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Managing Education and Training for Electronic Medical Records to Improve Medical Service Quality at Gunung Maria General Hospital, Tomohon

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ABSTRACT

The digitalization of health services has shifted hospital management toward integrated information systems, more accurate data governance, and stronger human resource capability. One of the most consequential changes in this transition is the adoption of Electronic Medical Records (EMR), which replaces fragmented paper-based documentation with digital records that can support continuity of care, patient safety, and managerial efficiency. Yet the success of EMR implementation depends not only on software and infrastructure but also on how hospitals manage education and training for the personnel who use the system. This article develops a journal-style synthesis of a qualitative dissertation on the management of EMR training at Gunung Maria General Hospital, Tomohon, Indonesia. The study focused on four managerial dimensions: planning, organizing, implementation, and evaluation of training. Using a qualitative descriptive design, data were gathered through in-depth interviews, observations, and document analysis involving hospital management, medical personnel, and administrative staff. The findings show that EMR utilization has been constrained by high rates of input error, uneven user competence, inadequate needs analysis, limited continuity in post-training support, and weak supervision and evaluation mechanisms. Although EMR training has been implemented, it has not yet been managed as a systematic competency-based program grounded in continuous improvement. The study further shows that effective EMR utilization requires alignment between training design, organizational support, workflow integration, supervision, and evaluation. On the basis of these findings, the article proposes an integrated education and training management model emphasizing competency mapping, adaptive instructional strategies, structured mentoring,

ongoing supervision, and periodic evaluation linked to service quality outcomes. The model is expected to reduce human error, improve medical data accuracy, strengthen user confidence, and enhance quality of care. This article contributes to educational management and health information systems literature by demonstrating that digital transformation in hospitals must be supported by a human-centered training system rather than by technology adoption alone.

Keywords: digital transformation, education and training management, Electronic Medical Records, healthcare workforce, hospital service quality, supervision.

INTRODUCTION

Hospitals across the world are under sustained pressure to modernize their service systems in response to expanding patient expectations, regulatory reform, and rapid technological change. Digital transformation in health care has become a strategic necessity rather than an optional innovation. Health information technologies are now expected to improve the speed, accuracy, transparency, and continuity of clinical and administrative processes. Among the most important components of this transformation is the Electronic Medical Record (EMR), a digital system used to store, retrieve, and manage patient data in a structured and accessible format. In principle, EMR enables faster access to patient history, more reliable documentation, better coordination among health professionals, and stronger support for clinical decision making. However, implementation in practice is often more complex than the technology narrative suggests.

The literature consistently shows that EMR systems can generate both major benefits and significant operational strain. On the one hand, digital records improve data accessibility, reduce duplication, and create new possibilities for quality control and service integration. On the other hand, poorly implemented EMR systems may increase documentation burden, introduce new forms of error, interrupt clinician workflow, and deepen frustration among staff who have not been adequately prepared for system change. These contradictions are especially visible in institutions transitioning from long-established paper-based habits to digital working cultures. In such settings, success depends not merely on the presence of hardware, software, and network systems, but on the capacity of the organization to prepare people, redesign routines, and sustain learning over time.

This issue is particularly important in hospital environments, where documentation errors are not only administrative weaknesses but also potential threats to patient safety. Inaccurate, incomplete, delayed, or inconsistent data entry may undermine diagnosis, medication accuracy, continuity of care, and medico-legal accountability. Consequently, the implementation of EMR is inseparable from the question of workforce competence. Medical personnel and administrative staff must understand how to use the system accurately, how to adapt workflows to digital documentation, and how to maintain the ethical and clinical standards associated with data integrity. These demands place education and training at the center of digital transformation.

Gunung Maria General Hospital in Tomohon, Indonesia, provides a particularly relevant site for examining this issue. The hospital introduced EMR in 2022 as part of its broader modernization efforts. Yet implementation has not been seamless. The dissertation on which this article is based identifies persistent challenges, including high input error rates, uneven competence among users, limited

familiarity with updated EMR modules, resistance among staff accustomed to manual procedures, and weak training follow-up. A reported error rate of around 48 percent indicates that the challenge is not marginal. It reflects a deeper organizational problem: technology has been introduced more quickly than the institutional learning system needed to sustain it.

The study therefore positions education and training management as the key lens through which EMR implementation should be understood. Rather than seeing EMR adoption as a purely technical project, the research treats it as a problem of organizational learning, competence development, and managerial coordination. This perspective is important because hospitals frequently conduct training as a one-off activity. Users may attend workshops or short briefings, but training is not always preceded by a rigorous needs assessment, supported by tailored instructional design, reinforced through mentoring, or evaluated against behavioral and service-quality indicators. Without these elements, training becomes procedural rather than transformative.

The present article develops the dissertation into a full-length journal manuscript of approximately 7,000 words in a style similar to IJITE. It aims to present a coherent analysis of how education and training management can optimize EMR implementation and improve medical service quality. Specifically, the article examines four managerial dimensions: planning, organizing, implementation, and evaluation of EMR training. These dimensions are treated not as isolated administrative functions but as an integrated system influencing competence, discipline, data accuracy, and service effectiveness.

The importance of this study is threefold. First, it contributes to educational management by extending the application of training management theory into hospital digitalization. Second, it enriches discussion in health information systems by emphasizing that human and organizational readiness are as decisive as technical infrastructure. Third, it offers a context-sensitive model for Indonesian hospitals and similar institutions operating under resource constraints, evolving regulations, and strong cultural legacies of manual work.

