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Analysis of digital literacy development to improve skills, competence, and self-confidence in students

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Article Info	ABSTRACT
	Education is an essential aspect of human resource development. Additional learning facilities in the form of patient acceptance digital literacy are needed to improve students' skills and competencies before carrying out work practices. This study aimed to analyze the need for developing digital literacy in patient admission applications in health services. This investigation adopts a qualitative research methodology characterized by an exploratory perspective. Data gathering encompassed conducting interviews, observations, and reviewing documentary materials. Digital literacy patient acceptance of applications needs to be developed immediately to support the preparation for practical work activities. Things that need to be designed to create digital literacy are the function features provided, the display of the dashboard menu, and the material the participants must master. This research was successful in helping to collect the data needed to develop digital literacy in patient admission applications in health services. This research is expected to offer insights that can be valuable for future studies focused on enhancing digital literacy through characteristics, interfaces, and learning materials.

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1. INTRODUCTION

The fast-paced advancement of information technology has left a considerable imprint on every individual within society, extending its influence even to healthcare [1]. The COVID-19 pandemic that has spread worldwide has affected various aspects of life, including social structure, economics, and education [2], [3]. The use of technology is an alternative to continue carrying out life activities according to established health protocols to prevent the chain of transmission of the coronavirus. After the pandemic, technology for learning is increasingly in demand and continues to be used.

Education is an essential aspect of improving human resources [4]. During a pandemic, continuity of education must be carried out. Various methods of distance education are carried out to continue improving human resources quality [5]. Some of the technologies used to organize distance education are TV, radio, print media with learning content management, Google Classroom, YouTube, WAG, Google Meet, Zoom, and Edmodo [2], [5]-[8]. Some factors influence the quality of learning, namely the professionalism of lecturers and facilities [9], [10]. Lecturer skills in conveying material to students as a capital that encourages readily accepted material. Similarly, provision comprehensive educational resources simplifies the process of students acquiring the presented material.

Practicum learning requires more facilities so the students can understand the targeted learning abilities. management Digital literacy as a learning companion facility is an attractive and practical

alternative to development. Digital literacy is understanding and using information through various digital sources [11]. Digital literacy can be employed to gain a deeper understanding of the role played by the health information profession within hospital settings.

The health information management profession encompasses the position of a data entry officer, verifying exact diagnosis codes, overseeing reports, and managing health statistics. Managerially, the roles, and responsibilities within the health information management profession are organized into four levels: serving as a health information service provider, acting as a health information management coordinator, overseeing health information management at the health service level, and functioning as a health information manager with policy-making responsibilities [12].

In Indonesia, the Indonesian Medical Record and Health Information Professional Standards consist of three graduate levels, Diploma, Applied Bachelor, and Bachelor, who can work in various health service facilities. Service at the registration site is one of the mandatory competencies for the medical record profession, which includes almost all of the seven competency areas in Figure 1 [13].
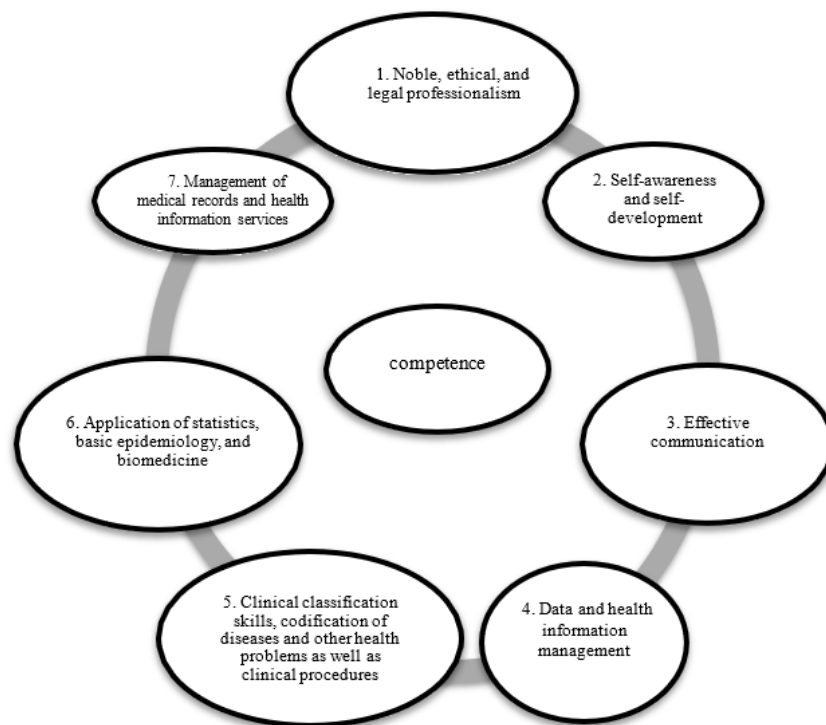

