Design Thinking in a Professional Nursing Course – Its Effectiveness and Unearthed Lessons

Reynold Culimay PADAGAS¹

¹University Researcher and Faculty,
College of Nursing and Health Sciences,
Jose Rizal University, Mandaluyong City,
Philippines, reynold.padagas@jru.edu

Abstract: Historically, learning was strictly confined in a typical brick-and-stone classroom with the sole purpose to enable knowledge transmission from the teacher to the learners. The traditional classroom has been but highly teacher-centric where students act as obedient receptors of knowledge until massive technology disruptions emerged during the fourth industrial revolution. One strategy that has been used exponentially in education is design thinking (DT), a human-centered approach in problem solving. In this pre-test and post-test experimental research, DT enabled randomly paired nursing informatics (NI) students to construct their conceptual papers or frameworks addressing significant challenges that affect healthcare. Pre- and post-surveys were conducted after the completion and oral presentations of their conceptual papers. Key informant interviews were also conducted to generate qualitative data, which were believed to expand understanding about the perceptions and expectations of the students in NI through DT. The findings revealed that design thinking was an effective strategy in developing students' conceptual papers or frameworks. The nursing students valued design thinking as a tool that enhances team diversity, collaboration, patience to listen, openness to honest feedback mechanisms, openness to learning new things, social awareness and sensitivity, inquisitiveness, and keenness to details. Furthermore, it was found out that the students used mistakes as opportunities to learn. Certain areas for improvement, however, were discovered which include data analysis, time management, technical writing, problem-solving, conducting literature review using online platforms, reading comprehension, concentration, critical thinking, cultural sensitivity, innovations, adaptability, following prescribed formats, and creativity.

Keywords: *Design thinking, conceptual paper, technology disruptions, research, metacognition.*

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1. Introduction

Tracing back history, learning was strictly confined in a typical brick-and-stone classroom solely purposive to enable knowledge or content transmission from the teacher to the learners. The traditional classroom is highly teacher-centered where students just act as obedient receptacles of knowledge. Not to undermine its capacity to develop cognition, the traditional classroom does not ensure wholistic development of the learners.

The conservative, traditional method of instruction is a vivid illustration of teacher-centered philosophy. While it aims to ponder knowledge acquisition in its strictest sense, this mode of instruction does not imbue teachers as facilitators of learning. The downside of teacher-centered instruction rapidly expands denouncing the learners as the centers of the teaching-learning loop or cycle. One major concern in a teacher-centered instruction is the lack of creativity and innovation of both the teacher and the learners. This concern, however, can be resolved through design thinking.

Matsuyama et al. (2019) eloquently mentioned that previous studies indicate that a teacher-centered context could hinder baccalaureate degree students from self-regulated learning, whereas a learner-centered context could promote self-regulated learning. The shift towards learner-centered learning could promote self-directed learning even in students strongly accustomed to teacher-centered learning (Matsuyama et al., 2019). Self-regulated learning is believed to be enhanced by innovative teaching strategies such as design thinking.

Design thinking is inherently collaborative and may help build skills useful for practicing as part of a team (Beaird et al., 2018). Collaboration is another essential component to nursing education and more work is needed to understand the role both interdisciplinary courses and design thinking have in interprofessional education (Beaird et al., 2018). Interdependence is an essential ingredient for graduates to become more prepared and successful in the actual world of work. Design thinking is a collaborative problem-solving and human-centric approach that fosters innovation by elevating participants' creative thinking abilities (Aflatoony et al., 2018). Creative thinking is vital in fostering innovations that are viewed essential in good decision-making. Creative thinking is one of the vital soft skills that nursing students must acquire in their formal education. This skill is developed and enhanced in pre-determined sets of teaching and learning activities using design thinking as a methodological approach. Also, design thinking fosters meta learning dimension. Rubin (2017) cited that meta-

learning is originally described by Donald B. Maudsley in 1979 as the process by which learners become aware of and increasingly in control of habits of perception, inquiry, learning, and growth that they have internalized. Meta learning dimension means learning how to learn. Basically, this encompasses development and enhancement of the knowledge, skills and characters of students. Creative confidence, adaptability, social and cultural awareness, critical thinking and problem solving, creativity, collaboration, curiosity, motivation, reflection and patience are some of the many things that students can acquire out of design thinking once infused in the teaching-learning process. When nursing students master the how's of learning, they will become more self-regulated, autonomous, and productive learners.

