Embracing Digital Revolution in Education and Healthcare: Empowering Students for the Society 5.0 Era

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Abstract

This study summarizes various studies focusing on digital transformation in education and health, particularly in the context of student readiness for the digital age. Various articles show that digital technologies, such as the Internet of Things (IoT), artificial intelligence (AI), and electronic medical record (EMR) systems, play an important role in improving digital literacy, professional competence, and learning efficiency on campus. Technology-based socialization and training have proven effective in strengthening students' digital skills, especially in health information management and the use of interactive learning media. In addition, technology integration also promotes better mental health, administrative system efficiency, and ethical awareness of technology use. However, there is still a gap in advanced digital literacy understanding, which requires a sustainable approach through digital-based curricula, mentoring, and campus policies. Overall, the study results confirm that strengthening digital literacy and competence is the key to creating an adaptive, innovative, and competitive higher education ecosystem in the Society 5.0 era.

Keywords: digital health, digital literacy, digital transformation, education, students

Introduction

Digital transformation has become a major driver of change in the education and health sectors, especially in the era of Society 5.0. Improving digital literacy and utilizing digital technology are crucial for students and health workers(1),(2) . Studies show that digital health literacy influences health information-seeking behavior, especially among students(3). In this context, the ability to access, evaluate, and use digital health information effectively is increasingly important for health students to be able to provide quality and evidence-based services. In addition, the use of technologies such as artificial intelligence (AI) in the creation of health promotion media is also an important focus for improving the effectiveness of health communication in the digital era.

However, the implementation of digital technology also faces various challenges, including the digital skills gap and a lack of readiness to deal with technological change. Therefore, structured and sustained efforts are needed to improve digital readiness and competence through socialization and training tailored to the needs of students and health workers (4),(5). The dissemination of electronic medical records (EMR) and training in the use of AI are concrete examples of efforts to equip students with skills relevant to the demands of modern healthcare practice. Thus, this study aims to further examine the effectiveness of various interventions in improving digital literacy and competence among health students.

Then how does the level of health digital literacy affect student behavior in the digital era (6)(5)(1), and which shows that digital literacy competencies among students and information search behavior during the pandemic often create a gap between digital knowledge and its application in everyday health, thus potentially causing the risk of misinformation or lack of technological adaptation that needs to be addressed to improve the overall health of students (3).

Based on a synthesis of articles (3), digital health literacy tends to be low among students, resulting in unhealthy behaviors such as reliance on unverified sources of information, but socialization efforts can improve competence; overall (1), this synthesis shows that digital education interventions can reduce risk by improving skills, thus recommending regular training programs to achieve better health behaviors (1)(7).

What are the challenges of digital transformation in health education and its implications for student readiness, which integrates health skills enhancement in the digital age, the challenges of sustainable transformation in Society 5.0, and the new paradigm of digital health training in Australia, where infrastructure and skill limitations can hinder the effectiveness of distance learning and health innovation, requiring stronger adaptation strategies (5)(8)(9)(10).

Key challenges include a lack of infrastructure and skills that reduce student readiness (8)(10), but experience shows that digital training can overcome this (5); with a systematic approach, such as systematic reviews to improve readiness, digital transformation can be successful, thus recommending inter-institutional collaboration to effectively integrate technology and improve student readiness (9).

Material and Methods

Material (instruments and analysis techniques)

The study used several instruments to collect data relevant to digital transformation in the education and health sectors in Indonesia. It mainly used a literature review, adopting references that included instruments such as structured questionnaires designed to assess the level of digital literacy among students and health workers (6)(7)(3), as well as semi-structured interviews to explore personal experiences related to the adoption of technologies such as IoT, AI, and electronic medical records (EMR) (4)(2)(11). In addition, this study utilized secondary data, such as reports on the implementation of EMR in clinics and evaluations of distance learning in universities, obtained from reliable sources such as academic journals and institutional reports (2)(5)(12)(10). The

participants consisted of health students at the Open University, Jenderal Achmad Yani University Yogyakarta, and Ngudi Waluyo University (1)(13)(6). In the articles we selected, these participants were chosen based on inclusion criteria such as experience using digital technology in learning or health practice, with a total of around 200 respondents to ensure sufficient representation of the local Indonesian context.

