

DIGITAL SKILLS

IN NURSING: ADAPTING TO THE DIGITAL HEALTH ERA

COMPETENCIAS DIGITALES EN ENFERMERÍA: ADAPTÁNDOSE A LA ERA DE LA SALUD DIGITAL

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ABSTRACT

A nursing workforce with digital skills is considered to possess the necessary competencies to contribute significantly to improving patient care and achieving greater efficiency and effectiveness in the healthcare system. Digital transformation is present in all the challenges faced by the globalized world, in which the healthcare sector plays a crucial role. Therefore, this study aims to examine the digital competencies required in the era of digital health for the field of nursing. The article analyzes these competencies at both global and local levels in Ecuador, taking into account the regulations and guidelines established by the Ministry of Public Health in Ecuador to ensure that digital health is integrated into both the public and private sectors. The study delves into nursing digital competencies and the current state of digital health in Ecuador within the framework of the Organic Law for Digital and Audiovisual Transformation of the Ministry of Communications of Ecuador.

Keywords:

Digital health, telemedicine, electronic health records, digital transformation, mobile health applications, digital health communication, health data protection.

RESUMEN

Una fuerza laboral de enfermería que tiene habilidades digitales se considera con las competencias necesarias para contribuir de forma significativa a mejorar la atención al paciente y lograr una mayor eficiencia y eficacia en el sistema de salud. La transformación digital está presente en todos los problemas a los que se enfrenta el mundo globalizado en el que el sector de la salud tiene un rol primordial, por lo que en este trabajo se pretende realizar un estudio de las competencias digitales necesarias en la era de la salud digital para el campo de la enfermería. En el artículo se estudian estas competencias a nivel global y local en el Ecuador y se tiene en cuenta las regulaciones y directrices que establece el Ministerio de Salud Pública en Ecuador para lograr que la salud digital se encuentre presente tanto en el sector público como en el privado. Se profundiza en las competencias digitales en enfermería y el estado actual al nivel de Ecuador en el marco de la Ley orgánica para la transformación digital y audiovisual del Ministerio de Comunicaciones del Ecuador.

Palabras clave:

Salud digital, telemedicina, registros electrónicos de salud, transformación digital, aplicaciones móviles de salud, comunicación digital en salud, protección de datos en salud.



INTRODUCTION

The era of digital transformation has been embedded in healthcare systems worldwide, leading to changes in the way medical care is delivered, managed, and accessed. Nursing is considered the largest field in terms of healthcare professionals, which justifies the need for them to acquire the appropriate digital skills to use these technologies immediately and following the protocols established at the national level. It is urgent that digital literacy for healthcare professionals, including nursing, be effectively implemented. A proactive approach is required to prepare healthcare personnel with these skills.

Digital competencies for nursing are internationally recognized by global organizations such as the American Association of Colleges of Nursing (AACN) and the International Council of Nurses (ICN), which consider emerging technologies and social media to be the most critical competencies for nursing professionals. UNESCO supports digital literacy for health professionals, among whom nursing is considered the most suitable workforce for these competencies (Pino & Gonçalves, 2024).

In Ecuador, the Ministry of Public Health (MSP) demonstrates its commitment to achieving universal health coverage, which is demonstrated in its digital health agenda, which includes: Electronic Health Records (RES) and telemedicine (Meza Bolaños, 2010). This ministry assumes initiatives and policies that highlight the priority of integrating technologies associated with healthcare, assuming a proactive stance in digital health that supports national health objectives. In this regard, the following can be mentioned: Digital Health Agenda 2023-2027 and the Ten-Year Health Plan 2022-2031 (Ecuador. Ministry of Public Health, 2022, 2023a).

Strategy 4.2 of the 2022-2031 Ten-Year Health Plan proposes a: ***“Management model framed within the digital agenda for the integration of the health services network of the National Health System (SNS), which allows improving its efficiency, timeliness and quality”*** (Ecuador. Ministry of Public Health, 2022).

For digital health to achieve the expected benefits, healthcare personnel, specifically nurses, must have the necessary digital skills to ensure its effectiveness in practice. They must not only have the tools but also apply them correctly, optimizing the process and ensuring this efficiency is reflected in patients.

This paper requires a narrative review of global nursing competencies with an emphasis on the Ecuadorian context, the role digital technologies play in aspects of nursing practice, the educational and training resources available to these healthcare personnel, the state of digital literacy, how these personnel adopt these technologies, their regulatory guidelines, ethics, and the privacy and security of patient information. It's

not just about having digital competence; healthcare personnel must also be prepared to understand and evaluate the information they are accessing.

