Cogitare Enfermagem

ORIGINAL ARTICLE

DESIGN THINKING: AN APPROACH TO RESEARCH AND INNOVATION IN NURSING

HIGHLIGHTS

1. Design thinking is an approach to everyday professional problems.
2. Design thinking is an important reference point for nursing.
3. The application of design thinking to nursing is still incipient.

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ABSTRACT

Objective: To analyze the application of design thinking to the scientific production of a Postgraduate Nursing Program. **Method:** This is a documentary, descriptive, retrospective, and qualitative study of the scientific production of the Postgraduate Program in Nursing Care Management - Professional Modality, in Florianópolis, Santa Catarina, Brazil, from 2009 to 2022, based on dissertations published in a public directory. **Results:** Five academic master's theses were analyzed that applied all or part of the design thinking approach to the development of proposed products/services. All the studies aimed to solve problems identified in the researchers' professional contexts. The studies generated information, data, products, processes, and methodologies for nursing care. **Conclusion:** design thinking is an important reference point for nurses in the field of research and development, as well as contributing to the training of professionals who aim to solve complex problems in the field of health care, management, education, and research.

DESCRIPTORS: Nursing; Innovation; Scientific Research and Technological Development; Nursing care; Knowledge.

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INTRODUCTION

Nurses occupy a privileged space for identifying and filling gaps in healthcare systems, and therefore have strategic potential for accelerating innovation processes[1]. In addition, they constitute the largest workforce in healthcare and are present in most of the care settings[2], having acquired extensive knowledge of the limitations and opportunities for innovation in the healthcare market. However, despite these factors and the significant amount of evidence demonstrating the impact of nurses on the progress and development of health policies[3], there is still little involvement in the research and development (R&D) of products or services for the sector[4].

In this sense, to improve performance in research, nurses need to rely on an approach that supports technological development studies in health[5]. One of the perspectives that may arouse interest is Design Thinking (DT). It is defined as a human-centered approach to solving complex problems through which the designer matches the needs of the public of interest with the technical and financially viable improvement of products or services, to create value for the client/user[6]. The application of DT in healthcare contributes to the development of innovative attitudes and high professional skills related to the field of R&D and nursing[7].

Therefore, to improve performance in research, nurses need to rely on an approach that supports technological development studies in health[5].

DT can be understood using the double diamond model proposed by the Design Council[1-8], as shown in Figure 1.
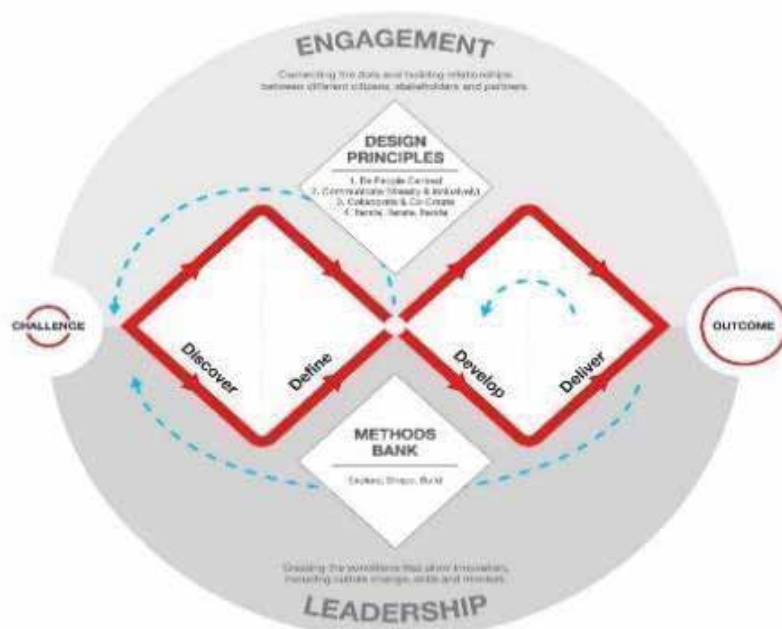

Figure 1 - Design Council double diamond model. Florianópolis, SC, Brazil, 2023
Source: Design Council (2019).

The Double Diamond demonstrates the movement of convergent and divergent thinking through the stages of the model. The first diamond focuses on the problem to which the project is seeking solutions, with a focus on understanding the context of the problem in depth, and the second diamond focuses on solutions, the development and

interaction of ideas[9-11].

