

Digital transformation and literacy: challenges in nursing practice

Transformación digital y alfabetización: desafíos de la práctica de enfermería

Transformação e letramento digital: desafios da prática de enfermagem

Luiz Gustavo Torres Dias da Cruz^{1*}

ORCID: 0000-0001-5550-6082

Elliana da Silva Seabra¹

ORCID: 0009-0004-5929-9497

Viviana Bezerra Cabral¹

ORCID: 0009-0008-0251-1548

Luzimar Helena Castro Gomes¹

ORCID: 0009-0004-4942-4573

Gabriel Conde Y Marin Cebriano¹

ORCID: 0000-0002-0125-7874

Maria Olinda Ferreira de Sousa¹

ORCID: 0000-0002-1376-7097

Monique Abreu Silvino²

ORCID: 0000-0002-2921-8738

¹Hospital Universitário Pedro Ernesto da Universidade do Estado do Rio de Janeiro. Rio de Janeiro, Brazil.

²Ministério da Saúde/ Instituto Nacional de Câncer. Rio de Janeiro, Brazil.

How to cite this article:

Cruz LGTD, Seabra ES, Cabral VB, Gomes LHC, Cebriano GCM, Sousa MOF, Silvino MA. Digital transformation and literacy: challenges in nursing practice. *Glob Acad Nurs.* 2024;5(1):e419. <https://dx.doi.org/10.5935/2675-5602.20200419>

*Corresponding author:

luiz.cruz@uerj.br

Submission: 02-23-2024

Approval: 03-15-2024

Abstract

This study aimed to describe the use of digital tools in a clinical ward of a university hospital. The implementation of digital tools in a clinical ward of a university hospital in Rio de Janeiro was described. Access data was analyzed using Google Analytics, providing information on the user profile. Data were collected from May 2022 to September 2023. The unit's nursing team comprises 35 professionals, and digital tools have been implemented gradually, yielding positive results. The trend line pointed to a growing adherence to digital tools in the unit, with Pearson's coefficient = 1. Digital literacy is fundamental for modern nursing. The positive adherence to implementing digital tools in the hospital unit demonstrated the importance of leadership in promoting digital literacy and creating an environment of psychological safety for learning innovations. Digital transformation is no longer an option but is necessary to provide safe, efficient, and patient-centered healthcare.

Descriptors: eHealth Strategies; Health Management; Digital Literacy; Leadership; Nursing Education.

Resumén

El objetivo fue describir el uso de herramientas digitales en una sala clínica de un hospital universitario. Se describió la implementación de herramientas digitales en una sala clínica de un hospital universitario de Río de Janeiro. Los datos de acceso fueron analizados con Google Analytics, proporcionando información sobre el perfil de los usuarios. Los datos fueron recolectados desde mayo de 2022 hasta septiembre de 2023. El equipo de enfermería de la unidad está integrado por 35 profesionales y se implementaron herramientas digitales de forma paulatina, con resultados positivos. La línea de tendencia apuntó a una creciente adherencia a las herramientas digitales en la unidad con un coeficiente de Pearson = 1. La alfabetización digital es fundamental para la enfermería moderna. La adhesión positiva a la implementación de herramientas digitales en la unidad hospitalaria demostró la importancia del liderazgo en la promoción de la alfabetización digital y la creación de un ambiente de seguridad psicológica para las innovaciones en el aprendizaje. La transformación digital ya no es una opción, sino una necesidad para brindar atención médica segura, eficiente y centrada en el paciente.

Descritores: Estrategias de eSalud; Gestión de la Salud; Alfabetización Digital; Liderazgo; Educación en Enfermería.