In this article, EMR training is not reduced to a technical briefing. It is understood as an ongoing educational process that must cultivate knowledge, skill, attitude, confidence, and accountability. The article argues that improvements in EMR use depend on whether hospitals can shift from fragmented training events to integrated education and training management. Such a shift requires competency mapping, structured planning, coordinated implementation, supportive supervision, and evaluation mechanisms directly connected to service outcomes. By treating digital adoption as an educational management issue, the study illuminates a pathway for hospitals seeking not only to computerize records but to improve quality of care through better-managed learning systems.

THEORETICAL FRAMEWORK

Educational management provides a strong conceptual foundation for understanding why EMR implementation succeeds in some organizations and stalls in others. At its core, educational management concerns the deliberate planning, organization, implementation, and control of learning-related processes in order to improve competence and achieve institutional goals. Bush (2018) frames educational management as the process by which human, material, and organizational resources are

coordinated to support effective learning and development. In a hospital context, this concept becomes highly relevant because professional competence is not static; it must be continuously updated in response to technological change, evolving clinical standards, and service quality demands. Recent studies further broaden this perspective. Wullur et al. (2024) emphasize that educational management should also consider multicultural policies as a basis for creating inclusive, equitable, and socially responsive institutional environments. This perspective is relevant in healthcare organizations where personnel frequently come from diverse professional, cultural, and social backgrounds that influence communication and learning processes.

Training management is one important subfield within educational management. Dessler (2020) describes training management as a systematic effort to improve employee performance through planned learning interventions aligned with job requirements. This definition emphasizes intentionality: training is not simply content delivery but a managerial process beginning with needs analysis and ending with performance improvement. Mulyasa (2019) further emphasizes that in public-service institutions, training should not be limited to technical ability; it must also strengthen professionalism, discipline, service ethics, and institutional responsibility.

The policy dimension of educational management also contributes to organizational effectiveness. Lumapow et al. (2024) argue that management policy functions as a strategy for improving educational quality through delegation of authority, stakeholder participation, accountability, and decision-making processes that are aligned with organizational needs. Within hospital settings, these principles become particularly important because successful EMR implementation requires collaboration among administrators, health professionals, technical staff, and users. Decentralized decision-making may also strengthen responsiveness to operational challenges emerging during implementation.

The strategic management perspective further reinforces this discussion. Lumapow, Podung, and Koessoy (2023) explain that community-based educational strategic management requires institutional partnerships, locally relevant program development, effective human resource management, and systematic performance evaluation. Although developed in an educational context, these principles are transferable to hospitals implementing digital systems because EMR implementation similarly requires cooperation between institutions, staff members, and external stakeholders while ensuring that training programs address contextual organizational needs.

The technological content of the training also matters. Electronic Medical Records differ from broader Electronic Health Records (EHR) and Personal Health Records (PHR), although the concepts overlap in practice. The World Health Organization (2009) describes digital medical records as essential tools for improving continuity, safety, and efficiency in healthcare delivery. Tinangon, Lumapow, Oentoe, and Lengkong (2023) demonstrate that telemedicine education management requires service planning, effective use of technology, coordination among health professionals, and community education. Their findings support the argument that healthcare digitalization should not be viewed merely as technological adoption but rather as an integrated management process involving human competencies and organizational coordination.

Adult learning theory provides another essential lens. Knowles, Holton, and Swanson (2015) explain that adults learn most effectively when training is relevant to their real work, problem-centered, and connected to existing experience. Hospital personnel are adult learners operating under

time pressure and strong professional identities. Umbase (2023) further argues that learning management in the digital era requires the integration of technology, pedagogy, and content knowledge (TPACK). Although originally developed in educational contexts, the TPACK framework highlights an important principle for EMR training: successful learning requires not only technological understanding but also the ability to integrate technical tools with contextual work practices and knowledge needs.

METHOD

This article is based on a qualitative descriptive study conducted at Gunung Maria General Hospital, Tomohon, Indonesia. The qualitative approach was selected because the research sought to understand how EMR training was planned, organized, implemented, and evaluated within a real institutional setting. Rather than measuring variables statistically, the study aimed to capture managerial processes, user experiences, perceived barriers, organizational responses, and contextual influences shaping the use of EMR. A qualitative descriptive design was considered appropriate because it allows a detailed account of practical realities while remaining closely connected to the language and meanings used by participants.

The study site was selected purposively. Gunung Maria General Hospital had already introduced EMR and had begun implementing training activities, making it a relevant setting for examining how educational management functions operate during digital transformation. The hospital also represented a setting in which the transition was still incomplete, thereby allowing the study to identify both progress and unresolved issues. The time frame of the study followed the hospital's post-implementation experience after EMR adoption beginning in 2022.

Data sources included hospital management personnel, medical staff, administrative staff, and relevant institutional documents. Participants were selected on the basis of their direct involvement in EMR use, training activities, or policy and supervisory roles. This broad participant composition enabled the study to compare managerial expectations, user experiences, and institutional procedures. It also allowed the researcher to identify mismatches between formal training design and the realities of day-to-day practice.

