Digital education in wound care for practicing health professionals: a scoping review protocol

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ABSTRACT

Objective This manuscript presents the method which will be used for a scoping review aiming to review the learning theories that have been applied in digital education related to wound care. The proposed review with examine the reported outcomes; the use of technology and identify the challenges and barriers associated with implementing digital learning regarding wound care education for healthcare providers.

Introduction The rising prevalence of wounds results in a necessity for proficient wound care management by healthcare providers. Digital education has potential in knowledge and skill acquisition, accessibility, and scalability. However, regarding wound care education no existing review provides an overview of the learning theories used with digital education or their associated outcomes.

Inclusion criteria This scoping review will consider studies that describe the use of digital education in wound care in all contexts intended for health professionals. The review encompasses quantitative, qualitative, and mixed methods study designs, as well as systematic reviews, text and opinion papers, and conference proceedings.

Methods Following the JBI methodology for scoping reviews and the PRISMA-ScR guidelines, a comprehensive search strategy will be implemented across MEDLINE, CINAHL, Embase, PsycINFO, Web of Science, ERIC, considering both published and unpublished sources. Articles published in English, French, Italian or German, will be included. Screening and data extraction will be performed using Covidence, and the findings will be presented in a table with a narrative summary.

- The review aims to identify learning theories, outcomes, and challenges associated with digital education in wound care for healthcare professionals.
- Existing reviews lack a focus on wound care, learning theories, and implementation strategies, highlighting the need for this scoping review.
- Using JBI and PRISMA-ScR methodologies, the review will map evidence from diverse study designs and contexts to inform future digital education initiatives in wound care.

Keywords digital, education, theory, wound

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INTRODUCTION

The demand for proficient wound care management among health professionals has become increasingly paramount in recent years due to the impacts of global ageing and increasing population sizes. Epidemiological studies in the UK and the US indicate that both the incidence and cost of managing wounds is steadily increasing.[1,2] Additional challenges are reported in relation to diagnostics, with patients often experiencing delays in obtaining an accurate diagnosis due to healthcare providers variances in knowledge and skill associated with wounds.[3]

The ever-growing complexities associated with wound care, coupled with the imperative to ensure optimal patient outcomes, necessitate theoretical and practical background for clinicians. With a specific focus on wound care, healthcare providers knowledge seems insufficient to assess and treat wounds according to best practices recommendations.[4,5,6,7,8]

Against this backdrop, digital technologies have emerged as pivotal tools for knowledge dissemination and skill development. The integration of digital education in the training of health professionals holds the promise of addressing challenges such as accessibility, flexibility, and scalability.[9] A recent mapping review of digital education for health professionals by Tudor Car et al[9] which synthesised the findings of 77 systematic reviews on digital education for healthcare professionals reported that reviews mostly focused on online and offline learning with few considering the broader digital education approaches, such as virtual reality,

m-learning or game-based learning. This review[9] also reported limited exploration of issues associated with implementation and adoption of digital education interventions.

As the digital frontier expands, there is a pressing need to assess the current situation regarding the use of digital education in the context of wound care training for health professionals. A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis was conducted and no current or in-progress scoping reviews or systematic reviews described how and when learning theories were used in digital wound care education. However, specific literature reviews on associated topics were identified. First, a Cochrane Systematic Review of e-learning for health professionals was conducted in 2016 focusing on impacts on patient outcomes, professionals' skills and knowledge and did not focus on the context of wound care.[10] Another Cochrane Systematic Review of educational interventions for professionals for preventing pressure ulcers included only randomised controlled trials (RCT) and considered any learning modality.[11] A later systematic review by Martinengo et al[12] examined randomised controlled trials comparing digital education to blended or traditional education for health professionals in the context of chronic wound management. In both later reviews heterogeneity of study methods in the included studies precluded full meta-analyses. To the author's knowledge, to date no broad scoping of the literature around digital education for health professionals across all wound contexts (for example not etiology specific or considering non-experimental studies) has been conducted. In addition, existing reviews did not consider issues related to learning, implementation or sustainability as identified in broader reviews of digital education.[9] In addition to these conceptual and contextual limitations of existing reviews, it has been argued that insufficient attention is given to learning science, learning theory and pedagogical approaches, in the development of digital education for health professionals.[13]

A review of RCT on digital education interventions for health professionals reported that only one third of studies reported the use of learning theory in the design, assessment, conceptualisation, or interpretation of outcomes of digital education interventions.[13] This review reported that the implications of this atheoretical approach to digital education may result in a failure to understand the mechanisms which make digital education effective. In addition, the proliferation of non-validated self-assessment tools to evaluate digital education may prevent meaningful synthesis of studies.

