ORIGINAL RESEARCH

Promoting design thinking in nursing education: Experience of Moroccan undergraduate students in a surgical department

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ABSTRACT

Background and objective: "Design Thinking" is a problem-solving strategy focused on human behavior and needs. Within education, it is a collaborative approach with significant potential to produce innovations that address current issues. The Higher Institute of Nursing Professions and Technical Healthcare in Morocco is a public institution that provides training for nursing and healthcare technicians. By examining the contribution of design thinking in helping students overcome challenges during their internships, this study aims to improve the education experience of nursing students by promoting the adoption of this approach in their clinical practice.

Methods: This study is descriptive and exploratory, using the design thinking approach of the d-School at Stanford University with Moroccan students at the Higher Institute of Nursing Professions and Technical Healthcare of Tetuan. The study follows a five-step process (Empathize, Define, Ideate, Prototype, and Test) and includes 21 selected nursing students as designers during clinical training in a surgical ward under the guidance of their nurse educator. The designers then collaborated with the other nursing students on their surgical rotations and presented the solutions. Two satisfaction questionnaires were distributed among the designers and participating students to assess how this approach aided in addressing the identified problems.

Results: Using design thinking allowed students to be familiar with the management of the surgical department, how it operates, and the expectations of the training. The approach yielded numerous solutions, which the designers compiled into a guide for improving the clinical education experience for all nursing students. The satisfaction questionnaire results indicate that 76% of designers see potential in using this approach to overcome practical difficulties, and 52% believe it enhances the learning experience. However, the guide format received a satisfaction rate of 91% among end-users.

Conclusions: The use of the "Design Thinking" process showed that the conceptual thinking framework helped the nursing students understand the difficulties they faced during the first contact with the field placement. Promoting design thinking among nursing students has become an essential tool to generate innovations, and address challenges by developing competencies in a professional environment.

Key Words: Innovation, Design thinking, Problem-solving, Healthcare, Clinical settings

1. INTRODUCTION

Design thinking (DT) comprises a collection of tools and mindsets intended to solve problems of any magnitude. The approach is iterative and adaptable, firmly rooted in meeting the needs of the end-users.[1] In the '60s, DT gained popularity and, since then, has been applied to problem-solving

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within business, primary education, and higher education in areas of health such as medicine or nursing. This method has traditionally contrasted with positive thinking aligned with arts and social sciences disciplines that used the constructivist paradigm as an approach to truth.[1]

DT was described by Tim Brown who attributed 3 stages to this cyclical process: inspiration, ideation, and implementation.[2] The emergence of other disciplines as Biodesign or design-based research has presented DT in five stages that started with empathy or discovery, followed by interpretation. Then, ideation with experimentation, and finally, test or evolution.[3]

DT has been presented as an extended five-step process by various emerging healthcare disciplines: Empathy is the first step of the process, which necessitates immersing oneself in the user's environment for better understanding and interaction. This phase allows us to identify any problems associated with the field. It also gives us a better understanding of the user's expectations. Definitions involve a comprehensive examination of the issues identified in the previous phase, to improve understanding and advocate solutions that meet the target audience's needs. The Ideation phase involves brainstorming sessions where all suggestions are accepted without subjective evaluation. It is a collaborative effort in which each individual contributes to the exploration of all possible solutions to the problem at hand. The prototyping phase follows the identification of the most relevant ideas. The process of prototyping entails generating a distinct and perceptible initial version that can be examined, assessed, and refined to meet the users' expectations. The Testing represents the final step, which involves testing the most validated version. The objective is to receive user feedback by testing the prototype and implementing rapid iterations to refine the final product.[3–6]

This flexible process of DT grants iterative solutions and an increased understanding of needs which promote the development of cognitive skills such as open-mindedness, suspension of judgment, and bias toward action. To date, health professionals are faced with complex clinical problems that present a barrier to decision-making. Design thinking opens the opportunity to solve problems related to clinical outcomes, healthcare spending,[7,8] or patient experiences.[9,10]

In response to the changing needs and demographics of the population, several reforms have been introduced in the field of nursing education in Morocco. This series of health sector reforms have introduced a new approach focused on citizens, patients, and new health priorities. They aim to correct the dysfunctions and inequalities in the sector that have contributed to a decline in its effectiveness and efficiency.[11]

One of the priorities of this series of reforms is to enhance the quality of nursing education and training, as outlined in Health Plan 2025, to address the longstanding shortage of nursing professionals in Morocco.[12]

