

# Mapping the literature on Digital and Technological Solutions in nursing: a scoping review protocol

## Mappatura della letteratura sulle soluzioni digitali e tecnologiche nell'assistenza infermieristica: un protocollo di scoping review

Gianluca Conte<sup>1</sup>  
Greta Ghizzardi<sup>5</sup>

Rosario Caruso<sup>2-4</sup>  
Cristina Arrigoni<sup>3</sup>

Federica Dellafiore<sup>3</sup>

Arianna Magon<sup>4</sup>

1. Department of Biomedicine and Prevention, University of Rome Tor Vergata, Rome, Italy
2. Department of Biomedical Sciences for Health, University of Milan, Milan, Italy
3. Department of Public Health, Experimental and Forensic Medicine, Section of Hygiene, University of Pavia, Pavia, Italy
4. Health Professions Research and Development Unit, IRCCS Policlinico San Donato, San Donato Milanese, Italy
5. Bachelor's Degree Programme in Nursing, Azienda Socio-Sanitaria Territoriale di Lodi, Lodi, Italy

Correspondence:

Rosario Caruso, PhD, RN  
Department of Biomedical Sciences for Health, University of Milan. Head of the Health Professions Research and Development Unit, IRCCS Policlinico San Donato, Italy.  
Email: rosario.caruso@unimi.it

ORCID iDs

Gianluca Conte  
<https://orcid.org/0000-0002-8171-8203>  
Rosario Caruso  
<https://orcid.org/0000-0002-7736-6209>  
Federica Dellafiore  
<https://orcid.org/0000-0001-8220-8347>  
Arianna Magon  
<https://orcid.org/0000-0003-0440-6940>  
Cristina Arrigoni  
<https://orcid.org/0000-0002-1168-8627>

C is the primary author and was responsible for the first and all subsequent drafts of this scoping review protocol. RC is the corresponding author and decided to take primary responsibility for communication with the journal and the readers. FD and CA hugely contributed to the design of this study protocol, providing methodological guidance and revising drafts critically for improvements. AM and GG participated in discussions on the study design. All six authors approved the final version to be published. All authors have agreed to be held accountable for all aspects of this study protocol.

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### ABSTRACT

**INTRODUCTION:** Digital and technological solutions (DTS) might have an impact on people's personal and professional lives. These types of solutions, according to studies, have the potential to revolutionize and improve the quality and long-term sustainability of healthcare activities, with nurses playing a significant role. Although DTS appears to be intimately linked to the future of nursing, technology must be utilized as an active rather than passive tool. Nonetheless, understanding DTS appears to be difficult, and a scoping study can provide a thorough overview of such a complicated topic. As a result, the scoping study on this topic will map all of the important aspects of DTS and synthesize studies on the nursing workforce, as well as analyze and clarify knowledge gaps and aid future research and development. This article presents the study protocol.

**METHODS:** The Joanna Briggs Institute (JBI) scoping review methodology will be used for the proposed scoping review. It will include both quantitative and qualitative scientific research as well as grey literature on DTS in nursing. Only English-language works will be considered for inclusion. Two independent reviewers will take part in an iterative process of evaluating literature, choosing papers, and extracting data. Disagreements among reviewers will be resolved through debate until a consensus is reached or through consultation with the study team if necessary. Results will be presented using descriptive statistics, diagrammatic or tabular displayed information, and narrative summaries, as specified in the JBI guidelines.

**DISCUSSION:** This scoping review protocol explained why it is important to describe the literature on embracing DTS in the nursing field, how to approach the research process, and what the study's key implications will be. The protocol itself may be helpful to increase transparency in the research process, attract interested researchers to work with the group that developed the protocol and offer a practical methodological benchmark for researchers interested in performing scoping reviews by serving as an example of a scoping review protocol.

