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### **Concept Mapping: Does It Promote Meaningful Learning in the Clinical Setting?**

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#### **Abstract**

Preparing, organizing and planning care for patients is challenging for nursing students as they must learn to link theory to practice. Concept mapping has been suggested as an effective strategy to facilitate meaningful learning and promote critical thinking among nursing students (Baugh & Mellott, 1998; Schuster, 2003). Utilization of concept maps is relatively new in its application to the clinical realm.

A pilot project was implemented to evaluate the perceived effectiveness and feasibility of the use of concept maps in a clinical setting. Concept maps were used by 4 groups of third year students (n=32) on a weekly basis to plan care for 1 - 2 assigned patients for 2, 12-week rotations on a Pediatric medical/surgical floor. Students completed simple short answer questions at the end of their rotation, which addressed student's thoughts on utilization, effect on clinical reasoning and ability to link lab values, medications, pathophysiology and patient issues.

Student's reported that they enjoyed using concept maps, it allowed them to visualize key connections between identified patient issues, stay organized, and made preparations less time consuming.

Study findings will be described as continued use of concept maps are recommended. Implications for curriculum planning as well as further research will be discussed.

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#### **Introduction**

Educational theorists and researchers have found that using learning strategies promoting meaningful learning and the use of metacognitive skills are more likely to produce critically thinking professionals (Baugh & Mellott, 1998). Learning in the clinical setting needs to encourage students to build upon prior knowledge. Faculty need to employ methods whereby students learn concepts in a meaningful way and develop the skills necessary to enable them to continue to acquire knowledge even after formal training. Our goal as faculty is to facilitate the student's ability to think critically and link theory to practice. The difficulty for faculty is in determining how well students understand the entirety of a patient's situation. A useful tool

in promoting meaningful learning in the clinical setting is concept mapping.

A concept map is a creative teaching method that can enhance a student's critical thinking and communication skills in clinical settings (Schuster, 2002a). Concept mapping is based on the work by Ausubel, Novak, & Hanesian (1978), comparing meaningful learning versus rote learning (Irvine, 1995). Ausubel (1978), believes that meaningful learning happens if the information presented is significant to the individual who will then link preexisting knowledge with new material (cited in Irvine, 1995). The use of concept maps allows previous experience or knowledge to be incorporated into new ideas. A concept map presents information in a meaningful way using diagrams to uncover the students thought process in relation to patient problems and interventions; a visual representation of a student's thinking. The use of concept maps in the clinical arena helps students prepare their plan of care for their assigned patient in an organized fashion for their clinical experience. Processing client data using concept maps helps students to form interrelationships with their individual patient issues and helps the student to visualize the patient as a whole.

Through the use of concept maps the student focuses on interrelationships of their client rather than being task focused, thus failing to see the big picture (Kathol, 1998). Visual learners benefit hugely from this method of learning which promotes organization and the ability to process and prioritize new information in a creative fashion. Linear thinkers may be disadvantaged, however concept mapping may be a strategy to push the linear thinkers to a higher level of thinking especially in such a fast pace, complex field as nursing (All, 1997; Harpaz, 2004). Concept maps can also be a powerful tool for identifying and clarifying misunderstandings before new learning is built on incorrect assumptions (Kathol, 1998).

### **Literature Review**

Schuster (2000, 2002a, 2003), has studied and used concept maps extensively in the clinical setting with great success. She has written a text detailing a systemic process of completing a concept map (Schuster, 2002a). This visual map becomes the students pocket guide that they carry with them throughout the day, updating, having discussions with their tutor and serves as an alternative to the traditional 5 column nursing care plan. Castellino and Schuster (2002), reported that students and faculty found concept maps specific to the patient, concise, and organized care. Harpaz and Ehrenfeld (2004), assessed student responses through the use of concept maps and found they encouraged them to think independently, increased orientation in knowledge and in finding connections between the different areas, and gave them more confidence in implementing their knowledge. Faculty reported that concept maps helped change the students from a passive to an active learner, enabled them to evaluate students' knowledge and most

importantly, improved evaluation of the student's safety to practice in the clinical area. Black et al. (2000), adopted concept mapping in lieu of the nursing process care plan and found that it allowed students to be more focused on synthesis and analysis of client data. In addition, student preparation for clinical demonstrated a focus on realistic goals, interventions and evaluation. Student's feedback was overwhelmingly positive. Smith (1992), evaluated the use of concept mapping in an immunology nursing course and reported that concept maps encouraged students to learn by themselves and provided the knowledge to implement into the clinical field. Daley (1996), concludes that concept maps help bridge the gap between theory and direct application to patient care.

Baugh and Mellott (1998), emphasize that as nursing educators we are in a position to influence the future of nursing practice by providing our students with meaningful clinical learning assignments that encourage both application and synthesis. Concept maps do just that. However, documentation in the literature using this strategy in clinical is minimal (Kathol et al., 1998; Irvine, 1995; Castellin & Schuster, 2002). In an effort to assist our students to bridge the gap between theory and practice, concept maps were used as a learning tool over two, 12 week rotations on a Pediatric medical / surgical unit.

