



Health Informatics Competencies and User Experience at Hospital: Case Study in Private Hospital Semarang, Indonesia

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Article Info

Article History

Submitted: December 18, 2025

Revised: June 11, 2026

Accepted: June 30, 2026

Keywords:

User Experience, Digital Health Literacy, Health Informatics, Hospital, Indonesia

Abstract

An assessment of the readiness of medical and nursing staff in implementing electronic medical records (ERM) at RSU Banyumanik 2 Semarang was necessary because the hospital just started providing health services in 2021, so it needs a lot of preparation in facing electronic medical records (ERM). The purpose of this study was to analyze the user experience and digital health literacy of medical and nursing staff at RSU Banyumanik 2. The research method is quantitative descriptive. Data were collected using a User Experience Questionnaire (UEQ) and the PHIC4PHC questionnaire. The research subjects were 5 physicians and 25 nurses. User experience data analysis uses Data Analysis Tools (DTA) on Microsoft Excel, and digital health literacy uses the PHIC4PHC index calculation. The results showed that the user experience of the KHANZA system was rated as above average by all respondents. The digital health literacy of the respondents tends to vary, with 50% classified as experts, 43.3% as fluent, and 6.7% as basic. Based on these results, the hospital should provide training on EMR use for medical officers and nursing staff to improve their performance and knowledge of ERM. In addition, the hospital needs to evaluate and maintain SIMRS KHANZA according to user needs.

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pISSN 2964-2035
eISSN 3025-9258

Introduction

Electronic medical records are records that contain written and recorded information regarding the identity, anamnesis, physical determination, laboratory, diagnosis of all diseases, and medical actions that have been carried out on patients that are stored in a system. With the existence of electronic medical records or EMR, it is hoped that it can improve the professionalism and performance of each hospital management (Handiwidjojo, 2015). This is also supported by the Ministry of Health of the Republic of Indonesia, which has stipulated the Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records, which requires every health service facility to organize medical records electronically (Yunisca et al., 2022).



So there needs to be thorough preparation in the implementation of electronic medical records so that they can provide great benefits for health services such as basic and referral service facilities (hospitals). This can also increase efficiency in health services. Physicians and health workers can also benefit when providing health services to patients with easy access to all patient information (Ningsih et al., 2022).

User Experience (UX) is defined as the user experience related to the user's reactions, perceptions, behaviors, emotions, and thoughts when using the system (Multazam et al., 2023) for UX evaluation with the UEQ (User Experience Questionnaire) questionnaire, which is used to measure user experience efficiently. The scale on the UEQ questionnaire questions includes attractiveness, efficiency, novelty, clarity, accuracy, and stimulation (Dr. Martin Schrepp, 2023). The User Experience Questionnaire (UEQ) is a tool designed to measure users' experience of interactive products in a simple, quick, and direct way, providing a comprehensive picture of the aspects they like. These measures include attractiveness, clarity, dependability of stimuli, and efficiency (Wulandari et al., 2022).

In the evaluation of digital literacy, which is a tool to measure the user's ability to access, understand, and use health information digitally, in this case, using the PHIC4PHC Questionnaire (Rachmani et al., 2024). Several studies have noted the increasing use of health information technology in various primary health care (PHC) initiatives. These technologies include electronic inpatient registration, processing and evaluation programs, management systems, clinical decision support systems, surveillance tools, and patient monitoring systems (Ludwick & Doucette, 2009; Rachmani, Lin, et al., 2020). Aspects of digital literacy include health information system knowledge, health information system skills, general computer skills, office application skills, network skills, legal security knowledge, health information management, health information integrated, and health information evaluated (Alomari et al., 2020).

Based on the results of an initial survey conducted on October 19, 2023, according to one of the physicians at RSU Banyumanik 2, the electronic medical records implemented are quite good. However, in making surgical reports, physicians are not yet equipped with the means to visualize the action report, so they need means to support the preparation of surgical reports. In addition, physicians need a long time to check the patient's nursing history because the nursing history displayed in the EMR is displayed in its entirety. For SIMRS used by RSU Banyumanik 2, it is called KHANZA, which contains electronic-based medical record data. With the implementation of Permenkes number 24 of 2022, RSU Banyumanik 2 has provided socialization and training to medical record officers, medical officers, paramedics, and other officers regarding how to use EMR and how to overcome obstacles in accessing EMR. So that there have been actions from RSU Banyumanik 2 in facing the era of digitalization of electronic medical records.