Data were collected through three main techniques. First, in-depth interviews were used to explore participants' perceptions of EMR training, competence gaps, workload implications, resistance, supervision, and service quality effects. Interviews provided insight into how different actors interpreted the same organizational change. Second, observation was used to examine work processes, training situations, user interaction with the EMR system, and the practical consequences of digital documentation for service delivery. Observations were important for identifying routine behaviors and contextual constraints that might not be fully articulated in interviews. Third, documentation analysis was used to review training records, internal guidelines, implementation notes, and other materials related to EMR and hospital management. These documents helped triangulate claims made during interviews and situate them within institutional policy.

Data analysis followed an interactive model consistent with Miles, Huberman, and Saldaña (2014). The process included data condensation, data display, and conclusion drawing or verification.

In the condensation stage, interview and observation materials were organized according to the four major themes of the study: planning, organizing, implementation, and evaluation. Repeated reading and coding were used to identify patterns such as lack of needs analysis, uneven training participation, dependence on informal assistance, and limited evaluation follow-up. In the display stage, the researcher organized the data thematically so that relationships across participants and managerial functions could be interpreted more clearly. In the verification stage, patterns were checked against multiple sources to ensure that conclusions remained grounded in the empirical data.

Trustworthiness was supported through triangulation of methods and sources. Interview findings were checked against observations and documents wherever possible. The diversity of participants also strengthened source triangulation because hospital managers, medical personnel, and administrative staff often described the same training process from different perspectives. Credibility was further strengthened through continued engagement with the field and iterative interpretation of data. The study also paid attention to transferability by presenting findings in a way that preserves contextual detail, thereby enabling readers to judge the relevance of the results to similar institutions. Dependability and confirmability were pursued through systematic organization of field materials and transparent linkage between data patterns and analytical conclusions.

The unit of analysis in this study was not individual attitude alone, but the management of training as an institutional process influencing EMR use and service quality. Accordingly, the results are presented not as isolated personal opinions but as converging patterns across managerial dimensions. The study did not aim to claim universal generalization. Instead, it sought analytical generalization by offering a grounded interpretation of how educational management can support hospital digitalization.

Because the study deals with hospital service processes, ethical sensitivity was important throughout the research. Participant perspectives were treated confidentially, and the analysis was oriented toward institutional improvement rather than individual blame. This is especially important in digital transformation studies, where staff may fear that admitting difficulty with new systems could be interpreted as incompetence. The research therefore treated user difficulties as organizational learning issues requiring managerial response.

The methodological strength of the study lies in its integration of educational management theory with field-based analysis of hospital practice. By examining the everyday realities of training, supervision, adaptation, and documentation work, the study generates a practical understanding of how EMR competence is actually built or weakened in institutional settings. This makes the findings useful both for theory development and for operational improvement.

RESULTS AND DISCUSSION

The findings reveal that EMR implementation at Gunung Maria General Hospital has not failed, but it has not yet matured into a stable, competency-based system of practice. The hospital has taken meaningful steps toward digital transformation, including the introduction of EMR since 2022 and the conduct of training activities. Nevertheless, the transition remains marked by a gap between technological adoption and institutional readiness. This gap is visible in persistent input errors, uneven

confidence among users, difficulty adapting to updated modules, reliance on informal help, and limited alignment between training and actual workflow needs.

Planning of EMR training emerged as the first major area of concern. Training had been initiated, indicating institutional awareness of the need to support users. However, the planning process was not yet grounded in a systematic competency needs assessment. Instead of beginning with a clear mapping of user categories, digital literacy levels, task-specific demands, and existing weaknesses, training appears to have been organized more as a general response to implementation pressure. This weakened the precision of program objectives. Medical personnel, administrative staff, and managers did not necessarily need the same depth or type of EMR instruction, yet training was not always differentiated accordingly.

The planning problem also affected the training curriculum. Participants indicated that EMR training covered operational aspects of the system, but not always with enough depth, sequencing, or contextual connection to day-to-day service situations. As the hospital's digital environment evolved, including the development or updating of modules such as AIDO, staff faced new technical demands without a correspondingly dynamic training design. This created a lag between system complexity and user readiness. In effect, the hospital had a digital system that was changing faster than its learning architecture.

Another feature of weak planning was limited continuity. Training was treated more as an event than as a long-term development pathway. Participants were exposed to initial instruction, but post-training reinforcement, structured refreshers, and progressive skill-building were not yet fully institutionalized. This is significant because EMR competence is cumulative. Users do not master complex systems through a single exposure, particularly in clinical environments where stress, interruptions, and workload shape how learning is absorbed and applied. The absence of longitudinal planning increased dependence on memory, peer assistance, and trial-and-error adaptation. See table 1.