As posited, tomorrow's professionals will require an enhanced capacity for collaboration, cooperation and creative thinking (Markauskaite & Goodyear, 2016; McLaughlan & Lodge, 2019). Nursing students are not exempted in this regard. As future members of the healthcare workforce, they have to be competent to execute their acquired hard and soft skills. Collaboration, cooperation and creative thinking are some of the soft skills one can learn from hidden curriculum. These soft skills are becoming the gold standard attributes that employers are looking for in an applicant. For instance, the practice of nursing requires critical thinking and clinical reasoning to define a client's problem, examine the evidence-based practice in caring for the client, and make choices in the delivery of care (Kabeel & Sahar, 2016). Learning to identify and formulate a good clinical question can create better results in terms of finding for the best evidence available to impact clinical decisions that eventually influence quality patient care outcomes. Without critical thinking and clinical reasoning, poor insight and judgment become inevitable resulting to poor ethical decision-making. A survey conducted by DeSimone (2016) assessed the similarities between critical thinking and ethical decision making perceived by faculty and students justified using critical thinking skills to measure ethical decision-making competence. Using an empirical evidence generated by rigorous and comprehensive research significantly affects the delivery of quality patient care. The capacity to discern evidence to ensure patient safety and quality management requires the aforementioned skills. Furthermore, DeSimone (2016) also highlighted that by integrating critical thinking skills throughout the nursing curriculum, faculty heightened the capacity of students to make and defend their own ethical decisions. Nursing students are trained to acquire various types of knowledge that include empirical knowledge, aesthetic knowledge, personal knowledge, and ethical knowledge. These ways of knowing (Carper, 1978) help both students and nurses to appreciate

the unique nature of nursing as a discipline and as a practice. It is through these forms of knowledge that they can facilitate therapeutic management of their target patients.

In the Philippines, the program outcomes for the baccalaureate degree in nursing stipulate that three to five years after finishing Bachelor of Science in Nursing (BSN), the graduates excel in their profession/career utilizing the knowledge acquired in the BSN; become effective collaborators and innovators in Nursing Profession, applying professional/technical skills and competencies to make a positive impact on society; and be engaged in life-long learning and professional development through self-study, continuing education, or graduate and professional studies. To attain such, the curriculum has been designed in a fashionable manner to realize the program outcomes. Based on the Commission on Higher Education (CHED) Memorandum no. 15, s. 2017, Higher Education Institutions (HEIs) in the Philippines are encouraged to develop BSN curriculum that provide enhancements in selected program outcomes such as apply guidelines, and principles of evidence-based practice in the delivery of care; communicate effectively in speaking, writing, and presenting using culturally-appropriate language; work effectively in collaboration with inter-, intra-, and multi-disciplinary and multicultural teams; conduct research with an experienced researcher; engage in lifelong learning with a passion to keep current with national and global developments in general and nursing, and health developments in particular; and apply techno-intelligent care systems and processes in healthcare delivery.

The BSN curriculum has been responsive enough to address global innovations and developments. For instance, the Nursing Informatics (NI) became one of the courses in BSN that integrates nursing science, information science, and computer science. NI is a three unit course (2 unit theory; 1 unit laboratory). This course deals with the use of information technology system and data standards based on nursing informatics principles and theories. It further deals with the utilization of clinical information systems in the management and decision-making of patient care. Likewise, laboratory sessions shall be provided for practice application.