Resumo

Objetivou-se descrever o uso de ferramentas digitais em uma enfermagem clínica de um hospital universitário. Descreveu-se a implementação de ferramentas digitais em uma enfermagem clínica de um hospital universitário no Rio de Janeiro. Os dados de acesso foram analisados com o *Google Analytics*, fornecendo informações sobre o perfil dos usuários. Foram coletados dados de maio de 2022 a setembro de 2023. A equipe de enfermagem da unidade inclui 35 profissionais, e as ferramentas digitais foram implementadas gradualmente, com resultados positivos. A linha de tendência apontou para uma adesão crescente às ferramentas digitais na unidade com coeficiente de Pearson = 1. O letramento digital é fundamental para a enfermagem moderna. A adesão positiva à implementação de ferramentas digitais na unidade hospitalar demonstrou a importância da liderança na promoção do letramento digital e na criação de um ambiente de segurança psicológica para a aprendizagem de inovações. A transformação digital não é mais uma opção, mas uma necessidade para fornecer assistência médica segura, eficiente e centrada no paciente.

Descritores: Estratégias de eSaúde; Gestão em Saúde; Alfabetização Digital; Liderança; Educação em Enfermagem.



Introduction

Internet use is widespread throughout the world, although it is unevenly distributed. It is estimated that around 5.6 billion people are Internet users worldwide, approximately 62% of the world's population. Of this total, around 92% use the Internet from a mobile device. In the last decade, the total number of Internet users has more than doubled¹.

The integration of technological innovation with healthcare can bring immediate and sustainable benefits to the healthcare complex, as well as to users and society. Digital health shows that technology will have a person-centered scope involving the patient, family, and community. In this scenario, healthcare professionals must be prepared to use these digital tools within healthcare systems. This understanding is in line with the Sustainable Development Goals defined by the United Nations 2030 agenda^{1,2}.

Sociocultural and educational differences are critical factors for building a culture of innovation and digital transformation. The approach to digital determinants, considerations about the different actors, interests, the maturity of institutions, and the complexity of processes are axes of the Brazilian digital health strategy³.

Investments in digital health can be costly, and their sustainability in an ecosystem depends on factors such as the attitude and digital literacy of health professionals. In this sense, technological innovation can contribute to the expansion of nursing care practices aligned with digital technologies. According to a World Bank report, one of the pillars for more equitable health care is the digital transformation of these systems.

Digital literacy is one of the strategies defined by the WHO to improve health outcomes and is understood as the production and reading of texts in digital environments, as well as the social practices arising from these actions. In Brazil, the 2014 Internet Framework recognizes equal access to the Internet as a right of all its citizens^{4,5}.

This study aimed to describe the use of digital tools in a clinical ward of a university hospital.

Methodology

Descriptive exploratory study of the research project called "Development of Health Management Tools and Indicators in a Clinical Ward of a University Hospital", authorized by the Research Ethics Committee under CAAE number: 61798022.8.0000.5259 and Opinion Number: 5,590,032 of 08/18/2022, as determined by Resolution No. 466/2012 of the National Health Council.

The setting is a clinical ward in a tertiary care hospital located in the capital of the state of Rio de Janeiro. This hospital unit is maintained by the state manager, and currently has more than 500 beds in operation, and the study took place in a clinical ward that has 12 (twelve) beds in operation distributed in 6 (six) male and female beds, with a clientele of users over 18 years of age.

The analyses of the access data to digital tools were performed using tracking code and metrics from Google

Digital transformation and literacy: challenges in nursing practice
Cruz LGTD, Seabra ES, Cabral VB, Gomes LHC, Cebriano GCM, Sousa MOF, Silvino MA Analytics®, which provides such information with the following nomenclatures: user, new user, returning user, total events, first visit, page views, and user engagement. According to the glossary of terms available at https://support.google.com/analytics/search?q=gloss%C3%A1rio&from_promoted_search=true&count=16 of the platform mentioned above:

- User: A person who interacts with an application or website whose activities you measure with Google Analytics®.
- New User: Number of users who interacted with your website or accessed your app for the first time.
- Returning User: The number of unique users who have started at least one previous session, regardless of whether it was an engaged session or not.
- Total Events: All actions are events. Each event's name is not necessarily unique. It is a best practice to reuse the same event name multiple times, differentiating them by the parameter values collected.
- First Visit: The first time a user visits a website or launches an Android instant app with Google Analytics® enabled.
- Page views: Each time the page is loaded, or the browsing history state is changed by the active site.
- User Engagement: User engagement is the amount of time a person spends with your web page in focus or your app screen in the foreground, which allows you to measure when users are actively using your website or app.