Table 1. Planning strategy and early achievements for EMR training

Component of planning	Strategy implemented	Initial outcome/early achievement
Training needs analysis	Survey and interviews with physicians, nurses, administrative staff, and hospital management	Three major needs identified: basic EMR operation, data security, and advanced AIDO features
Training objectives	Set measurable targets: input errors <10%, input time ≤5 minutes, user confidence ≥90%	Input errors declined from 48% to 19% within six months; average entry time improved by about five minutes
Participant segmentation	Prioritized groups: emergency and inpatient units, then administrative staff, then heads of unit	More focused participation and more even skill development across units
Training curriculum	Three-tier modules: basic, intermediate, and advanced	Content became more systematic and better matched to user ability
Training methods	Blended learning: face-to-face simulation, e-learning, and on-site coaching	82% of respondents reported greater confidence using the EMR system

Trainer resources	Train-the-trainer model using senior medical staff as peer facilitators	Facilitator capacity expanded beyond the IT team
Budgeting	Training budget integrated into the hospital annual work and budget plan	Program continuity became less dependent on incidental funds
Scheduling	Shift-based scheduling to protect clinical services	Reduced timetable conflicts and increased participation
Indicators and evaluation	Kirkpatrick levels used for reaction, learning, behavior, and results	Progress became more measurable and more suitable for longitudinal review
Service impact	Better inter-unit integration and less duplicate data entry	Higher data accuracy and improved staff and patient satisfaction

The second major finding concerns organizing. The hospital had undertaken some organizational effort to implement training, but coordination remained uneven. Roles and responsibilities for training support, technical assistance, and follow-up supervision were not always clearly integrated into a coherent system. As a result, training support could become fragmented. Some users relied on direct assistance from more experienced colleagues, while others had fewer accessible support channels. Such informal support was useful, but it could not substitute for an organized training structure.

Organizing problems also appeared in resource allocation and scheduling. In hospital environments, training competes with service demands. If training schedules are not strategically aligned with staffing patterns and patient loads, participation becomes difficult and learning quality declines. Participants' experiences suggest that organizational constraints limited the consistency and depth of participation. This is especially important for hospital systems where shift work, clinical urgency, and role differentiation affect staff availability. Without careful coordination, training may occur, but organizationally it remains peripheral to service operations rather than integrated within them. See table 2.

Tabel 2. *Comparison of the previous and revised organizing model for EMR training*

Aspect	Previous condition	Revised organizational model proposed in the dissertation
Organizational structure	Training depended mainly on the internal IT team	A formal structure is created: director as sponsor, HR as coordinator, IT as facilitator, training committee as quality assurer, heads of unit as supervisors, and senior staff as peer trainers
Coordination	Weak coordination and frequent schedule clashes across units	Multi-level coordination is introduced through vertical and horizontal communication plus monthly review meetings
Leadership role	Leaders mostly approved programs administratively	The director provides strategic direction and unit heads actively mentor staff
Number of facilitators	Only three IT staff handled most training activities	Train-the-trainer expands facilitation capacity through trained senior clinicians
Scheduling	Inflexible scheduling often conflicted with clinical duties	Shift-based training and e-learning increase flexibility without disrupting services

Supervision and monitoring	Minimal monitoring and little follow-up after training	Unit heads supervise field practice and an EMR monitoring team performs monthly audits
Organizational culture	Many staff perceived EMR as difficult and burdensome	A learning-organization culture is encouraged through forums, online groups, and recognition for improvement
Performance effect	Attendance around 60%, high error rates, patient satisfaction 74%	Attendance reaches 95%, errors fall to 19%, patient satisfaction rises to 88%, and productivity increases by 15%

In addition, organizing did not always ensure that technological and instructional resources were fully synchronized. Effective EMR training requires not only a trainer and a timetable, but also access to working systems, stable devices, realistic simulation opportunities, and immediate troubleshooting support. Where these are weak or uneven, training becomes more theoretical than practical. In the studied setting, users still faced technical and operational confusion in real use, suggesting that organizational preparation had not yet fully bridged the space between instruction and workplace performance.

The third major finding relates to implementation. This was the dimension where the consequences of planning and organizing weaknesses became most visible. Training had been delivered, and many participants had acquired some knowledge of the system. Yet the quality of actual implementation remained inconsistent. One of the clearest indicators was the high input error rate reported in the dissertation, reaching approximately 48 percent. Such a figure signals that learning transfer from training to practice remained incomplete.

Implementation problems had several layers. First, user competence was uneven. Some staff adapted relatively well and could work with the digital system effectively. Others continued to struggle with basic or updated functions, especially when required to move beyond routine tasks or respond to system changes. Second, confidence levels were uneven. Even when some personnel had basic knowledge, they were not always confident enough to use the system independently under work pressure. Third, workload and time pressure likely reduced the effectiveness of learning transfer. Staff working in demanding service environments often prioritize speed and immediate problem solving, which can reinforce shortcuts or increase the likelihood of documentation errors. See table 3.

Table 3. Stages of EMR training implementation at Gunung Maria General Hospital

Stage	Main activities	Method	Responsible actor(s)	Expected result	Observed achievement
1. Preparation	Program socialization, shift-based scheduling, preparation of modules and materials	Staff meetings, official memos, cross-unit coordination	Hospital director, HR, IT team	All staff understand the schedule and goals; materials are ready	92% of medical staff knew the schedule and modules were prepared before training started
2. Classroom learning	Interactive presentation, data-	Interactive lecture, computer	IT facilitators, heads of unit, peer trainers	Participants understand basic EMR	81% of participants completed fictive

	entry simulation, case discussion	simulation, group discussion		concepts and can perform simple entry tasks	data entry without error
3. Online learning	Access to LMS materials, videos, e-books, quizzes, and self-evaluation	Interactive e-learning modules	IT team and training committee	Flexible learning with progress recorded electronically	87% of participants passed the online quiz with an average grade of B+
4. Supervised field practice	Direct assistance for entering patient data and integrating lab and radiology outputs	Coaching, mentoring, peer training	Senior physicians or nurses and IT team	Participants become accustomed to using EMR in real care situations	Input errors fell to 19% and input time improved from about 12 to 7 minutes per patient
5. Formative evaluation	Post-test in each session and direct facilitator feedback	Short quizzes and immediate feedback	Facilitators and evaluation team	Participants identify strengths and weaknesses during learning	88% of participants corrected prior mistakes in the next session
6. Summative evaluation	Practical examination, performance interview, and audit of EMR use	Field examination, interviews, system audit	Training committee and hospital director	Measure overall success and service impact	Patient satisfaction rose from 74% to 88%, and staff productivity increased by 15%