Figure 1. Indonesian medical record and health information profession competency [13]

Learning process development activities can be carried out through needs analysis, learning evaluation, and identifying collaboration partners' needs (fieldwork practice) [14]. Fieldwork practices are carried out in hospitals with medical record service materials, including patient registration [15]. Patient registration is a place of initial service in hospitals that deal with patients directly. Service at the registration site is one of the benchmarks for patient satisfaction. Factors influencing patient satisfaction in hospitals include the availability of facilities, infrastructure, information technology, space, and supporting equipment related to medical services or information systems [16]. The challenge currently being faced by hospitals in Indonesia is the implementation of electronic medical records according to the applicable provisions no later than December 31, 2023 [17].

The results of a preliminary study conducted through a survey of 73 students of the health information management study program, Vocational School, Universitas Gadjah Mada found that as many as 65% of students were able to learn to use electronic medical records for the first time during fieldwork activities in Figure 2. This can potentially cause service complaints at the hospital due to a lack of student knowledge regarding cases at the registration site. Student skills that have not been prepared before carrying out practical work activities impact patient satisfaction, wastage of materials and practice materials, and degrade the image of health facilities. The solution is the provision of skills to students through the provision of learning media before work practice activities.
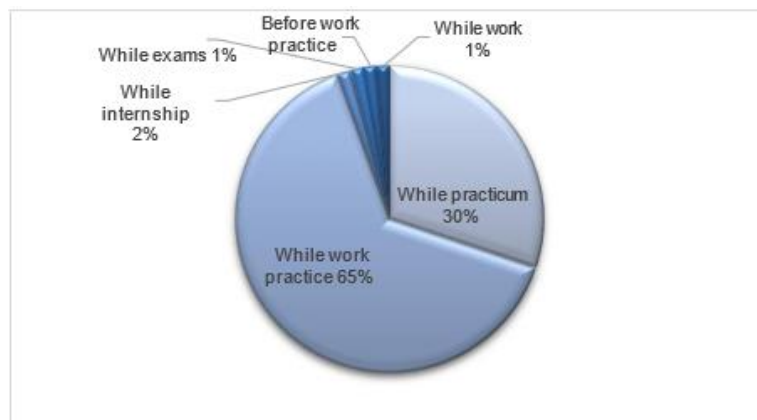
Figure 2. Graph of first exposure to electronic medical records

The description above encourages the importance of developing digital literacy, which contains cases at patient registration services in hospitals to provide an overview of activities during work practice activities. Development of web-based digital literacy in patient registration cases at hospitals to introduce the competence of the medical record profession and health information in providing registration services to patients before students carry out practical fieldwork activities. This article aims to identify the need for developing digital literacy to introduce the competence of registration officers to students before carrying out practicum courses. It is hoped that the findings from this article can be followed up immediately in the form of developing digital literacy that can be implemented for learning, especially for health information management students.

2. METHOD
2.1. Study design

This form of exploratory qualitative research is the most suitable for this study. Employing a qualitative approach with an exploratory method enables researchers to delve into participants' responses and utilize "probes" to stimulate informants to elaborate on their viewpoints [18]. The advantage of this method lies in its ability to dig deeper and understand contexts that may not be revealed through other research methods.