Medical and nursing educators are integrating DT into their curricula.[1,3,13,14] Recently, a meta-analysis about the effect size of DT on educational outcomes demonstrated that this instructional method is effective and helps participants achieve their educational goals.[15,16] However, a study of 101 Taiwanese nursing students' self-perceived competence in DT revealed that only approximately 50% of students rated themselves as skilled and competent in this area. The evidence indicates that a substantial number of students lack confidence in their design-thinking abilities.[15] These findings suggest a need for educational interventions that integrate nursing students into the healthcare network and prepare them to meet the challenges of increasingly complex situations.

Developing nursing students' skills in the DT process is necessary because it enables them to evaluate the healthcare system and work together with different professionals.[17] This process differs from traditional evidence-based approaches as it gives priority to human users.[18] Applying DT may enhance efficiency by fostering more interest in the needs of patients and providers, as well as promoting interprofessional collaborations.[17]

The present study aims to investigate how introducing "DT" into nursing students' experiential education can promote innovation and equip them with problem-solving skills necessary for clinical settings. We are implementing DT for the first time with Moroccan undergraduate nursing students at our institute during their surgical department training practice. The study proposes to enhance the clinical training experience by achieving three objectives: (1) Identifying challenges faced by students in the clinical setting during training; (2) Incorporating student engagement in clinical training; and (3) Equipping nursing students to handle issues in healthcare settings.

2. METHODOLOGY

2.1 Ethical considerations

This study complied with the ethical standards applicable to nurse researchers, as defined by Rashid,[19] namely beneficence, respect for human dignity, and guaranteed confidentiality for participants. The hospital and institute administration gave their approval before the study was carried out. Subsequently, the researcher (nurse educator) contacted the nursing students before the start of training and explained the aim, objectives, and methodology of the study in detail

at a meeting.[19] Nursing students voluntarily consented to participate in the study by indicating their training group to the nurse educator. All nursing students were also informed of their right to withdraw from the study at any time without any consequences.

2.2 Design

A qualitative, exploratory, and descriptive research methodology was used through DT workshops with student designers and focus group interviews with the remaining nursing students. The study aims to improve the educational experience of nursing students in their internship and to familiarize nursing students with this innovative approach.

2.3 Area description and period of the study

The Higher Institute of Nursing Professions and Technical Healthcare (ISPITS) is a non-university higher education institution established by Decree N°. 2.13.658 on September 30, 2013, under the supervision of the health governing body in Morocco. The institute offers a 3-year professional nursing and technical healthcare program, consisting of 6 semesters. The study was conducted at the Provincial Hospital of Tetuan, which is situated in the northern region of Morocco. Every year, nursing students from both the public (ISPITS) and private sectors receive training in all of the hospital's departments.

The pedagogical approach will be applied to the women's surgery department during the students' practical training. The department comprises two nurses, three nursing assistants, and nineteen physicians specializing in different fields.

The surgical department internship lasted for one month, while the study covered the period from February 2021 to June 2021. The purpose of the study was to implement the 5 steps of the DT process during and after the practical training of nursing students in the surgical department.

2.4 Population and sampling

Eighty-three nursing students from the last semester completed rotations in the surgery department alongside students from different semesters. The nurse educator adhered to the inclusion criteria for students assigned to placements in the women's surgery department who agreed to participate in the study. A group of 21 students was selected as designers to implement and adopt the different stages of the DT process. The designers engaged with other students in the same internship to test their solutions. Table 1 displays the demographic characteristics of the participants in the DT process.

2.5 Instruments and data collection

2.5.1 *Approach study*

The DT process was carried out by 21 nursing student designers supervised by their nurse educator. It was essential to organize and plan workshops to cover all phases of the process (see Figure 1) and identify the primary topics for development. A total of eight workshops were scheduled, each lasting between two to four hours (see Figure 2). During the first workshops, the designers and the nurse educator interacted and brainstormed to prepare interviews utilizing a guide that contained a list of open-ended questions for nursing students and the surgical department staff. The objective of the 5 questions designed for nursing students was to identify problems that students experienced during their 3-year clinical setting training. The questions are listed as follows:
• What is your experience with learning during the internship?
• Are the learning conditions in hospital departments optimal? Please justify your response.
• What challenges do you face during your clinical training?
• Are you able to apply what you know in theory to complex situations? If not, can you explain why?
• Please describe a significant experience, either positive or negative, from your clinical training that has had a lasting impact on you.

