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Concept Maps and Nursing Theory: A Pedagogical Approach

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The author declares no conflict of interest.

Correspondence: Dr Hunter Revell, University of Massachusetts Dartmouth, 285 Old Westport Rd, North Dartmouth, MA 02747-2300 (susan.hunterrevell@umassd.edu).**▼ Abstract**

Faculty seek to teach nursing students how to link clinical and theoretical knowledge with the intent of improving patient outcomes. The author discusses an innovative 9-week concept mapping activity as a pedagogical approach to teach nursing theory in a graduate theory course. Weekly concept map building increased student engagement and fostered theoretical thinking. Unexpectedly, this activity also benefited students through group work and its ability to enhance theory-practice knowledge.

Teaching nursing theory is a challenge because of the abstractness of the content,¹ traditional approaches used to teach it, and the students' perception of its detachment from practice.² Students often fail to understand what theory is or why it is important. Getting students to think theoretically and appreciate theory's usefulness in practice has been a charge of nursing faculty for decades,³ and concept maps can be one creative way to teach nursing theory.⁴

Concept Maps

The seminal work of Novak and Gowin ⁵ in the book, *Learning How to Learn*, began 3 decades of research on concept maps. A map is based on the meaningful relationship between concepts, which then form propositions. Concept maps are visual road maps that highlight the meanings of these relationships.⁵ Maps allow the visual representation of a student's knowledge about a certain topic ⁴ and are either graphic or pictorial depictions.⁶ These depictions include the antecedents, consequences, and attributes of the main concept.⁷ Four main types of concept maps include spider maps (central concept with radiating subthemes), hierarchy maps, flowchart maps (linear format), and system maps (linear format with addition of inputs and outputs).⁶

Concept maps provide a good learning strategy for students because they link newer concepts within broader known concepts.⁸ As an educational tool, maps provide students with a way in which to communicate their understanding of complex concepts on a single piece of paper and, in turn, allow faculty to evaluate student progress in learning theory, including highlighting areas for expanding knowledge.⁴ Concept maps assist students in learning how to learn,^{5,9} encourage them to think independently, and improve their confidence in applying what they know to the clinical setting.¹⁰

Background

Multiple uses of concept maps with undergraduate nursing students have been discussed in the literature. Researchers have evaluated their effectiveness for teaching critical thinking,¹¹⁻¹⁶ problem solving,¹³ and understanding case studies as part of didactic courses.⁶ Concept mapping has also been found to be useful when applying the nursing process through care planning,^{9,14,15} planning for assessment of a task,⁸ and in preparing and presenting patient data in pre- and post-clinical conferences.^{6,16}

By using concept maps, students learn to develop the skill of including the “context of nursing practice in their conceptualization of client problems.”^{11(p42)} In one study, senior clinical students mapped out the complex “relationships among the clients, pathophysiologic factors, pharmacologic factors, and therapeutic nursing interventions.”^{11(p44)} Concept maps were used as a tool to link theoretical concepts learned in class to the clients the students saw in the clinical. Researchers reported an improvement in student critical-thinking ability as a result of the concept map project.¹¹ Similar findings of increased critical-thinking ability were reported in other studies.^{13,16}

Concept mapping provides students with an opportunity to analyze the interrelatedness of data, visually mapping out concepts to understand the entire picture of a patient’s health status.¹⁴ In one study, students organized concepts hierarchically, with the most important concepts at the top of the map and more specific concepts underneath the major ones. The exact structure of the map was thought to be context-dependent, and several revisions were expected in order for students to produce a valid map.⁹ Concept maps present students with a schematic summary of their learning. Maps also allow faculty to see student growth and opportunities for clarification of incorrect links,⁸ thus providing an occasion for evaluation of student knowledge and understanding of concepts.¹⁰

For the practicing nurse, concept maps may be used to explain disease processes, assist with developing care plans and nursing task lists, and for evaluating nurse competency. Concept mapping has been used to apply established nursing theories to practice with a small group of staff nurses. Findings from one study indicated that participants reported an increased ability to use theory to guide their practice, with an improvement in nurse satisfaction.¹⁷