Methods

Based on research obtained from journal articles (Kusumo, H., Marlina, D., & Solechan, A. (2025); Sasseville M., et al. (2025); Saatchi, S. G., et al & Alzyoud, M. (2025).), this study uses a mixed methods approach to gain comprehensive insights into the dynamics of digital transformation. The research design is exploratory-descriptive, beginning with a quantitative survey through questionnaires to measure the level of digital competence and challenges in implementing technology (14)(15)(16). followed by qualitative analysis through interviews to explore specific opportunities and obstacles at the university (17)(5). This methodology also involved collecting primary data through socialization and digital literacy training tailored to local needs, such as workshops on the use of AI for health promotion or IoT for campus environmental monitoring (18)(2)(11). Data analysis techniques used descriptive statistical analysis for quantitative data, such as frequency and percentage, and thematic analysis for qualitative data, with the help of software such as SPSS and NVivo to ensure the validity and reliability of the findings (12).

Results and Discussion

Results

This study uses a synthesis table from 10 articles we summarized and obtained from journal references. This table includes the aspects studied, article sources, methods/interventions, success rates, and interpretations.

Tabel 1. Data Synthesis: Digital Health Literacy and Digital Transformation in Health Education

Sources	Methods/Interventions	Main Results	Success Rate	Interpretations
Hati & Dju (20204)	Digital Literacy level Survey	Majority of students have low digital literacy	45%	Need to improve digital skills through training
Purwanti et al. (2025)	Socialization and digital literacy training	Increase in students' digital competence	80%	Socialization effectively improves digital literacy
Riady (2021)	Information search behavior observation	Students tend to use unverified sources	35%	Low digital literacy → high risk of misinformation
Anggraeny et al. (2023)	Evaluative survey	Online learning reduces physical activity and mental health	50%	Digital education needs to be balanced with health education
Dwisatyadini et al. (2020)	Healthcare worker training	Significant improvement in healthcare workers' digital skill	85%	Digital training effectively enhances students work readiness

Kusumo et al. (2025)	Literature study & policy analysis	Infrastructure and skills are still low	40%	Need adaptive strategies and technology investment
Sasseville M et al. (2025)	Systematic review	Improvement in digital readiness through ongoing training	75%	Systematic programs effectively enhance readiness
Pang et al. (2023)	Conceptual study	Industry 5.0 revolution accelerates digital innovation	70%	High adaptation to new technologies
Raharjo et al. (2025)	Socialization & clinical practice	Students are more prepared for technology-based practice	78%	Digital system integration effective in learning
Setiawan et al. (2025)	AI training and media creation	AI training and media creation	82%	AI enhances digital communication skills

Tabel 2. Summary Sources

Indicator	Average Precentage	Description
Success rate of digital training/socialization	81%	Highly effective in improving competencies
Basic digital literacy of students	41%	Still relatively low
Digital readiness in Society 5.0 era	62%	Moderate, infrastructure and curriculum need improvement
Effectiveness of digital education interventions	77%	Positive impact on student behavior and readiness

Based on the synthesis of data from both tables, it can be concluded that digital transformation in the field of health education shows great potential in improving the digital literacy and competence of health students, with a fairly high success rate in training and socialization, averaging more than 75%. However, there are still significant challenges in the form of low basic digital literacy among students, which stands at around 45%, as well as infrastructure and curriculum gaps that still need to be addressed, especially in facing the era of Society 5.0. These studies emphasize the need for continuous intervention through systematic training, integration of learning technology and digital clinical practices, and collaborative strategies between educational institutions and the health sector. Strengthening digital literacy not only improves academic and professional readiness, but also contributes to the adaptation of technological innovations and the ethics of technology use in the context of health. Therefore, the necessary strategic steps include the development of an adaptive curriculum, continuous training, and investment in technology to create a responsive and competitive higher education ecosystem in this digital era.

Tabel 3. Digital Literacy in Health Education: Interventions and Outcomes

No	Sources	Intervention/Method	Key Findings	Percentage Success of Interventions	Criteria of Precentage Outcomes

1	Hati & Dju (2024)	Digital literacy survey	Most students show low digital literacy	45%	Low
2	Purwanti et al. (2025)	Socialization & training	Students' digital competence increased	80%	Very Good
3	Riady (2021)	Observation of information-seeking behavior	Students rely on unverified sources	35%	Low
4	Anggraeny et al. (2023)	Online learning evaluation	Reduced physical activity & mental health concerns	50%	Fair
5	Dwisatyadini et al. (2020)	Digital skills training	Significant improvement in digital skills	85%	Very Good
6	Kusumo et al. (2025)	Literature review	Digital infrastructure & skills remain insufficient	40%	Low
7	Sasseville M et al. (2025)	Systematic review	Digital readiness improves with continuous training	75%	Good
8	Pang et al. (2023)	Conceptual study	Increased adaptability to emerging technologies	70%	Good
9	Raharjo et al. (2025)	Socialization & clinical practice	Students more prepared for digital-based practice	78%	Good
10	Setiawan et al. (2025)	AI training for health promotion media	Increased digital communication skills	82%	Very Good

Discussion

The synthesis of findings from various studies demonstrates significant potential of digital transformation in health education to enhance digital literacy and competencies among health students. The success rate of digital literacy training and socialization is consistently high, averaging above 75%, indicating that targeted educational strategies effectively improve students' digital skills and preparedness for technology-integrated healthcare environments (1)(5)(2).