2.2. Participants

Participants in this study were five health information management students, two hospital registration officers, the head of the patient reception department, and the head of the hospital information technology department. Student participants gave their opinion on the importance of digital literacy, which contains cases at the registration service at the hospital as an additional learning medium before students carry out practical fieldwork activities. Participants from the hospital provided an overview of issues and the services offered to patients as material for developing digital literacy.

2.3. Data collection

Data collection methods in this research include observation, interviews, and document analysis in the hospital registration environment. A semi-structured interview guide was created to explore participants' perspectives on digital literacy requirements and content. Interviews were conducted through open and guided discussions, with researchers employing "probes" to delve into detailed qualitative data [18]. The tools used in the data collection process were interview guides and audio recorders.

The following collection method is carried out by the observation method, which is carried out by observing patient registration activities at the hospital. The aspects observed consisted of the attitude of the officers, the types of cases, the equipment used, and the way of providing patient admission services at the hospital. The data collection tool in this data collection method is an observation guide. Observation guides allow researchers to provide additional information found during research. The third data collection method is a documentation study. This documentation study was carried out using a documentation study checklist guide. The documentation study was conducted on six cases of emergency medical records, twenty-three outpatient medical records, and eight points of inpatient medical records. In this study, the validity of the data

method uses the triangulation method. Triangulation of methods verifies the reliability of research data by comparing outcomes from different data collection approaches [19].

2.4. Ethical consideration

The ethical commission has approved this research with the protocol number DP.04.03/e-KEPK.2/689/2023. Research participants in this study first obtained information and signed an agreement to become research participants. This step aims to ensure each respondent understands the purpose of the research, their rights, and the consequences of their participation. In addition, this approval process emphasizes the researcher's commitment to maintaining the safety and security of information from respondents and ensuring that the research was conducted following strict ethical standards.

2.5. Data analysis

The qualitative data obtained from this research were systematically analyzed, commencing with the processes of data simplification, data presentation, and eventual conclusion [19]. The analysis of qualitative data is conducted with the aim of uncovering insights, identifying patterns, and deriving meaningful themes that yield comprehensive descriptions and explanations of the phenomena under investigation. The data analysis process utilizes the Atlas.Ti software application.

3.   RESULTS AND DISCUSSION

3.1. Results

Derived from the results of qualitative analysis, the study's data collection revealed themes, categories, and subcategories emphasizing the importance of developing functional learning support applications in Table 1. The development of learning support applications in this study is, from now on, referred to as digital literacy. Learning digital literacy at the patient reception is used to provide an overview of the activities and competence of officers when accepting patients. The purpose of developing digital literacy is as a learning companion before students of the health information management study program carry out practical work activities in health services.

Table1. Qualitative analysis results

Theme	Categories	Subcategories
Urgency	Important	Debriefings
		Recall
Objective	Understanding of material	Learning support
	Skills	Competence
Feature	System guide	Service dashboard
	Material	Patient admissions flow
	Simulation	Communication with patient/family
		Communication with health workers
	Practice & score	Game
	Evaluation	Feedback
	Information	Communication with admins
		System notifications
	Web-based	
Dashboard	Matching color combination	Inconspicuous color
	Using symbols and charts	
	Use effective writing	
	Using video animation/virtual reality/audio	
Material	Effective communication	
	Procedure	Patient identification
		General consent
		Patient name
		Patient numbering
	The completeness of document	Patient card
		Identity verification
	Service flow	Outpatient department
		Inpatient department
		Emergency department
	Application	Hospital information system
		Membership eligibility letter
		Primary care information system
		Register
		Referral system

3.1.1. The urgency and goals of digital literacy development for patient acceptance applications

According to feedback from the interviewees, it was highlighted that integrating digital literacy as a supplementary tool in preparing for work-related tasks is a pressing requirement. This integration is essential for boosting self-assurance and providing a reminder of the competencies required for these activities.