Resistance to change also formed part of the implementation picture. The study does not present resistance as outright rejection, but rather as hesitation, discomfort, and attachment to established manual routines. This is understandable in institutions where staff have spent years working with paper-based systems and where digital use can initially feel slower, more visible, and more risky. Resistance was compounded when personnel did not fully understand the long-term benefits of EMR or when support mechanisms were insufficient. In this sense, implementation difficulties were both technical and cultural. See table 4, figure 1 & 2.

Table 4. Before-and-after comparison of service outcomes following EMR training

Indicator	Before EMR training	After EMR training	Change / impact
Accuracy of medical data	Frequent documentation errors (48% of observed cases)	Error rate decreased to 19%	Accuracy improved by 29 percentage points
Patient safety	Incidents related to record error were relatively high	Incidents decreased by 35%	Clinical risk declined and services became safer

Patient satisfaction	Patient satisfaction level was 74%	Patient satisfaction rose to 88%	Increase of 14 percentage points
Medical staff productivity	Average input time 12 minutes per patient; limited service capacity	Average input time 7 minutes per patient; patients served per shift increased by 15%	Faster service and higher capacity
Work attitude and culture	Resistance to technology and fear of making mistakes	82% of staff felt confident using EMR and began suggesting system improvements	Work culture shifted toward innovation and participation

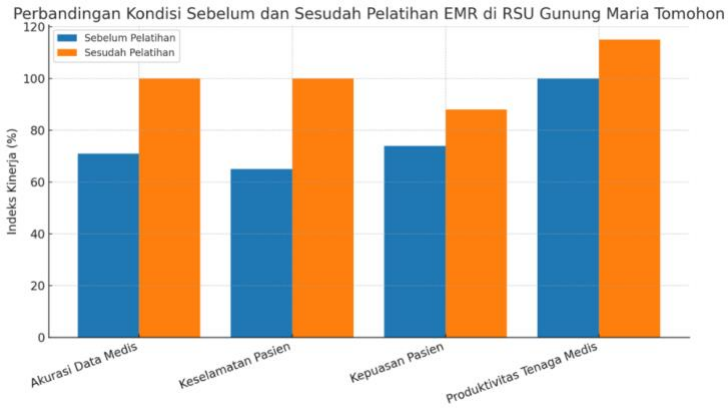

Figure 1. Graphic comparison of conditions before and after EMR training

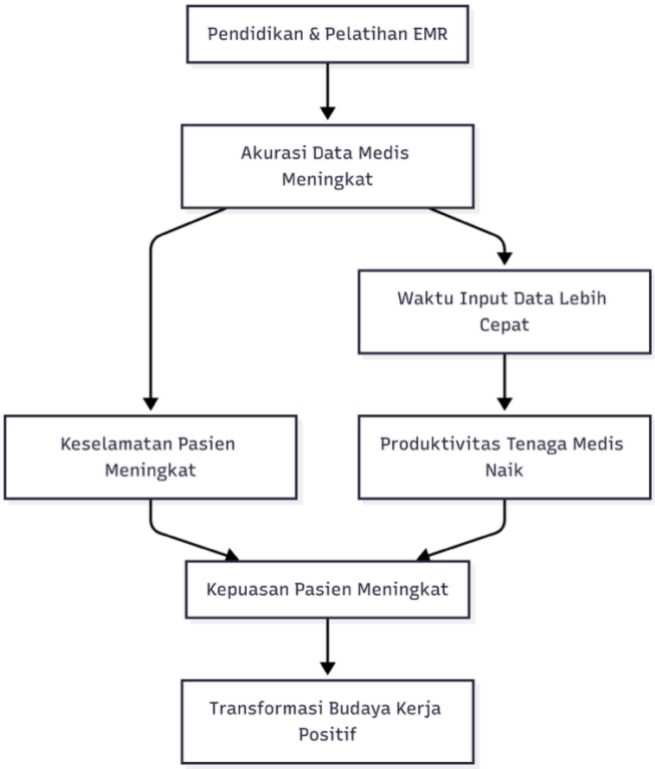

Figure 2. Flowchart of the impact pathway generated by EMR training

Another important implementation finding was the dependence on informal adaptation. Staff often learned through doing, asking colleagues, and coping with problems as they arose. While such learning is common in organizational life, over-reliance on informal adaptation can normalize inconsistency. Different units or individuals may develop different undocumented practices, which undermines standardization. For EMR systems, lack of standardization is particularly risky because clinical and administrative decisions depend on consistent data structures and documentation habits.

The fourth major finding concerns evaluation. Among the four managerial dimensions, this appears to be one of the weakest. Training had not yet been supported by a comprehensive evaluation framework based on competence improvement, behavior change, and service outcomes. Evaluation tended to focus more on whether training had occurred than on whether it had altered practice in measurable ways. As a result, the hospital lacked a strong evidence base for refining training strategy.