The purpose of interviewing the staff of the surgical department is to collect their recommendations for enhancing the clinical education of nursing students and to obtain their perceptions regarding the students during their clinical rotations. The interview included six open-ended questions:
• Please describe objectively the level of involvement and motivation exhibited by nursing students during their placement in your department.
• What are the activities that students perform throughout the day?
• What additional tasks are assigned to develop their skills?
• How do you rate their technical and practical ability to complete assigned tasks?
• What areas do you recommend for improvement to increase their proficiency and alignment with service requirements?

In the remaining workshops, the results of the focus group interviews were analyzed, problems were identified, themes were developed, ideas were prototyped, solutions were tested, and student feedback was collected to improve the proposed solution (see Figure 1).
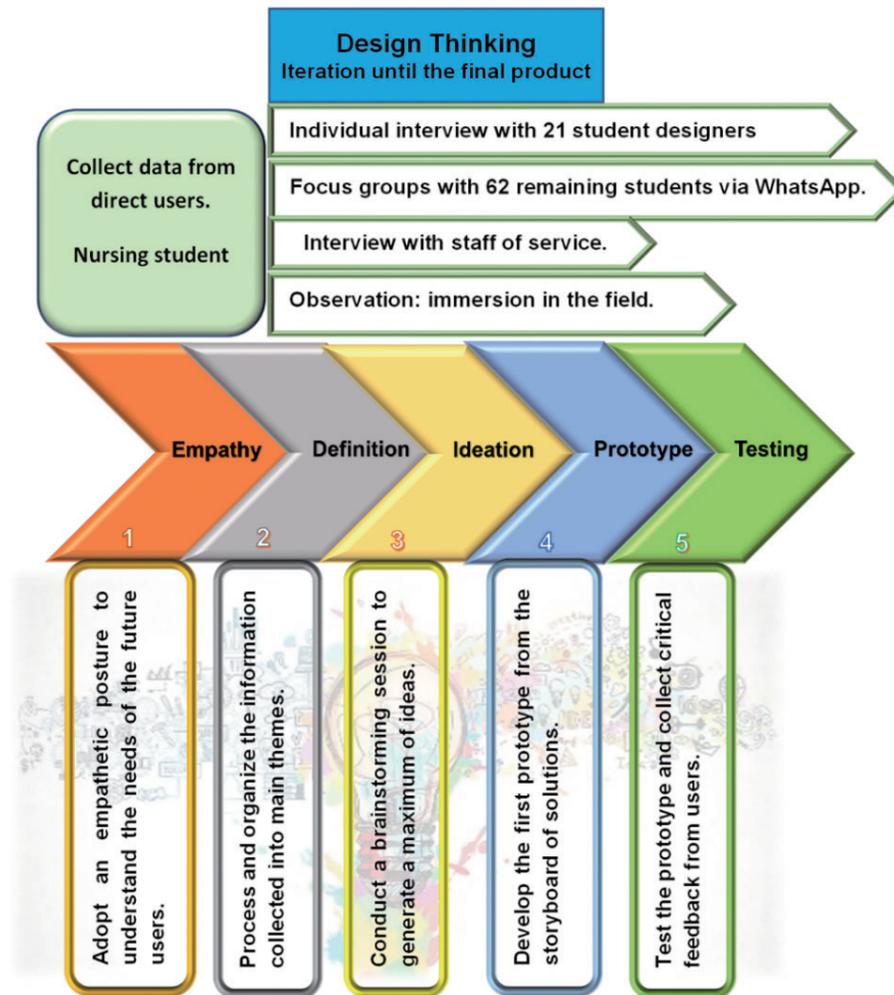
Figure 1. Diagram of the design thinking process followed by the designers

2.5.2 *Data collection and analysis*

Qualitative data were collected from 62 nursing students through seven focus group interviews with 10-11 nursing students on the surgical department rotation. The interviews were facilitated by designers accompanied by the researcher (nurse educator). The interviews began between February and April 2021, using French as the language of communication, and had an average duration of 50 to 60 minutes. Two focus group interviews were conducted during the internship. The remaining focus group interviews were conducted via WhatsApp due to the challenges of face-to-face interaction during the internship.

