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Participatory Methods in the Context of Digital Innovations in Care Facilities: A Scoping Review

Partizipative Methoden im Kontext digitaler Innovationen in Pflegeeinrichtungen:
Ein Scoping Review

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ADMINISTRATIVE INFORMATION

Support - No financial support.

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - The author is employed as a project manager for the company MUNDUS-Leben, which may have a potential interest in the results of this study. This professional connection could be considered a potential conflict of interest, but it has been transparently disclosed and taken into account at all stages of the research. There are no other conflicts of interest that could affect the conduct or reporting of this study.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 08 July 2024 and was last updated on 08 July 2024.

INTRODUCTION

Review question / Objective By conducting a scoping review, this study aims to provide an overview of the current state of research on the application of human-centered and participatory methods in the development of digital e-health innovations, as well as to identify open topics and research questions that highlight existing gaps in the research. Ongoing interaction with stakeholders from nursing practice involved in the innovation process will support this objective. Through this comprehensive approach, a contribution to the further development and optimization of the innovation process for digital e-health solutions in the nursing sector is to be made. From this objective, the following research question is derived:

To what extent are participatory and human-centered methods, such as Human Centered Design, applied in the innovation process of e-health solutions within care facilities?

This research question implies the following sub-questions:

Are there already concepts and empirical evidence on the use of participatory methods in the innovation process of e-health solutions in care facilities?

Which participatory methods are used in which phases of the innovation process?

What benefits and challenges are identified in the implementation of participatory methods?.

Background By 2049, up to 690,000 nursing staff will be missing in the care sector in Germany, while 130,000 positions are currently unfilled, according

to projections from the Federal Statistical Office (1). At the same time, 5 million people currently require nursing care, a number that will continue to rise due to the aging population (2). This imbalance leads to significant challenges in both outpatient and inpatient care. The resulting time pressure causes physical and emotional overload for the nursing staff, often leading to increased turnover. This development threatens the quality of care and endangers the adequate provision of services to those in need (3).

Digital innovations offer a crucial approach to making the care sector more effective and future-proof, and to alleviating the burden on nursing staff in the long term (3). The possibilities for the use of digital technologies are diverse, ranging from care robots to telemedicine, exoskeletons, digital platforms, and digital assistance systems. These technologies offer broad application possibilities with great potential for change in work organization. They can avoid care disruptions and duplicate documentation, increase self-determination, make communication processes more efficient, and save time. Additionally, they have the potential to reduce both the physical and psychological burdens on nursing staff, leading to increased efficiency, higher quality of care, and more intensive patient engagement (4).

However, the integration of digital innovations in the care sector also carries risks and presents significant challenges. These technologies require high investments and financial efforts, which pose a financial burden for many facilities (4). Moreover, software developments must meet high data protection requirements (5). Poor user-friendliness, inadequate training, and lack of support in troubleshooting can lead to frustration and rejection by users (4). The consequence of these risks is numerous failed IT projects in healthcare, which drain the system's scarce resources and reveal a disproportionate cost-benefit ratio if no fundamental change in approach occurs (6).

Studies show, however, a high willingness of people to use digital health technologies or share health data (7-10). A study on the technology affinity and willingness of nursing staff to use digital solutions in German care facilities found that 65.4 percent of facility managers and 54.6 percent of employees were willing to use digital solutions (11). Another study from Texas showed that 75 percent of nurses and 56 percent of patients aged 55 and older already use or are willing to use digital health apps (10). The literature suggests that the high number of failed projects is due to the lack of user perspective involvement during the

design process. The usual development and implementation approaches are often based on bilateral collaboration between managers and developers, following a top-down principle (6).

Technology providers report that the decision to implement digital solutions is primarily made at the top management level, with further planning and communication mainly occurring between executives and providers. Employees are often not sufficiently informed, consulted, or involved, making the rationale for the acquisition not comprehensible throughout the entire facility. The innovation process in care practice lacks needs orientation and participation, resulting in technologies not being used to the intended extent (12).