The statistical analysis of the data obtained from the Google Analytics® platform was performed using the R Studio program, version R 3.34. The data collection period began in May 2022 and ended in September 2023. All participants in this research project agreed to participate voluntarily and signed the Free and Informed Consent Form provided.

Results

The Nursing team at the unit where the study took place is made up of 35 professionals, including four nurses, four resident nurses, 26 nursing technicians, and one administrative professional, in addition to a floating population of students undergoing training in the practical field, such as nursing students and mid-level interns.

The use of digital tools based on the digital transformation strategy began to be implemented in May 2022 with the use of a QR code that contained a link to access a web page, developed by the local leadership of the unit, with an article whose theme was relevant to an institutional sector training on medication scheduling. The website developed on the Google Sites® platform was titled "Strategy: Knowledge Translation" (KT Strategy) located at <https://sites.google.com/view/knowledgetranslation/in%C3%ADcio> and a Google Analytics® tracking and metric code was associated with it, the objective of which was to analyze the access data^{1,3}.



Figure 1. Timeline of the Implementation of the Digital Transformation Strategy in the unit. Rio de Janeiro, RJ, Brazil, 2023



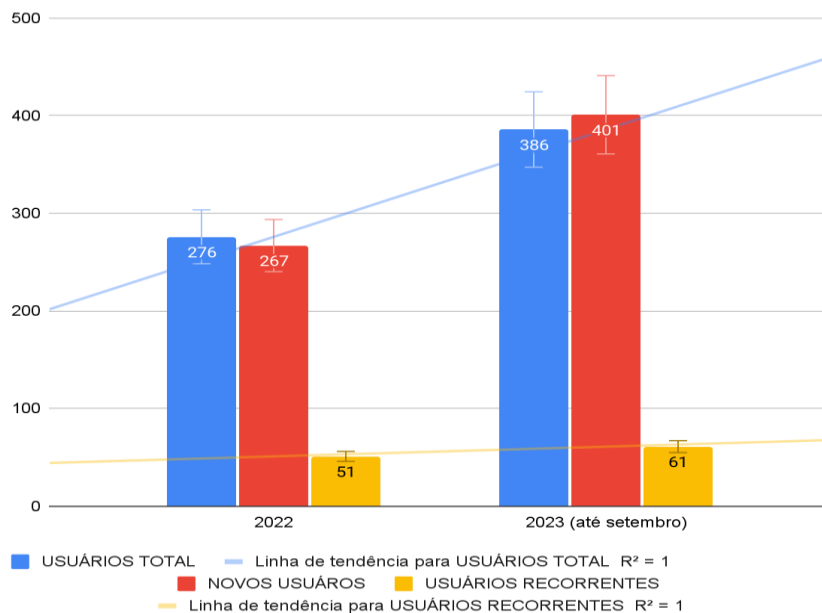
Following the initial use of these strategies, a next step was taken in September 2022, to place on this same website, albeit on a different link (<https://sites.google.com/view/treinamentoemservioenfermaria1/in%C3%ADcio>) the institutional training for the care and maintenance of long-term peripherally inserted catheters - PICC, at the end of the training, participants were invited to participate in a game with key questions about the care of that device, and the results were: 118 accesses, 33 unique users and 29 game participants with an assertiveness rate of 87%.

Subsequently, another training session was held, this time on safe medication, which addressed intra-institutional issues of the safe medication administration protocol. The results for this strategy were: 63 accesses, 19

unique users, 29 game participants, with an accuracy rate of 66%.

