The Education and Training Program on Hospital Management Information System for Healthcare Workers in the Surakarta Region.

Joni Maulindar[1]*, EM Sutrisna[2], Raafika Studiviani Dwi Binuko[3]
[1] Teknik Informatika, Fakultas Ilmu Komputer, Universitas Duta Bangsa Surakarta
[2] [3] Medical Faculty, Universitas Muhammadiyah Surakarta

*Coresponding Author
Email: joni_maulindar@udb.ac.id

Abstract

Healthcare workers in the Surakarta region still face challenges in understanding and operating the Hospital Management Information System, which impacts work efficiency and service quality. This program aims to enhance the competencies of healthcare workers through education and training based on lectures, simulations, and evaluations via pre-test and post-test assessments. The community service method included delivering lecture materials, practical training with case simulations, and evaluating participants' comprehension improvements. The results show that the average pre-test score was 58, while the post-test score increased significantly to 85, reflecting a 46.6% improvement. Understanding of Hospital Management Information System concepts improved from 62 to 85, mastery of basic features from 58 to 88, and data analysis skills from 54 to 82. A total of 95% of participants found the training relevant and effective, while 89% expressed confidence in using Hospital Management Information System. Feedback from participants and hospitals indicated that the training successfully contributed to administrative efficiency and prepared healthcare workers for digital transformation.

Keywords: Hospital, Training, Education, Pre-Test, Post-Test.

INTRODUCTION

Digital transformation has become an urgent need in the healthcare sector, particularly in hospitals, which serve as centers for public health services(Avinash & Joseph, 2024)(Esposito et al., 2023). One form of this transformation is the implementation of the Hospital Management Information System, which is designed to manage data and information more effectively and efficiently. Hospital Management Information System covers various operational aspects, from patient registration, electronic medical records, financial management, to logistics management(Keitel et al., 2011). Thus, the implementation of Hospital Management Information System aims to improve service quality, accelerate administrative processes, and support data-driven decision-making (Nisar et al., 2021)(Basile et al., 2023). Although Hospital Management Information System offers numerous benefits (Dehnavieh et al., 2018)(Tuan et al., 2022), its implementation still faces various challenges, particularly in regions with limited human resources skilled in information technology. In Surakarta, many hospitals have adopted Hospital Management Information System, but its success is often hindered by the lack of understanding and skills among healthcare workers in operating this system.

Healthcare workers, such as nurses, midwives, and administrative staff, play a critical role in the successful operation of Hospital Management Information System (McQuide et al.,

2023)(Mussi et al., 2023). However, many of them struggle to adapt to the new system due to insufficient training and support (Page et al., 2024)(Tong et al., 2024). Most healthcare workers are more familiar with manual methods, so transitioning to digital technology is often perceived as complicated and requires a lengthy adaptation period (Galetsi et al., 2023)(Torab-Miandoab et al., 2023). Additionally, not all healthcare workers have a background in information technology, which presents an additional challenge in understanding the functions and features of Hospital Management Information System. This challenge is exacerbated by the limited training available in hospitals, both in terms of frequency and quality. As a result, many healthcare workers only have partial knowledge of the system, preventing the full potential of Hospital Management Information System to enhance efficiency and service quality from being realized.

Another issue is the lack of standardized training for healthcare workers in using Hospital Management Information System (Tsandila-Kalakou et al., 2023)(Taye et al., 2023). Some hospitals may conduct internal training, but these sessions are often general and not tailored to the specific needs of healthcare workers in different departments. Furthermore, changes or updates made by the Hospital Management Information System developers add complexity, as users need to relearn new features without adequate guidance (Rebuge & Ferreira, 2012). This leads to many healthcare workers feeling insecure about using the system and opting to return to manual methods, ultimately reducing hospital operational efficiency and effectiveness.