This research is motivated by the importance of understanding medical personnel and nurses about the use of electronic medical records or EMR by analyzing the user experience and evaluating the knowledge of medical personnel about digital health literacy analysis. This is done so that RSU Banyumanik 2, which is a type C General Hospital and is still classified as a new hospital that was established in 2021, becomes a more developed hospital and a complete modern hospital.

Methods

This study used quantitative descriptive methods from October 2023 to March 2024. This study uses the PHIC4PHC Questionnaire (Rachmani et al., 2022) and the user experience questionnaire (Umar et al., 2021). The number of participants in this study was 30, so the questionnaire was distributed to 30 samples consisting of physicians and nurses. Data was obtained through primary data obtained from the results of the questionnaire. Analysis of digital health literacy data in this study uses the PHIC4PHC index calculation, and user experience questionnaire data in this study uses a formula to determine the average level of satisfaction.

Results

The results of data collection in this study used 2 types of questionnaires, namely the UEQ questionnaire and the digital health literacy questionnaire, with the aim of analyzing user experience and also digital health literacy in medical personnel and nursing staff at Banyumanik 2 Hospital, with a total of 30 respondents consisting of 5 physicians and 25 nurses. When respondents filled out the questionnaire, it was also based on their experience regarding the use of medical records or KHANZA at RSU Banyumanik 2. Based on the results of the User Experience (UEQ) and Digital Health Literacy questionnaires, some data were obtained, which are presented below:



Respondent Characteristics

Table 1. Characteristics of the Last Education of Medical Personnel and Nursing Staff

Aspect		Total		Physician		Nurse	
		f	%	f	%	f	%
Length of work	1. < 5 Years	23	77	5	100	18	72
	2. 5-10 Years	4	13	0	0	4	16
	3. > 10 Years	3	10	0	0	3	12
Ever Had Computer Training	1. Yes	6	20	0	0	6	24
	2. No	24	80	5	100	19	76
Last Education	1. Associate's Degree	13	43.3	0	0	13	52
	2. Bachelor's Degree	15	50	3	60	12	48
	3. Master's degree	2	6.67	2	40	0	0

In terms of working for less than 5 years, the total is 23 (77%), consisting of 5 physicians and 18 nurses. Then there are 4 nurses with a working period of 5 to 10 years, and 3 nurses who have worked for more than 10 years. Moreover, in terms of having computer training, most have never attended computer training, with a total of 24 (80%), consisting of 5 physicians and 19 nurses. As for those who attended computer training, only 6 nurses attended. The last education of physicians was mostly bachelor's degree graduates, totaling 3 people. While the last education of nurses was mostly master's degree graduates, totaling 13 people.

User Experience

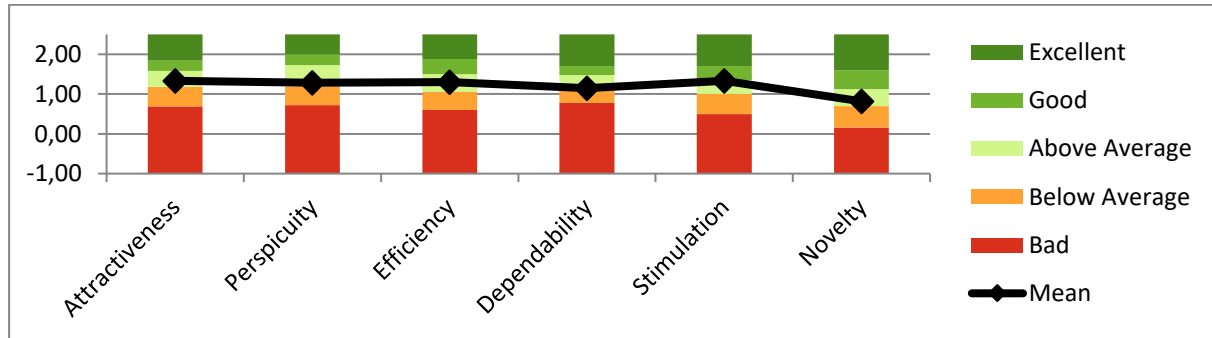
Table 2. UEQ Questionnaire Answer Recapitulation

Items	Average							Items	Average
	Negative								
	-3	-2	-1	0	1	2	3		
Annoying								Enjoyable	1.7
Not Understandable								Understandable	1.9
Dull								Creative	0.4
Difficult to Learn								Easy to Learn	1.1
Inferior								Valuable	1.3
Boring								Exciting	1.1
Not Interesting								Interesting	1.5
Unpredictable								Predictable	0.9
Slow								Fast	0.7
Conventional								Inventive	0.4
Obstructive								Supportive	1.5
Bad								Good	1.3
Complicated								Easy	0.6
Unlikable								Pleasant	1.3
Usual								Leading Edge	0.9
Unpleasant								Pleasant	1.5
Not Secure								Secure	1.3
Demotivating								Motivating	1.5
Does not Meets Expectations								Meet Expectations	0.9
Inefficient								Efficient	1.6
Confusing								Clear	1.6