This weakness affected the institution's ability to learn from implementation. If error rates are high, if users continue to struggle, and if workflow problems persist, evaluation should make these issues visible and feed them back into planning and organizing. Yet the dissertation suggests that such feedback mechanisms were not yet fully systematic. Supervision and monitoring existed, but they had not been optimized as integrated components of educational management. Without periodic structured review, training weaknesses may recur, and new users may inherit unresolved problems.

At the same time, the findings do not imply an absence of institutional potential. On the contrary, the hospital already possesses the main ingredients needed for improvement: it has adopted EMR, conducted training, identified major issues, and shown concern for service quality. The challenge is to transform these separate efforts into an integrated training management model. The dissertation

identifies four key areas requiring reinforcement: competency-based planning, coordinated organization, adaptive and continuous implementation, and systematic evaluation tied to quality improvement.

The service-quality implications of these findings are substantial. High documentation errors and uneven EMR use affect not only administrative neatness but also the accuracy of medical information, timeliness of care, and trust in the system. Conversely, when training is better managed, the hospital stands to gain more reliable documentation, greater staff confidence, smoother workflows, and stronger support for patient safety. Thus, the findings support the central argument of the study: EMR implementation is fundamentally a training management issue with direct consequences for service quality.

Overall, the findings show a hospital in transition. It has moved beyond paper dependency, but it has not yet reached a stage where digital documentation is fully embedded in organizational competence and routine. The main barriers are not a lack of technological ambition, but weaknesses in how the organization educates, supports, supervises, and evaluates its people. This insight is critical because it shifts the solution away from technology replacement alone toward an integrated human-centered management strategy.

The findings demonstrate that the quality of EMR implementation cannot be understood solely through the lens of technology provision. The hospital had already introduced EMR and provided training, yet major difficulties persisted. This confirms the broader argument in the literature that digital transformation in health care is a sociotechnical process rather than a purely technical one. The presence of a digital platform does not automatically produce digital competence, workflow efficiency, or service quality. Instead, these outcomes depend heavily on the quality of education and training management surrounding the system. See table 5.

Table 5. Summary of the training-to-service impact pathway discussed in the dissertation

Stage	Process / intervention	Direct effect	Extended effect	Indicator
EMR education and training	Blended learning through face-to-face sessions, simulation, e-learning, and field coaching	Improved system understanding, data-entry skill, and awareness of data security	Changed staff mindset toward digital work	82% of respondents felt more confident
Medical-data accuracy	Standardized data-entry practice and use of validation features	Reduced documentation errors	Strengthened professionalism and clinical accountability	Errors dropped from 48% to 19%
Patient safety	More accurate patient data and better use of alert functions	Lowered risk of incidents related to wrong medication or incomplete history	Greater patient trust in hospital services	Incidents dropped by 35%
Efficiency and productivity	Shorter input time and more structured workflow	Faster service delivery	Medical staff had more time for clinical attention	Input time fell from 12 to 7 minutes and

				productivity rose by 15%
Patient satisfaction	Faster service, fewer errors, clearer communication	Patients felt safer and more respected	Hospital image improved in the community	Satisfaction rose from 74% to 88%
Work-culture transformation	More collaboration and openness to change	Adaptive and collaborative work culture emerged	Organization became better prepared for health-sector digitalization	Work consistency and loyalty improved

The weakness of training planning is especially important. Planning is the stage where institutions decide whether training will be generic or strategic. In this study, planning had not yet been fully based on a structured needs assessment. This supports Dessler's (2020) contention that effective training must begin with a clear diagnosis of competency gaps. When training is organized without sufficiently identifying who needs what kind of instruction and for which work tasks, the result is often partial learning and uneven transfer. In hospitals, this weakness becomes particularly consequential because EMR users perform different tasks under different pressures. Medical personnel, administrative staff, supervisors, and managers do not interact with the system in identical ways, so training design must reflect differentiated roles.

The finding also resonates with adult learning theory. Knowles et al. (2015) argue that adult learners need clear relevance and immediate applicability. If EMR training is not rooted in the actual problems users face, learning will remain abstract. The hospital's experience suggests that users needed more contextualized learning connected to the real complexities of digital documentation, not simply exposure to system features. This helps explain why the training could occur without fully reducing error rates. The issue was not simply attendance, but the alignment between training content and workplace reality. See table 6.

Table 6. Planning weaknesses and the dissertation's recommended direction for continuous improvement

Planning aspect	Initial condition	Recommended planning direction after the study
Training needs analysis	Not conducted systematically; training was largely reactive after technical problems emerged	Use interviews, observation, and questionnaires to map competency gaps across clinicians and administrative staff
Training objectives	No measurable objectives; the effort mainly aimed to reduce complaints	Adopt measurable goals related to errors, speed, confidence, patient satisfaction, and record audit quality
Participant identification	Participants selected without clear priority by unit	Prioritize high-impact units first, then expand gradually to other functions
Curriculum	No standard module structure	Use modular curriculum covering basic use, data security, validation, analytics, and advanced integration
Training methods	Short face-to-face exposure with little practice	Use blended learning, simulation, and on-the-job coaching

