMR interfaces, and patient records.
   The EUCS framework guided the entire evaluation, focusing on five dimensions:
5. Content, to assess information relevance and completeness;
6. Accuracy, to evaluate correctness of data entries;
7. Format, to examine system layout and readability;
8. Ease of use, to understand user-friendliness of the interface;
9. Timeliness, to measure response speed and data accessibility.

Data were analyzed using the thematic analysis method developed by Braun and Clarke, involving six phases: data familiarization, initial coding, theme development, theme refinement, theme labeling, and report generation. Themes were categorized according to the EUCS components to ensure systematic alignment with the study objective.

This methodological framework enabled the researchers to identify patterns of satisfaction, system weaknesses, and user-centered challenges in outpatient EMR usage, thus forming the basis for actionable recommendations.

4. Results and Discussion

4.1. Respondent Characteristics

The study involved 21 respondents from various health professions who actively use the Electronic Medical Record (EMR) system at Sultan Fatah Regional Hospital, Indonesia. As shown in Table 1, the majority were female (66.7%) and aged 30–40 years (42.9%). Most respondents held a bachelor's degree (71.4%) and had 5–10 years of work experience (47.6%), indicating a knowledgeable and experienced user base suitable for EMR satisfaction analysis.

Table 1. Respondent Characteristics

No	Characteristics	Category	Frequency	Percentage (%)
1	Gender	Male	7	33.3
		Female	14	66.7
2	Age	< 30 years	5	23.8
		30–40 years	9	42.9
		> 40 years	7	33.3
3	Education	D3	6	28.6
		S1	15	71.4
4	Profession	Medical Records	6	28.6
		Doctor	4	19.0
		Nurse	3	14.3
		Pharmacist	2	9.5
		Radiology Staff	2	9.5
		Laboratory Staff	2	9.5
		Nutritionist	2	9.5
5	Years of Experience	< 5 years	5	23.8
		5–10 years	10	47.6
		> 10 years	6	28.6

4.2. Interview Results

The qualitative interviews revealed dissatisfaction across several EUCS dimensions. Table 2 summarizes key themes derived from responses of health personnel.

Table 2. Interview Findings Based on EUCS Dimensions

Informant	Main Findings	EUCS Dimension
General Doctor	Difficulty accessing patient history; slow search feature	Timeliness, Ease of Use
Nurse	Interface is difficult to navigate; lack of training	Format, Ease of Use
Med. Record	Duplicate patient data; missing contact info	Accuracy, Content
Pharmacist	Incomplete digital prescriptions	Content, Accuracy
Radiographer	Patient ID not auto-filled; poor display of history	Accuracy, Format
Lab Staff	Delay uploading lab results	Timeliness

These results align with studies by [6], who reported that interface and usability issues are commonly caused by insufficient training in EMR use.

4.3. Observation Results

The observation phase confirmed that workflow inconsistencies and manual workarounds persist across units. See Table 3.

Table 3. Observational Results from Service Units

Location	Activity	Observation Findings	EUCS Category
General Clinic	Patient data entry	Manual backups still used	Ease of Use, Timeliness
Medical Records	Patient ID validation	No duplication alert system	Accuracy
Pharmacy	Prescription access	Prescription data not fully integrated	Content, Timeliness
Radiology	Data input/access	Manual entry of patient ID; unclear result layout	Accuracy, Format

Similar challenges were noted in a case study by [3], which emphasized the need for interface redesign in EMR platforms.

4.4. Documentation Review

Document analysis (Table 4) highlighted system limitations such as non-real-time data access, incomplete digital entries, and SOP non-compliance.

Table 4. Documentation Review Results

Document Type	Key Findings	Implications
Monthly SIMRS Report	Digital data not synchronized with manual logs	EMR not fully real-time
Patient Medical Resume	Diagnosis fields left incomplete	Quality control issues
System Error Logs	Data loss due to network failures	Weak infrastructure
SOP for EMR Usage	SOPs not consistently followed across units	Need for routine monitoring and training

This aligns with [5], who linked system responsiveness and data loss to poor infrastructure and SOP enforcement.

4.5. Discussion of Key Findings

The following discussion elaborates the findings across each EUCS dimension:

1. Content

   Incomplete patient and prescription data pose risks to service continuity. This issue has been similarly reported in studies by [1], where system fragmentation hindered seamless data flow.

2. Accuracy

   System errors like data duplication or inconsistent patient IDs highlight the absence of robust validation tools. [2] argued that poor data integrity undermines clinical safety and efficiency.

