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## DEDICATION

I want to take this opportunity to first thank my husband Rick, and sons Adam and Matt, what would I ever do without all of you. You are the substance of my life and I could have never accomplished this without your love and support.

## **ACKNOWLEDGMENTS**

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## CHAPTER ONE

## INTRODUCTION

*Critical Thinking in Nursing Practice*

Health care requires nurses to function in a complex and technical environment (Bowles, 2000). As nurses are faced with complex patient situations, they must use good clinical judgment when making decisions. When nurses make important decisions about patient care situations, it is crucial that they use critical thinking skills because “critical thinking enables the nurse to process and analyze information, solve clinical problems and decide on actions to take” (Oermann, Truesdell & Ziolkowski 2000, p. 155). In an effort to prepare nursing students to deliver safe quality care, critical thinking becomes essential to nursing education.

Alfaro-LeFevre (2004) described critical thinking and clinical judgment as “thinking that requires careful identification of key problems, issues and risks involved” and is “constantly re-evaluating, self-correcting and striving to improve” (p. 5). This author indicated that critical thinking is based on the scientific method of the nursing process in which the nurse makes clinical judgments that are supported by evidence. The nursing process is an organized systematic approach that consists of assessment, diagnosis, planning, implementation and evaluation (Alfaro-LeFevre, 2004). Furthermore, the nursing process not only requires cognitive skills in thinking and reasoning, but also psychomotor skills of actual doing and the affective skills of feelings and values (Lewis, Heitkemper &

Dirksen, 2004); intuitiveness (Ignatavicius & Workman, 2002) and creativity (Alfaro-LeFevre, 2004).

According to Alfaro-LeFevre (2004) critical thinkers and non-critical thinkers use the nursing process differently. Alfaro-LeFevre (2004) took the position that critical thinkers take a “more proactive dynamic approach” (p. 74) to the nursing process whereas, non-critical thinkers view the nursing process as “linear” to be “followed rotely, without critical thinking” (p. 76). For example, consider the client has an order to receive a beta-blocker daily. Using critical thinking skills, the nurse would assess the client’s blood pressure, heart rate and possibly the electrocardiogram. Based on the client’s status the nurse would then make a decision regarding whether the client should receive the medication; and then act upon that decision by giving the medication, holding the medication or notifying the physician. Non-critical thinkers would give the medication as ordered, without assessing the heart rate or blood pressure or, if they did make those assessments, they would not correlate the abnormal findings to decide whether the medication should be administered or held.

Nursing practice that is based upon the scientific methods of the nursing process provide the framework that enable nurses to deliver care to meet the clients needs. According to Ignatavicius & Workman (2002) nursing care that is based on the nursing process is a decision-making approach that enhances critical thinking. However, as students develop their critical thinking skills the nursing process becomes clearer, thereby, directing nursing actions that provide

safe and competent care. Ultimately, developing critical thinking skills will enhance the nursing process.

The National League of Nursing (NLN) defined critical thinking as a “discipline specific, reflective reasoning process that guides a nurse in generating, implementing, and evaluating approaches for dealing with client care and professional concerns” (NLN, 2007 pg. 2). The National League of Nursing Accrediting Commission (NLNAC) requires a written plan for systematic program evaluation to maintain accreditation. Included in these guidelines, nursing programs must demonstrate how critical thinking is evaluated in their curriculum (NLNAC, 2004).

For purposes of this study, critical thinking is defined as a non-linear process that is appropriate to a particular domain of thinking. Through a mastery of intellectual skills and abilities the individual collects, interprets and analyzes the data. Once the individual makes a decision (clinical judgment) based upon these findings, they will draw conclusions and act accordingly to carry out those decisions. Finally, the individual evaluates their actions along the way to determine if their actions were successful or what changes should be implemented.

#### *Problem Statement*

According to the Bureau of Health Professions (2002) by the year 2015, the demand for nurses will exceed its supply by 20%; and if the demand continues, by the year 2020, the increase in shortage of nurses will be up to 29% (<http://bhpr.hrsa.gov/healthworkforce/reports/rnproject/>). Reasons cited for this

increase in demand for nurses were an 18% increase in population, a larger elderly population, medical advances, and larger number of nurses leaving the profession (<http://bhpr.hrsa.gov/healthworkforce/reports/rnsurvey/rnss1.htm>).