To address these challenges, it is important to design the implementation of digital innovations in a participatory and needs-oriented approach and to link it with appropriate competence building (4). Especially in the complex healthcare economy, it is crucial to align services and applications with the needs of users. Existing processes should not be adopted uncritically but should be consistently questioned and evaluated from the user's perspective. Only in this way can the digital transformation of processes generate tangible added value and fully exploit the potential of available technologies (13).

Rationale At this point, innovation management methods such as Human-Centered Design (HCD) and Design Thinking come into play. These methods focus on innovations that address the needs and desires of the user while ensuring technical feasibility and economic viability (14). "By competently applying the associated tools and consistently carrying out the process, all considerations for the development and/or improvement of products and services are viewed from the perspective of potential customers" (13). Through empathetic approaches to complex challenges, it proves to be a more effective method compared to traditional expert-driven approaches, leading to more effective interventions and making a significant contribution to improving patient care (15). It is therefore essential to understand the constantly changing technology landscape and consider the specific needs of users to find a tailored solution. Only in this way is a critical foundation laid for higher job satisfaction and improved quality of care. The role of decision-makers becomes a critical element that determines the success or failure of the innovation (12). Studies show that participatory methods are already being used in various areas of healthcare

and are showing promising success (15, 16). Against the backdrop of the acute shortage of skilled workers in both outpatient and inpatient care, and the proven effectiveness of HCD and other human-centered methods, this review aims to uncover existing concepts and empirical evidence on the use of participatory methods in the innovation process of e-health solutions in care facilities. It aims to examine how these methods have been applied and evaluated.

METHODS

Strategy of data synthesis To gain an overview of existing concepts and empirical evidence on the use of participatory methods in the innovation process of e-health solutions in care facilities, a scoping review will be conducted. Scoping reviews are useful for exploring broad topics, uncovering research gaps, mapping key concepts, and informing about the type of evidence relevant to practice. They differ from other review types, such as systematic reviews, in that scoping reviews provide an overview of evidence regardless of its quality, whereas systematic reviews aim to answer specific questions based on the synthesis of research evidence. Consequently, scoping reviews do not include a formal assessment of the methodological quality of the included studies (59). The conduct of this scoping review will follow the enhancements to the Arksey and O'Malley framework proposed by Peters et al. (60), which incorporate the Joanna Briggs Institute (JBI) approach (60). Inclusion and exclusion criteria were developed accordingly. After an initial search in databases, the criteria were specified and adjusted. The criteria are summarized using the PCC (Population, Concept, Context) framework:

Inclusion Criteria:

Population:

- Users of digital innovations (e.g., staff, care recipients, relatives, facility management)

Concept:

- Use of participatory methods in at least one phase of the innovation process
- Explanation of the procedures and contents of the applied participatory methods
- Case description of the innovation process starting at least from the design process
- Implementation of technological innovations
- Evaluation of the applied methods

Context:

- Residential care facilities (e.g., retirement homes, nursing homes, long-term care facilities, short-term care facilities, senior residences, group homes)
- Outpatient/home care

Other:

- English or German language

- Full-text access

- Published from 2010 onwards

Exclusion Criteria:

Population:

- Non-users of digital innovations (e.g., technology providers/developers, (IT) managers)

Concept:

- No application of participatory methods
- Pure knowledge transfer without methodological application

- Lack of description of the applied methods

- Case description does not start at least from the design process

- Innovations without technological reference

- Studies without evaluation of participatory methods

Context:

- Hospitals

- Rehabilitation facilities

- Psychotherapy facilities

- Other industries

Other:

- Other languages

- No full-text access

- Published before 2010

The central question of this review investigates the extent to which participatory methods are applied in digital innovations in care facilities and the associated benefits. Therefore, only studies that consider end-users as a source of innovation and highlight their active involvement and co-creation in the innovation process through participatory methods will be included. The main focus is on the initial phase of the innovation process, as early involvement and co-design by end-users are essential for usability and acceptance (6). The innovation process must be described starting at least from the design process and apply human-centered methods in at least one of the phases. Studies focusing solely on usability evaluation after the implementation of an innovation will be excluded. The thematic focus is on digital innovation, so solutions without a technological reference will be excluded. To demonstrate the benefits of participatory methods, only studies that evaluate the application of these methods will be included. Additionally, this study only includes the introduction of digital innovations in outpatient or residential care facilities and excludes clinical innovation processes in hospitals, rehabilitation facilities, or other industries. Both English and German publications with full-text access published from 2010 onwards will be included to ensure the currency of the study results. This scoping review does not impose restrictions on study type or quality. All types of literature dealing with the application of participatory methods in the

innovation process of digital solutions in care facilities will be considered to provide a comprehensive overview of the research.