> *"... sometimes they forget how to receive patients, so they lack confidence. So we can learn through this application before practical work activities...."* (P3)

Before carrying out practical work activities, students have taken courses and received a debriefing, but this is felt to be insufficient to provide students with skills before carrying out work practice activities. The purpose of developing digital literacy is to simulate movements during practical work in healthcare facilities' medical records and health information departments. Gradually this application was developed starting from the patient reception department, which was then developed in the medical records and other health information sections.

3.1.2. Digital literacy development features of patient acceptance applications

User identification related to features in the digital literacy of patient acceptance application contains system guides, materials, simulations, exercises and acquisition scores, evaluations, information, and web-based application features as conveyed by participants:

> *"....there should be a manual for using the system...."* (P3, P4, P5)

> *"....material related to the patient admission process, what is the process for accepting patients at outpatient, emergency care, and inpatient registration?"* (P1, P3, P4, P5, P6)

> *"....practice on how to communicate with patients' needs to be done before practical work...."* (P3, P4, P5, P6)

Students' understanding of patient acceptance material is a provision that becomes more critical to find service improvement efforts that can be proposed for work practice locations. The activity simulation feature provides opportunities for students to learn and develop skills that replicate conditions when they are in charge of receiving patients in health services. Simulation exercises with real cases offer experience and increase student readiness and confidence in carrying out practical work activities in health services.

Feedback is given when students try to do the simulation. This feedback becomes an evaluation to improve students' abilities and skills on the material before carrying out practical work activities in health services. Communication facilities with system administrators are in place to communicate user requirements. Administrators can share with users to motivate users to optimize the use of this digital literacy application.

3.1.3. Dashboard of digital literacy development of patient acceptance applications

Participants conveyed the identification of needs for dashboard on digital literacy systems using fantastic color combinations, symbols, charts to get material, animated videos or virtual reality technology, or audio to simulate service activities. This is what was said by the following participants:

> *"....the form of the homepage has colors, symbols, minimizes writing, avoids rigid boxes, and uses contrasting colors." (P3, P4, P5)" the contents of the written menu are important, the material is presented with videos or animations maybe it's more interesting, if not, use sound..."* (P4, P5)

The digital literacy dashboard was developed by considering responsive design principles and accommodating users to quickly adapt to a comfortable display system. An attractive appearance allows users to utilize the system effectively and increase capabilities and productivity. Thus, the development of this dashboard does not only focus on functional aspects but also pays attention to the overall user experience, creating a stimulating environment and supporting the improvement of digital literacy skills.

3.1.4. Digital literacy development material for patient acceptance applications

Based on identifying participants' opinions, the material presented in digital literacy contains knowledge and skills related to patient acceptance in health services. The material presented in the digital literacy application for admitting patients to health services includes knowledge on effective communication between medical record workers and patients, patient admission procedures, completeness of documents,

service flow, and introduction to systems used at patient reception areas. This is to the opinion of the participants as:

"....effective communication materials, clear communication to patients…" (P5)

"....mastering patient flow and procedures, as well as the system used…" (P1, P2, P4, P5, P6)

The need to understand patient acceptance material because medical record officers are the initial determinant of patient acceptance according to their conditions. Observations at the patient reception area at the hospital are carried out to obtain case study materials in digital literacy so that they can add to students' knowledge, skills, and experience. Observations were made on 23 outpatient admission activities, six emergency patient admission activities, and eight inpatient admission activities. In this admission process, five patients registered for outpatient services with the insurance payment method from the government, who had to complete the requirements before being registered as patients at the hospital in Table 2.