The researcher employed various communication techniques, including reflection, silence, and nodding, to gather extensive information related to the research questions. The designers' notebooks recorded all interviews, while the researcher also took field notes on non-verbal cues and nuances to support data collection. After each interview, the transcribed ideas were sent to an independent educator with substantial ex-

perience in qualitative studies for analysis of the data and development of themes. The themes were then shared on the storyboard during the subsequent workshop for discussion to identify and propose possible solutions.

The study includes two 5-question satisfaction surveys covering the three main criteria of subjectivity, relativity, and evolutivity. The questions focus on the cognitive and emotional dimensions of the participant's experience. Satisfaction questionnaires were carried out with the designers to assess their experience using design thinking, and with the nursing students to evaluate the developed guide resulting from this process (see Figure 2).

3. RESULTS

The collaborative approach of the "Design Thinking" process to clinical training issues for nursing students, using a conceptual thinking framework, resulted in many ideas and a wide range of outcomes, which were considered relevant to the students and professionals.

Figure 2. The workshops conducted by the designer's team following the design thinking process

The participants are represented by 30 females and 13 males, the youngest being 18 and the oldest 21. The 21 participants were involved in the design thinking process, while the 22 students from the other semesters represent the end-users who took part in the testing step (see Table 1).

3.1 Empathy

The empathy phase facilitated gathering information and answers about nursing students, including their learning progress, conditions, and challenges encountered in clinical settings. The immersion into the information collected through focus groups with students and interviews with professionals enabled the student designers to develop an empathy map (see Figure 3).

3.1.1 *The learning process of students on placement*

-Nursing students report targeting achievable objectives independently during their placement period in the absence of their supervisor.

-Nursing students also reported that they try to behave responsibly and respectfully to make a good impression on the nursing staff and hospitalized patients.

-Nursing students report preferring the most helpful and communicative nurses, who are willing to assist them with their tasks.

-The nursing students report that they endeavor to carry out their objectives only after receiving approval from the supervising nurse, who typically fulfills a supervisory function. In situations where the department is overwhelmed, the students are satisfied with assuming the role of observer, refraining from interfering, or disrupting the department's workflow to avoid drawing negative attention to themselves as trainee students.

Table 1. Demographics of the participants in the design thinking process

Phases DT	Participant demographics	Sample size
Design team	Nursing students' designers from the sixth semester	N=21
	Gender	15 females and 6 males
	Age range	20-21 years old
Empathy phase	Nursing students from the sixth semester	N=62
	Gender	44 females and 18 males
	Age range	20-21 years old
Testing Phase	Nursing students from the second, fourth, and sixth semester	N=22
	Gender	15 females and 7 males
	Age range	18-20 years old

3.1.2 *Learning conditions for internships*

-The nursing students report that students often cannot properly apply the technical sheets they have learned in theory classes due to a lack of time, materials, management, and organization. This frequently leads to confusion.

-Nursing students have stated that practical training is inadequate and challenging due to the unfavorable learning conditions in hospital environments.

-The nursing students state that they are often subjected to the demands of the internship environment, and they must endure certain inappropriate situations silently since ultimately, the inexperienced student has no say in expressing their opinion.

-The nursing students state that the guidelines need to be adapted to the current conditions in Moroccan health facilities because of the significant discrepancy between achievable goals and reality.

-The students reported suffering from overcrowding at the internship sites, which was caused by private sector students, inadequate departments, heavy course/internship loads, and short periods dedicated to each department.

-One of the responses in the form of a question was: "What types of learning are possible in a hospital department where the number of students exceeds its capacity by tenfold?".

3.1.3 *Common problems faced by students during clinical training*

The challenges cited by nursing students during their clinical training are summarized below:

-Short periods of hospital internship.

-Confusion in adjusting to the department.

-Challenging access to patient files.

-Insufficient number of nurse instructors.

-Failure to accommodate every student's learning pace.

-Lack of materials needed to properly produce technical data sheets.

-Lack of recognition and appreciation of students' considerable efforts and free support.

-Overcrowding in the department.

Interviews with department professionals revealed a negative perception due to the lack of involvement and motivation of nursing students in recent years. Professionals in the surgical department perceive that the level of technical/practical tasks performed by nursing students is weak, due to the short duration of the training period.

Then, to improve the level of nursing students conforming to department requirements the professionals suggested:

-Increase the period of internships to develop the skills needed to achieve objectives.

-Designate an internship supervisor, given the overload of hospital departments.