On the other hand, hospital management also faces challenges in providing sufficient resources to support Hospital Management Information System training and assistance. With limited budgets, hospitals often have to choose between allocating funds for technology development or workforce training. However, both aspects should progress simultaneously for the successful implementation of Hospital Management Information System to achieve optimal results. The lack of support from management is also a factor that contributes to the low adoption rate of Hospital Management Information System among healthcare workers. This highlights that the success of Hospital Management Information System implementation depends not only on the technology itself but also on the readiness of the human resources operating it.

Therefore, comprehensive solutions are needed to address these challenges. One effort that can be undertaken is through a structured and continuous education and training program for healthcare workers. This program aims to improve the understanding and skills of healthcare workers in operating Hospital Management Information System, enabling them to utilize the system to its full potential in their daily work. With relevant and practical training, healthcare workers are expected to overcome their fear or confusion with new technology and gain more confidence in using Hospital Management Information System. Additionally, training can serve as a platform to align the understanding of healthcare workers from various departments, thus creating uniformity in the operation of the system.

This Hospital Management Information System education and training program not only aims to improve individual competencies but also supports the sustainability of digital transformation in hospitals. With competent healthcare workers, hospitals can optimize the use of Hospital Management Information System to improve service quality, operational

efficiency, and patient satisfaction. Therefore, community service through Hospital Management Information System education and training becomes a strategic step to address the challenges of implementing information technology in the healthcare sector, especially in Surakarta.

The main goal of this Hospital Management Information System education and training program is to enhance the competencies of healthcare workers in Surakarta in effectively and efficiently operating Hospital Management Information System. This program aims to provide in-depth understanding of the concepts, functions, and benefits of Hospital Management Information System, as well as equip participants with practical skills to use the system in their daily tasks. Additionally, this training also aims to overcome the challenges healthcare workers face in adapting to information technology, such as lack of system understanding, fear of new technology, and confusion in operating Hospital Management Information System features. Through this program, it is hoped that healthcare workers will become more confident and competent in using Hospital Management Information System, thus supporting the hospital's administrative efficiency and improving the quality of patient care. The program is also expected to serve as a model for sustainable training, enabling the digital transformation in hospitals to proceed smoothly and deliver long-term benefits to the healthcare sector.

RESEARCH METHODS

The research method used in this program adopts the Participatory Action Research (PAR) approach, as described by Kemmis and McTaggart (Pitura, n.d.), emphasizing active participant involvement through cycles of reflection, planning, action, and evaluation. The program is systematically designed, beginning with lectures to provide a conceptual understanding of the Hospital Management Information System (HMIS), followed by education through interactive discussions that allow participants to address practical challenges in implementing HMIS. Next, practical training in the form of HMIS simulation is conducted to offer concrete experiences relevant to healthcare workers' daily tasks. This method also aligns with Kolb's (Sinha, 2023) Experiential Learning Theory, which integrates real-world experiences, reflection, and active experimentation into the learning process. To assess its effectiveness, evaluations are conducted using pre-tests and post-tests, reflecting Levels 2 and 3 of Kirkpatrick's Training Evaluation Model (Cheung et al., 2023), measuring knowledge improvement and skill enhancement. The program further adheres to (Santos-Meneses et al., 2023) Adult Learning Principles, emphasizing the relevance of material to participants' experiences, enabling not only theoretical comprehension but also practical application in real-world contexts

RESULTS AND DISCUSSION

The education and training program for the Hospital Management Information System for healthcare workers in the Surakarta region was carried out using a participatory approach and involved several structured stages. The results of this program indicate success in improving healthcare workers' competencies in operating Hospital Management Information System, both in terms of conceptual understanding and technical skills. In the initial stage, a survey and pre-test were conducted to identify participants' baseline understanding of Hospital Management Information System. The pre-test results showed that the majority of participants, 78%, had a low understanding of the basic concepts and functions of Hospital Management Information System, while only 22% had a moderate understanding. This indicates the need for intensive educational intervention to improve information technology literacy among healthcare workers. Additionally, interviews with participants revealed several key challenges, such as the lack of prior training, system changes not accompanied by adequate support, and the scarcity of easily accessible documentation and guides.