Concept Maps in Graduate Nursing

In a national survey of master’s-level nursing faculty (n = 46) by McEwen,¹⁸ content areas identified as needing more emphasis in the course included application to practice and relationship of theory-practice-research. According to the survey, only 1 faculty responded that students were required to develop a conceptual framework or nursing model as an assignment. In the decade since this survey, a limited number of faculty have identified the use of concept maps as part of their graduate theory courses.⁴

All and Huycke⁴ discussed how students in their graduate nursing theory course learned to create serial concept maps that highlighted the evolution of perceptions of a concept over a period of time. The process of creating successive maps culminated in a final concept map and formal written paper. This learning strategy provided faculty a conceptual preview to the students’ prior knowledge and link to their evolving insights on the concepts. Student concept maps were each unique based on the notion that meaningful learning was assimilated into the preexisting knowledge of the individual. Thus, each concept map was distinctive based on the students’ previous experiences and knowledge, leading to one-of-a-kind concept maps. The ultimate goal was for concept mapping to lead to an increased student understanding of the theory-practice link. The process of serial concept mapping also allowed students to actively engage with faculty.⁴

A Graduate Theory Course Example

As a seasoned nursing faculty, I taught the graduate-level nursing theory course. The 14-week, traditional in-class format course met weekly for 3 hours. I opened the first class in Spring 2010 by asking the 14 students, who included nurse practitioner, adult health, and community health students, what the first word was that came to mind when they heard the term *theory*. Their responses included ugh!, boring, grand, and irrelevant. This provided the perfect impetus to introduce concept mapping to the students as a creative strategy to engage them in thinking theoretically. The concept mapping project was one of the course assignments and was graded at its completion.

theoretically. The concept mapping project was one of the course assignments and was graded at its completion through poster and oral presentations.

Guiding Framework

Walker and Avant's 19 concept analysis was used to guide the development of the concept map project. "Concept analysis allows the theorist, researcher, or clinician to come to grips with the various possibilities within the concept of interest—to "get inside" the concept and see how it works."^{19(p157)} Weekly theory group work included the following selected steps from Walker and Avant's model: "select a concept, determine the aims or purposes of analysis, identify all uses of the concept that you can discover, determine the defining attributes, and identify antecedents and consequences."^{19(p160)}

Pedagogical Approach

Process: Concept Map Project

At the first class session, I introduced the semester-long project and asked students to share their areas of nursing interest. Students were encouraged to discuss their nursing practice experiences as well as other conceptual areas of importance to them. Students submitted their areas of interest at the end of class. This activity aligns with Walker and Avant's step, *selecting a concept*, because it is important to select a concept that is of greatest interest or related to your work.¹⁹

From the compiled list of interests, I grouped students according to similar concept areas for the semester, with 3 students per grouping being the ideal number so each student had an equal opportunity to be heard. Once groups were formed, students met and determined which concept would be selected to develop into a map. In subsequent weeks, during the last 45 minutes of class, students met with their theory groups to work on concept map development.

A handout with weekly guidelines (Table 1) directed students' group discussions and assisted them in generating ideas and creative thinking. Each group kept weekly discussion notes that I checked during class; however, they were not part of the project grade.

Week 1	Discuss personal values and beliefs of nursing. Discuss your assumptions about nursing, clients, and the world in general. Consider how your philosophical beliefs influence your practice. Compile a list of concepts that you engage in during your practice.
Week 2	Begin with list of concepts. Discuss which concepts "rise up" as priorities in your nursing practice. Explain why particular concepts emerge as "essential," while others seem "secondary." Select 1 concept to be used for concept map.
Week 3	Discuss how the selected concept is used in nursing (eg, practice, research, theory focus). Discuss how nursing goals are achieved related to the concept. Discuss knowledge you have and knowledge you may need to achieve those goals.
Week 4	Consider how you view the concept. Is it a property or a