However, much concern is focused on how students are aided in their research competencies hence the integration of conceptual paper development addressing pressing issues and concerns affecting healthcare because of massive technology disruptions. The conceptual papers encompass tedious brainstorming and ideation, review of related literature making use of various print and non-print sources using a variety of platforms, among other steps. To help students, the teaching strategy used

was design thinking. This study hypothesized that design thinking is an effective means to help students attain more focused conceptual papers, as well as to assist them in acquiring necessary soft skills.

1.1. Research Problem

The quality of instruction depends on how the teacher utilizes specific teaching strategies to achieve desired end. Contingently, the teacher can employ a teaching strategy to be able to translate creativity of students into tangible products that would speak about the attainment of learning objectives.

Nursing informatics (NI), like any other professional courses in nursing, requires teacher creativity and innovativeness to turn specific learning objectives into tangible learning outcomes. The course focuses on the integration of computer science, information technology, and nursing science. Indeed, the course is more than technology, itself.

In this regard, the researcher recognized the capacity of the course in honing the research skills of the nursing students. To be able to help the students, the researcher utilized design thinking as a teaching strategy to help students enhance their research capability. Hence, this study sought answer as to whether or not design thinking is effective in conceptual paper development in nursing. Using design thinking, the students are to find solutions of their identified problems.

1.2. Research Questions

The study sought answers to the following research questions:

1. How effective is design thinking as a teaching strategy in the development of conceptual papers in nursing informatics?
2. What lessons can be unearthed beyond using design thinking as a teaching strategy in the development of conceptual papers in nursing informatics?

2. Materials and Methods

In the Philippines, nursing faculty are not being prepared to teach the way professional teachers are prepared in their baccalaureate degrees. To become a nursing faculty in the Philippines, a certificate of teaching proficiency is not even being sought after. For as long as the nursing faculty meet the minimum requirements such as 3-year clinical experience and master's degree in nursing, they can eventually teach in a nursing school or

institute. However, despite this fact, nursing faculty are creative and innovative in delivering quality instruction.

It is through creativity and innovativeness that a nursing faculty can realize the goals of instruction. In NI, the researcher finds it essential to employ evidence-based teaching measures to deliver instruction. However, this does not limit the nursing faculty to look for a potential education intervention to meet the learning needs of students.

Given the difficulty of students in writing research for instance, the researcher utilized an innovative teaching strategy known as design thinking to help students write their conceptual papers in nursing.

2.1. Sample

There were 24 nursing students enrolled in Nursing Informatics class during summer period who participated as respondents in this study. These students belong to the last batch to take Nursing Informatics during summer period. The researcher ensured the anonymity of the nursing students as research participants. An informed consent was obtained.

2.2. Instrument and Procedures

This study employed pre- and post-test, experimental research design. Initially, the students responded to a pre-survey to determine their level of knowledge, skills, and characters prior to a design thinking activity. The concept of Design Thinking (DT) was first provided to the students using a teacher-facilitated discussion. This ensured that students acquired base knowledge regarding DT as well as to surface and level their expectations.

After the discussion on DT, the design thinking activity was conducted. The design thinking activity required the students to come up with conceptual frameworks where nursing science, computer science, and information science were integrated. The design thinking activity ensured application of the various lessons learned by the students such as use of online platforms in their literature search, proper referencing and citations, among other things. The students were guided in their selection of topics through the well-planned DT activity employing while employing creativity and innovativeness. Team discussions were encouraged to give respect to individual contributions regardless of whether they are accepted or not. Team diversity and collaboration were observed. To ensure proper use of time, the *pomodoro technique* was instituted. The *pomodoro technique* is a time-management method. Likewise, to become more organized, *mise en place* was also integrated. In this way, everything was literally in place during the DT

activity. Both the *pomodoro technique* and *mise en place* are commonly used by a cook or a chef during cooking but their principles were highly practical guide for the researcher to conduct the DT activity.