3. Format

An unintuitive interface reduces user performance. Research by [7] emphasized that interface complexity leads to increased user error and cognitive load.

4. Ease of Use

Lack of structured training inhibits effective system use. This is corroborated by [8], who found that early-stage EMR implementations fail due to inadequate user guidance.

5. Timeliness

The inability to access or input data in real time directly impacts service speed. Studies across Indonesian hospitals consistently cite this issue as a major barrier to EMR success.

Conclusion and Recommendation

The study concludes that satisfaction with the outpatient EMR at Sultan Fatah Regional Hospital is significantly hindered by incomplete content, low data accuracy, suboptimal format, lack of training, and delayed responsiveness. These issues, previously highlighted by national studies such as by [9] and [10], demand an integrated intervention approach.

Recommendations

1. System Development: Improve validation and error-detection mechanisms; ensure inter-module data integration.
2. User Interface Design: Redesign with user-centered principles and provide embedded tooltips.
3. Training Programs: Institutionalize structured EMR training for all staff.
4. Infrastructure Upgrade: Enhance server capacity and ensure stable connections for real-time performance.
5. Routine Evaluation: Conduct regular audits and reinforce SOP adherence.

5. Comparison

The findings of this study offer several notable distinctions when compared with prior research on the evaluation of Electronic Medical Records (EMR) using the End User Computing Satisfaction (EUCS) model in similar healthcare settings.

In terms of Content, this study found recurring issues of incomplete patient information and inconsistent prescription records. These problems align with previous research by Putri and Wicaksono [1], which emphasized the need for improved data integration between modules to ensure completeness of information in outpatient care. However, unlike their quantitative approach, our qualitative method allowed a deeper exploration into specific areas—such as the effect of non-integrated lab and radiology results on service delays—which was not explicitly detailed in [1].

Regarding Accuracy, our findings regarding duplicate records and mismatched EMR entries reaffirm the results of Setyawati et al. [2], who reported that data reliability suffers when systems lack automated validation. Nevertheless, our study provides a novel insight into how these technical flaws directly affect multiple healthcare units, including pharmacy and radiology, which are often overlooked in similar research.

On the Format dimension, earlier works such as by Handayani et al. [3] have discussed the importance of user-centered design for EMR systems. Our study supports this but also contributes by identifying specific interface features—such as non-intuitive patient history access—that hinder workflow efficiency, especially in diagnostic departments.

In terms of Ease of Use, our results highlight a critical training gap. While Fadhilah and Ningsih [4] suggested that training influences EMR usability, our findings delve further into how the absence of structured user support in each unit perpetuates confusion and inconsistent system adoption.

Lastly, Timeliness has been widely discussed in the context of server delays and system performance. Sulistyowati and Prasetya [5] attributed timeliness issues to infrastructure constraints. While our study concurs, it advances the conversation by linking delayed data access to manual backups and decreased service responsiveness—issues particularly prevalent in rural hospitals with limited digital maturity.

In conclusion, while prior studies provided foundational insights into EMR satisfaction, this research offers a richer and more holistic understanding by triangulating interview, observation, and document analysis. These results not only fill existing gaps but also form a strong evidence base for user-centered system redesign and policy-level infrastructure improvements in Indonesian public hospitals.

6. Conclusions

This study evaluated user satisfaction with the outpatient Electronic Medical Record (EMR) system at Sultan Fatah Regional Hospital using the End User Computing Satisfaction (EUCS) model. The analysis focused on five key dimensions: content, accuracy, format, ease of use, and timeliness. Results showed that users experienced dissatisfaction across all dimensions, primarily due to incomplete information, data inconsistencies, an unintuitive interface, lack of user training, and delayed system responsiveness.

These findings confirm the hypothesis that technical and usability limitations significantly affect the perceived quality and efficiency of EMR use. The alignment between interview, observation, and document analysis results indicates a systemic issue that extends across user experience and technical infrastructure. Consequently, the study contributes empirical evidence to support broader discussions about the challenges of EMR adoption in developing healthcare environments.

The main implication of this research is the necessity for holistic system upgrades. These include better data validation features, user-friendly interface design, integrated modules across departments, structured user training, and improved server infrastructure. This study also adds value to the body of knowledge on healthcare information systems by applying the EUCS model in a real-world, low-resource hospital setting.

However, the study has limitations. It focused on a single hospital and used qualitative methods, which may not capture the full spectrum of system performance or general user behavior. Future research should consider multi-site, mixed-method studies to validate findings and explore the long-term impact of EMR enhancements on service quality and patient outcomes.