The Bureau of Health Professions conducted a survey in 2000 called the National Sample Survey of Registered Nurses. This survey is conducted every four years and examines trends over time to predict supply, distribution and requirements of registered nurses. Data is obtained from currently licensed registered nurses in the United States with regards to age, gender, ethnic/racial background, educational level, employment status, salaries and geographic distribution. The survey reported that in 1980, 52.9% of the nurses were under the age of 40 and of those nurses 25.1% of the RN's were under the age of 30. Comparatively, in 2000, this number fell to only 31.7% of the R.N.'s under the age of 40, and only 9.1% were under the age of 30

(<http://bhpr.hrsa.gov/healthworkforce/reports/rnsurvey/rnss1.htm>). This survey also reported that the mean age of nurses was 45.2 which reflects that fewer younger nurses are entering the profession as the current population are moving into their 50's and 60's

(<http://bhpr.hrsa.gov/healthworkforce/reports/rnsurvey/rnss1.htm>). As nurses retire and fewer younger people choose nursing, the lack of experienced and expert resources available for inexperienced nurses becomes a concern.

Methods to improve nursing graduates' ability to critically think to make good clinical judgments will be essential to nursing education.

While the prediction of nursing workforce shortage continues, it becomes imperative that nursing graduates are well prepared because there will be fewer experienced resources available. Nursing faculty always consider new ways to help students become better prepared. One method is the clinical focus and nursing care plans. The clinical focus method assists in preparing for the clinical assignment. Students must obtain a great deal of information on client diagnosis, surgical procedures, lab values, diagnostic tests, and medications. From this information, students utilize the nursing process and develop a nursing care plan for their client. Frequently, when preparing for clinical assignments it becomes overwhelming and difficult for students to understand the relationship among the data (Kathol, Grieger, Hartig, 1998; & Mc-Hugh-Shuster, 2002). Consequently, students fail to link important concepts to current information that could affect clinical judgment and ultimately client care.

Students fail to see the bigger picture because they have difficulty in analyzing the problem and taking the correct action when delivering patient care. The researcher experienced a clinical example of this problem. A senior-level student was caring for a client with a very fast heart rate. The physician arrived to assess the client and asked for a repeat electrocardiogram (ECG). Instead of the student delegating the ECG to the licensed practical nurse (LPN) the student began to perform the ECG. The student was so focused on completing the ECG that she failed to notice that the physician performing carotid massage on the client to lower the heart rate. The student failed to link the concept of carotid massage with a fast heart rate because she focused on tasks instead of the

bigger picture. The bigger picture was the client's response to carotid massage, potential complications, etiology of the tachycardia and anticipation of new orders including new medications to be administered.

The above is an example of how clinical judgment could affect patient outcomes. There have been several studies done to examine students' clinical judgment and critical thinking abilities (Benner, 1984; Brooks & Shepard, 1990; Kataoka-Yahiro & Saylor, 1994; Bowles, 2000). Benner's (1984) work first described the five stages of skill acquisition in nursing practice; (a) novice, (b) advanced beginner, (c) competent, (d) proficient and (e) expert nurse. Benner (1984) exemplified the differences between the novice and the expert practitioner. As nurses deliver patient care, the novice tends to view only the tasks at hand whereas the expert nurse "operates from a deep understanding of the total situation" (Benner, 1984 p. 32). In later works, Benner, Tanner and Chelsea (1996) purported that beginners often look at clinical situations as puzzles. Beginners often work in situations when they have only a minimal understanding of the client's condition and they have difficulty seeing the relationships of the client's multiple problems (Benner, Tanner & Chelsea, 1996). The proficient and expert nurses have a perceptual grasp of client situations with "increased intuitive links between salient issues" and "ways of responding to them" (Benner, Tanner & Chelsea, 1996 p. 142).

### *Concept Mapping*

Nursing faculty continually search for teaching methods that will improve students' abilities to organize their thoughts, link important relationships and

apply the newly learned knowledge. One such method is concept mapping. Baugh and Mellott (1998) theorized that concept mapping is a “teaching method that improves metacognition and meaningful learning” (p. 253). Baugh and Mellott (1998) based meaningful learning on Ausubel's (1968) philosophy that meaningful learning takes place when students are able to identify relationships between concepts and relate new knowledge to concepts already known. McHugh-Schuster (2002) expanded on the use of clinical concept mapping and meaningful learning as it allows the student to “build the structure of what is known” (p. 2) and incorporate the new knowledge into that structure. Baugh and Mellott (1998) further stated that concept mapping indicates students understanding or misunderstanding as concept mapping “resemble(s) thinking patterns rather than linear forms of course assignments” (p. 254). Concept mapping helps the student to develop a deep understanding of relationships between nursing concepts. Concepts such as nursing diagnosis, expected outcomes and evaluations are easily defined by students. However, when the students understand how these concepts work together (or the relationships between the concepts), higher level cognitive thinking takes place. Critical thinking becomes more apparent as students continually use a higher level of cognitive thinking.