Human resources and budget	Only three IT staff acted as trainers and no train-the-trainer system existed	Develop peer facilitators and secure formal annual budget support
Scheduling	Irregular timing often conflicted with clinical work	Align training with staff shifts to protect patient services
Success indicators and follow-up	Evaluation relied mostly on complaints and lacked continuity	Create a cyclical monitoring and evaluation system with post-training observation, tests, surveys, and audits

The organizing dimension reveals a second theoretical insight: training effectiveness depends on institutional coordination, not merely instructional quality. Even well-designed training can fail if schedules clash with service demands, if technical support is unclear, or if post-training assistance is fragmented. This reinforces Bush's (2018) view that educational management is fundamentally about aligning resources, roles, and processes to support learning. In the hospital case, informal colleague support emerged as an important coping mechanism. While this reflects collaborative goodwill, it also indicates that formal organizing structures were not yet sufficient. Informal support can sustain short-term adaptation, but it is too unstable to serve as the main backbone of hospital digitalization.

The implementation findings, especially the high error rate, deserve close attention. A reported error level of about 48 percent indicates that the problem reaches beyond ordinary adjustment difficulties. It suggests that learning transfer has been significantly constrained. The literature on EMR implementation has repeatedly shown that digital systems may create new forms of work burden when users are not adequately prepared. Menachemi and Collum (2011) highlight the role of ongoing training in successful EMR use, and Ratwani et al. (2018) warn that complex digital environments can generate substantial error when design and user preparation are not well aligned. The present study confirms these concerns in a local Indonesian context.

Yet the high error rate should not be interpreted as evidence that staff are incapable or resistant by nature. The study instead points to an institutional learning deficit. Users were operating in a context where system updates, work pressure, varying digital literacy, and limited follow-up combined to weaken confidence and consistency. This supports the learning organization perspective of Senge (1990). A hospital can only sustain digital transformation if it creates mechanisms for continuous organizational learning. The presence of informal adaptation indicates that users were learning, but doing so through improvised rather than strategically supported pathways.

The discussion of resistance to change further clarifies the managerial challenge. Resistance is often treated as a personal obstacle, but the findings suggest it is better understood as a predictable response to organizational uncertainty. Staff who had long relied on manual documentation were asked to adopt a new system with different logic, visibility, and accountability demands. If support, communication, and reinforcement are limited, hesitation becomes rational. This aligns with Kotter's (1996) change management theory, which emphasizes the importance of vision, communication, and sustained reinforcement in organizational transformation. In other words, hospitals should not treat resistance as a disciplinary problem alone. It is also a sign that change has not yet been fully translated into a shared and supported practice.

The weakness in evaluation is perhaps the most strategically important finding because it prevents learning from becoming cumulative. Kirkpatrick and Kirkpatrick (2006) emphasize that

training evaluation must proceed beyond reaction to learning, behavior, and results. In the hospital case, training existed, but evaluation had not yet systematically connected training to observed behavior change or service-quality outcomes. This meant that error rates, competence gaps, and workflow problems could persist without being fully recycled into program redesign. Evaluation, in effect, had not yet become a driver of continuous improvement.

This is where supervision becomes central. The dissertation underscores that supervision and monitoring were present but not fully optimized. From an educational management perspective, supervision should function as an extension of training, not as an unrelated administrative mechanism. Supervision can identify recurring errors, clarify standards, support mentoring, and generate evidence for targeted retraining. Chen et al. (2019) show that real-time monitoring can reduce input errors significantly when combined with corrective systems. Thus, the hospital's path forward lies not in separating training and control, but in integrating them within one quality-improvement cycle.

The service-quality implications of the study are also consistent with Donabedian's structure-process-outcome model. EMR technology forms part of the structural environment, but the real quality question lies in process: how users enter, interpret, retrieve, and apply data in service encounters. If process quality is weak because users are undertrained or unsupported, then structural investment fails to produce outcome improvement. The findings suggest that service quality can improve substantially if hospitals strengthen training management. More accurate data can support safer clinical decisions, reduce duplication, increase efficiency, and build greater confidence in institutional records.

The study also contributes to broader discussions of digital transformation in middle-resource institutional settings. In many organizations, technology arrives faster than capability-building systems. Training may be conducted, but not yet embedded in long-term policy, competency standards, mentoring structures, or evaluation routines. The present study provides a grounded illustration of that gap. Its value lies in showing that the solution is not simply "more training" in a generic sense, but better-managed training: training that is competency-based, role-specific, iterative, supervised, and evaluated against meaningful service outcomes.

Based on the findings and discussion, an integrated EMR education and training management model can be proposed. In the planning stage, the hospital should begin with competency mapping across user categories. Training objectives should then be linked to specific work tasks, system modules, and quality indicators. In the organizing stage, the hospital should designate a clear internal structure for training coordination, technical support, mentoring, and supervision. Schedules should be aligned with service workflows, and training resources should include simulation opportunities and updated user guides. In the implementation stage, the hospital should use practical, adult-centered strategies such as hands-on exercises, guided practice, role-based modules, and on-the-job coaching. In the evaluation stage, the hospital should apply multi-level evaluation, including user reaction, demonstrated learning, observed behavior, documentation accuracy, and service-quality indicators. Supervision data should then feed directly back into the next cycle of planning.

This model is not merely procedural. It reflects a deeper shift in how hospital leadership understands digital transformation. Technology should not be managed as a stand-alone project, but as a process of institutional learning. Such a view repositions hospital leaders as educational managers who shape competence systems, learning cultures, and feedback mechanisms. It also recognizes that

the quality of care increasingly depends on how well organizations can manage digital knowledge in practice.