DT can be applied in different ways, considering the theoretical and methodological framework of each organization used in the approach to promote innovation. The approach proposed by the Stanford School of Design proposes an interactive design journey in five steps: empathize, define, ideate, prototype, test. In DT, experimenting and testing ideas as early as possible and iterating are part of the process of discovery and constant improvement[8].

The double diamond model promotes a significant change in the way solutions are sought, proposing the incorporation of the human factor, diversity of perspectives, collaborative work, and experimentation, favoring a holistic and systemic view of the problem and the proposition of assertive solutions that add value for people. These principles should guide the development team of a project that uses DT as a theoretical framework.

Although Design Thinking has benefits, being a similar approach to nursing in terms of the centrality of the human being, its application to health care is still limited[5]. Studies indicate that DT plays an important role in proposing positive and innovative solutions in practical care processes and in the training of health professionals, including nurses[12-14].

Faced with so many benefits, research into the use of the DT in nursing scientific production has emerged as a contemporary need, to answer the questions: How is the DT applied to nursing scientific production? What are the characteristics of the studies that used the DT as a theoretical and methodological reference? How did these studies apply the DT? Which components of the DT were emphasized in the development of products or services? What were the results of applying DT? What benefits or contributions have been identified from the application of DT to the development of health products and services? Thus, with the aim of starting a discussion on the subject in the context of nursing, this study aimed to analyze the application of the Design Thinking approach to the scientific production of a Stricto Sensu Postgraduate Nursing Program.

METHOD

Documentary, descriptive, retrospective research with a qualitative approach, within the scope of the Postgraduate Program in Nursing Care Management - Professional Modality (PPGPENF, in Portuguese). It was carried out in Florianópolis, Santa Catarina, where information was collected on the Course Completion Papers. The PPGPENF began in 2009 to train professionals with the skills to carry out research applied to the development of technologies and innovation, and to exercise advanced professional nursing practice.

The data was collected from the PPGPENF repository, the Pergamum platform (https://pergamum.ufsc.br/pergamum/biblioteca/index.php) and the program's website (https://mpenf.ufsc.br/). The data was collected in October 2022. The following keywords were used to capture the studies: Nursing; Design Thinking; Innovation; Scientific research and technological development. The time frame was from 2009 to 2022. The inclusion criteria were full publication, availability in electronic media and adoption of DT, or any of its stages, as the study's theoretical or methodological reference. The exclusion criteria were papers that did not explicitly apply the DT to the study.

Once the selection criteria had been applied, a sample of five papers was taken, which were read and analyzed in full. The following data from the final papers was extracted and organized in an electronic spreadsheet: the title; authors; line of work; theme; year of publication; problem; objectives of the study; place where the study was applied; methodological aspects; participants; justification for applying the DT; ways of applying the DT; research techniques used; results; contribution of the DT to Nursing and conclusions. All data extraction was carried out by the main researcher. Thematic analysis was used to

analyze the data. After detailed reading, the results were organized for discussion.

In this type of study, public access documents are used and, because of this nature, it does not require submission to the CEP /CONEP System (Research Ethics Committee/ National Research Ethics Commission), as prescribed in resolutions no. 466/12, of December 12, 2012 and no. 510, of April 7, 2016[15-16].

RESULTS

We selected five graduation papers from a total of 163 master's theses published between 2009 and 2022. Table 1 shows the main characteristics of these studies.

Chart 1 - Characteristics of the studies that applied the DT approach. Florianópolis, SC, Brazil, 2023

Title	Authors	Year	Objective	Form of application	Product
Construction and validation of an information folder for relatives after hospital death17	Ana Paula Hoch Berta Tedesco	2021	To create and validate an information folder for relatives and carers of adult patients after hospital death.	Applied, in part, to work. Developed in four stages: discover, define, develop, and deliver	Information brochure "Coping with loss - Information on the aftermath of hospital death"
Care management in medium complexity: an intervention proposal for the control of neoplastic lesions of the cervix18	Camila Beltrame Bagio	2021	To collectively build an intervention plan for the early detection and treatment of cervical neoplasms at the Palhoça Municipal Polyclinic - UNISUL.	Methodological reference in just one work product, Applied to four stages: discover, define, develop, and deliver	Work process strategy Educational folder Educational video "Let's prevent cervical cancer"
Educational game for teaching the Systematization of Nursing Care19	Poliana Paz Barcelos	2021	Developing and validating the content and appearance of an educational game on the Systematization of Nursing Care for undergraduates	In four stages: immersion, ideation, conception, and validation	Educational game "Pensa e SAE" on the systematization of nursing care
Dynamics for humanized nursing consultations with women for cervical cytopathology tests20	Letícia Fumagalli da Silva	2022	Building a dynamic for a humanized nursing consultation with women to carry out the cytopathological examination of the uterine cervix	Methodological framework in five stages: empathy, definition, idea generation, prototyping, and validation.	The Fumagalli method for humanized nursing consultations during cervical cytopathological examinations