Some nursing authors are now incorporating concept maps in their textbooks (Ignatavicius & Workman, 2002); however, other literature has described the importance of students creating their own concept maps. According to Ruiz-Primo, Schultz, Li and Shavelson (1998) it is important to have

students create their own concept maps because it provides students with an opportunity to reflect their actual understanding. According to All and Havens (1997) “concept maps are an explicit, overt representation of the concepts and propositions held by an individual” (p. 1213). Concept maps are an expression of what the learner is thinking and a summary of what has been learned (All & Havens, 1997). Furthermore, according to Brooks & Brooks (1993) it is necessary for teachers to explore the student’s understanding of concepts before sharing their own understandings. This allows the student to form his or her personal theories and ideas before hearing the correct answer from the teacher as most students stop thinking about a concept once they hear the correct answer (Brooks & Brooks, 1993). When students explore theories and ideas first with themselves, it encourages them to analyze, synthesize and evaluate the concepts (Brooks & Brooks, 1993).

Currently in an Associate Degree Nursing Program in Mid-Michigan, students are expected to apply theoretical concepts learned in classroom at the clients’ bedside. Students are assigned clients whose diagnosis correlates with the theory content. For instance, if the theory content is about diabetes, the clinical assignment is to include a client with diabetes. To prepare for the clinical assignment students must complete a five-page clinical focus for each client. The clinical focus is a linear outline that students must complete before giving care in the clinical setting. The clinical focus requires the student to obtain information regarding pathophysiology, nursing interventions, medications, lab values, and patient education. In addition, students must also complete a

nursing care plan on the client during the semester. This care plan is also a linear five columned form that requires assessment data with nursing diagnosis, expected outcomes, interventions and scientific rationale and evaluation. Because the format of the clinical focus and the care plan is linear and several pages long, it does not enable students to visually link concepts or see relationships.

Heinze-Fry and Novak (1990) studied concept mapping as a tool to enhance meaningful learning in a college biology class. The authors hypothesized that “linkages that are made only vertically would be more likely to be forgotten than those that are also made laterally” while “cross links relate together concepts in different domains of a concept hierarchy” (p. 463). Although not statically significant, the study showed that the mean scores of the concept mapping group were higher than the mean score of the control group. In addition, the mean scores of the concept mapping group were even greater than the control group at the five-month measure. Heinze-Fry and Novak (1990) concluded that concept mapping appears to “enhance clarity of learning” and “enhance integration and retention of knowledge” (p. 472).

Current research has addressed students’ perceptions to concept mapping. Many students very much like the process of concept mapping (Daly, Shaw, Balistrieri, Glasenapp and Piacentine 1999; Smith, 1992) and others did not (Beitz, 1998). Smith’s (1992) study documented that some students felt that concept mapping helped them “fit concepts together” and “pull things together for studying” (pg 21). Some students felt that if concept mapping would have been

introduced at the beginning of their nursing education it would have fostered their learning (Daly, et al. 1999). Other students have criticized the activity of concept mapping because they felt it was hard to attain the skill and was very time-consuming (Beitz, 1998; Smith 1992; & Daly et. al., 1999). According to Chang, Sung and Chen (2002) concept mapping enhances depth of learning. However, the training that it takes to develop a concept map is time consuming that could result in cognitive overload, which could have a negative affect on learning outcomes (Change, Sung & Chen, 2001).

Students who develop clinical concept maps are using a specific level of thinking. As students gather and interpret data they must have a basic understanding of these concepts upon which to build. According to Bloom's Taxonomy (1956) higher levels of cognitive thinking take place as the student begins to analyze, synthesize and evaluate. As the student uses these higher levels of cognitive thinking they recognize previous relationships and identify new ones (McHugh-Schuster, 2002). Thus critical thinking is a process that evolves as students develop a deep understanding of concepts and analyze relationships (McHugh-Schuster, 2002).