	process? Is it a process or outcome? Begin to sketch out a visual representation of the concept. Discuss the nurse's role in its management.
Week 5	Begin with your concept map sketch. Discuss potential antecedents, consequences, and mitigating factors. Consider the origins of your knowledge related to these factors. Is the basis professional, educational, theoretical, or personal? Revise your map to include additional factors as appropriate. Prior to the next class, search the literature for conceptual models/theories related to your concept. Bring to class any examples.
Week 6	Discuss findings from the literature search. Is the concept used in a similar way? Consider aspects of the related work that would strengthen your concept map. Working from revised map, add in additional concepts and factors as appropriate or desired.
Week 7	Theory groups are assigned to peer critique concept maps and provide constructive feedback. Final revisions to be made to concept maps.
Week 8	Poster presentation planning. Discuss what should be included. What are you trying to correct? Who is your audience? How do you make the poster visually appealing?
Week 9	Finalize decisions about poster-board content and layout. Students to review helpful tips for scholarly presentations, including professional attire and drawing in your audience.

Table 1. Guidelines for Weekly Concept Map Group Meetings

The weekly group meetings provided an opportunity for student thinking to evolve along with the concept maps. These meetings also provided an opportunity for me to evaluate group progress. I listened to group discussions as they worked toward developing a “conceptual” product. Early in the semester, students were able to identify the concept map purpose. This activity supports Walker and Avant’s step, *determining the aims of analysis*, which assists individuals to cue in to what they intend to do with the finished product.¹⁹

According to the literature, the faculty role in evaluating the map is not only in reviewing what has been included in the map, but also what has not been included. It is the absence or incorrect use of specific concepts that provides a learning opportunity for students.⁴ During the concept map project, I was able to guide students in translating their practice knowledge into conceptual language and then represent it visually. Although the weekly group meetings allowed me to evaluate learning, it also required me to be comfortable thinking on the spot to answer questions and quickly assess where they were “conceptually” in the group process in order to meet their learning needs.

Process: Weekly Meetings

To assist student groups with creation of their concept maps, using the guidelines (Table 1), each weekly meeting had a specific focus. Using a similar approach as that reported in another nursing study on concept mapping,⁴ the week 1 group activity provided an opportunity for students to get to know each other including areas of clinical practice and conceptual interests. At the end of week 1, students had compiled a list of concepts they engaged in during professional practice.

The week 2 activity asked students to begin with their compiled list and discuss which concepts emerged as essential to nursing practice. This exercise allowed groups to whittle down their concept list and arrive at 1 concept that was ultimately selected for the project. Students were asked during week 3 to brainstorm different ways the selected concept is used in nursing. This brainstorming activity is similar to Walker and Avant’s step, *identify uses of the concept*. The use of all available literature sources is encouraged to identify how the concept is used.¹⁹ While students in the nursing theory course collaborated with group members to create their list, literature was not searched until prior to week 6.

During week 4, students considered how they viewed their selected concept and determined the nurse’s role. This assignment aligns with Walker and Avant’s step: *determine the defining attributes*. It is essential to identify the characteristics of the concept and then determine which of the possible meanings will be the most appropriate for the purpose of your analysis.¹⁹

Then at week 5, students expanded on the defining attributes and added in antecedents, consequences, and mitigating factors. Walker and Avant’s step, *identify antecedents and consequences*, provided the basis for this activity. Antecedents are defined as the events that should be in place before the concept can occur, and consequences are the events that result from the concept occurring.¹⁹ At this point, prior to the start of the next class, students were asked to search the literature for conceptual models and theories that related to their concept and bring the examples to class the following week.

During week 6, students discussed the literature search findings on their selected concept and added components to their existing concept maps as appropriate. I stressed the importance of inductively arriving at the

concept map through the use of group process with an emphasis on real-world practice experience. The approach of searching the literature was also used in another study on concept mapping.⁴

For week 7, student groups were assigned to peer critique another group's concept map and present their feedback orally at the end of the class. The peer review provided student groups an opportunity to provide insight into other maps and offer suggestions not highlighted by the group members or through my input. Similar to this learning activity, students in another study presented their concept maps and received feedback from other students.⁴

At week 8, students began to plan for poster presentations as the culmination of their projects. Several other studies also discussed the use of poster presentations for evaluation.^{8,20} Advantages of this approach include the ability for students to convey complex ideas and gain a sense of accomplishment from creating the poster and for faculty to be able to evaluate students' ability to think critically.²⁰ During week 9, students finalized decisions regarding their posters and began to plan for their formal presentations.