Ultimately, the study suggests that EMR implementation is a test of organizational maturity. Hospitals may purchase systems quickly, but meaningful transformation requires disciplined learning structures. Gunung Maria General Hospital's experience shows that digital adoption can expose hidden weaknesses in planning, coordination, supervision, and staff development. At the same time, it shows that these weaknesses are manageable if institutions approach EMR not only as software but as a sustained educational change process. That is the central theoretical and practical contribution of this study.

Proposed Integrated Model And Practical Implications

Based on the study, an integrated model of EMR education and training management can be articulated more explicitly. The model is cyclical rather than linear, and each stage feeds into the next. In the first stage, competency-based planning begins with a baseline audit. The hospital should map users not only by unit but also by level of digital literacy, frequency of EMR use, task complexity, and error history. A doctor entering clinical notes, a nurse documenting treatment, and an administrative officer handling patient registration all require different emphases in training. The competency map should therefore identify core competencies shared across users and specialized competencies tied to specific roles. Planning should also define measurable indicators such as input accuracy, completeness of records, turnaround time, error frequency, and adherence to documentation standards.

The second stage is structured organizing. Here the hospital should form a small EMR learning and quality team composed of management representatives, technical personnel, clinical users, and administrative staff. This team should not only schedule training, but also maintain materials, coordinate updates, monitor attendance, identify high-risk areas, and connect technical changes with user learning. Organizing should also ensure that training does not compete destructively with service operations. Short modular sessions, shift-adjusted workshops, microlearning formats, and protected practice time can help users learn without disrupting patient care. Equally important is the provision of simple job aids, quick-reference guides, and supervised simulation environments that allow users to practice in low-risk conditions.

The third stage is adaptive implementation. Training should move away from lecture-heavy sessions toward interactive practice. Demonstration alone is insufficient; users need repeated guided entry, case-based simulation, peer discussion, and immediate correction. New employees should receive orientation modules, while experienced staff should receive refresher and update training when new features are introduced. Coaching and mentoring are especially important during the early adoption phase and after major system revisions. In addition, implementation should normalize help-seeking rather than stigmatize difficulty. A learning culture is strengthened when staff can report confusion and mistakes as part of improvement rather than as a threat to professional reputation.

The fourth stage is developmental evaluation and supervision. Evaluation should occur before, during, and after training. Before training, a baseline assessment identifies existing competence and common error patterns. During training, formative checks help facilitators identify who is still struggling and what content needs reinforcement. After training, evaluation should extend beyond tests to observation of real use, review of records, and analysis of system-generated indicators.

Supervisors should use these findings not merely to identify faults but to determine where retraining, mentoring, workflow revision, or technical clarification is required. In this way, evaluation becomes a developmental instrument connected to quality assurance.

The practical implications of this model are significant. For hospital leaders, it suggests that EMR governance must include a learning strategy, not only a technical maintenance strategy. For trainers, it emphasizes that instruction should be role-based, continuous, and problem-centered. For supervisors, it clarifies that monitoring documentation quality is inseparable from supporting competence development. For policymakers, it indicates that national digitalization agendas should account for institutional training readiness and not assume that software deployment automatically creates service improvement. Finally, for patients, the ultimate implication is safer and more reliable care because accurate digital records improve continuity, timeliness, and accountability throughout the service process.

CONCLUSION

This article has shown that the implementation of Electronic Medical Records at Gunung Maria General Hospital is shaped less by the availability of technology alone than by the quality of education and training management supporting its use. The hospital has made an important transition toward digital documentation, yet the process remains constrained by weak needs-based planning, uneven organizational coordination, inconsistent training transfer, and limited evaluation and supervision. These weaknesses help explain why EMR use continues to be marked by high input errors, uneven user confidence, and incomplete standardization. The study demonstrates that four managerial dimensions are decisive: planning, organizing, implementation, and evaluation. Planning must begin with competency mapping and role-specific objectives rather than generic instruction. Organizing must ensure that responsibilities, schedules, technical support, and learning resources are coordinated with hospital workflows. Implementation must use practical, adult-centered, and continuous learning strategies that bridge the gap between training sessions and everyday work. Evaluation must move beyond attendance and satisfaction toward behavioral and service-quality indicators, supported by systematic supervision and feedback. The broader implication is that digital transformation in hospitals is fundamentally a human capability issue. EMR systems do not improve service quality automatically. They improve quality only when users are adequately prepared, supported, monitored, and continuously developed. For this reason, hospital leadership should institutionalize a competency-based and continuously evaluated training system as part of EMR governance. Doing so can reduce human error, improve documentation quality, strengthen patient safety, and increase organizational efficiency. This study contributes to the literature by bringing educational management into closer dialogue with health information systems. It argues that hospitals implementing EMR should be viewed not only as technology adopters but also as learning organizations. The practical contribution lies in the integrated training management model proposed from the study, which can guide similar hospitals seeking to optimize digital records through better-managed competence development. Future research may extend this work by examining how the model performs longitudinally, comparing hospitals with different levels of digital maturity, or integrating user-experience and service-outcome

metrics more systematically. Even so, the central conclusion remains clear: successful EMR implementation requires not just a digital system, but a managed educational system capable of sustaining digital practice.

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