Table 2. Conditions of patients who must complete the requirements

No.	Patient condition
1.	The patient does not examine according to the schedule on the referral letter
2.	The patient registers for internal referral services but does not have a referral letter
3.	The patient registers to check at the destination clinic that is not by the referral letter
4.	The patient does not perform a fingerprint scan on the insurance system, so it fails to verify the membership
5.	The patient registers for examination by bringing a reference letter that is no longer valid

Table 2 illustrates to students that the admissions officer must have a thorough nature to check the completeness of the patient's requirements as proof of registration for services at the hospital. The patient must complete some of these conditions so he can be registered as a patient at the hospital with a payment method from the government. Therefore, this table provides a practical presentation of the registration requirements and an overview of the responsibilities and careful information required in the administration process.

3.2. Discussion
3.2.1. The urgency and goals of digital literacy development for patient acceptance applications

Digital transformation in the health sector is progressing so fast. The policy for utilizing electronic health records in Indonesia will be implemented no later than December 2023 [17]. Other digital advances are telemedicine applications [20] and patient interest in accessing applications for health services [21]. These circumstances promote the need to educate healthcare professionals in skills related to utilizing information systems in healthcare delivery. Digital literacy is a learning application that provides opportunities to learn and practice by utilizing learning technology [11], [22], [23]. Digital literacy is expected to train students' abilities and creativity to be more critical in providing input to improve health services.

3.2.2. Digital literacy development features of patient acceptance applications

Learning using activity simulation is a pedagogical approach using a conditioned environment to enhance skills and practices [24]. Study simulations develop by creating scenarios by imitating real experiences at service points [11]. Methods developed on health digital literacy focus on service activities according to reality in health services. Designs range from simple multilevel exercises to complex patient admission simulations. The practice of using software applications for learning provides experience to students in operating existing systems. Communication and interaction of medical record officers with patients or other health workers is one of the competencies that needs to be trained before students carry out practical work activities.

3.2.3. Dashboard of digital literacy development of patient acceptance applications

The presentation of a system is a critical component of digital literacy since it pertains to users' comprehension and efficient utilization. The discussion of system display relates to interface navigation, system elements, utilization of system controls (use of buttons or cursors), system feedback, responsive design and display, and managing multiple windows to work simultaneously [25], [24]. Feedback on the system provides information to users to improve the quality of the data produced [26].

The user interface display is a visualization and interactive form of the application that the user interacts with. Digital literacy is designed to be intuitive, engaging, and user-friendly by providing easy access to app features and content. Classification of content in learning digital literacy is presented effectively, which includes a hierarchical structure, information flow, and tracking user progress. Multimedia integration in digital literacy is needed to enhance the learning experience by providing images, audio, video, interactive simulations, and if required, animation according to the learning context [27], [28]. The utilization of diverse sensory channels can increase user understanding and interest. Assessment and feedback are used to evaluate student progress. Material mastery assessment can be presented through quizzes, assignments, tests, or interactive exercises. Collaboration and communication features between students and instructors are facilitated in discussion forums, chat systems, or document correction of exercise results.

3.2.4. Digital literacy development material for patient acceptance applications

Material on digital literacy contains an overview of concepts and benefits, including implementation related to patient data confidentiality and security, digital communication, health data management, and problem-solving through case exercises. This material is designed to increase ability through skills and knowledge about patient acceptance services in health services. Teaching materials related to real world situations are needed to make it easier for teachers to deliver learning material holistically and authentically. Digital literacy as accompanying material in the learning process. Digital literacy has been proven to help increase success in education and their daily lives [29]. The use of digital literacy for learning aims to improve communication, expression, collaboration, and advocacy [30]. Practicing effective communication in digital literacy applications can reduce errors when practicing directly in health services. Effective communication material can be applied through prepared case exercises.

4. CONCLUSION

This study succeeded in identifying data requirements for developing digital literacy patient admission applications consisting of features, menu views, and materials. As a learning support tool, digital literacy in patient acceptance applications prepares students to be more skilled, competent, and confident in conducting practical work activities in Health Services. Digital literacy in patient acceptance of health services must be developed and implemented as a learning facility on campus before students undertake work practice in health facilities.