**KEYWORDS:** Digital solutions; Technological solutions; Nursing; Scoping review; Study protocol; Framework

### RIASSUNTO

**INTRODUZIONE:** Le soluzioni digitali e tecnologiche potrebbero avere un impatto sulla vita personale e professionale della popolazione. Questi tipi di soluzioni, secondo gli studi, hanno il potenziale per rivoluzionare e migliorare la qualità e la sostenibilità a lungo termine delle attività di salute, dove gli infermieri svolgono un ruolo significativo di innovatori, facilitatori e gestori dei processi. Sebbene le soluzioni digitali e tecnologiche sembrano essere intimamente legate al futuro dell'assistenza infermieristica, la tecnologia deve essere utilizzata come strumento attivo, piuttosto che passivo. Tuttavia, la comprensione del fenomeno sembra essere difficile e una scoping review può fornire una panoramica completa di un argomento di tale complessità. Di conseguenza, la presente scoping review mapperà tutti gli aspetti salienti legati alle soluzioni digitali e tecnologiche e sintetizzerà gli studi sul coinvolgimento della professione infermieristica, nonché analizzerà e chiarirà le lacune di conoscenza presenti e aiuterà la ricerca e i progetti futuri. Questo articolo presenta il protocollo di studio di scoping review per raggiungere l'obiettivo di mappatura della letteratura.

**METODI:** Il protocollo utilizza la metodologia di scoping review del Joanna Briggs Institute (JBI). Comprenderà sia la ricerca scientifica quantitativa che qualitativa, nonché la letteratura grigia sulle soluzioni digitali e tecnologiche nell'assistenza infermieristica. Solo i lavori in lingua inglese saranno presi in considerazione per l'inclusione. Due revisori indipendenti prenderanno parte a un processo iterativo di valutazione della letteratura, scelta dei documenti ed estrazione dei dati. I disaccordi tra i revisori saranno risolti attraverso il dibattito fino al raggiungimento di un consenso o attraverso la consultazione con il gruppo di studio, ove necessario. I risultati saranno presentati utilizzando statistiche descrittive, le informazioni presentate in forma grafica, tabulare o a mezzo narrativo, come specificato nelle linee guida JBI.

**DISCUSSIONE:** Questo protocollo di scoping review intende definire perché è importante descrivere la letteratura sull'adozione delle soluzioni digitali e tecnologiche in ambito infermieristico, come affrontare il processo di ricerca sottostante alla revisione e quali saranno le implicazioni chiave dello studio. Il protocollo stesso può essere utile per aumentare la trasparenza nel processo di ricerca, ingaggiare i ricercatori interessati a lavorare con il gruppo che ha sviluppato il protocollo (research engagement) e offrire un punto di riferimento metodologico e pratico per i ricercatori interessati a svolgere revisioni nel medesimo ambito.

**PAROLE CHIAVE:** Soluzioni digitali; Soluzioni tecnologiche; Infermieristica; Revisione della letteratura; Protocollo di studio

## INTRODUCTION

Digital and technological solutions (DTS) have hugely impacted daily life by providing faster communication, easier and reliable acquisition of different kinds of information, and overall better quality of life (Lee & Clarke, 2015). Recently, research has shown that these kinds of solutions have the potential to transform and improve the quality and sustainability of healthcare activities, supporting healthcare workers in their clinical and organisational practice (Kuek & Hakkennes, 2020). The nursing profession represents undoubtedly the primary resource for every healthcare system worldwide, being the largest occupational group in the healthcare arena, accounting for approximately 59% of the health professions ((State of the World's Nursing 2020: Investing in Education, Jobs and Leadership, 2020)). Nurses represent *de facto* a relevant cornerstone of healthcare systems and their innovations, being providers, advocates, and leaders (Caruso et al., 2019).