In 2023, we went a step further and started making the spreadsheet with dressing procedures available on the website with direct access only via QR code <https://doi.org/10.17605/OSF.IO/X7ARH> in addition to offering a button to report the user's experience with the use of the strategy. In 2022, with mapping provided by the Google Analytics® metric and tracking ID, the total access was: 276 users, 574 page views, 451 page views, 107 user engagements, 51 of which were recurring. The total access until September 2023: 386 users, 61 recurring users, 787 page views, 205 user engagements. The increasing linear trend line with $R^2 = 1$ points to the growth in the use of such tools in the variation between 2022 and 2023, as shown in Graph 1.

Graph 1. Total Accesses to Digital Tools. Rio de Janeiro, RJ, Brazil, 2023



Regarding the total number of events recorded between the two years, there was a considerable increase from 1,900 events in 2022 to 2,600 in 2023, with growth also in the number of page views (from 574 to 787), and first visit (451 in 2022 and 401 in 2023) considering that the 2023 data is partial until September. The exponential trend line ($R^2 = 1$) seen in the ascending curve of Graph 2 proves this fact.

The types of devices that generated the most access were: 80.3% mobile, 46.44% Chrome browsers, and 79.1% devices with screen resolution lower than 414 x 486 kb. For a total of 29 participants who answered the questionnaire outlining the user profile, the following were: 89.7% are health professionals; 72.4% have higher education and 20.7% have secondary education; and in the comments, 4

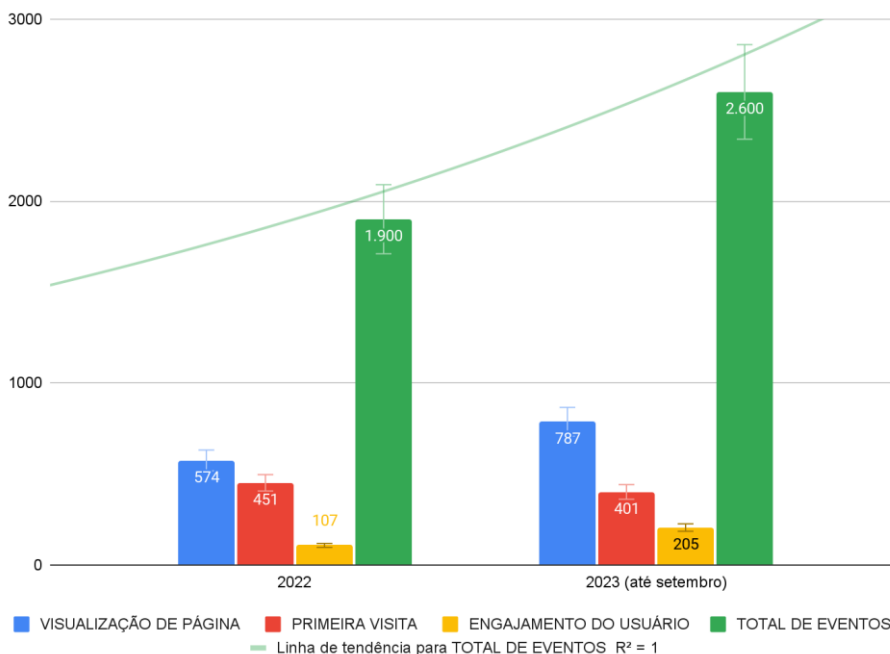


(four) describe it as a very good initiative, remembering that all people who pass through the sector can have access to the electronic form of the profile of use of digital tools, whether they are health professionals or not.