-Designate a student responsible for each team per period, who communicates any difficulties to the department professional.

-Nursing students must be motivated to seek out tasks and information from the professional or their placement supervisor.
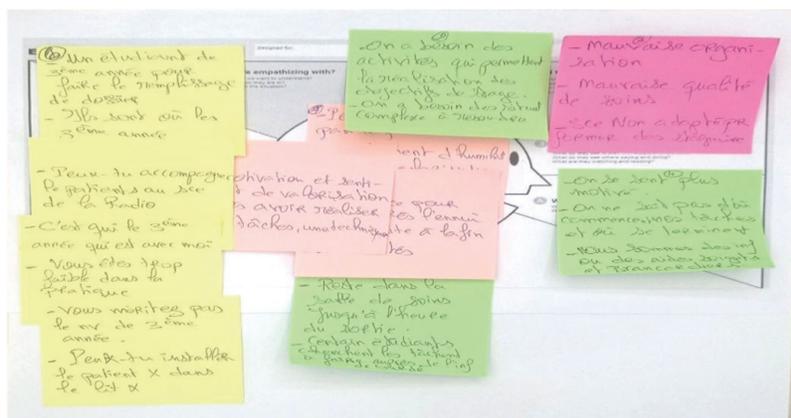

Figure 3. The empathy card used for the immersion process

3.2 Definition

As a result of the organization of the information collected, we have identified the most important points under the following headings: - Lack of supervision, absence of a nurse referent (Internship tutor); Gap between theory taught in class and practice that reflects reality in the field; Lack of communication between student trainees and nursing staff on duty; Lack of orientation/poor strategy for Teaching-Training within the department; Ignorance of patient management protocol in the surgical department and its management; Passivity of learning and lack of autonomy. We converted the identified themes into questions that adopted the structure "How might we...". Consequently, a compilation of inquiries was created such as:

Hmw address the issue of inadequate supervision in clinical placements?

Hmw support personnel supervises visiting students without burdening their workload?

Hmw bridge the gap between theoretical classroom teachings and practical applications in the field?

Hmw enhance the practical training experience for student nurses?

Hmw educate students on department-specific patient management protocols?

Hmw nursing students acquire the theoretical knowledge necessary to achieve their placement objectives?

3.3 Ideation

We selected and grouped ideas for prototyping based on the inquiries formulated. The aim is to develop an orientation guide for nursing students in the women's surgery department, which will include general department information (plan, organization, management), and the role of both the head nurse and on-call nurse.

3.4 Prototyping

The proposed guide's prototyped ideas are as follows:
-Women's surgery patient pathway.
-Women's surgery service plan.
-Nursing file.
-Staff organization chart.
-Patient care: post- and pre-operative patient preparation.
-Patient Information, Education, Communication (IEC).
-Pharmaceutical product management.
-Calculation of statistical indicators.
-Meal management.
-Personnel management.
-Medical visits.
-Clinical supervision of trainees.

3.5 Testing

During this phase, which lasted approximately one-week, numerous iterations were exchanged between the designer team and the end-users (nursing students and staff) to refine the prototyped solutions as much as possible and to make any necessary changes to the produced guide.

In collaboration with two web programmers, the design team was able to create an electronic guide (http://guidestage-ispits.com/) in addition to the paper format. For easier use and consultation scan the QR code below.

3.6 Satisfaction questionnaire results

After the training period, a satisfaction questionnaire was administered to the designers to evaluate their satisfaction level after implementing the DT methodology in clinical supervision. The outcomes were generally satisfactory, as no one was dissatisfied with the experience (see Table 2). Furthermore, the data shows that 76% of designers acknowledge the potential usefulness of this approach in addressing practical challenges, while 57% consider this pedagogical methodology to be effective and appropriate for their level of knowledge.

After the testing phase, a satisfaction questionnaire was distributed to nursing students from the second, fourth, and sixth semesters. A one-week feedback period was held to gauge their satisfaction levels and elicit their recommendations for improving the guide (see Table 3). The results were positive, as none of the nursing students reported dissatisfaction with the experience. 91% of the end-users were very satisfied with the format of the guide and 55% of respondents indicated that the proposed themes were useful, and the language employed was satisfactory to 59% of the participants. The idea of creating an orientation guide is perfect and irreproachable, but the proposal and implementation of this project must be made permanent, which will ensure that students are well-equipped for their clinical placement in the surgical department.