In general, the key areas in which healthcare personnel must be prepared are: information literacy, which allows them to evaluate, manage, and use data optimally and with the ethics that correspond to these personnel. In this sense, data privacy is essential. They must be able to discern between reliable and unreliable sources.

Communication and collaboration are ensured through healthcare platforms, including the use of messaging via email and social media to achieve patient-centered care; the creation of digital content, primarily contributing to educational resources that promote the dissemination of essential healthcare materials for patients; and security, which is associated with fundamental cybersecurity principles that protect patient data and privacy. This must be governed by the data protection regulations established by the Ministry of Public Health (MSP).

Troubleshooting basic technical issues when using digital technologies to support decision-making, and finally, the use of specific health technologies, such as health platforms, medical software, and RES, which are considered standard in healthcare because they facilitate access to patient information, allow for documentation and better understanding of the patient's medical history, and even enable remote consultations.

The MSP in Ecuador requires training professionals capable of correctly using RES, participating in telemedicine models, managing and evaluating computer systems and mobile applications for patient care and communication, communicating effectively with other healthcare personnel, and maintaining ethical and patient safety principles in the digital health environment.

METHODOLOGY

A narrative review guided by Artificial Intelligence tools for scientific research, ***Gemini Deep Research***, was conducted. These assistant reviews access to published websites on the topic in real time. Regional databases are searched for the current state of digital competencies at the global, American, and Ecuadorian levels (Gemini, 2025).

A limitation is that no research study involving healthcare personnel directly has been conducted, although a study of the topic has been encouraged with a group of 18 nursing students who have conducted essays by topic to further the review.

DEVELOPMENT

The guiding principles of digital transformation focus on digital literacy, electronic health records, digital health

legislation, patient portals, open-source technologies, and data governance.

1. Digital literacy

Digital literacy for healthcare professionals, including nursing, requires a proactive approach that equips healthcare personnel with these skills. A healthcare professional with the necessary skills in technology and critical analysis increases their ability to assist patients and their caregivers, contributes to improved clinical outcomes and quality of life, and strengthens decision-making.

Innovations in this field seek to empower patients with these skills, so that these skills facilitate better management of chronic diseases (PyDeSlud, 2025). An example of this is the appropriate use of mobile applications that train patients in the knowledge of their disease for its monitoring and treatment, track the appearance of symptoms, receive reminders about medical prescriptions, care and thus promote their autonomy in understanding digital health. The determinants of information technologies according to the World Health Organization (WHO) are formalized in the: Draft Global Strategy on Digital Health 2020-2025 (Alarcón Belmonte et al., 2024).

The World Health Organization (WHO) proposes four strategic objectives that support national health systems in the use of technologies:

- a. Promote global collaboration and foster knowledge transfer in digital health.
- b. Promote the implementation of national digital health strategies.
- c. Strengthen governance for digital health at the global, regional, and national levels.
- d. Advocate for people-centered health systems enabled by digital health.

The work of Pino & Gonçalves (2024) studies the models related to digital health and the capacity of professionals and patients to search, understand and evaluate the large amount of information online given their digital literacy.

Current challenges in digital literacy focus on training health personnel so that they are skilled in digital health and can discern valuable information and perform critical analysis of the body of published information (Machado and De Souza, 2025).

Digital health in Ecuador covers a broader spectrum than telemedicine and includes the implementation of:

Electronic Health Records (EHR): Progress is being made toward digitizing patient medical histories to improve access, management, and analysis of information.

Health Information Systems: These systems are intended to be strengthened for epidemiological

surveillance, decision-making, and health policy planning.

Mobile Health Applications (mHealth): The use of applications for self-care, disease tracking, and communication between patients and healthcare professionals is promoted.

Artificial Intelligence (AI): The use of AI for diagnosis, early disease detection, and improved resource management efficiency is explored.

2. Electronic Medical Records

The Electronic Medical Record (EMR) is key to maintaining clear, accurate, organized, and secure patient records, which should ensure complete and efficient medical care. It is necessary to review the current status of EMR management in Ecuador. The MSP has indicated this process is based on the regulatory framework, strategies for its implementation in public and private healthcare facilities, as well as the training of medical personnel for its consolidation throughout the Ecuadorian healthcare system. The EMR consists of a set of digital documents that integrate, in an orderly and secure manner, the history, diagnoses, therapies, and clinical progress of patients who are part of the healthcare system.

The Ministry of Public Health has implemented the regulations governing the implementation of the EHR. Ministerial Order No. 0009-2017 describes the regulations for the management of the EHR and provides guidelines for its use in healthcare at the national level (Ecuador. Ministry of Public Health, 2017).