From conceptualization to the development and oral presentations of their conceptual frameworks, the students were guided by the researcher. There were 12 teams composed of two students per team created through simple random sampling using fishbowl technique. The researcher discretely classified the students into two groups. The order of classifying the students depended on the ratings of their most recent written works, performance tasks, and products in NI.

A post-survey was conducted after the completion and oral presentation of their conceptual frameworks. To make the study more meaningful, key informant interviews were also conducted to generate qualitative data, which were believed to expand understanding of the meta learning dimension of the students in NI through DT.

The 32-item questionnaire used in this study was researcher-made. Contents of which were based from literature reviews. The questionnaire underwent content validation. Upon validation, improvements were made. The actual data collection, both pre- and post-tests, were made accessible through Google form. A portion of the questionnaire contained qualitative questions as these were important to elicit data to understand further the students' perceptions on design thinking, their descriptions and expectations about design thinking, their teacher as facilitator as well as their teammates.

The DT activity was completed in six weeks.

2.3. Data Analysis

The data obtained from the pre- and post-surveys were treated using descriptive statistics (i.e. mean scores, weighted means, and standard deviations). To answer the second research question, basic content analysis was used to extract categories and themes from the qualitative data acquired during the key informant interviews. To represent the general qualitative findings of the study, a simulacrum was developed.

3. Results

The results of this study are presented accordingly based on the research questions explored.

3.1. Research Question 1: How effective is design thinking as a teaching strategy in the development of conceptual papers in nursing informatics?

Table 1 presents the pre- and post-test results about design thinking employed as a measure in the development of conceptual framework in Nursing Informatics. Based on the nursing student assessment, it can be gleaned that the weighted mean in pre-test is 3.07 that is lower compared to the post-test of 3.37. The nursing students valued design thinking as a tool that enhances team diversity, collaboration, patience to listen, openness to honest feedback mechanisms, openness to learning new things, social awareness and sensitivity, inquisitiveness, keenness to details, and uses mistakes as opportunities to learn. The areas of improvement, however, are shown in the areas of data analysis, time management, writing research, problem-solving, conducting literature review using online platforms, reading comprehension, concentration, critical thinking, cultural sensitivity, innovations, adaptability, following prescribed formats, and creativity.

Table 1. Pre- and post-survey results about design thinking
Source: Author's own conception

Items	Survey results			
	<i>Pre-test</i>		<i>Post-test</i>	
	<i>MS</i>	<i>SD</i>	<i>MS</i>	<i>SD</i>
1. I value team diversity.	3.61	0.49	3.79	0.41
2. I view the value of my mistakes as opportunities to learn.	3.61	0.57	3.72	0.56
3. I have the need to collaborate with my classmate.	3.52	0.58	3.67	0.55
4. I am patient to listen.	3.52	0.50	3.67	0.62
5. I am open to honest feedback from my teammate and mentor.	3.52	0.58	3.75	0.43
6. I am open to use comments and suggestions from my teammate, classmates, and mentor to improve my work.	3.48	0.58	3.7	0.52
7. I am open to learn new things in a variety of ways.	3.43	0.71	3.71	0.45
8. I am socially aware and sensitive to anybody.	3.35	0.56	3.46	0.82
9. I am inquisitive to learn and keen to details.	3.35	0.70	3.54	0.64
10. I am highly motivated to learn things that challenge me most.	3.35	0.63	3.58	0.57