Figure 1. Delivery of Material

The lecture and education sessions conducted in this program successfully provided a better understanding of the basic concepts, benefits, and key features of Hospital Management Information System. The material was delivered systematically using interactive presentation media and case studies, allowing participants to more easily grasp the practical applications of the theory presented. Participants gave positive feedback on this lecture method, with 87% stating that the material was presented clearly and was relevant to their daily work. One key point understood by the participants was how Hospital Management Information System can help integrate various hospital functions, from patient registration, medical records, logistics management, to financial reporting. This understanding served as a strong foundation for participants to move on to the practical training stage.

Figure 2. Practical Training on the Use of Hospital Management Information System

Practical training is a crucial stage in this program, as it provides participants with the opportunity to directly apply the theory they have learned. The training was conducted using Hospital Management Information System software simulated with data and work scenarios similar to real-life conditions. Participants were trained to perform basic operations, such as entering patient data, recording medical records, and managing drug stocks. Evaluation results during the training showed that most participants experienced an increase in confidence in using Hospital Management Information System. This was supported by post-test results, where 92% of participants showed significant improvement in their scores compared to the pre-test. Participants who initially found it difficult to understand the system interface were now able to operate basic features effectively.

In addition to improving technical skills, the program also succeeded in enhancing participants' understanding of the importance of Hospital Management Information System in supporting the operational efficiency of hospitals. During group discussions held throughout the training, many participants expressed that before joining the program, they were not fully aware of how Hospital Management Information System could help reduce their administrative workload. Some even mentioned feeling more motivated to integrate Hospital Management Information System into their daily routines after directly understanding its benefits. One of the most appreciated benefits was the ability of Hospital Management Information System to provide accurate and real-time data, which greatly assists in clinical and administrative decision-making.

However, the program also encountered several challenges that need attention for future implementation. One of these challenges was the limited training time, which some participants, especially those interacting with Hospital Management Information System for the first time, felt was insufficient. Participants from high-workload units also faced difficulties in attending the full training due to time constraints. Therefore, it is recommended to extend

212

the training duration or provide follow-up training periodically so that participants can delve deeper into the material presented. Additionally, some participants complained about the limitations of training facilities, such as inadequate computers and unstable internet connections. This highlights the need for greater attention to providing adequate supporting infrastructure to ensure the success of the program.

Based on the results of the post-test and feedback surveys, it can be concluded that the program successfully achieved its main goal, which was to enhance healthcare workers' competence in operating Hospital Management Information System. A total of 95% of participants were satisfied with the training format, while 89% stated that they felt more confident in using Hospital Management Information System. Furthermore, the program received appreciation from hospital management, who noted that this training positively impacted administrative efficiency and inter-unit coordination. Some hospitals even expressed interest in making this program a regular part of their staff training.

Overall, this Hospital Management Information System education and training program has made a significant contribution to supporting the digital transformation of hospitals in the Surakarta region. With healthcare workers more competent in using Hospital Management Information System, it is expected that hospitals will improve the quality of their services to patients and enhance efficiency in daily operations. However, the sustainability of this program requires support from various stakeholders, including hospital management, Hospital Management Information System developers, and health education institutions, to ensure that the training can continue to be held regularly and its quality improved. Moving forward, similar training can also be expanded to other regions and involve more participants, so that its benefits can be more widely felt in the healthcare sector.

Table 1. Average Results of Pre-Test and Post-Test

Measured Aspects	Average Pre-Test	Average Post-Test	Improvement (%)
Understanding the Concept of Hospital Management Information System	62	85	37,10
Mastery of Basic Features of Hospital Management Information System	58	88	51,70
Data Analysis Capability of Hospital Management Information System	54	82	51,00
Overall Average	58	85	46,60

CONCLUSION

The education and training program on Hospital Management Information System for healthcare workers in the Surakarta region has successfully enhanced participants' competencies, both in conceptual understanding and technical skills. Based on the results of pre-test and post-test evaluations, there was an average improvement of 46.6%, indicating the effectiveness of the lecture, education, training, and evaluation methods used. Participants were able to understand the functions and benefits of Hospital Management Information System and apply them in daily task simulations. The program also received positive feedback from participants and related institutions, as it successfully provided solutions to the challenges faced in the implementation of Hospital Management Information System.