Nurses are often the key personnel in introducing, implementing, and using DTS in clinical practice, such as by collecting assessments and recording health-related outcomes (Barnard, 2017). Nurses need to collect and manage data more than ever before to act conscientiously in a world where digitally collected information is crucial to highlight hidden patterns and relationships and, ultimately, produce new knowledge (Caruso et al., 2020). Therefore, DTS endorses patient-centred care by providing nurses with numerous decision-making support systems and technology-based tools (Seo et al., 2019). The future of nursing demands a wide base of knowledge, skills, and proficiencies regarding DTS, aiming to deliver complex and effective patient-centred care (Archibald & Barnard, 2018). Thus, technology has to be embraced as an active tool rather than a passive one.

In this regard, Nes et al. (2021) proposed a scoping review to assess technological literacy in nursing education and identify how educational institutions operationalise, teach, measure, and maintain students' technological literacy throughout their undergraduate programs (Nes et al., 2021). The review concluded that few studies addressed the absolute complexity of technological literacy in nursing education; moreover, the authors highlighted the importance of bringing technological competencies to a higher level, including problem-solving and critical thinking. Although Nes et al. (2021) described technological literacy in undergraduate nursing education, the literature regarding meaningful aspects required to embrace DTS is still un-synthesised for studies concerning the nursing workforce.

The lack of a literature review that keeps into account antecedents, behaviours, and consequences of embracing DTS (e.g., self-efficacy, gender differences, anxiety, intentionality, attitude, competency, literacy, and others)

undermines DTS factual implementation among nurses: Understanding DTS seems nuanced and complex, and a solid conceptualisation and a comprehensive framework are still required to allow researchers, educators, and broadly nurses to implement DTS successfully. Therefore, this research aims to systematically map the literature focused on embracing DTS in the nursing field, from primary to tertiary care settings. This study will provide healthcare professionals and researchers with a much-needed source of information on the subject and might reveal knowledge gaps, facilitating further research and developmental studies. This article presents the study protocol.

Scoping reviews in the nursing field typically aim to systematically collect and synthesise information to (a) clarify key concepts and definitions in the literature, (b) explore and define knowledge gaps on the subject, (c) provide a comprehensive and up-to-date overview for nurses, researchers, and educators, (d) facilitate future research and development. Therefore, the aims of the proposed scoping review are: (1) To map all the meaningful aspects of DTS and synthesise the studies concerning the nursing workforce; (2) to provide a conceptualisation and a comprehensive framework of the phenomenon.

## METHODS

A scoping review to map the literature focused on embracing DTS in the nursing field will be performed following this study protocol. The complexity of the phenomenon, the wide range of existing methods and results, and the lack of a literature review that keeps into account antecedents, behaviours, and consequences of embracing DTS suggests the use of a scoping review as described by Arksey and O'Malley, Levac et al. and Peters et al. (Arksey & O'Malley, 2005; Levac et al., 2010; Peters et al., 2020). A scoping review employs a broader search strategy while maintaining reproducibility, transparency, and reliability: Scoping reviews are an excellent tool for determining the extent (or coverage) of a body of literature on a specific and nuanced topic – such as DTS in nursing – and for providing a clear indication of the volume of literature and studies available, as well as an overview of the real phenomenon focus (Munn et al., 2018). Moreover, Munn et al. described scoping reviews as an advantageous way for examining emerging evidence when it is still unclear what other, more specific questions can be posed (Munn et al., 2018), making this kind of review the ideal method to respond to this study's aims and objectives. The proposed review will be performed in accordance with the Joanna Briggs Institute methodology for scoping reviews (Peters et al., 2020).

### Review questions

The questions for the proposed scoping review are as

follows:

- What are the key concepts when defining DTS in nursing?
- What are the geographical contexts of studies related to DTS in nursing?
- What barriers and facilitators have been identified in studies that use DTS in nursing?
- What are the characteristics of the instruments/tools/scales developed in studies about DTS in nursing?

### Search strategy

The search strategy will aim to locate both published and unpublished studies. An initial limited search of MEDLINE and CINAHL was undertaken to identify articles on the topic and define the keywords. The text words contained in the titles and abstracts of relevant articles and the index terms used to describe the articles were used to develop a complete search strategy (see online Supplementary Appendix 1). The search strategy, including all identified keywords and index terms, will be adapted for each included information source.