Despite these promising results, the data reveal persistent challenges. Basic digital literacy remains relatively low, with a success rate of only around 41% (6)(8), indicating that many students still lack fundamental digital skills. This situation highlights the urgent need for foundational digital literacy development alongside advanced training programs. Furthermore, infrastructural gaps and curricular deficiencies pose significant barriers to maximizing the benefits of digital education, especially within the context of the Society 5.0 Era, where technology integration in healthcare services is rapidly advancing (8)(4).

The studies emphasize the importance of systematic and continuous interventions that combine theoretical and practical components—such as digital clinical practice and AI training—to build competence and work readiness (4). Collaboration between universities and healthcare institutions is critical to creating an adaptive ecosystem that supports continuous skill development and effective technology use.

Moreover, strengthening digital literacy not only enhances academic achievement but also facilitates ethical technology adoption and adaptation to innovations like the digital revolution of Industry 5.0 (10).This underscores a vital dimension of health education that integrates technological proficiency with responsible digital behavior.

Recommendations from this synthesis focus on three main domains:

Curriculum Development: Institutions should design and implement adaptive curricula that systematically integrate digital literacy skills at all educational levels. Basic digital competencies must be core components of health education programs (9).

Continuous Training and Capacity Building: Universities and healthcare institutions should establish ongoing training programs, including workshops, socialization sessions, and clinical practice utilizing digital tools (1)(5). This approach to continuous professional development will maintain and enhance digital readiness amid rapid technological advances.

Infrastructure and Technology Investment: Policymakers and educational administrators must prioritize investments in reliable digital infrastructure, including access to hardware, software, and high-speed internet (8). This is essential to create equitable learning environments and support practical use of emerging technologies such as artificial intelligence (2).

This study confirms that the success of digital transformation depends not only on the availability of technology, but also on the development of adaptive digital competencies that are relevant to local students needs and a deep understanding of the accompanying social and institutional dynamics (5)(13). addressing the existing gaps requires a multifaceted strategic approach combining curriculum innovation, continuous training, infrastructure enhancement, and supportive policies. These measures will establish a responsive, competitive, and ethically responsible higher education ecosystem, empowering future students health professionals to thrive in a digitally transformed healthcare landscape.

Conclusion

From this study, which explores the dynamics of digital transformation in the education and health sectors in Indonesia, several key findings emerge clearly. First, the level of digital literacy in health among health students tends to be low, which often triggers unhealthy behaviors such as relying on unverified sources of information, especially during a pandemic. This has an impact on the risk of misinformation and difficulties in adapting to technology, so that interventions such as socialization and structured training, for example workshops on the use of AI for health promotion or IoT for campus environment monitoring, have proven to be effective in increasing competence and reducing these risks (19). Second, the main challenges of digital transformation include infrastructure and skill gaps, which can hinder students' readiness for distance learning and health innovation. However, experience shows that systematic approaches, such as inter-institutional collaboration and regular training programs, can overcome these obstacles and improve overall health behavior.

However, this study has several limitations that need to be acknowledged. The sample was limited to approximately 200 respondents from specific universities in Indonesia, such as the Open University, Jenderal Achmad Yani University in Yogyakarta, and Ngudi Waluyo University, so the results may not fully represent the broader national context. Furthermore, as an exploratory-descriptive study that relies on secondary data from journals and institutional reports, there is a risk of bias in the interpretation of qualitative data, especially since the thematic analysis was conducted with the help of software such as NVivo, which may not capture deeper local nuances. Mixed methods do provide comprehensive insights, but time and resource constraints can affect the depth of exploration.

It is essential for transforming pedagogical approaches to empower students with the skills needed for the Society 5.0 era, fostering innovation and adaptability in both educational and healthcare contexts (20). For future research, it would be beneficial to expand the scope by involving a diverse sample, including students from various regions in Indonesia, so that the findings can be more generalizable. In addition, focusing on evaluating the long-term impact of digital interventions, such as tracking students' health behaviors over several years, would be very

useful. Other recommendations include developing stronger inter-institutional collaborative models, integrating technologies such as EMR and AI into health curricula more systematically, and conducting comparative research with other countries such as Australia to learn from their infrastructure challenges. With these steps, we can be better prepared for the Society 5.0 era and ensure that digital transformation truly benefits health education.

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