However, the limited training time and infrastructure remain challenges that require further attention. It is recommended that this program be held periodically to reach more healthcare workers and provide more in-depth follow-up training. Adequate infrastructure, such as technology devices and stable internet connections, is essential to support the smooth running of the training. Additionally, continuous evaluations should be conducted to ensure that the participants' improved competencies can be effectively applied in their daily work.

REFERENCES

Avinash, B., & Joseph, G. (2024). Reimagining healthcare supply chains: a systematic review on digital transformation with specific focus on efficiency, transparency and responsiveness. *Journal of Health Organization and Management*, *38*(8), 1255–1279. https://doi.org/10.1108/JHOM-03-2024-0076

Basile, L. J., Carbonara, N., Pellegrino, R., & Panniello, U. (2023). Business intelligence in the healthcare industry: The utilization of a data-driven approach to support clinical decision making. *Technovation*, *120*, 102482. https://doi.org/https://doi.org/10.1016/j.technovation.2022.102482

Cheung, V. K.-L., Chia, N.-H., So, S.-S., Ng, G. W.-Y., & So, E. H.-K. (2023). Expanding scope of Kirkpatrick model from training effectiveness review to evidence-informed prioritization management for cricothyroidotomy simulation. *Heliyon*, *9*(8). https://doi.org/10.1016/j.heliyon.2023.e18268

Dehnavieh, R., Haghdoost, A., Khosravi, A., Hoseinabadi, F., Rahimi, H., Poursheikhali, A., Khajehpour, N., Khajeh, Z., Mirshekari, N., Hasani, M., Radmerikhi, S., Haghighi, H., Mehrolhassani, M. H., Kazemi, E., & Aghamohamadi, S. (2018). The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries. *Health Information Management Journal*, *48*(2), 62–75. https://doi.org/10.1177/1833358318777713

Esposito, S., Rosafio, C., Antodaro, F., Argentiero, A., Bassi, M., Becherucci, P., Bonsanto, F., Cagliero, A., Cannata, G., Capello, F., Cardinale, F., Chiriaco, T., Consolaro, A.,

Dessì, A., Di Mauro, G., Fainardi, V., Fanos, V., Guarino, A., Li Calzi, G., … Gaddi, A. V. (2023). Use of Telemedicine Healthcare Systems in Pediatric Assistance at Territorial Level: Consensus Document of the Italian Society of Telemedicine (SIT), of the Italian Society of Preventive and Social Pediatrics (SIPPS), of the Italian Society of Pediatric Primary Care (SICuPP), of the Italian Federation of Pediatric Doctors (FIMP) and of the Syndicate of Family Pediatrician Doctors (SIMPeF). In *Journal of Personalized Medicine* (Vol. 13, Issue 2). https://doi.org/10.3390/jpm13020198

Galetsi, P., Katsaliaki, K., & Kumar, S. (2023). Exploring benefits and ethical challenges in the rise of mHealth (mobile healthcare) technology for the common good: An analysis of mobile applications for health specialists. *Technovation*, *121*, 102598. https://doi.org/https://doi.org/10.1016/j.technovation.2022.102598

Keitel, A., Ringleb, M., Schwartges, I., Weik, U., Picker, O., Stockhorst, U., & Deinzer, R. (2011). Endocrine and psychological stress responses in a simulated emergency situation. *Psychoneuroendocrinology*, *36*(1), 98–108. https://doi.org/https://doi.org/10.1016/j.psyneuen.2010.06.011