Product: Concept Maps and Poster Presentations

Students presented their completed concept maps in poster-board format. A sample concept map is shown in Figure 1. Faculty evaluation was based on active engagement during weekly group work as well as quality of poster-board and oral presentations. In evaluating this pedagogical approach, there were expected and unexpected findings. Students learned to think abstractly and learned about theory. One student wrote, "...the theory-based poster was effective because it really demonstrated the process [that] it takes to form an idea and progressively arrive at an end point." Students supported the use of this active teaching strategy to learn how theory applies to their practice environments. Another student wrote, "The weekly in-class work on our theory concept maps... was set-up perfectly. Each week we were not overwhelmed, [and] the project was completed by the end of the semester, and we all learned a lot from it." The weekly exchanges within groups and with faculty were identified by the course faculty as a benefit of this teaching strategy. Faculty feedback was integral to the educational concept map projects of several other researchers as well.^{4,9} Concept maps lead to specialized faculty feedback and increase student engagement and active learning.⁴

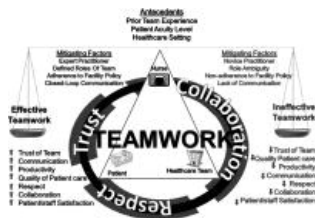


Figure 1. Sample student concept map.

An unexpected finding from the student evaluations was the benefit of group work. A sense of group cohesion formed throughout the semester that was built on a mutual area of conceptual interest. Students contributed to the development of a concept map through sharing professional experiences and perspectives, as well as their thoughts, ideas, and philosophical perspectives. The students created concept maps that were unique to each group because they were based on their collective input. Students also commented on their appreciation for the ability to apply what they had learned to clinical practice.

The use of small groups has been established as an effective means of exchanging ideas. Benefits include collaboration, peer sharing, and fostering an understanding of how to practically apply concepts. Students learn to use problem-solving techniques through active engagement with the concepts.²⁰ Concept mapping can benefit classroom teaching by having students engage in collaborative learning groups to complete assignments.²¹

Conversely, a downside to the use of group work for this activity is the potential tendency for dominant personalities within a theory group to "take over" for group decision making, whereas new and/or more introverted students may be more inclined to remain quiet during group time.

Conclusion

Concept maps are an effective way to teach nursing theory to students, including graduate students. Concept

mapping enables the abstract world of theory to become relatable to students through the gradual process of creating a tangible concept map. This pedagogical approach represents a departure from traditional approaches to teaching nursing theory. Faculty must be comfortable with a degree of fluidity in the class for students to feel open and ready to dialogue about conceptual ideas. This fluid style often requires faculty to “think on the fly” in providing theoretical direction to students. The faculty role also incorporates the use of questions to assist students to consider all possible conceptual perspectives regarding their concepts of interest. Weekly group meetings promote cohesion, collaboration, and peer support and provide faculty with a bird’s-eye view of the theoretical thinking that is occurring. Concept mapping assignments encourage productive exchanges between faculty and students.¹⁵

Student benefits from this teaching strategy include active engagement and meaningful learning: “When students and faculty learn the process of concept mapping, they appreciate its value. In a relatively simple manner, concept mapping can expedite learning and promote long-term retention of material.”^{7(p39)} The final concept maps are applicable to practice in large part because they were derived from the students’ own practice experiences.

Directions for future research regarding concept maps include their application to practice through a practicum experience and the integration of this teaching strategy in additional graduate courses. A concept mapping assignment may naturally lend itself to doctoral teaching. For example, a course in theory construction and synthesis could benefit from an exercise that actively encourages students to make linkages between conceptual ideas and dissertation research interests.

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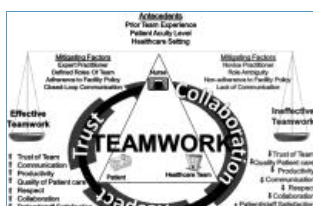


Figure 1

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Table 1