Items	Average							Items	Average
Negative	-3	-2	-1	0	1	2	3	Positive	
Impractical					█			Practical	1.5
Cluttered					█			Organized	1.3
Unattractive					█			Attractive	1.2
Unfriendly					█			Friendly	1.1
Conservative					█			Innovative	1.5

The highest average question score is on the incomprehensible/understandable item with an average of 1.9. Meanwhile. The lowest average question score is on the monotonous/creative and conventional/inventive items, with an average of 0.4.



Graph 1. Average Total UEQ Results Graph

The largest average scale of the UEQ questionnaire results in the Attraction and Stimulation scale. with an average value of 1.33. Moreover, the lowest is on the Novelty scale. with an average value of 0.82. Overall. The average scale of the UEQ questionnaire result for all scales is in the “Above Average” category or above.

Digital Health Literacy

Table 3. Percentage of Digital Health Literacy Questionnaire Answers

No	Statement	A%	B%	C%	D%	E%
1	I can receive and send emails and transfer files over the network.	6.7	3.3	0	30	60
2	I do not know how to use a computer for personal needs.	43.3	53.3	3.3	0	0
3	I cannot use a spreadsheet program (e.g., Excel) to do simple data processing.	40	46.7	10	3.3	0
4	I can use database software to create databases needed for my work.	3.3	0	6.67	53.3	26.7
5	I can use SIK to complete the work.	3.3	0	10	60	26.7
6	I know how to organize and store files.	6.7	3.3	0	56.7	36.7
7	Computers can be used as tools for staffing, controlling, etc.	3.3	0	3.33	56.7	36.7
8	When processing computer data and medical records, confidentiality is important.	6.7	0	0	40	53.3
9	I am aware of the rules/laws regarding the protection of patient information on computers.	6.7	0	10	43.3	40
10	The Internet can be used as a source of health information	6.7	0	0	43.3	50



No	Statement	A%	B%	C%	D%	E%
11	I know how to use the internet to answer questions about Health.	6.7	0	0	46.7	46.7
12	I can evaluate health information found on the internet.	6.7	0	0	53.3	40

Explanation :

A : Strongly Disagree; B : Disagree; C : Neutral; D : Agree; E : Strongly Agree

Table 4. Percentage Category Average Total Digital Health Literacy Score

Category	Total		Physician		Nurse	
	f	%	f	%	f	%
Master (>42)	15	50	4	80	11	44
Fluency (>33-42)	13	43.3	1	20	12	48
Literacy (>25-33)	0	0	0	0	0	0
Basic (0-25)	2	6.7	0	0	2	8

Based on the table. The percentage of the average category of the number of digital health literacy scores mostly falls into the "Master" category, totaling 15 (50%), consisting of 4 physicians and 11 nurses. In the "Fluency" category. There are 13 (43.3%). consisting of 1 physician and 12 nurses. Moreover, there are 2 nurses who fall into the "Basic" category.

Table 5. Average Results of Digital Health Literacy Aspects

Aspect	Average Total DHL
<i>Health Information System Knowledge</i>	4.23
<i>Health Information System Skills</i>	4.07
<i>General Computer Skills</i>	4.13
<i>Office Application Skill</i>	4.23
<i>Network Skill</i>	4.33
<i>Legal Security Knowledge</i>	4.22
<i>Health Information Manage</i>	4.30
<i>Health Information Integrated</i>	4.27
<i>Health Information Evaluated</i>	4.20

On average, the highest overall digital health literacy score is in the network skills aspect, with a score of 4.33. Moreover, the lowest score is in the health information system skills aspect, with a score of 4.07.

Correlation

Table 5. Average Results of Digital Health Literacy Aspects Correlations

		UEQ	DHL
UEQ	Pearson Correlation	1	-0.085
	Sig. (2-tailed)		0.655
	N	30	30
DHL	Pearson Correlation	-0.085	1
	Sig. (2-tailed)	0.655	
	N	30	30

In the correlation test above. using the Pearson test with a significant condition of p-value <0.05. Then it can be concluded that the test above is not significant because the p-value of 0.655 is greater than 0.05. So it shows there is no relationship between Digital Health Literacy and User Experience (UEQ).