While existing reviews have provided robust synthesis of quantitative evidence[9,11,12,13] associated with the use of digital education in healthcare, they have also identified key gaps, including, lack of heterogeneity reported in existing reviews evaluating digital education in wound care, limited focus on implementation approaches to digital education in broader reviews on the concept, and lack of focus on learning theory in the design of digital and evaluation of education. Therefore, a scoping review method is indicated to identify types of evidence available in the field of digital education in wound care, identify and analyse knowledge gaps and identify key characteristics or factors related to our concept of interest.[14] Therefore, the proposed scoping review aims to identify the key learning theories that have been applied in digital education related to wound care; to examine the reported outcomes; of different digital learning approaches (such as interactive modules and virtual simulations) in the context of wound care education; to investigate the use of technology (such as mobile applications and virtual reality) in digital learning for wound care and its impact on learning outcomes; and to identify the challenges and barriers associated with implementing digital learning for wound care education and strategies to overcome them. The proposed review presented in this protocol, will contribute towards the design and implementation of digital education in the context of wound care.

REVIEW QUESTIONS

What digital education approaches have been used for health professionals in wound care?

Sub-questions:

- What learning theories and pedagogy are used in digital education in wound care for health professionals?
- What are the barriers and enablers to implementation of digital education in wound care for health professionals?

INCLUSION CRITERIA

Participants

This review will consider studies that include digital education interventions in the context of wound care intended for health professionals, such as nurses or doctors, working across all settings.

Concept

This review will consider studies that explore the use of digital education methods.

According to Car et al[9] digital education is defined as:

> *'Digital education (also known as electronic learning or digital learning) is the act of teaching and learning by means of digital technologies. It is an overarching term for an evolving multitude of educational approaches, concepts, methods, and technologies. Digital education can be further characterised by specific pedagogies and instructional methods, contexts of provision, and technical affordances of hardware and software. Modalities of digital education range from the basic conversion of content into a digital format (eg, a book into a PDF or HTML format) to complex deployment of digital technologies (eg, mobile education, serious games, virtual patients, and virtual reality)' (p.3)*

This will include literature which describes the use of digital education on its own or in combination with non-digital approaches, known as blended learning.

Context

This review will consider studies that are specific to healthcare professionals and are not focused on education in other contexts. For example, digital education for patients with wounds will not be included. No restrictions will be placed based on health profession, geographic location, or specific clinical contexts.

Types of sources

The proposed scoping review will include quantitative,

qualitative, and mixed methods study designs. In addition, systematic reviews, text, and opinion papers will be considered for inclusion in the proposed scoping review if they answer the research question. Conference proceedings will also be included if detailed descriptions are available of the digital education intervention being studied / reported on.

METHODS

The proposed scoping review will be conducted in accordance with the JBI methodology for scoping reviews.[15] And in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).[16]

Search strategy

The search strategy will aim to locate both published and unpublished primary studies, reviews, and text, opinion papers and conference proceedings. The search process will be done in collaboration with an experienced librarian. First, an initial search of MEDLINE (PubMed) was undertaken to identify articles on the topic. 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 full search strategy for Embase and Medline via Ovid (see Appendix I). The search strategy, including all identified keywords and index terms, will then be adapted for the databases to be searched including, CINAHL, PsycINFO, Web of Science, ERIC, JBI and Cochrane databases. Sources of unpublished studies and grey literature to be searched included the first 10 pages of Google Scholar.

Finally, back- forward-citation searching will be performed on all studies selected. Articles published in English, French, Italian or German will be included as they are spoken by the research team. Articles published from database inception to the present will be included.

Study/Source of evidence selection

Following the search, all identified records will be collated and uploaded into Covidence and duplicates removed. Following a pilot test, titles and abstracts will then be screened blindly by two independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant papers will be retrieved in full, and their citation details imported into Covidence. The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full-text papers that do not meet the inclusion criteria will be recorded and reported in the scoping review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion or with a third reviewer. In line with the research questions of the scoping review no quality appraisal will be conducted. The results of the search will be reported in full in the final scoping review and presented in a PRISMA ScR flow diagram.[17]

Data extraction

Data will be extracted from papers included in the scoping review by two independent reviewers using a specific adapted data extraction tool. The data extracted will include specific details about the population, the aim, the digital method, the learning method (theory and pedagogy), its context, and key findings relevant to the review question. A draft extraction tool is provided in Appendix II. This preliminary draft of data extraction tool will be modified and revised as necessary during the process of data extraction. Modifications will be detailed in the full scoping review. When needed, the authors of papers will be contacted to request missing or additional data.

Data analysis and presentation

To address this review's research question of identifying and mapping the evidence indicating how digital education is currently used in wound care, data from the literature will be summarised in a table of findings. This will follow the structure of the data extraction table. A narrative summary will accompany the tabulated data and will describe how the results relate to the review's objectives.