Table 2. Distribution of 21 designers' satisfaction levels after using the DT approach during the Women's Surgery Department internship

Items	Very satisfied %	Satisfied %	Fairly satisfied %	Unsatisfied %
This method is useful in your professional practices	38	38	24	-
Can you solve problems using this approach?	29	27	43	-
This method has the potential to overcome any difficulties encountered in practice.	76	-	24	-
Did the DT method make learning easier?	24	52	24	-
Did you find this pedagogical method effective?	57	29	14	-
Is this method appropriate for your knowledge level?	57	29	14	-

Table 3. Distribution of 22 nursing students 'satisfaction levels after using the guide during the Women's Surgery Department internship

Items	Very satisfied %	Satisfied %	Fairly satisfied %	Unsatisfied %
Is this guide easy to use?	50%	27%	23%	-
Is the format of the guide satisfactory?	91%	5%	5%	-
What do you think of the language used by the designers in the guide?	59%	23%	18%	-
Did you find the guide's logical structure helpful in understanding the material?	45%	41%	14%	-
Are the proposed themes useful?	55%	27%	18%	-

4. DISCUSSION

The study revealed that the nursing students, as designers in action and aware of the importance of their involvement in their activities in the internship, were able to identify the challenges and difficulties. This experience enabled nursing students to practice the five steps of DT as they empathize with their partners, define a problem related to training, generate ideas, create a prototype, and receive feedback from their partners.

4.1 Design thinking as a pedagogical approach to skills development

Results revealed that the nursing students were encouraged by the DT. They were implicated in the immersion process that requires developing a deep understanding of their colleagues affected by problems through observation and engagement in training practice. The students were able to identify the problems faced and try to find what solutions could help enhance their training experience in clinical settings.

Student reflections were reported in a study that described the experiences of students who participated in the first honors class that used DT. The nursing students explained that this methodology placed them outside of their comfort zone, making it difficult initially for them to invest in the process. They recognized that students who are focused only on acquiring the skills and knowledge necessary to become nurses might not immediately appreciate the value of DT.[6]

Recently, notable individual differences in DT competencies among nursing students were revealed in a study conducted by Liu[15] in Taiwan. The students perceived lower proficiency in visualization, prototyping, and evaluation, and lacked optimism when confronted with tough problems.[15] Consequently, nursing schools should prioritize the early development of strategies to inculcate creative synthesis and design skills among students.

The significance of soft skills for healthcare professionals has emerged as a fresh avenue of study.[20] Integrating these skills as part of nursing education, with an emphasis on training and assessment, will enhance professional performance in the clinical setting, communication, and patient services.[21]

Currently, educational practices take within a specific time and place where political, social, and cultural factors intersect and can only be analyzed through clinical immersion. From this perspective, the nursing student can adopt a critical-reflexive training approach to develop their skills, which enhance their ability to analyze different situations, contexts, and knowledge. As a result, the critical thinking skills acquisition to solve problems in complex situations is increasingly presented as an essential skill to be acquired in nursing training.[22]

4.2 Design thinking as a tool for identifying problems

According to our findings, design thinking offers advantages over traditional multi-level methods in educational experiences. By focusing on end-users and stakeholders and following the different stages of the process, causes and reasons that impede the learning process of students in clinical settings were identified.

The success of this design thinking experiment is attributed to the wealth of information sources that made it easy to obtain valuable data from multiple perspectives. In the definition phase, relevant information helped to define the problem. The student's internship challenges were revealed during the empathizing phase when the lack of a supervisor or internship mentor was identified.

Nursing education aims to bridge the gap between theory and practice.[23] In our context, the duration of the internship program has been decreased with the implementation of the License Master Doctorate (LMD) system in our institute. Some of these problems evoked during this approach were related to recent educational changes. Until now, the role of a clinician with teaching experience has been to supervise students. Practice tutors in clinical education are frequently employed in nursing and medical education in high-income countries. A practice tutor model was introduced in the Republic of Ireland in 2011 to support clinical sites that agreed to supervise more health students on an ongoing basis.[24] The introduction of tutoring is a pedagogical necessity, as it provides human accompaniment and socialization of the new professional within the care team, enabling a better work experience.[25]

4.3 Design thinking as a creative methodology for innovative products

To date, modern healthcare systems, innovation, and practice recognize design thinking as a creative problem-solving tool in healthcare.[17] Design thinking competence has been defined as the ability to creatively synthesize and exhibit characteristics essential to design thinkers.[15] As a complex skill, researchers view it as an experience-based learning process.[26]

Indeed, the student designers in this study are considered novice learners, and their introduction to design will allow them to investigate possibilities through learning and innovating.[15] The guide created by these students will enhance the belief that actions can result in improvement.