### Study selection

All identified articles will be collected and uploaded into the reference manager Zotero (Zotero, n.d.) and duplicate removed after the search. Two independent reviewers will then screen titles and abstracts for assessment against the review inclusion criteria using Rayyan (Ouzzani et al., 2016). The full text of selected papers will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full-text studies that do not meet the inclusion criteria will be recorded and reported in the scoping review. Disagreements amongst reviewers will be addressed by discussion until a consensus is established or, if necessary, through consultation with the study team. The search results will be reported in full in the final scoping review and presented in the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

### Data extraction

Data will be extracted from papers included in the scoping review by two independent reviewers using a data extraction tool developed by the reviewers. The data extracted will include specific details about the population, concept, context, study methods, and key findings relevant to the review objective. A draft charting table is provided (see online Supplementary Appendix 2). The draft data extraction tool will be modified and revised as necessary during the process of extracting data from each included study. Modifications will be detailed in the full scoping review report. Any disagreements that arise between the reviewers will be resolved through discussion or consulta-

tion with the study team. Authors of papers will be contacted to request missing or additional data, where required.

### Data presentation

As indicated in the JBI guidelines, the extracted data will be presented in diagrammatic or tabular form in a manner that aligns with the objective of this scoping review. A narrative summary will accompany the tabulated and/or charted results (see online Supplementary Appendix 3) and will describe how the results relate to the review aims and objectives.

### Patient and public involvement

There was no patient or public involvement in the design of this scoping review protocol.

## DISCUSSION

DTS have impacted the daily living of people in both personal and professional domains. Research has shown that these kinds of solutions have the potential to transform and improve the quality and sustainability of healthcare activities, in which nurses are absolute protagonists. The future of nursing seems to be deeply connected to DTS, but technology has to be embraced as an active tool rather than a passive one. Nevertheless, understanding DTS seems nuanced and complex. Therefore, the scoping review on this topic will map all the meaningful aspects of DTS and synthesise the studies concerning the nursing workforce, providing a conceptualisation and a comprehensive framework of the phenomenon.

In general, scoping review protocols are a crucial component of the research process, and publishing protocols is important to give a recorded account of a structured plan of action, outlining in advance the rationale, methods, and analysis. Study protocols offer more transparency in the research process and safeguard the general public from some potential unclear aspects related to the research *per se*. These aspects include the selective procedure of publishing the findings, the selective presentation of the data or analysis, and the pertinent facets of the justification and the study's methodology. In addition, scoping review protocols help to reduce needless duplication of efforts and foster collaboration between research groups, providing the scientific community with information about the current research activities being conducted to respond to a precise research question.

Considering the ethical aspects of the current protocol, the conduct of this study does not require ethical approval. For the proposed scoping review, the only previously collected information will be examined. The findings will be published in a peer-reviewed journal and disseminated at conferences and/or seminars. This protocol aims to be informative to the nursing scientific community and, more broadly, to the researchers interesting in studying DTS in nursing. In this sense, along with the implications regar-

ding the transparency pursued by publishing a study's protocol, the current protocol has also an educative meta-implication due to the availability of peer-reviewed protocols that might represent a benchmark for researchers who wish to perform a study with similar methods.

In conclusion, this protocol described the rationale for performing a scoping review answering to map the literature focused on embracing DTS in the nursing field, the methods to address the research process and the main implication of performing the study. The protocol per se might be useful to provide transparency to the research process, engage interested researchers in collaborating with the group of developers of the protocol, and provide an example of scoping review protocol as a practical methodological benchmark for researchers interested in performing scoping reviews.

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### Supplementary file:

- Supplementary Appendix 1. Complete search strategy  
 Supplementary Appendix 2. Data extraction tool (proposed)  
 Supplementary Appendix 3. Table for presentation of results (proposed)  
 Online at: [www.profinf.net/pro3/](http://www.profinf.net/pro3/)