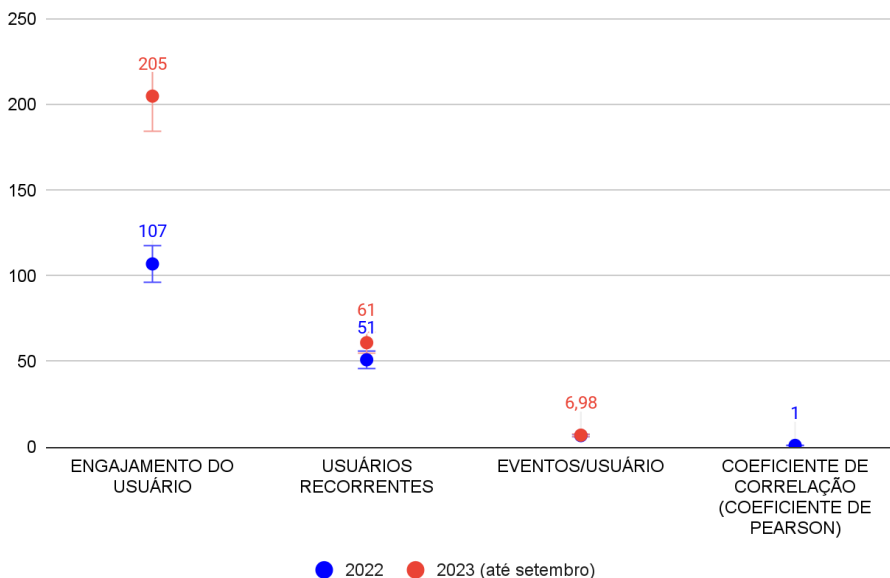
When analyzing the user engagement and recurrence access data described in Figure 4, we obtained a

perfect positive correlation of 1 from the Pearson coefficient, and a value of p.005 for the T-squared test in the recurring users and events/users variables. Therefore, we can affirm from the fact described that such digital tools are in full use and adoption in the unit where they are developed, as identified in Graph 3.

Graph 2. Total Events measured in the use of Digital Tools. Rio de Janeiro, RJ, Brazil, 2023



Graph 3. Correlation Coefficient between User Engagement versus Repeat Users. Rio de Janeiro, RJ, Brazil, 2023



Discussion

The art of caring for people, the practice of nursing, contemporary to Florence Nightingale, is undergoing a profound moment of modernization. The World Health Organization and the Global Advisory Panel on the Future of Nursing suggest that nursing practices should be associated with humane and comprehensive care for users and the community, using technological and digital tools whenever possible¹⁰.

Increasing the availability of access to digital technologies with a focus on digital literacy is one of the ways to initiate digital transformation in a healthcare unit. Therefore, identifying these requirements can help in taking assertive measures during the implementation of digital transformation projects^{1-4,7,10}.

This study shows how most users use devices with low screen resolution, highlighting that every platform used must be able to meet this condition. In other words, start



with simpler tools that include users and allow for expanded use until reaching an advanced ecosystem and reducing the impact of digital inequality^{1-3,7}. The implementation of this practice - digital transformation can help respond to healthcare challenges from the microsocial environment, such as clinical ward care, to macrosocial challenges such as equity of access to healthcare¹⁻⁷.

Ultimately, digital literacy is not just an additional skill but an indispensable tool for modern nursing. Empowering nurses with the skills needed to effectively navigate the digital environment will not only benefit professionals but will also promote safer, more efficient, and patient-centered healthcare, thus contributing to a more effective and resilient healthcare system.

Nursing leadership plays a key role in developing digital transformation strategies^{7,13}. In its third strategy, the World Nursing Panorama intuits young leadership's transformative role in competencies, the main ones being those described by Lapão⁷:

“[...] new sensors (e.g. Internet of Things, wearables), new technological networks, robots, 3-D printing, and, above all, more sophisticated and complex decision support systems for healthcare and management practices will support deeper interaction with healthcare service users. Nurses’ interaction with users in the digital world will place them at the center of

Conclusion

Throughout this article, we explore the importance of digital literacy for nurses in an increasingly digitalized healthcare landscape. The ability to effectively navigate and utilize digital technologies is no longer an option, but rather an imperative necessity for nursing professionals.