McQuide, P. A., Brown, A. N., Diallo, K., & Siyam, A. (2023). The transition of human resources for health information systems from the MDGs into the SDGs and the post-pandemic era: reviewing the evidence from 2000 to 2022. *Human Resources for Health*, *21*(1), 93. https://doi.org/10.1186/s12960-023-00880-y

Mussi, C. C., Luz, R., Damázio, D. D., Santos, E. M., Sun, V., Porto, B. S., Parma, G. O., Cordioli, L. A., Birch, R. S., & Andrade Guerra, J. B. (2023). The Large-Scale Implementation of a Health Information System in Brazilian University Hospitals: Process and Outcomes. In *International Journal of Environmental Research and Public Health* (Vol. 20, Issue 21). https://doi.org/10.3390/ijerph20216971

Nisar, Q. A., Nasir, N., Jamshed, S., Naz, S., Ali, M., & Ali, S. (2021). Big data management and environmental performance: role of big data decision-making capabilities and decision-making quality. *Journal of Enterprise Information Management*, *34*(4), 1061–1096. https://doi.org/10.1108/JEIM-04-2020-0137

Page, B., Irving, D., Amalberti, R., & Vincent, C. (2024). Health services under pressure: a scoping review and development of a taxonomy of adaptive strategies. *BMJ Quality &Amp; Safety*, *33*(11), 738 LP – 747. https://doi.org/10.1136/bmjqs-2023-016686

Pitura, J. (n.d.). Participatory action research: advocacy and activism for promoting social justice in and through CALL. *Computer Assisted Language Learning*, 1–26. https://doi.org/10.1080/09588221.2024.2310290

Rebuge, Á., & Ferreira, D. R. (2012). Business process analysis in healthcare environments: A methodology based on process mining. *Information Systems*, *37*(2), 99–116. https://doi.org/10.1016/j.is.2011.01.003

Santos-Meneses, L. F., Pashchenko, T., & Mikhailova, A. (2023). Critical thinking in the context of adult learning through PBL and e-learning: A course framework. *Thinking Skills and Creativity*, *49*, 101358. https://doi.org/https://doi.org/10.1016/j.tsc.2023.101358

Sinha, E. (2023). 'Co-creating' experiential learning in the metaverse- extending the Kolb's learning cycle and identifying potential challenges. *The International Journal of*

Management Education, *21*(3), 100875. https://doi.org/https://doi.org/10.1016/j.ijme.2023.100875

Taye, B. K., Gezie, L. D., Atnafu, A., Mengiste, S. A., & Tilahun, B. (2023). Data completeness and consistency in individual medical records of institutional births: retrospective crossectional study from Northwest Ethiopia, 2022. *BMC Health Services Research*, *23*(1), 1189. https://doi.org/10.1186/s12913-023-10127-0

Tong, W., Zhang, X., Zeng, H., Pan, J., Gong, C., & Zhang, H. (2024). Reforming China's Secondary Vocational Medical Education: Adapting to the Challenges and Opportunities of the AI Era. *JMIR Med Educ*, *10*, e48594. https://doi.org/10.2196/48594

Torab-Miandoab, A., Samad-Soltani, T., Jodati, A., & Rezaei-Hachesu, P. (2023). Interoperability of heterogeneous health information systems: a systematic literature review. *BMC Medical Informatics and Decision Making*, *23*(1), 18. https://doi.org/10.1186/s12911-023-02115-5

Tsandila-Kalakou, F., Wiig, S., & Aase, K. (2023). Factors contributing to healthcare professionals' adaptive capacity with hospital standardization: a scoping review. *BMC Health Services Research*, *23*(1), 799. https://doi.org/10.1186/s12913-023-09698-9

Tuan, N. A., Hue, T. T., Lien, L. T., Van, L. H., Nhung, H. T. T., & Dat, L. Q. (2022). Management factors influencing lecturers' research productivity in Vietnam National University, Hanoi, Vietnam: A structural equation modeling analysis. *Heliyon*, *8*(9), e10510. https://doi.org/10.1016/j.heliyon.2022.e10510