Patient and worker safety in the resuscitation room of an emergency unit: applying design thinking21.	Aline Cristina da Rosa	2022	Propose strategies to promote patient and worker safety in the resuscitation room of an emergency care unit	Philosophical and methodological framework in four stages: discover, define, develop, and deliver	Strategies for organizing work and the health team.

Source: Authors (2022).

The publication of the studies was concentrated in the years 2021 and 2022. All of the studies are characterized as intervention projects, with proposed solutions developed through the application of different research methods and techniques: one applied research study; one action research study; two methodological studies; and one project identified as design thinking. The topics covered included: patient safety in urgent and emergency care; post-hospital death care; the systematization of nursing care; and two studies related to cervical cancer.

All the works aim to solve problems identified in the researchers' professional contexts, for which they have proposed the development of products and services aimed at the needs of health professionals and institutions. There is a predominance of initiatives undertaken in the hospital context. And among the participants in the studies, the inclusion of health professionals, nurses and doctors prevails. Service users were included in only one of the studies.

Regarding motivation for application, DT is highlighted for its orientation towards a specific intentionality, ability to solve problems and non-arbitrary approach to solutions, using strategies, research techniques and creativity for innovative ideas. One of the authors mentions DT's potential to propose systematic solutions with a focus on the human being, through innovation, collective work, empathy, collaboration, diversity of opinions and creativity. Two authors did not state their motivation for using DT.

In terms of application, four studies used DT for the development of the entire project. Only one of them used DT for the development of a single product, secondary to the project's objective. Three authors implemented the approach in four stages: discover, define, develop, and deliver. One author also implemented it in four stages; however, unlike the first, he divided the operation into the following stages: immersion; ideation; conception; and validation. And, unlike the others, another author referred to the use of DT in five stages: empathy; definition; idea generation; prototyping; and validation.

The first stage of the DT was called discovery/ discovery/ immersion/ and empathy and was carried out in all the studies analyzed. Three of the authors used information obtained from secondary sources, their own experiences in the contexts of the study and empirical knowledge. Two studies based the stage on information from interviews with health professionals and of these, only one study collected information from health service users.

The definition stage was implemented in four of the studies analyzed. In three of them, the stage involved interpreting and analyzing the information gathered in the previous stage, synthesizing the findings, and defining the requirements of the solution to be developed. In one of the studies, the stage was discussed in focus group rounds, with only two participants. In the two other studies, the stage was developed solely based on literature reviews, empirical knowledge and the synthesis of opinions obtained from the researchers' professional experience.

The generation of ideas or ideation was implemented in only two works. One

generated idea based on the contents of the literature reviews and the second was based on ideas presented by the researcher herself, without the participation of other professionals or users.

All five studies used the DT development stage, also known as conception and prototyping. Two studies developed solutions based on the researcher's own convictions and ideas. Another study proposed solutions based exclusively on the data gathered in the previous stages, developing prototypes, and carrying out tests to validate some of the proposed solutions. Two studies used specific product development techniques to make the proposed solutions tangible. Only two studies referred to the production of prototypes to test the solutions. The others developed the solutions and delivered them.

The delivery stage was reported in three of the scientific productions. One of them reported the agile application and experimentation of the proposed solutions, supported by a project management plan for implementation and continuous improvement of the proposal. Two other studies reported on the development of prototypes for validation with experts before final delivery.

In three of the studies analyzed, the validation stage was proposed. Two mentioned having carried out appearance or content validation with a panel of experts. Only one study reported validation with end users, without mentioning any adjustments or subsequent actions. This study also carried out two types of validation: one semantic, with structured data collection on the content and presentation of educational products, and the other through experimentation and feedback from end users, without detailing the methods used or the results obtained.