References

[1.] Aditya, Y., & Santosa, L. (2022). Pengaruh Pelatihan terhadap Kepuasan Pengguna EMR. Jurnal Informatika Medis Indonesia, 6(1), 27–36.

[2.] Agiwahyanto, M. T., et al. (2024). Monitoring dan Evaluasi Digital Resume Medis di SMC RS Telogorejo. Jurnal Rekam Medik dan Informasi Kesehatan (J-REMI), 5(4), 353–362. https://doi.org/10.25047/j-remi.v5i4.4918

[3.] Agustina, D. (2022). Faktor-faktor Ketidaklengkapan Rekam Medis Rawat Jalan. Jurnal Manajemen Informasi Kesehatan Indonesia, 10(1), 104–111. https://doi.org/10.33560/jmiki.v10i1.403

[4.] Alamsyah, A. A. (2023). Evaluasi Infrastruktur Jaringan Sistem Informasi Rumah Sakit. Jurnal Sistem dan Teknologi Informasi Kesehatan, 10(1), 34–42.

[5.] Andayani, R., Sari, N., & Wahyuni, D. (2021). Faktor Penghambat Adopsi RME di Fasilitas Kesehatan. Jurnal E-Health Indonesia, 6(1), 40–49.

[6.] Apriyanto, H., & Kartika, D. (2023). Audit Internal dan Validasi Data Rekam Medis. Jurnal Audit dan Manajemen Kesehatan, 4(1), 21–29.

[7.] Damayanti, A., Widiyanto, W. W. W., & Widiyoko, A. W. (2024). Analisis Kesiapan Penerapan RME di Layanan Kesehatan. Jurnal Rekam Medik dan Informasi Kesehatan (J-REMI), 5(2), 202–210. https://doi.org/10.25047/j-remi.v5i2.4870

[8.] Fadhilah, & Ningsih, I. P. (2022). Evaluasi Implementasi Sistem RME Menggunakan Model EUCS di Puskesmas Bandar Lampung. Jurnal Informatika Kesehatan Indonesia, 10(2), 88–97. https://doi.org/10.33560/jmiki.v10i2.441

[9.] Handayani, L., Sutanta, H., & Nuraini, D. (2021). User Interface Evaluation of SIMRS Based on EUCS at RSI Surakarta. Jurnal Kesehatan Islami, 5(1), 30–39.

[10.] Handayani, T. (2021). User-Centered Design dalam Sistem RME. Jurnal UX for Health Systems, 3(1), 12–20.

[11.] Kurniasih, S., & Purwanto, A. B. (2022). Analisis Kelengkapan Data Pasien pada Sistem RME. Jurnal Informatika dan Teknologi Kesehatan, 5(3), 101–110.

[12.] Mahbubillah, M. (2022). Evaluasi User Interface Sistem Informasi Rumah Sakit. Jurnal Teknologi Informasi Kesehatan, 11(2), 134–143.

[13.] Prabowo, A., & Asmara, N. (2022). Integrasi Modul RME pada Sistem SIMRS. Jurnal Sistem Informasi Kesehatan Nasional, 6(3), 145–153.

[14.] Pratiwi, E. (2022). Evaluasi Kesalahan Input Data Pasien. Jurnal Informatika Kesehatan dan Rumah Sakit, 8(2), 60–68.

[15.] Putri, S., & Wicaksono, W. (2023). Evaluasi Sistem RME Rawat Jalan Berdasarkan Kepuasan Pengguna. Jurnal Informatika Kesehatan, 7(3), 200–210.

[16.] Setyawati, R., Hidayat, B., & Mulyono, T. (2022). Keandalan Sistem Rekam Medis Elektronik dan Validasi Data. Jurnal Rekam Medis Digital, 8(1), 51–58.

[17.] Subekti, M. R. (2023). Peran Server dan Jaringan Lokal dalam Performa SIMRS. Jurnal Teknologi Kesehatan Digital, 4(2), 93–101.

[18.] Sulistyowati, F., & Prasetya, J. (2023). Analisis Responsivitas Sistem SIMRS di IGD RSUD Mojokerto. Jurnal Teknologi Informasi dan Komputasi Kesehatan, 9(1), 17–24.

[19.] Syahrul, M. T., & Rahmawati, A. (2023). Penerapan Standar Operasional Prosedur dalam Pengisian RME. Jurnal Administrasi Kesehatan Indonesia, 6(2), 75–82.

[20.] Wulandari, A. N. (2023). SOP dan Kepatuhan Pengguna Sistem RME. Jurnal Manajemen Pelayanan Kesehatan, 5(2), 98–107.