AUTHOR CONTRIBUTIONS

CV, PB and MW initiated and conceptualised the review. MW provided a first draft of the review protocol. PMT developed the search strategies. All the authors reviewed the manuscript and the search strategies presented and contributed in writing the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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APPENDIX I: SEARCH STRATEGY

Database	Query	Records retrieved. On 15.05.2024
Embase	(('distance learning'/exp OR 'digital technology'/de OR 'internet'/exp OR 'multimedia'/exp) AND ('learning'/exp OR 'education'/exp) OR 'e learn*':ab,ti,kw OR elearn*:ab,ti,kw OR 'm learn*':ab,ti,kw OR mlearn*:ab,ti,kw OR 'tele education':ab,ti,kw OR teleeducation:ab,ti,kw OR (((digital* OR electronic OR online OR 'on line' OR internet OR web OR www OR mobile OR multimedia OR distance OR virtual*) NEAR/3 (learn* OR teach* OR course* OR instruct* OR program* OR train* OR pedagog* OR educat* OR workshop* OR classroom*)):ab,ti,kw)) AND ('injury'/de OR 'wound'/exp OR 'abrasion'/exp OR 'burn'/exp OR 'ulcer'/de OR 'skin ulcer'/exp OR 'wound care'/de OR 'wound dressing'/exp OR 'diabetic foot'/exp OR wound*:ab,ti,kw OR abrasion:ab,ti,kw OR 'bed sore':ab,ti,kw OR bedsore:ab,ti,kw OR 'diabetic foot':ab,ti,kw OR 'diabetic feet':ab,ti,kw OR 'skin tear*':ab,ti,kw OR (((pressure OR skin OR leg OR foot OR decubit* OR decubus OR venous OR stasis OR varicose) NEAR/3 ulcer*):ab,ti,kw) OR (((skin OR cutaneaous OR pressure) NEAR/3 (injur* OR trauma*)):ab,ti,kw)) AND ('health care personnel'/exp OR 'paramedical education'/exp OR 'medical education'/exp OR (((healthcare OR health) NEAR/5 (provider* OR profession* OR personnel OR student* OR worker* OR workforce OR practitioner*)):ab,ti,kw) OR ((hospital NEAR/3 (personnel OR staff OR manpower OR worker* OR employee*)):ab,ti,kw) OR (((nursing OR medical OR paramedical) NEAR/3 (educati* OR personnel OR staff OR manpower OR employee* OR auxiliar* OR assistant* OR student* OR learner*)):ab,ti,kw) OR nurse*:ab,ti,kw OR physician*:ab,ti,kw OR doctor*:ab,ti,kw OR hospitalist*:ab,ti,kw OR clinician*:ab,ti,kw OR paramedics:ab,ti,kw OR physiotherapist*:ab,ti,kw OR 'physical therapist*':ab,ti,kw OR 'occupational therapist*':ab,ti,kw)	815
Medline via Ovid	(((exp Education, Distance/ or Digital Technology/ or exp Internet/ or exp Multimedia/) and (exp Learning/ or exp Education/ or Education.fs.)) or (e-learn* or eLearn* or m-learn* or mLearn* or tele-education or teleeducation).ab,kf,ti. or ((electronic or digital* or online or on-line or internet or web or WWW or mobile or multimedia or distance or virtual*) adj3 (learn* or teach* or course* or instruct* or program* or train* or pedagog* or educat* or workshop* or classroom*)).ab,ti,kf.) and (Wounds and Injuries/ or exp Burns/ or Ulcer/ or exp Skin Ulcer/ or exp Wound Healing/ or (wound* or abrasion or bedsore or bed sore or diabetic foot or diabetic feet or skin tear*).ab,kf,ti. or ((pressure or skin or leg or foot or decubit* or decubus or venous or stasis or varicose) adj3 ulcer*).ab,kf,ti. or ((skin or cutaneaous or pressure) adj3 (injur* or trauma*)).ab,kf,ti.) and (exp Health Personnel/ or exp Education, Medical/ or exp Education, Nursing/ or ((healthcare or health) adj5 (provider* or profession* or personnel or student* or worker* or workforce or practitioner*)).ab,kf,ti. or (Hospital adj3 (personnel or staff or manpower or worker* or employee*)).ab,kf,ti. or ((nursing or medical or paramedical) adj3 (educati* or personnel or staff or manpower or employee* or auxiliar* or assistant* or student* or learner*)).ab,kf,ti. or (nurse* or physician* or doctor* or hospitalist* or clinician* or paramedics or physiotherapist* or "physical therapist*" or "occupational therapist*").ab,kf,ti.)	265

APPENDIX II: DATA EXTRACTION INSTRUMENT

Evidence source Details and Characteristics
Citation details (e.g. author/s, country, date, title, journal, volume, issue, pages)
Aim
Context
Participant details (e.g. profession, age , sex and number)
Details/Results extracted from source of evidence
Type of digital education (e.g. virtual reality, metaverse, e-learning, m-learning)
Learning theory / pedagogy utilised (e.g. constructivism, social learning)
Barriers and enablers to implementing digital education method
Evaluated outcomes (e.g. knowledge, self-perceived confidence, patient-related outcomes)
Outcomes reported (e.g. increase in knowledge, reduction in pressure ulcer incidence)