11. I always reflect before I speak or whenever I do something.	3.30	0.62	3.33	0.80
12. I work more productively with a supportive teammate and mentor.	3.22	0.72	3.63	0.56
13. I am confident to share what I know to someone any time.	3.17	0.82	3.38	0.56
14. I can communicate my ideas to someone with ease, orally or written.	3.17	0.48	3.25	0.72
15. I am empathetic to others' needs and a good listener.	3.17	0.56	3.54	0.64
16. I know "how" to learn.	3.17	0.56	3.58	0.56
17. I know "what" to learn.	3.04	0.69	3.27	0.55
18. I am confident in using online platforms and do proper citation.	3.00	0.72	3.50	0.58
19. I am a creative learner.	2.96	0.55	3.25	0.60
20. I follow prescribed formats in writing easily.	2.96	0.46	3.45	0.57
21. I can adapt to situations easily.	2.83	0.56	3.29	0.68
22. I am an innovative student.	2.78	0.66	3.29	0.54
23. I have a high level of focus or sense of direction.	2.78	0.66	3.21	0.64
24. I am culturally sensitive.	2.74	0.79	3.13	0.73
25. I am good at critical thinking.	2.74	0.53	2.88	0.60
26. I have a high level of concentration.	2.70	0.55	3.08	0.76
27. I have a high reading comprehension.	2.70	0.46	3.17	0.62
28. I know how to conduct literature review using various online platforms.	2.70	0.69	3.08	0.57
29. I am good at problem-solving.	2.65	0.48	3.08	0.64
30. I am passionate to do and write a research.	2.65	0.63	3.04	0.73
31. I am good in managing my time.	2.57	0.71	3.08	0.81
32. I love data analysis.	2.39	0.57	3.00	0.68
Weighted means	3.07	0.60	3.37	0.63

To determine the significant differences between the pre- and post-test surveys about design thinking, the one-tailed T-test was used. The results show that the design thinking as a tool in conceptual framework development in Nursing Informatics was effective (t -value: -4.04763; p -value: 0.000073).

Table 2. Significant differences between the pre- and post-survey results about design thinking
Source: Author's own conception

Tests	Mean	Computed t-test	Computed p-value	Decision	Remarks
Pre-test	3.07	-4.04763	0.000073	Reject H_0	Significant
Post-test	3.37				

3.2. Research Question 2: What lessons can be unearthed beyond using design thinking as a teaching strategy in the development of conceptual papers in nursing informatics?

Based on the key informant interviews conducted, design thinking exhumed various lessons learned by the nursing students who participated in this study. The participants described design thinking as a tool that fosters critical thinking, analytical thinking, reflective thinking. Some participants described it as easy, enjoyable yet challenging. Design thinking was also cited as a tool that enables students to promote collaboration and productiveness. The participants reported that design thinking is innovative and informative. It was further described as exciting and inspiring, ingenious, strategic, and valuable or useful in problem-solving.

Initial perceptions of the participants were also extracted. Some participants cited that design thinking expands knowledge, creativity, and concentration. It is a blueprint in any research undertaking. It is a good strategy that promotes collaborative thinking. While others find it easy to understand, some participants viewed it as difficult because it entails analysis of data, use of diagrams and flow charts. Nonetheless, design thinking is fun, engaging, strategic problem solving mechanism.

The participants also presented their expectations about their DT teacher as patience and understanding, knowledgeable and engaging. Most of the participants believed that the teacher can explain the DT process in details and can simplify things for them to understand. The teacher was also hands-on as he mentored the participants. The teacher also provided opportunities to explore talents.

As regard teammates, the participants also shared their views. They have described their teammates as cooperative because they shared their insights and finished assigned tasks on time. Most of the participants cited that their teammates are also patient and have sense of responsibility, good

communicator, participative and collaborative, helpful, story-teller, open-minded and accepts failures. Team work or esprit de corps was also observed between and among the participants.

Interestingly, a simulacrum has been devised by the researcher to encapsulate other lessons unearthed from the experience of doing design thinking as a teaching strategy in nursing. A simulacrum is a representation or a framework. Figure 1 presents the simulacrum or representation on how design thinking can also enhance metalearning dimension based on the qualitative data extracted from the key informant interviews.

Figure 1. Simulacrum of design thinking based on qualitative data obtained
Source: Author’s own conception

In the above figure, design thinking has been proven to enhance the students’ ability to “learn how to learn”. Through the application of design thinking as a teaching strategy in conceptual paper development in nursing, the students learned several lessons beyond what the activity desired for.