### **Clinical Application**

Students were asked to complete a concept map after review of a journal article based on the work of Schuster (2000), outlining how to complete a concept map with patient data and received a two hour interactive group tutorial. A template was provided to guide the process.

The student was expected to spend approximately 2 hours the night before clinical to prepare for the next morning. Although with practice and the acquisition of more knowledge this time was expected to decrease. Students would collect data from the unit the day before clinical based on a template provided. A map was then constructed using this data. Potential nursing interventions were provided for each issue identified

During clinical, tutor's had discussions with the student to identify relationships in the client data between the actual client assessment data, use and response of medications, diagnostic tests / results, medical regimen and client responses which were incorporated in appropriate facets of the plan of care. Maps are thus updated and refined throughout the shift to reflect more knowledge and increased understanding.

### **Evaluation**

We found the concept map to be extremely useful in assessing the student's knowledge, preparedness and ability to make linkages between concepts. When a student failed to recognize a connection

or had difficulty understanding concepts the tutor would help transition the student to identify and clarify through the use of questions built on previous learning and point out missing links. Initially the students had some difficulty with the technique however as the term progressed there was marked improvement. Use of the concept map was seen as fun and interactive, replacing the traditional tedious paperwork that often accompanies clinical placements from week to week, which is consistent with remarks from other faculty who have used concept maps (Kathol et al., 1998; Irvine, 1995).

At the end of each rotation during course evaluations, students (N=32) were asked to share their thoughts on the use of concept maps. Concept maps were received enthusiastically with positive feedback. Figure 1 records examples of student commentary.

Students rated their ability to link lab values, medications, pathophysiology and patient issues as improved (100%) versus demonstrated no change and as deteriorated. As well, students rated their clinical reasoning as improved (100%) versus demonstrated no change and as deteriorated. Suggestions were offered to improve upon the use of concept mapping (Figure 2).

## Conclusion

Concept maps in the clinical setting provide students with a visual tool to prepare and understand the complex interconnectedness of client data. Through real time discussions students are continually being evaluated and motivated to be self-directed in their learning. It is recommended that students receive an interactive tutorial with clear guidelines in order for them to be successful as they may feel overwhelmed to deviate from standard clinical work-ups (Harpaz & Ehrenfeld, 2004). Working through a real life scenario helps the student work through the process as a starting point for learning this strategy. The map has helped the student organize their thoughts, plan the care of their patient, prioritize and critically think. The overwhelmingly positive response to the concept map in the clinical setting by the students supports further in depth studies to evaluate its ability to link nursing theory to practice using validated tools. In addition, future research could evaluate grading concept maps as a method of incorporating a grade value to the clinical setting, instead of a traditional Pass / Fail. This graded component would help the student place more value on clinical time and effort if a grade were attached to it. Schuster (2003), recommends that in addition to giving performance evaluations, faculty need to assign grades to concept map care plans and since the information contained in a concept map is organized and being reviewed throughout the clinical day that grading would take less time and not be difficult. A concept map care plan grading tool has been developed by Schuster and is available (Tyler, 2004), however validity and reliability needs to be established. The authors wish to evaluate this graded component in future clinical courses.

Nursing is a complex combination of academic and practical skill integration which requires the effective integration of theory to practice. Concept maps represent a clear picture of what student's are thinking and has been shown to be a successful strategy to use in the clinical area.

**Figure 1: Student feedback**

"It helped me link concepts and visualize key issues."

"It was helpful in planning interventions."

"It made me see things looking at the whole picture. I was able to see how things related."

"I liked how it incorporated all aspects of the patients care. It allowed us to open our minds."

"Helps keep me organized, helps me identify the key issues for each of my patients."

"It's great for organization, a different way of learning, initiates critical thinking."

"I was able to retain the information I learned because it was applied during clinical."

"It forces you to make connections; you see how everything is connected."

"You learned and demonstrated a lot of connections without writing pages and pages."

"Allowed me to critically think."

"I was able to apply all relevant concepts and see how everything related together."

"I like with concept mapping I was able to engage in meaningful learning; able to link prior knowledge with new knowledge."

"It was nice that the teacher could see my ideas and school of thoughts."

"They get you thinking about your patient before you get them not after."

"It allows you to get organized and incorporate research into patient care."

"I am a visual learner, this really helped, prompts me to

use critical thinking."

**Figure 2: Student suggestions for improvements on use of concept maps**

"Use in 2nd year PBL and clinical because concept mapping clarified the nursing process and supports critical thinking development."

"I myself might have benefited more if it was marked on a weekly basis."

"More space provided: Also, they should introduce concept mapping in first year."

"Incorporate nursing theory i.e. prioritization of problems."

"Ask more questions to get us critically thinking - challenge more."

"Try to encourage more incorporation of patho and lab values."

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