The studies used various research techniques. The literature review was carried out in five studies. At least two projects used semi-structured interviews, questionnaires, content validation, appearance validation, persona construction and Bardin's content analysis for data collection and analysis. In addition, other techniques were employed, such as informal conversations, focus groups, empirical case studies, concept maps, semantic panels, card sorting, brainstorming, video production, apps and digital graphic design and game design platforms.

As a result, all the studies generated information about the problem they were developing solutions for. Three resulted in educational, information and nursing care technologies. One resulted in management strategies, work processes and an action plan. And the last developed a nursing care method.

Four of the authors reported the contribution of the DT to: the interaction of the multi-professional team; collective and collaborative work; the involvement of different actors; the construction of a safe environment and trust between study participants; and the promotion of continuous improvement, based on the proposal of the DT prototyping cycles.

The potential for impact on innovation and the production of nursing knowledge was highlighted in two studies, as was the ability to foster the identification of knowledge gaps in the area. Empathy, speed of experimentation, the generation of new knowledge, and the creation of solutions to problems in daily clinical practice, according to the needs identified in the contexts in which the projects were carried out, as well as the use of different strategies and areas of knowledge, were also considered benefits of applying the DT approach to the studies analyzed.

DISCUSSION

The results indicate that in the context of the PPGPENF, the DT is applied as a strategy to address problems present in everyday professional life, in health services of all levels of

complexity, with a view to generating value for nursing professionals and health services.

These results are in line with those of another study, in which proposals for innovation in nursing are concerned with simplifying workflows, building care methods, developing innovative care devices, and improving the quality of care. According to the study, the role of nurses in R&D represents a new trend in professional nursing education[1].

Researchers' interest in the DT is related to the systematized structure of processes oriented towards problem-solving and the concepts that guide the approach to problems: empathy, collective work, diversity of opinions and creativity. On the other hand, limitations have been identified regarding the application of the DT concerning the low diversity of participants in research and researchers, reducing the analysis of the problem to the perspective of the nurses proposing the research; the overvaluation of personal knowledge and experiences when approaching problems; and the presumption of a solution even before developing the design process.

In this respect, authors, and design research institutes[9,22-24] state that DT is an integrative approach in which the analysis of the problem and the development of the solution are carried out in a systematic and holistic way through a process that favors divergent thinking, diversity of views through a plurality of specialists and the exchange of different perspectives on a given problem.

The model proposed by the Design Council[10], the Double Diamond, outlines key principles, methods and the working culture needed to achieve positive, significant, and lasting change in the problems addressed via DT. The two diamonds represent the process of exploring an issue (divergent thinking) followed by taking focused action (convergent thinking). The first diamond promotes people's understanding of the problem, rather than simply taking on the problem. It involves interacting with the people affected by the problem. In the definition stage, the insight gained in the previous stage can re-signify the problem, directing the proposed solution. Next, the second diamond encourages proposing non-obvious answers to the redefined problems, seeking inspiration elsewhere and co-designing the solutions with a range of different people. The last stage of DT, delivery, involves testing alternative solutions on a small scale, rejecting those that won't work and improving those that will[24].

The study's findings are corroborated by Roberts et al.[25] who point out that the design process has many parallels with the ways in which science produces innovations; however, there are important differences in the way researchers and designers solve problems. The former places more emphasis on the analysis of pre-formed hypotheses or theory-driven approaches to solutions, while the latter places more emphasis on synthesizing information and ideas from different sources, searching for new and unconventional solutions. From this perspective, DT can be an important set of tools for tackling complex problems for which the paradigms of practice have proved insufficient.

The results of the study also indicated that DT was applied primarily as a theoretical and methodological reference to four stages, with emphasis on the discovery and development stages. Discovery was implemented in all the studies, mostly through immersion in bibliographical references and the personal perceptions of the authors, influencing the development of the projects in terms of alignment with the needs and desires of the users of the products under development. At this point, it is important to stress that DT starts with people and not with a specific technology or objective, and that the client/end user must have a decisive influence on the process. It is in this discovery phase that the development team uses empathy to develop a more profound understanding of the known and hidden needs, desires, and values of an interest group.[22] It is a moment marked by divergence where the participants seek to discard known references searching for a new vision. The discovery stage uses the foundations of ethnographic research[23].