The development of the simulacrum was based on the qualitative data obtained from the students.

4. Discussion

The contextual shift from teacher-centered to student-centered learning has created significant impacts to nursing education. Student-centered learning provides opportunities for students to learn and master a task given to them. With massive technological advances, coupled with other notable factors such as appropriate guidance, nursing students yearn to learn from a variety of methods and strategies. These teaching methods and strategies ensure quality instruction hence, the development and enhancement of the students' capacity to learn a concept. Any teaching method or strategy, such as design thinking, needs to revolve within the realms of creativity and innovativeness.

The current study illuminated the effectiveness of design thinking as a teaching strategy in conceptual paper development in nursing. While the study is limited to a particular course in nursing, the teaching strategy employed may also be adopted by other nursing faculty to be able to help them engage their students using a non-conventional teaching intervention.

Writing a conceptual paper requires tedious efforts in ensuring accurate searches using various databases, excellent academic writing, among other nursing research skills. Nursing students, at early year levels, need to be taught how to do it to be able to develop the necessary skills. As an intervention, the design thinking was initiated and has resulted to outstanding results.

More than the affordances offered by design thinking, it can be noted that design thinking also enhances metalearning dimension of students. Meta-Learning fosters the process of self-reflection and "learning how to learn" by the students, as well as the building of the other three dimensions namely knowledge, skills and character (Bialik & Fadel, 2015). With knowledge comes understanding and competence, skills generate therapeutic execution and psychomotor abilities to facilitate nursing interventions that alleviate human suffering, and character to expand compassion and other caring expressions true to nursing. Essentially, Rubin (2017) also emphasized and cited that the Center for Curriculum Redesign (CCR) defined meta-learning as two components, namely Metacognition - the process of thinking about thinking, and Growth Mindset - the inner belief that abilities can be developed through hard work. The metacognitive abilities of individuals, as well as students, need to be expanded as these are vital to success. However, growth mindset can further enhance success and

survival amidst rapidly changing school and work environments. Fundamentally, individuals who believe their talents can be developed and enhanced through hard work, excellent strategies, and valuable input from others have a growth mindset (Dweck, 2016). Embracing growth mindset emancipates individuals. This is also true to students who are being prepared for in facing the challenges of the future world of work. Indeed, design thinking is particularly powerful in adding value regarding the three dimensions 'character', 'skills' and 'learning to learn' (Tschepe, 2018). When students are immersed in design thinking and they make use of it as a way of life, then success would be colossal. This will be contributory to intrapersonal, interpersonal, and organizational achievements.

Despite the limitations of the current study, it can be deduced that through the design thinking as a strategy in doing the assigned collaborative activity, the nursing students were able to maximize available resources to succeed in their task as they also utilized both hard and soft skills. While the design thinking was only meant to help the nursing students accomplish a simple task, the application and acquisition of new hard and soft skills were monumental as these are also essential in the practice of their future nursing profession.

5. Conclusion

The research findings indicate that design thinking is an effective teaching strategy in nursing. Indeed, more effective because it uncovered various lessons students need to acquire and imbibe. Design thinking does not only guarantee success as a teaching strategy in realizing learning objectives, but it also provides avenue for students to improve their metalearning dimension as they enhance their knowledge, skills, and character.

In a learning environment challenged by pressing factors and limitations of resources, the teacher can be creative and innovative enough to cater to the learning needs of students. Using a strategy that perfectly fits purpose, the teacher can maximize it to make learners more engaged and participative in their quest for knowledge.

The call to help students learn life skills has been reverberating for quite some time and up until this very moment, teachers are still being challenged to address such concern. Finding solutions to such a dilemma may just be made simple using design thinking as a non-traditional measure.

The researcher recommends that design thinking be explored further in teaching professional nursing courses using a wide-scale population.

Qualitative studies may also be conducted to uncover meanings from the experiences of those who use it and those whom design thinking have been utilized for specific purposes.

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