During the ideation phase, designers participated in workshops and group work to propose innovative solutions for improving the internship experience for students, drawing on imagination, collective intelligence, and collaborative work-

ing within the team. The proposed solutions are based on identified themes. As argued by Brown,[2] the appropriate viewpoint to initiate the creation and innovation process - the tasks carried out while following the design thinking approach - reflects attitudes and mental states.[2]

The prototyping phase aimed to make the generated ideas tangible before sharing them with other students. In the testing phase, we gathered information to demonstrate how the problem had been understood and how well the solution could meet the users' needs. Multiple iterations and feedback were necessary to generate new ideas that ultimately improved our solution and allowed us to share it.

Design thinking can be incorporated into healthcare and education to provide a holistic approach to identifying gaps in interprofessional education and understanding stakeholder needs.[27] The data collected and analyzed allowed us to acquire additional details about the guide. We have implemented various modifications and enhancements to the content and structure of our ultimate product. The creation of this type of tool will aid in practical learning for students during their initial interaction with the clinical environment.

4.4 Study limitations

Embarking on the end-to-end design process can add significant value. However, it is time-consuming and requires the involvement of a significant number of students. Particularly in terms of the number of students in contact with the product. One needs to be aware of the timelines of the project and the resources available when considering this technique. Of note, success can often be achieved through the use of only a few of the tools or components of the process, depending on the timing and needs of the project. In addition, team members must be open, active, and engaged, given the highly interactive nature of this approach. The success of this approach may be diminished by including team members who are resistant or uninterested.

5. CONCLUSION

A satisfactory result was obtained by using design thinking for the first time with nursing students during their internship. These results indicate the need for further educational interventions. Educators and service providers should work closely together to identify learning needs. Design thinking, as a model of critical-reflective practice training, could contribute to the development of reflective procedures enabling nursing students' engagement with the clinical environment. Therefore, educators should integrate design thinking into their curricula, providing nursing students with a soft skill that enhances their competencies through training and practice.

CONFLICTS OF INTEREST DISCLOSURE
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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No additional data are available.

REFERENCES

[1] Gottlieb M, Wagner E, Wagner A, et al. Applying Design Thinking Principles to Curricular Development in Medical Education. AEM Education and Training. 2017; 1: 21–6. PMid:30051004 https://doi.org/10.1002/aet2.10003

[2] Brown T. Design Thinking. Harvard Business Review. 2008: 11.

[3] McLaughlin JE, Wolcott MD, Hubbard D, et al. A qualitative review of the design thinking framework in health professions education. BMC Medical Education. 2019; 19: 98. PMid:30947748 https://doi.org/10.1186/s12909-019-1528-8

[4] Bouchra B, Malika S. Design Thinking une nouvelle approche d'innovation pédagogique. 2020. https://doi.org/10.5281/zenodo.3829780

[5] Kelley T, Kelley D. Creative Confidence: Unleashing the Creative Potential Within Us All. William Collins; 2013.

[6] Wingo N, Jones CR, Pittman BR, et al. Applying Design Thinking in Health Care: Reflections of Nursing Honors Program Students. Creative Nursing. 2020; 26: 169–74. PMid:32883816 https://doi.org/10.1891/CRNR-D-19-00055

[7] Dubois S, Giroux MN. L'innovation pédagogique chez les infirmières dans un contexte de début d'expérience professionnelle. Recherche en soins infirmiers. 2012; 111: 71–80. https://doi.org/10.3917/rsi.111.0071

[8] Ferreira MF, Savoy JN, Markey MK. Teaching cross-cultural design thinking for healthcare. The Breast. 2020; 50: 1–10. PMid:31958660 https://doi.org/10.1016/j.breast.2019.12.015

[9] Almaghaslah D, Alsayari A, Alyahya SA, et al. Using Design Thinking Principles to Improve Outpatients' Experiences in Hospital Pharmacies: A Case Study of Two Hospitals in Asir Region, Saudi Arabia. Healthcare. 2021; 9: 854. PMid:34356232 https://doi.org/10.3390/healthcare9070854