REFERENCES

[1] N. I. Kusumawati and S. Sulistyawati, "Acceptance of health information system for public health centre in North Borneo, Indonesia," *International Journal of Public Health Science (IJPHS)*, vol. 7, no. 3, p. 168, 2018, doi: 10.11591/ijphs.v7i3.14315.

[2] F. M. Reimers, *Primary and secondary education during COVID-19*. Cham: Springer International Publishing, 2022.

[3] D. L. Setyowati, S. Paramita, R. H. Ifroh, T. Asrianti, E. Fitriany, and W. Rahman, "Work readiness during covid-19 among taxibike online drivers in Samarinda, Indonesia," *International Journal of Public Health Science (IJPHS)*, vol. 10, no. 3, pp. 617–628, 2021, doi: 10.11591/ijphs.v10i3.20870.

[4] Sarbaini, Jumadi, E. W. Abbas, and I. Rajiani, "Managing e-learning in public universities by investigating the role of culture," *Polish Journal of Management Studies*, vol. 20, no. 1, pp. 394–404, 2019, doi: 10.17512/pjms.2019.20.1.34.

[5] M. F. Ripani, *Education and technology: The challenge of sustainability in Latin America*. Uruguay: Ceibal Foundation, 2022.

[6] E. K. Agormendah, E. Adu Henaku, D. M. K. Ayite, and E. Apori Ansah, "Online Learning in Higher Education during COVID-19 Pandemic: a case of Ghana," *Journal of Educational Technology and Online Learning*, vol. 3, no. 3, pp. 183–210, Sep. 2020, doi: 10.31681/jetol.726441.

[7] H. Hu, J. Li, X. Lei, P. Qin, and Q. Chen, "Design of health statistics intelligent education system based on Internet +," *Journal of Physics: Conference Series*, vol. 1168, no. 6, p. 062003, Feb. 2019, doi: 10.1088/1742-6596/1168/6/062003.

[8] H. Khoirunnisa', N. Umamah, and Sumardi, "Edmodo as a media for history learning in the digital era," *IOP Conference Series: Earth and Environmental Science*, vol. 243, no. 1, p. 012087, Apr. 2019, doi: 10.1088/1755-1315/243/1/012087.

[9] E. N. Prianti and K. S. Prihatin, "Teacher professionalism, learning facilities, and student interest in improving the intellectual intelligence of elementary students in Pandeglang regency," in *1st International Multidisciplinary Conference on Education, Technology, and Engineering (IMCETE 2019)*, 2020, pp. 145–149, doi: 10.2991/assehr.k.200303.035.

[10] R. Wiranto and S. Slameto, "Alumni satisfaction in terms of classroom infrastructure, lecturer professionalism, and curriculum," *Heliyon*, vol. 7, no. 6, p. 06679, Jun. 2021, doi: 10.1016/j.heliyon.2021.e06679.

[11] B. W. Becker, "Information literacy in the digital age: myths and principles of digital literacy," *School of Information Student Research Journal*, vol. 7, no. 2, p. 2, 2018, doi: 10.31979/2575-2499.070202.

[12] H. Fattahi, H. A. Gorji, M. Bayat, A. Fattahi, and F. G. Seproo, "Designing health headquarter workers general competency model for the national level: a multiple qualitative study," *Research Square*, 2021.

[13] Ministry of Health, "Decree of the Minister of Health Number 312 of 2020 concerning medical record professional standards," (in Indonesia), *Ministry of Health*, vol. 5, no. 1, 2020.

[14] M. Dwisatyadini, H. Kurniawati, D. Mustafa, S. Utami, F. R. Zuhairi, D. A. Suhardi, A. Hartari, "Upgrading skills of health workers in the digital era: the experience of Universitas Terbuka-Indonesia," in *Proceedings of the 3rd International Conference on Vocational Higher Education (ICVHE 2018)*, 2018, pp. 273–277, doi: 10.2991/assehr.k.200331.152.