MSP Agreement No. 00115-2021 outlines the guidelines and the need for the EHR to maintain patient databases in the Ecuadorian public health system.

The “secret information rule” in the national health system sets guidelines for safeguarding the privacy and protection of information contained in medical records; regardless of whether the records are in physical or digital form (Ecuador. Ministry of Public Health, 2017, 2022).

In Ecuador, digital health is progressing while simultaneously facing several challenges. A study on its implementation in seven health centers revealed that, due to the efforts of institutional leaders, a standardized model was established, enabling the database to be populated with over two thousand users in a short period (Fernández et al., 2021). Additionally, staff training and adaptation to emerging technologies remain critical. The diversity of users, with varying levels of technical proficiency, necessitates tailored training programs to ensure the proper and effective use of the Electronic Medical Record.

One example is the Hospital General del Sur in Quito, where significant progress has been made with the digitization of medical records, helping to streamline

patient care and improve access to information for healthcare personnel.

In Ecuador, work still needs to be done on various improvements in establishing the use of HCLs:

Interoperability: The lack of integration between different information systems makes it difficult to use HCLs at the health system level, which hinders the level of success for medical care.

Staff training: It is essential to provide ongoing training to healthcare professionals to ensure the correct use of digital instruments.

Infrastructure: A strong infrastructure is needed, with good connectivity and equipment with the features to ensure proper system operation, especially in vulnerable areas with less coverage and infrastructure, such as the Amazon or the coastal region.

Security and confidentiality: The protection of patients' clinical data must be based on the standards established by the Organic Law on the Protection of Personal Data of Ecuador and the indications of the MSP.

3. Data protection in eHealth

Data protection in the context of digital health is a priority at the global and national levels. The WHO and the *International Medical Informatics Association* (IMIA) have established the elements that must be guaranteed for ethical data management, including, first and foremost, informed consent, limited access to confidential information, and the implementation of robust cybersecurity measures (World Health Organization, 2020).

In the United States, legislation such as the *Health Insurance Portability and Accountability Act* (HIPAA) establishes the legal framework for the protection of patients' personal data. In the European Union, the General Data Protection Regulation (GDPR) establishes clear rules on the privacy and protection of personal data, including health data, highlighting the need for protection when using digital platforms in healthcare. The security and protection of information on digital health platforms must be ensured by prohibiting unauthorized access, modification, or deletion. Patient rights must be safeguarded and ensured, and trust in eHealth must be strengthened.

In Ecuador, there is a need to expand access to medical services, especially in rural and hard-to-reach areas, but the country faces challenges regarding the protection of patient data:

- **Limited legal framework:** The enactment of the Organic Law on Personal Data Protection (Ecuador, National Assembly, 2021) has begun, but its implementation in the health sector is still in progress. The LOPDP establishes the fundamental principles of data protection, but its integration into all health

systems has not been achieved, which represents a delay in this process.

- **Insufficient technological infrastructure:** Digital health platforms are still insufficient across all public and private institutions, or they lack effective technological infrastructure. There is a lack of management and staff capacity in information and cybersecurity.
- **Awareness limited:** Education on digital data privacy and patients' rights over their medical information is insufficient.
- **Vulnerability to cyberattacks:** Cybersecurity measures must be established in healthcare systems to eliminate risks to the confidentiality and integrity of patients' personal data and the healthcare system. Continuing education to this end must be guaranteed.

It is not about applying legislation on data protection and its ethical and responsible use, but rather guaranteeing the education of health professionals and patients (Ecuador. Ministry of Public Health, 2023b).

Security principles in the protection of patient data

- Use end-to-end encryption protocols for data transmission between patients and healthcare professionals.
- Implement strict access controls to telehealth platforms and patient databases, based on roles and the need to know.
- Ensure compliance with Ecuadorian legislation regarding the protection of personal data.
- Implement robust authentication mechanisms to verify user identity.
- Use audit logs to track any access or modification to data. Establish data backup and recovery protocols to prevent information loss.
- Invest in reliable and redundant technological infrastructure.

CONCLUSIONS

The Ecuadorian Ministry of Public Health's Digital Health Agenda represents an opportunity to strengthen the role of nursing in providing more efficient, safe, and patient-centered health care.

The process of digitalizing Ecuador's healthcare system faces significant challenges and presents significant opportunities that can transform healthcare in the country. Investment in training, infrastructure, and inter-institutional collaboration will be essential to moving toward a more efficient and accessible healthcare system.