[10] Uehira T, Kay C. Using design thinking to improve patient experiences in Japanese hospitals: a case study. Journal of Business Strategy. 2009; 30: 6–12. https://doi.org/10.1108/02756660910942418

[11] Siddiqi S, Souteyrand D, Abdelrahim I, et al. Examen du système de santé au Maroc: défis et opportunités pour accélérer les progrès vers la couverture sanitaire universelle. 2013. https://orbi.uliege.be/handle/2268/209418

[12] Doukkali A. Plan-de-santé-2025 2018. Available from: https://www.draatafilalet.ma/images/Publications-pdf/Plan-de-sant%C3%A9-2025.pdf

[13] Beaird G, Geist M, Lewis EJ. Design thinking: Opportunities for application in nursing education. Nurse Educ Today. 2018; 64: 115–8. PMid:29471271 https://doi.org/10.1016/j.nedt.2018.02.007

[14] Sandars J, Goh PS. Design Thinking in Medical Education: The Key Features and Practical Application. Journal of Medical Education and Curricular Development. 2020; 7: 238212052092651. PMid:32548307 https://doi.org/10.1177/2382120520926518

[15] Liu HY. Design thinking competence as self-perceived by nursing students in Taiwan: A cross-sectional study. Nurse Education Today.

2023; 121: 105696. PMid:36527754 https://doi.org/10.101
6/j.nedt.2022.105696

[16] Yoon SH. Effects of Design Thinking Interventions on Educational
Outcomes: A Meta-Analysis. Canadian Journal of Educational and
Social Studies. 2023; 3: 66–83. https://doi.org/10.53103/c
jess.v3i1.108

[17] Altman M. Design Thinking in Health Care. Prev Chronic Dis. 2018;
15. PMid:30264690 https://doi.org/10.5888/pcd15.180128

[18] van de Grift TC, Kroeze R. Design Thinking as a Tool for Interdis-
ciplinary Education in Health Care. Academic Medicine. 2016; 91:
1234. PMid:27097052 https://doi.org/10.1097/ACM.000000
0000001195

[19] Rashid D. Ethics in Nursing Research. 2022; 11: 2. https://doi.
org/10.37421/2167-1168.2022.11.520

[20] Laari L, Dube BM. Nursing students' perceptions of soft skills train-
ing in Ghana. Curationis. 2017; 40: 5. PMid:29041781 https:
//doi.org/10.4102/curationis.v40i1.1677

[21] Pearson E, McLafferty I. The use of simulation as a learning ap-
proach to non-technical skills awareness in final year student nurses.
Nurse Education in Practice. 2011; 11: 399–405. PMid:21497554
https://doi.org/10.1016/j.nepr.2011.03.023

[22] Flores-Lueg C. Reflective Processes Promoted in the Practicum Tu-
toring and Pedagogical Knowledge Obtained by Teachers in Initial
Training. Education Sciences. 2022; 12: 583. https://doi.org/
10.3390/educsci12090583

[23] Ahmadi S, Abdi A, Nazarianpirdosti M, et al. Challenges of Clini-
cal Nursing Training Through Internship Approach: A Qualitative
Study. Journal of Multidisciplinary Healthcare. 2020; 13: 891–900.
PMid:32982265 https://doi.org/10.2147/JMDH.S258112

[24] Mori B, Coleman J, Knott K, et al. Designing, Implementing, and
Evaluating a Practice Tutor Internship Model during an Acute
Care Clinical Internship. Physiother Can. 2020; 72: 177–91.
PMid:32494102 https://doi.org/10.3138/ptc-2018-0055

[25] Abdelilah M, Abdelrhani E, Tarik SH, et al. Impact of Tutoring
Method on Improving the Quality of Clinical Supervision in the Con-
text of Nursing Education. ESJ. 2019; 15. https://doi.org/10
.19044/esj.2019.v15n6p139

[26] Hölzle K, Rhinow H. The Dilemmas of Design Thinking in Inno-
vation Projects. Project Management Journal. 2019; 50: 418–30.
https://doi.org/10.1177/8756972819853129

[27] Cleckley E, Coyne B, Mutter MK, . Using an empathic design think-
ing approach to reshape interprofessional curricula for health care
trainees. Journal of Interprofessional Education & Practice. 2021; 24:
100446. https://doi.org/10.1016/j.xjep.2021.100446