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The effectiveness of mind mapping as an active learning strategy among associate degree nursing students

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Abstract
There is a significant need for faculty to move away from the traditional teacher-centered educational approach and increase implementation of an active, student-centered, learning environment. Creating learning experiences that facilitate reflection, knowledge building, problem solving, inquiry, and critical thinking is vital. Using mind maps as an active learning strategy is an innovative technique to facilitate student learning. Students can illustrate a vision, exhibit their contextual knowledge and creativity, and make associations about a central theme during this activity. Mind mapping can be used for note taking, completing homework assignments, preparing for exams, analyzing, and reflecting about nursing practice. Mind maps can be executed in nursing curricula as an alternative learning experience.

1. Problem Driving the Project

Engaging students in the learning process is a challenge for faculty members. Redesigning learning approaches is essential to meet the college student's demands for a worthy and satisfying classroom experience in today's educational communities (Gillies & Haynes, 2011). Mind mapping, an active learning strategy not commonly used in nursing education, facilitates the learning process and promotes the mind's natural ability to think (Buzan & Buzan, 1996). This learning strategy provides faculty members who are responsible for organizing learning activities the tools to enhance the classroom environment to facilitate student learning.

Mind mapping originated from the theory of radiant thinking, or the full brain actively thinking of associations driven from a central concept (Buzan & Buzan, 1996). Creating new ideas and problem solving emerges when the mind is allowed to think radiantly or freely. The technique of mind mapping is a graphic illustration using words, images, colors, and branches that extend from a central idea illustrating finer details and associations in a nonlinear format. It emphasizes the use of diagrams and pictures that enhance memory and cultivate knowledge (Buzan & Buzan, 1996). This strategy is easy for the novice learner to apply and encourages self-expression and exploration of a concept by the student. There are no limits to associations and connections of the concept. Mind mapping allows the student to build upon existing knowledge when new information is presented that enables meaningful learning to take place (Buzan & Buzan, 1996; Davies, 2010; Spencer, Anderson, & Ellis, 2013).

Traditionally, educators use concept mapping as a typical learning tool for nursing students to provide a visual exemplary to organize a holistic plan of care for the patient. The purpose

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of concept mapping is to construct formal relationships and cross connections between ideas systematically in a linear or structured format (Cook, Dover, Dickson, & Colton, 2012; Eppler, 2006). While the complexity of the concept map makes it difficult to enhance recall, the chief advantage is an outline of a relational structure of the concept. Linear thinking is no longer adequate for today's nursing student who requires expanded ways of thinking and learning.

Faculty need to move away from the traditional teacher-centered educational approaches and implement an active student-centered learning environment. It is essential to create learning experiences that facilitate reflection, knowledge building, problem-solving, inquiry, and critical thinking. With the aim of promoting a student-centered learning environment, the use of mind mapping was explored in a cooperative learning (CL) environment. Cooperative learning is defined as "learning in small groups to facilitate students working together to optimize their own, as well as, each other's learning" (Alexander, Lindow, & Schock, 2008, p. 18). The purpose of this article is to evaluate the effectiveness of mind mapping as an active learning strategy among associate degree nurses using a CL environment.

2. Literature Review

Evidence supports that both mind mapping and CL are valuable active learning strategies for today's college students. Cooperative leaning implemented in educational programs cultivates positive attitudes and self-directed student growth. Discussing one's ideas and having others react and respond within a group setting improves critical thinking, reasoning capabilities, intensifies learning comprehension, and academic achievement (Baumberger-Henry, 2005; Gillies & Haynes, 2011). Also, more learning occurs when individuals learn with others compared to learning alone (Michael, 2006). Collaboration, demonstration and a deeper understanding of the topic assigned are advantages of implementing mind mapping using CL groups.

Mind mapping has been found to be an effective strategy for adult learners (Davies, 2010; Noonan, 2012). Students 25 years of age or older are more likely to learn from their peers, have higher levels of motivation and cognitive involvement, all of which support the use of mind mapping in a CL environment (Alexander et al., 2008).

There is a lack of research examining the value of using mind maps among associate degree nursing students as an alternative to lecturing, creating the need to understand the usefulness of this strategy. Kern, Bush, and McClesh (2006) introduced mind mapping to move away from linear thinking associated with traditional care plans among associate degree nursing students. Using this strategy, the implementation of a mind map care plan (MMCP) was used to facilitate the operational knowledge of the nursing process in nursing curricula as an alternative to traditional care plans. During the nursing students first semester they were introduced to the concept of the nursing process using the mind mapping technique. Results indicated that greater than 90% of the students strongly agreed that mind mapping assisted them to: (a) view their patient in a holistic manner, (b) personalize the plan of care, and (c) think critically.

In a study conducted by Rooda (1994), mind mapping was introduced as a learning strategy in a baccalaureate level introductory nursing research course. Results showed that students who used mind mapping had higher exam scores (84.4%) compared to students who did not use mind mapping (76.7%). Rooda (1994) concluded that students who used mind maping were able to attain and recall a large volume of complex data.

D'Antoni, Pinto Zipp, and Olsen (2010) studied the use of mind mapping to assist with the retrieval of information and critical thinking among medical students. One group used mind mapping and the other used typical note taking during class sessions. Results showed the successful use of mind mapping for retrieval of short term information and retention of new information. Boley (2008) found graduate nursing students who used faculty created mind maps as study aides scored higher on quizzes than those who did not use the mind mapping. This evidence supports the value of using mind maps in nursing education.

The learning objectives of this activity were to have students:

- synthesize a mind map reflective of the components of critical thinking;
- implement self-assessment using a rubric while developing a mind map; and
- evaluate mind mapping as an effective learning strategy for the concept of critical thinking.

3. Methods

The mind mapping activity was implemented in a first semester writing intensive course focusing on nurse's ways of knowing at a state college of nursing. Students' were assigned to complete readings about critical thinking one week prior to class. The articles assigned describe mind mapping as a creative tool for critical thinking, and the application of reflective thinking in nursing practice. Additionally, students were assigned to watch a YouTube video How to Mind Map (Buzan, 2010). This tutorial explained how to create a mind map and was used to assist the students to complete this activity. The origin of mind mapping, what it is and how this strategy supports thinking, learning, and creativity was discussed at the beginning of the class.

3.1. Participants

The participants consisted of male and female students between the ages of 24 to 65 years. Approximately half of these students have had past college experiences grounded in