Eligibility criteria To develop a scoping review, the elements of the PCC framework—Population, Concept, Context—will be followed. Along these elements, a clear alignment between the title, aim, research question(s), and the inclusion and exclusion criteria is established (59).

Population: The first element describes the key characteristics of the study participants. Selection criteria refer to attributes that are relevant to the objectives of the scoping review, such as age, gender, or a specific disease (59). This research pertains to all study participants involved in the innovation process of digital innovations. This includes both the technology providers of the digital innovation and the decision-makers and participants in the care facilities.

Concept: The second element describes the core concept, which determines the scope and range of the investigation (59). The core concept of this scoping review involves participatory and human-centered methods used during the innovation process of digital e-health solutions.

Context: The context of a scoping review includes details of the specific setting (59). The setting of this work is limited to residential and outpatient care facilities.

Source of evidence screening and selection In the first step, an initial search was conducted in the databases PubMed and Web of Science to gain a preliminary overview of the topic. The initial search terms included: "human-centered design", "design thinking", "participation", "digital innovation", and "care facilities". The titles and abstracts of the retrieved articles were reviewed, and relevant keywords and index terms were noted. Additional keywords were identified through the references of the found articles and the "similar articles" function. To refine the search syntax, the relevant keywords were tabulated based on the PCC framework.

For the search component Population, terms were defined to ensure comprehensive coverage of all stakeholders involved in the innovation process. The Concept component was divided into three main fields: (1) participatory methods, (2) digital innovations, and (3) the innovation process. The third search component included terms and synonyms for the setting of outpatient and residential care facilities. Further keywords will be added through discussions with practitioners.

In the next step, a comprehensive search will be conducted using all identified keywords and index terms in the databases PubMed, Web of Science, and LIVIVO. Keywords will be combined using the operator "OR" in the corresponding search fields. Truncations or quotation marks may be used to refine the search as needed. Subsequently, the three search components (Population, Concept, Context) will be linked using the operator "AND". This process will be repeated by trying different combinations of search terms in all databases. Terms will be added or removed until the search syntax generates a satisfactory number of results for this scoping review. The complete search strategy for all databases will be documented in the appendix. In the final step of the search strategy, the reference lists of the included publications will be reviewed for additional studies.

Data management After conducting the search with the final keywords in all databases and the search engine, all identified literature sources will be consolidated in the reference management software Citavi. Duplicates will be checked and removed. Subsequently, the literature sources will be carefully reviewed by an evaluator based on titles, abstracts, and inclusion criteria to identify potentially relevant publications. For these, the full text will then be accessed, read in detail, and assessed to ensure they meet the established inclusion criteria. Literature sources that do not meet these criteria will be removed from the reference management software and will not be further considered for the scoping review.

The decision-making process for or against a source will be transparently depicted through a flowchart to make the evaluation process understandable. Finally, the results report will be created in accordance with the PRISMA-ScR guidelines to clearly and structuredly present the findings of the scoping review. This process ensures that the review is conducted methodically and transparently and that the quality of the identified literature sources is assured.

Presentation of the results The data extraction from the literature sources will be presented in tabular form. The preliminary categories of the table include: authors, title, year of publication, country of publication, study type, study aim, inclusion criteria (according to the PCC framework), phase of the innovation process, benefits, and challenges of the innovation process. If necessary, the data extraction table and its main categories will be further refined and adjusted during the extraction process to ensure that all relevant information is captured. The results of the data extraction will be recorded in a bullet-point

format. This will be followed by a narrative summary of the results.

Language restriction English and German.

Country(ies) involved Germany.

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Keywords E-Health; Co-Design; Human-Centered Design; Design Thinking; Care Facilities; Residential Care; User Involvement.

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