It is possible to infer from the results presented that the digital transformation underway in the hospital unit was embraced by the nursing care team, although its performance in the institutional context is still embryonic. Inferring the metrics achieved as positive is a reality. Encouraging the nursing team to use new devices that can aid practice is one of the roles of leadership, as demystifying "digital illiteracy" is vital in this scope; therefore, promoting a state of psychological safety conducive to learning innovations is necessary.

Nurses must continue to seek out opportunities to learn and develop their digital skills, keeping up to date with the latest trends and technological advancements in healthcare. Furthermore, educational institutions and employers have a key role to play in providing resources and support to ensure that nurses are adequately prepared to face the challenges of the digital world.

References

1. McKinsey and Company. Unlocking success in digital transformation [Internet]. 2018 [cited 2023 May 26]. Available from: <https://www.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations>
2. World Health Organization. Global strategy on digital health 2020-2025 [Internet]. Geneva: WHO; 2021 [cited 2023 May 25]. Available from: <https://www.who.int/docs/default-source/documents/gsdhdaa2a9f352b0445bafbc79ca799dce4d.pdf>
3. Ministério da Saúde (BR). Estratégia de Saúde Digital para o Brasil 2020-2028 [Internet]. Brasília: Ministério da Saúde; 2020 [cited 2023 Jun 25]. Available from: https://bvsmis.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf
4. Vidal-Alaball J, Alarcon Belmonte I, Panadés Zafra R, Escalé-Besa A, Acezat Oliva J, Saperas Perez C. Abordaje de la transformación digital en salud para reducir la brecha digital. Atención Primaria. 2023;55(9):102626. DOI: 10.1016/j.aprim.2023.102626
5. Brasil. Lei nº 12.965, de 23 de abril de 2014. Marco Civil da Internet [Internet]. 2014 [cited 2023 Aug 15]. Available from: https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2014/lei/l12965.htm
6. Google Analytics®. Glossário de Termos [Internet]. [cited 2023 Aug 20]. Available from: https://support.google.com/analytics/search?q=gloss%C3%A1rio&from_promoted_search=true&count=16
7. Lapão LV. The Nursing of the Future: Combining Digital Health and the Leadership of Nurses. Rev Latino-Am Enfermagem. 2020;28:e3338. <https://doi.org/10.1590/1518-8345.0000.3338>
8. Teegne MD, Tilahun B, Mamuye A, et al. Digital literacy level and associated factors among health professionals in a referral and teaching hospital: An implication for future digital health systems implementation. Front Public Health. 2023;11:1130894. DOI: 10.3389/fpubh.2023.1130894
9. World Economic Forum. Global Health and Healthcare Strategic Outlook: Shaping the Future of Healthcare [Internet]. 2023 [cited 2023 May 26]. Available from: <https://www.weforum.org/reports/global-health-and-healthcare-strategic-outlook-shaping-the-future-of-health-and-healthcare/>
10. World Health Organization. State of the world's nursing 2020: investing in education, jobs and leadership [Internet]. 2020 [cited 2023 May 27]. Available from: <https://www.who.int/publications/i/item/9789240003279>
11. International Council of Nurses. Nurses: A Voice to Lead Invest in nursing and respect rights to secure global health [Internet]. 2022 [cited 2023 May 27]. Available from: <https://www.icn.ch/node/1532>
12. Booth RG, Strudwick G, McBride S, O'Connor S, Solano López AL. How the nursing profession should adapt for a digital future. BMJ. 2021;373:n1190. doi:10.1136/bmj.n1190
13. Hayashida KY, Bernardes A, Moura AA, Gabriel CS, Balsanelli AP. A liderança coaching exercida pelos enfermeiros no contexto hospitalar. Cogitare Enferm. 2019;24:e59789. <http://dx.doi.org/10.5380/ce.v24i0.59789>
14. CLK, Lopes VH, Silveira MD, Argenta MI, Aued GK. Assistência de enfermagem em unidades de internação. Glob Acad Nurs. 2022;3(1):e216. <https://doi.org/10.5935/2675-5602.20200216>