Students who use clinical concept mapping are designing a picture that demonstrates their thinking and understanding about the bigger picture. Students who have been practicing this technique will become accustomed to thinking in this manner and therefore more proficient at critical thinking. A method to evaluate the student's proficiency in critical thinking would be to administer an exam that is designed to evaluate at the analysis, synthesis and evaluation level.

This assessment would determine whether concept mapping is effective in developing the student's critical thinking skills.

Another important factor of concept mapping is the students' perception of this teaching method. Students who enjoy developing concept maps may have the perception that it helped them to learn and easily apply the theoretical concepts. Therefore, those students may feel more comfortable with higher level cognitive thinking and testing accordingly. On the other hand, students who did not enjoy concept mapping may not feel that it helped them apply theoretical concepts nor did it make them feel comfortable with higher level cognitive thinking questions. In this instance, concept mapping may be more of a deterrent to a particular learning style.

#### *Research Questions*

The purpose of this study is to determine if a relationship exists between concept mapping and critical thinking; and what effect does perception have on these relationships. The research questions this study intends to answer are:

1. Does the use of concept mapping in the clinical setting have an impact on students' critical thinking scores?
2. What does the relationship between GPA, age, gender and credit hours have on critical thinking scores?
3. What are the student's perceptions of their clinical rotation?
4. What are the student's perceptions of concept mapping and what impact does this have on their critical thinking scores?

5. What are the student's perceptions of critical thinking and what impact does this have on their critical thinking scores?

Answering these questions may provide faculty with a better understanding of the relationship between concept mapping and critical thinking and what influence they have on student learning. The knowledge gained from this study may assist students in bridging the gap between theory and clinical practice.

#### *Assumptions of the Study*

1. The participants will all be adults, with reasonable intellect and the ability to learn from a variety of teaching methodologies.
2. The average age of the student will be between 19 to 55 years old and for many of the participants this will be their first career.
3. The participants will have had all the required prerequisite courses (Example: biology, pharmacology, and nutrition).
4. Each participant will have prior knowledge of fundamental nursing skills on which to build.
5. The participants will be at three local hospitals that are similar in size, patient population and services offered.

#### *Limitations of the Study*

1. The study was conducted at one urban community college setting.
2. There will be limited gender and cultural diversity among the participants.
3. The sample size is small.
4. Due to lack of appropriate clients, students may not be assigned to a

client with the diagnosis that is being discussed in lecture. All attempts will be made to assign students accordingly.

*Description of terms*

1. Assimilation theory: theory in which the student assimilates meaning that is built on previous knowledge and formulates links to the new knowledge.
2. Clinical Focus: Five page outline in which students collect information about their client to provide clinical care. The outline contains: pathophysiology of the current diagnosis and surgical procedures and based upon these readings, what signs and symptoms the client may experience; interventions and rationale including patient education for the interventions; medications including dosage, implications and side effects; complete listing of diagnostic tests and lab values including reasoning for the test and nursing interventions.
3. Concept mapping: a schematic method that represents meaning and understanding of the relationships between concepts.
4. Critical thinking: thinking that is appropriate to a particular domain of thinking and that displays a mastery of intellectual skills and abilities through a non-linear process of collecting, interpreting, analyzing data, drawing conclusions, presenting and evaluating information.
5. Meaningful learning: created when the individual relates or integrates the new knowledge with the old knowledge. Meaningful learning aids

the learner in understanding relationships between concepts because linkages have been made between old knowledge and new knowledge.

6. North American Nursing Diagnosis Association (NANDA): Nursing diagnosis provides the basis for selection of nursing interventions to achieve outcomes for which the nurse is accountable. Nursing diagnosis is based upon a clinical judgment about individual, family or community in response to actual or potential health problems or life processes.
7. Nursing Care Plan: is a linear five-column worksheet that describes the nursing care for a client. This includes nursing diagnosis with the scientific explanation for the diagnosis, expected outcomes, nursing interventions and scientific rationale, and evaluation.
8. Nursing Process: an organizing framework for professional nursing practice that includes assessment, nursing diagnosis, writing expected outcomes, determining appropriate nursing interventions and evaluation of the expected outcomes.