Discussion

User Experience (UEQ)

In this study. Based on Table 1, the largest average scale of the UEQ questionnaire results was on the Attractiveness and Stimulation Scale, with an average value of 1.33. Moreover, the lowest was on the Novelty Scale, with an average value of 0.82. The existence of the Attractiveness and Stimulation scale as the highest average value means that the system implemented has given an interesting and pleasant impression. thus increasing user interest in using the system repeatedly. This is in accordance with Table 2, showing two traits. namely monotonous/creative and conventional/inventive. which are included in the Novelty scale. which gets the lowest value of all traits. with a value of 0.4.

The results of research by Renando et al (2022) the highest average value is on the Attraction Scale of 2.29. Moreover, the lowest average value is on the Novelty Scale of 1.90. While for the Stimulation Scale. The average value is 2.14. So it is less in accordance with the results of this study because the Stimulation scale is a scale with a low average. While in this study. The Stimulation Scale is the scale with the highest average.

The results of Wayan et al (2021) research on the evaluation of information systems on the usability scale using the UEQ and Think Aloud methods show that most of the scales get the "Above Average" category or above average on the Attraction. Clarity. Efficiency and Novelty scales. While on the Accuracy and Stimulation scales. Get the "Good" category. Based on graph 1, the average scale of the UEQ questionnaire results is all in the "Above Average" category or above average. So it can be seen that the results of previous studies are less in accordance with the results of this study.

Digital Health Literacy

Characteristics of medical personnel and nursing staff in terms of having computer training. Only 6 had ever attended training. So, of the 13 respondents who got the "Fluent" category. 10 respondents had never attended computer training before. so as to improve digital health literacy competency in medical personnel and nursing staff. especially in the 10 respondents and 2 respondents who were included in the "Basic" category.

The results of Rachmani et al.'s (2020) study found that the higher the work education. The higher the PHIC level, the longer the work experience. The lower the PHIC score. Table 2 shows that the highest percentage in the aspect of the last education is a bachelor's degree. followed by a diploma level of education. While in Table 3, the highest percentage is in the aspect of length of work <5 years. Then followed by the length of work. 5-10 years and >10 years. Then. Based on Table 4, overall. All medical and nursing personnel have entered the top two categories. Based on the results of the analysis of this study. It can be said that it is in accordance with Enny Rachmani's research. namely. The higher the level of education, the shorter the work experience. The higher the PHIC score, will be.

Based on the urgency of the research explained above. This research will focus on "How Digital Health Literacy Improves the User Experience of Physics and Nursing Using Electronic Medical Records at RSU Banyumanik 2 in 2024". The results of this study are expected to be used as evaluation material in the implementation of electronic medical records or EMR in hospitals. In addition. The results of this study are expected to provide information on the quantity and quality of data, as well as help achieve the goals of RSU Banyumanik 2.

Conclusion

Based on the results of the research. It is recommended that training be carried out on Health Information System Skills and General Computer Skills, which are the two lowest aspects of the digital health literacy questionnaire in the implementation of electronic medical records or EMR to improve the performance and understanding of officers. It is hoped that physicians can also better understand the electronic medical record system interface because not all physicians have been included in the "Excellent" category. And regarding the lowest aspect in user experience, in the aspect of novelty. It is recommended to conduct evaluations. maintenance. Moreover, updates related to the results of the hospital system (KHANZA). which has been designed using design methodology to increase in the final score of usability testing and improve the development of SIMRS to meet user needs.

Author Contributions

Writing—original draft preparation. Razhita; review. Enny Rachmani.



Funding

This research received no external funding.

Institutional Review Board Statement

This study was conducted in accordance with the National Guidelines for Health Research Ethics 2011 and WHO-CIOMS 2016. Moreover, approved by the Ethics Committee of Banyumanik 2 Hospital (protocol code 0255/B/RSUB2/III/2024 and March 20, 2024).