For Roberts et al.[26], innovation in health services involves the creative involvement of target populations and knowledge of the context of their daily lives. DT offers a

framework for orienting project teams around problems, as they exist within, and as they are experienced by individuals and communities, rather than teams proposing solutions based on their individual knowledge, methodology or organizational structures. In addition to 'themes' or commonalities between individuals and communities, DT excels at exposing important 'insights' offering new perspectives on how individuals/communities experience health problems and how to tackle them in innovative ways.

The next phase, definition, is the time for synthesizing the information collected in the field. Synthesis is carried out by establishing relationships and connections between the research findings; seeking new meanings in the information; and generating insights. At this stage, the problem is reframed based on what has been learned about the user and their context[23]. In the studies analyzed, this stage was mostly influenced by the researchers' empirical knowledge of the problem, which is different from the literature.

The development stage opens the second diamond and corresponds to the ideation and prototyping stages. It consists of a phase of divergence in which solutions are sought to tackle the new problem developed in the previous phase. For ideation, the team must combine their understanding of the problem with the needs of the people for whom they are generating solutions and the creativity to generate new concepts and innovative solutions. Promising ideas are prototyped to enable testing with end users[23]. The results of the study point to the need to instrumentalize ideation processes by including different "views and perspectives", tools and processes.

Delivery comprises the stage of testing the prototypes in the field, to validate the ideas with real users and discover new insights and paths through meaningful feedback, with the aim of learning from the user how the prototype can evolve to meet their needs[24]. Testing takes place in iteration cycles, when the solution interacts with the target audience in a continuous cycle of prototyping-testing-analysis-improvement. The interaction cycles lead to the innovation process[23].

In this study, the use of medium and high-fidelity prototyping was identified, allowing for rapid experimentation in different contexts. This indicates a significant capacity to apply knowledge in nurses' daily lives. However, a limited implementation of the iteration cycles proposed in the DT was observed, possibly due to the time constraint to carry out the projects analyzed.

The application of DT within the PPGPENF proved challenging in terms of the use of design methods and principles. Even so, it contributed to the creation of innovations in nursing care, to the discovery of insights into new opportunities, knowledge gaps and products/services in the area. The DT approach also facilitated professional engagement, collaborative work, and continuous improvement cycles.

These results are in line with the analysis of the award-winning studies in the 2019 "Nursing Innovation Lab". This edition cataloged more than 200 innovative experiences, 16 of which stood out for their innovation and relevance to the Brazilian Unified Health System, highlighting nursing's innovative capacity.

In another study, the application of DT was valued for its contribution to management, innovation, and health practices. It was recognized that DT promotes human-centered research, collective work, diversity, and rapid prototyping to solve complex and persistent health problems[25]. In addition, DT has also been found useful in redesigning health interventions to achieve greater efficiency, effectiveness, and user satisfaction[26].

Another study revealed the benefits of the approach for the technical quality of professionals, for better recognition of the intervention context, recognition of clearer perceptions about the challenges of providing care, and about specific care interventions for people with dementia[14].

The DT is being used in various settings and health conditions, although there is

variation in application, methodological and quality limitations in the forms of application. More research is needed in the area, including studies to isolate its critical components and compare interventions based on DT with traditionally developed interventions[27].

Nurses can influence and become leaders in multiple aspects of innovation, and DT is a strategic tool that can be used successfully in the field. Once nurses understand how to implement this process, it can be applied widely to all their work. This combination provides a means for nurses to influence the development of products and services and positively impact patient care and health systems[5]. Along these lines, some universities have proposed changes to nurse training curricula, including aspects of the DT approach, with the aim of training nurses to become leaders in innovation and entrepreneurship in healthcare[5].

It should be noted that these findings have limitations related to the low number of studies analyzed and the specific application to a postgraduate nursing program at a university in southern Brazil. Therefore, for a better understanding of the different realities and the reach of more graduate nursing programs in Brazil, new studies are needed that include other contexts.

FINAL CONSIDERATIONS

The study highlights the relevance and applicability of DT for the development of nursing knowledge. It was observed that the use of DT in the field of nursing is still incipient, but it is considered an important reference point for the work of nurses around R&D, for training professionals to solve the complex problems that exist in the field of health care, management and research.

In this way, this research contributes to reflecting on the importance of expanding nurses' knowledge of the methods and processes of developing technologies, products and services in the health area.

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