[15] IFHIMA, "Module 2-patient identification and master patient (person) index," in Basic Health Records Practice Modules. Unites Sates., 2019 [Online]. Available: https://ifhima.org/education-and-training/ (accessed: Juli 4, 2023).

[16] E. E. Merawati, D. Derriawan, and E. Supriyadi, "The analysis of factors in increasing patient satisfaction in hospital," in *Proceedings of the Ninth International Conference on Entrepreneurship and Business Management (ICEBM 2020)*, 2021, vol. 174, pp. 233–239, doi: 10.2991/aebmr.k.210507.035.

[17] Ministry of Health, "Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records," (in Indonesia), *Ministry of Health*, 2022.

[18] J. W. Creswell and J. David Creswell, *Research design: qualitative, quantitative, and mixed methods approach*, Fifth Edit. SAGE Publications, 2018.

[19] U. Flick, *The SAGE Handbook of Qualitative Data Collection London*: SAGE Publications Ltd; 2018. doi:10.4135/9781526416070

[20] M. Senbekov *et al.*, "The recent progress and applications of digital technologies in healthcare: a review," *International Journal of Telemedicine and Applications*, vol. 2020, pp. 1–18, Dec. 2020, doi: 10.1155/2020/8830200.

[21] J. Featherall, B. Lapin, A. Chaitoff, S. A. Havele, N. Thompson, and I. Katzan, "Characterization of patient interest in provider-based consumer health information technology: survey study," *Journal of Medical Internet Research*, vol. 20, no. 4, p. 128, Apr. 2018, doi: 10.2196/jmir.7766.

[22] S. Sumaedi, Sumardjo, A. Saleh, and A. F. Syukri, "Factors influencing males' loyalty toward functional foods during the COVID-19 pandemic," *International Journal of Public Health Science (IJPHS)*, vol. 11, no. 1, pp. 121–128, 2022, doi: 10.11591/ijphs.v11i1.20886.

[23] A. Haleem, M. Javaid, M. A. Qadri, and R. Suman, "Understanding the role of digital technologies in education: a review," *Sustainable Operations and Computers*, vol. 3, pp. 275–285, 2022, doi: 10.1016/j.susoc.2022.05.004.

[24] J. Knight, M. Dooly, and E. Barberà, "Getting smart: towards critical digital literacy pedagogies," *Social Semiotics*, vol. 33, no. 2, pp. 326–349, Mar. 2023, doi: 10.1080/10350330.2020.1836815.

[25] E. Aguilera., Digital Literacies and Interaktive Media, New York, USA: Knowledge Works Global Ltd. 2022.

[26] S. C. Budi, S. Sunartini, F. S. T. Dewi, L. Lazuardi, and N. Rokhman, "Incident reporting development: PaSIR (patient safety incident reporting) system for better patient safety," *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, vol. 7, no. 4, pp. 1097–1104, Aug. 2022, doi: 10.30604/jika.v7i4.1287.

[27] M. D. Abdulrahaman *et al.*, "Multimedia tools in the teaching and learning processes: a systematic review," *Heliyon*, vol. 6, no. 11, p. 05312, Nov. 2020, doi: 10.1016/j.heliyon.2020.e05312.

[28] D. Maharani, M. Afifuddin, D. A. Putri, K. Setiawan, and S. A. Ansari, "Braille monopoly game as a tool of disaster mitigation education for visual disabilities," *IOP Conference Series: Earth and Environmental Science*, vol. 273, no. 1, p. 012042, Jun. 2019, doi: 10.1088/1755-1315/273/1/012042.

[29] Asrizal, A. Amran, A. Ananda, F. Festiyed, and R. Sumarmin, "The development of integrated science instructional materials to improve students' digital literacy in scientific approach," *Jurnal Pendidikan IPA Indonesia*, vol. 7, no. 4, pp. 442–450, Dec. 2018, doi: 10.15294/jpii.v7i4.13613.

[30] C. K. Gomathy, "a study on the effect of digital literacy and information management," *Journal of Scientific Research and Review*, vol. 7, no. 3, p. 5157, 2019.

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