Acknowledgments

This research received support from the author's family: friends and partner.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Alomari, H. W., Ramasamy, V., Kiper, J. D., & Potvin, G. (2020). A User Interface (UI) and User eXperience (UX) evaluation framework for cyberlearning environments in computer science and software engineering education. *Heliyon*, 6(5). <https://doi.org/10.1016/j.heliyon.2020.e03917>
- Dr. Martin Schrepp. (2023). *Data Analysis Tool*. <https://www.ueq-online.org/Material/Handbook.pdf>
- Handiwidjojo, W. (2015). Rekam medis elektronik. *Jurnal Eksplorasi Karya Sistem Informasi Dan Sains*, 2(1). <https://ti.ukdw.ac.id/ojs/index.php/eksis/article/view/383>
- Ludwick, D. A., & Doucette, J. (2009). Adopting electronic medical records in primary care: lessons learned from health information systems implementation experience in seven countries. *International Journal of Medical Informatics*, 78(1), 22–31.
- Multazam, M., Papatungan, I. V., & Suranto, B. (2023). *Perancangan User Interface dan User Experience pada Placeplus menggunakan pendekatan User Centered Design*. <https://journal.uui.ac.id/AUTOMATA/article/view/15528>
- Ningsih, K. P., Purwanti, E., Markus, S. N., Santoso, S., Husin, H., & Zaini, M. (2022). Upaya Mendukung Keberhasilan Implementasi Rekam Medis Elektronik Melalui Digitalisasi Rekam Medis. *Jurnal Empathy Pengabdian Kepada Masyarakat*, 61–70. <https://doi.org/10.37341/jurnalempathy.v0i0.107>
- Rachmani, E., Hsu, C. Y., Chang, P. W. S., Fuad, A., Nurjanah, N., Shidik, G. F., Ningrum, D. N. A., & Lin, M. C. (2020). Development and validation of an instrument for measuring competencies on public health informatics of primary health care worker (PHIC4PHC) in Indonesia. *Primary Health Care Research and Development*, 21. <https://doi.org/10.1017/S1463423620000018>
- Rachmani, E., Kom, S., Kom, M., Anjani, S., & Kes, M. (2022). *BUKU PANDUAN PENGGUNAAN KUESIONER PENGUKURAN KOMPETENSI LITERASI DIGITAL PADA TENAGA KESEHATAN*. <https://sicerdik.dinus.ac.id/wp-content/uploads/2022/08/MANUAL-BOOK.pdf>
- Rachmani, E., Lin, M.-C., Hsu, C. Y., Jumanto, J., Iqbal, U., Shidik, G. F., & Noersasongko, E. (2020). The implementation of an integrated e-leprosy framework in a leprosy control program at primary health care centers in Indonesia. *International Journal of Medical Informatics*, 140, 104155.
- Rachmani, E., Widianawati, E., Yuantari, M. G. C., Wulandari, R., & Hanif Pandu, S. (2024). *Applying Data Mining to Develop a Short Version of The Public Health Informatics Competencies for Primary Health Care (PHIC4PHC) Questionnaire* (pp. 5–16). https://doi.org/10.2991/978-94-6463-421-1_2
- Renando, F. A., Putra Kharisma, A., & Ananta, M. T. (2022). *Evaluasi dan Perbaikan User Experience Aplikasi Perangkat Bergerak Sistem Informasi Karyawan menggunakan Metode Usability Testing dan User Centered Design (Studi Kasus: Teladan Prima Group)* (Vol. 6, Issue 10). <http://j-ptiik.ub.ac.id>
- Umar, R., Ifani, A. Z., Ammatulloh, F. I., & Anggriani, M. (2021). ANALISIS SISTEM INFORMASI WEB LSP UAD MENGGUNAKAN USER EXPERIENCE QUESTIONNAIRE (UEQ). *METHOMIKA Jurnal Manajemen Informatika Dan Komputerisasi Akuntansi*, 4(2), 173–178. <https://doi.org/10.46880/jmika.Vol4No2.pp173-178>
- Wayan, I., Diarsa, B., Ernanda, K. Y., & Indrawan, G. (2021). Evaluasi Sistem Informasi Rumah Sakit Umum Daerah Kabupaten Bangli Pada Aspek Usability Dengan Metode User Experience Questionnaire Dan Think Aloud. *Jurnal Ilmu Komputer Indonesia (JIK)*, 6(2). <https://ejournal-pasca.undiksha.ac.id/index.php/jik/article/view/3685>



- Wulandari, R., Pangarsa, E. A., Andono, P. N., Rachmani, E., Sidiq, M., Setyowati, M., & Waluyo, D. E. (2022). Evaluation of Usability and User Experience of Oncodoc's M-Health Application for Early Detection of Cancer. *Asian Pacific Journal of Cancer Prevention: APJCP*. 23(12). 4169.
- Yunisca, F., Chalimah, E., & Sitanggang, L. O. A. (2022). Implementasi Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022 Tentang Rekam Medis Terhadap Hasil Pemantauan Kesehatan Pekerja Radiasi di Kawasan Nuklir Serpong. *Reaktor: Buletin Pengelolaan Reaktor Nuklir*. 19(2). 34-41. <https://jurnal.batan.go.id/index.php/bprn/article/view/6700>