## CHAPTER TWO

### LITERATURE REVIEW

#### *Conceptual Framework*

Ausubel's Learning Theory (1968) is the conceptual framework guiding this study. Ausubel's theory (1968) is based on the assumption that learning of new knowledge is dependent on what is already known. In other words, the learner must have some prior knowledge of the concepts to be able to incorporate the new knowledge. How the individual incorporates this new knowledge is what Ausubel's (1968) defines as meaningful learning. Meaningful learning is created when the individual relates or integrates the new knowledge with the old knowledge. Meaningful learning is different from rote learning, as rote learning does not aid the learner in understanding relationships between concepts (Ausubel, 1968). According to Ausubel (1968), rote learning becomes forgotten because certain details are lost as no linkages have been made. In order to learn meaningfully, the learner must discern the new concepts and place it within their own knowledge schema as optimal learning occurs when there is a fit between the students' schema and the material to be learned (Ausubel, 1968).

Ausubel (1968) contended that meaningful learning can be facilitated by the use of advanced organizers. Advanced organizers draw upon and mobilize relevant anchoring concepts that are already established in the learner's cognitive structure and integrate it into current knowledge (Ausubel, 1968). This renders rote memorization needless because the material once integrated becomes meaningful (Ausubel, 1968). According to Ausubel (1968) the principal

function of the organizer is to bridge the gap between what the learner already knows and what they need to know and to provide scaffolding for the retention of more detailed and differentiated material. Ausubel, Novak & Hanesian (1986) contributed to concept mapping with assimilation theory in which students' assimilate knowledge that is built on previous knowledge and formulate links to the new knowledge. Meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures (Novak, 1993).

### *Concept Mapping*

Novak and Gowin (1984) based their work on Ausubel's theory. Their work focused on ways to help individuals reflect on their experiences and construct more meaningful learning. Novak and Gowin (1984) described concept mapping as a schematic device for representing meaning and understanding relationships between concepts. They described concept maps as a visual road map showing pathways to connect meanings of concepts (Novak & Gowin, 1984). Concept maps help make clear to students and teachers a number of key ideas that they must focus on for a specific learning task and after the task is complete provides a schematic summary of what has been learned (Novak & Gowin, 1984). Concept mapping allows the learner to visually connect concepts and develop a deeper understanding of the relationships among the concepts. Learners who use concept maps may recognize new relationships and new meanings they did not consciously hold before making the map (Novak & Gowin, 1984).

Novak and Gowin (1984) implied that concept maps can be a compelling evaluation tool; however there is no wrong or right way to construct a concept map. Concept maps are an external view of the individual's framework, therefore can be used to evaluate what concepts are included (Novak & Gowin, 1984).

Concept maps can be organized either hierarchically, with progressive differentiation or with integrative reconciliation (Nowak & Gowin, 1984). The hierarchical structured map suggests differentiation of concepts and shows specific conceptual inter-relationships especially higher-order and lower-order relationships (Novak & Gowin, 1984). The progressive differentiation map suggests that meaningful learning is a continuous process where students are always learning, modifying and making more explicit the learned concepts (Novak & Gowin, 1984). Integrative reconciliation is when meaningful learning is enhanced and the learner recognizes new relationships (Novak & Gowin, 1984).

According to Novak and Gowin (1984), when students construct a concept map it requires them to perform on all six levels of Bloom's Taxonomy (1956), especially the higher cognitive levels: analysis, synthesis and evaluation. The analysis level requires the student to differentiate, categorize and distinguish among the concepts; the synthesis level requires the student to organize, construct, create and design the map in the students own view; and the evaluation level requires the student to assess, appraise and compare the relationships within the map (Appendix A).

Concept maps can also help evaluate student's misconceptions. Misconceptions are usually signaled either by a linkage between two concepts

that leads to a false proposition or a linkage that misses the key idea relating two or more concepts together (Novak & Gowin, 1984). According to Novak & Gowin, (1984), caution must be exercised when evaluating concept maps. A map that is organized in an unorthodox manner could signal a misunderstanding, or just a creative new way to look at the concept (Novak & Gowin, 1984). It is important that the evaluator be knowledgeable in the field and topic of what is being evaluated as to clearly discern whether the students have a misconception or are just thinking creatively.