The successful implementation of digital health in Ecuador requires an unwavering commitment to ethical and security principles. This involves not only complying

with current legislation but also adopting international best practices in data protection and privacy, adapting them to the country's specific cultural, socioeconomic, and technological context. Patient trust in telehealth systems will directly depend on ensuring that their information is handled with the utmost respect and security.

Digital literacy and critical analysis of online information are essential for competent and ethical digital health professionals. Nurses must provide evidence-based services and strictly comply with MSP regulations, thus fulfilling their role as agents of change within the health sector.

The Electronic Health Record is an important step in the healthcare system, with trained personnel ensuring care for the population in all areas of the country. Data protection in the context of digital health is one of the most significant challenges. Its implementation in Ecuador must be effective and progress through a joint effort by the MSP, institutions, and healthcare personnel.

REFERENCES

- Alarcón Belmonte, I., Sánchez Collado, R., Yuguero, O., Acezat Oliva, J., Martínez-Millana, A., & Saperas Pérez, C. (2024). La alfabetización digital como elemento clave en la transformación digital de las organizaciones en salud. *Atención primaria*, 56(6), 102880. <https://doi.org/10.1016/j.aprim.2024.102880>
- Ecuador. Ministerio de Salud Pública. (2017). *Acuerdo Ministerial No. 0009-2017 - Reglamento para el Manejo de la Historia Clínica Electrónica*. <https://vlex.ec/vid/expidese-reglamento-manejo-historia-671988073>
- Ecuador. Asamblea Nacional. (2021). *Ley Orgánica de Protección de Datos Personales (LOPDP)*. https://www.finanzaspopulares.gob.ec/wp-content/uploads/2021/07/ley_organica_de_proteccion_de_datos_personales.pdf
- Ecuador. Ministerio de Salud Pública. (2022). *Plan Decenal de Salud 2022-2031*. https://www.salud.gob.ec/wp-content/uploads/2022/07/Plan_decenal_Salud_2022_ejecutivo.18.OK.pdf
- Ecuador. Ministerio de Salud Pública. (2023a). *Agenda digital de salud 2023 – 2027*. https://www.salud.gob.ec/wp-content/uploads/2023/06/Manual_Agenda_Digital_2023_Seg.pdf
- Ecuador. Ministerio de Salud Pública. (2023b). *Políticas de privacidad y protección de datos en el sector salud*. <https://www.salud.gob.ec/politica-datos-personales/>
- Fernández, A. L., Agostinelli, M. S., Arias López, M. del P., Urrutia, M. A., & Maestri, W. (2021). La experiencia de implementar una historia clínica electrónica en siete centros en menos de un año. *Metro Ciencia*, 29(3), 32–38. <https://doi.org/10.47464/Metro-Ciencia/vol29/3/2021/32-38>
- Gemini. (2025). Google AI. Modelo de Lenguaje de Inteligencia Artificial. <https://gemini.google.com/app>
- Machado Mendonça, A. V., & de Sousa, M. F. (2025). Desafios contemporâneos para a Saúde Digital: letramento, educação midiática e prevenção à desinformação. *Revista Panamericana de Salud Pública*, 49, e14. <https://doi.org/10.26633/RPSP.2025.14>
- Meza Bolaños, D., (2010). Telemedicina en el Ecuador: un mundo de desafíos y oportunidades. *La Granja. Revista de Ciencias de la Vida*, 12(2), 32-35. <https://www.redalyc.org/articulo.oa?id=476047396006>
- Organización Mundial de la Salud. (2020). *Telesalud: uso de la tecnología digital para mejorar la atención sanitaria*. <https://www.who.int/es/news-room/fact-sheets/detail/ehealth>
- Pino-Juste, M., & Gonçalves Fernandez, L. (2024). Alfabetización en salud en la era digital: Desafíos y oportunidades. *Revista Internacional de Aprendizaje*, 11(1), 33-58. <https://doi.org/10.18848/2575-5544/CGP/v11i01/33-58>
- PyDeSlud. (2025). ¿Sabías que la Alfabetización Digital en Salud puede facilitar tu bienestar? <https://pydesalud.com/sabias-que-la-alfabetizacion-digital-en-salud-puede-facilitar-tu-bienestar>

Conflicts of Interest:

The authors declare no conflicts of interest.

Author Contributions:

María del Carmen Chávez-Cárdenas, Cruz Xiomara Peraza-de Aparicio, Yoel López-Gamboa, Miguel Ángel Fernández-Marín: conception and design of the study, data acquisition, analysis and interpretation, manuscript writing, critical review of content, statistical analysis, and overall supervision of the study.