Student-generated concept maps represent the learner's knowledge of the concepts studied. According to Ruiz-Primo, Schultz, Li and Shavelson (1998) it is important to have students create their own concept maps because it provides students with the opportunity to reflect their actual understanding. Chang, Sung and Chen (2002) revealed that, when presenting students with expert (teacher-generated) graphic illustration, the solution is given to the learner; whereas, student-constructed maps are a goal-oriented problem-solving task. Furthermore, presenting an expert graphic illustration might put the reader in a position in which they only passively take in the knowledge with little autonomous learning on their part (Chang, et al.). In addition, according to Brooks & Brooks (1993), most students stop thinking about a concept once they hear the correct answer.

According to the literature, different mapping techniques require different cognitive processes (Beissner, Jonassen & Grabowski, 1993; Ruiz-Primo, Schultz, Li & Shavelson, 1998). Ruiz-Primo et al. studied three different mapping

techniques: construct-a-map, fill-in-the-nodes and fill-in-the-linking-lines. In the construct-a-map technique students were asked to construct a map from scratch. In the fill-in-the-map technique students were asked to fill in the blanks with a 12-blank-node skeleton. The fill-in-the-linking-lines technique students were asked to fill in a 12-blank line skeleton map with a description of the relationships provided for each pair of connected concepts. The authors found that the cognitive demands of constructing a map from scratch (low-directed technique) placed higher cognitive demands on the learner (Ruiz-Primo, et al.). Ruiz-Primo et al. found that the low-directed technique of construct-a-map provide students with more opportunities to reflect their actual conceptual understanding than high-directed techniques.

Chang, Sung and Chen (2002), examined the effects of concept mapping to enhance text comprehension and summarization on a group of fifth graders. The participants were divided into four group's one control group and three experimental groups. The three experimental groups had a different type of map; (a) map correction (b) scaffolding, and (c) map generation. The map-correction group received an expert generated map with 30% to 40% of the concepts incorrect which the students needed to correct. The scaffolding group received a five-stage process; (a) reading an expert map, (b) fill in the blanks of the expert map, (c) complete the partial expert map, (d) determine key concept, and (e) relate links to the text to construct a map. The map-generated group received articles from which they constructed the concept map. They extracted concepts and links from the text and construct the maps independently.

The students (n=126) were then given a pre and post-test to determine text comprehension and summation. In the text comprehension scores, the researchers employed a one-way ANCOVA for the analysis on all four groups. The pretest scores were the covariates and the posttest scores were the dependent variables. The effect was significant (3, 121) = 4.40,  $p < .01$ . In the text comprehension analysis, the map-correction group demonstrated a greater improvement on the post-test than the map-generation and control group. The differences in the pre- and post-test scores for the scaffolding and map-generation control groups were not significant. The researchers felt that the map-correction strategy significantly improved the reading comprehension of the students when compared to the other groups. They attributed this to the idea that the learners had to think critically about what was wrong with the map, and then correct it.

ANCOVA was used for the text summarization analysis. The effect of the group was significant  $F(3, 121) = 11.85$ ,  $p < .01$ . The map-correction group scores were better in the summary post-test than the map-generation and control groups. The scaffold-fading group had higher scores in the text summary than the control group however; there was no significant differences between the map-generation group and control group. The researchers felt that the map-correction strategy had a greater influence on the participants' summarization ability than the map-generated or control group; and the scaffolding strategy was better for concept mapping than no concept mapping. Another interesting finding was that text summarization abilities of students using the map-generation

method were not significantly different from those participants in the control group. The researchers declared that cognitive overload maybe the reason for the low scores from self-generated concept maps (Chang et al., 2002).

In the educational literature, there is extensive research on concept mapping, especially in the areas of science and biology. However, much of this research is on the school-age learner (Chang, et al., 2002; Guastello, Beasley & Sinatra, 2000). In the nursing literature, there are several articles explaining the use of concept mapping as a teaching strategy to promote effective learning (Irvine, 1995; All & Havens, 1997; Baugh & Mellott, 1998; Beitz, 1998; Kathol, Geiger, Hartig, 1998; Schuster, 2000). Smith (1992) explored the use of concept mapping and Vee heuristics in an attempt to integrate theory into practice. Students (n = 42) in a junior level college lab were divided into two groups. The control group was required to complete weekly textbook readings, film viewing and definitions of glossary terms before each lab. Lab content was outlined and the instructor demonstrated all necessary skills. Students were then required to practice those skills. In the treatment group the students were required to complete the same traditional requirements except the first day of lab, students were oriented to Vee heuristics and concept mapping. In subsequent labs, the instructor used discussion time-centered on Vee diagrams. In addition students came to lab with one concept map of a selected glossary term each week.

Three measurement tools were used to measure the affects of the two strategies on student learning, (a) a short-answer questionnaire, (b) return demonstrations of practice skills and (c) taped clinical interviews. The responses

to the short-answer were analyzed by identification of theoretical principles for nursing care. Criteria were established in which to score the answers based on the accuracy and comprehensiveness of the answer. The results for the short-answer questionnaire revealed that the means for all the answers were significantly higher in the treatment group ( $F=8.98$ ,  $p=.005$ ). However, a statistical significance ( $p<.05$ ) was found in five out of 10 questions. The researchers opined that students in the treatment group were significantly better able to articulate scientific principles and the appropriate nursing actions.

In the return demonstration measurement, only those skills that differed significantly in the short answer questionnaire between the two groups were measured. The treatment group means were higher for all return demonstration, however, not statistically significant from the control group. The only statistically significant return demonstration was in body mechanics ( $p = .01$ ).

In the taped clinical interviews results showed that 50% of the treatment group and 15% of the control group felt they answered the interview question about studying and learning differently after taking this course (Smith, 1992). When asked what part of the laboratory helped them learn, the treatment and control groups responded differently. The control group valued "knowing what to expect" whereas, the treatment group "valued putting it all together" and "being forced to think" (Smith, 1992 p.21).

There have been very few studies that use concept mapping as a method to evaluate critical thinking. Staib (2003) did an extensive literature review of teaching strategies and measurement of critical thinking. She reviewed nursing

literature from 1996 to 2002 from the Cumulative Index for Nursing and Allied Health (CINAHL) database. Staib (2003) found sixteen published studies that were related to critical thinking strategies and measurement. The articles were divided by teaching strategy, goal, evaluation method, and the extent to which they taught the critical thinking habits of mind. The teaching strategies ranged from journaling, process-focused group learning, vignettes, role-playing, case study, imagery, antidotal and computer-assisted instruction to written assignments (Staib, 2003). The students were evaluated by a variety of tests; Watson-Glaser Critical Thinking Appraisal test (WGCTA), California Critical Thinking Skills Test (CCTST), National League for Nursing (NLN) Psychiatric exam and the Mosby's Assess test. Several of the critical thinking strategies were evaluated by anecdotal means (Staib, 2003) and preceptorships (Myrick, 2002). Of the sixteen studies only one study used concept mapping as a method to evaluate critical thinking (Daly, Shaw, Balistrieri, Glasenapp & Piacentine, 1999).

Daly, et al. (1999) conducted a quantitative study in which concept mapping was used to evaluate critical thinking. Senior clinical groups (n=54) were given instruction on creating concept maps. Over the semester students were asked to create three concept maps showing relationships among the clients, pathophysiologic factors, pharmacologic factors and therapeutic nursing interventions. Points were awarded on the hierarchical organization of the maps, progressive differentiation of the concepts and integrative reconciliation of the

concepts. In addition, points were awarded when the student created propositional links, analyzed and synthesized information.

Students maps were randomly selected (n =18) for data analysis and scoring. The study did not have a control group and although limited in size, the results showed a significant difference between the first and the third concept map ( $p =.001$ ) implying that concept maps improved students' critical-thinking abilities. The critical-thinking abilities utilized were those defined by Facione (1990). Faculty also felt that concept maps helped them evaluate whether the students were prepared to practice safely in the clinical area because the maps revealed students knowledge and plans for client care.

### *Critical Thinking*

There have been a variety of definitions for critical thinking (Watson & Glaser, 1980; Facione, 1990; & Paul, 1993). Watson & Glaser (1980) define critical thinking as knowledge and attitudes, including attitudes of inquiry toward problem identification and acceptance of evidence and knowledge of the nature of valid inferences, abstractions and generalizations, in which different evidence is weighted for accuracy and relevance in a logical determination of a solution. The American Philosophical Association (APA) Delphi Report categorized critical thinking into a set of cognitive skills and subskills (Facione, 1990). This report identified interpretation, analysis, evaluation, inference, explanation and self-regulation as the skill set needed to critically think (Facione, 1990). Paul (1993) added additional elements to critical thinking. He defined critical thinking as a "disciplined, self-directed thinking which exemplifies the perfections of thinking

that is appropriate to a particular domain of thinking and displays a particular mastery of intellectual skills and abilities” (p. 462).

Scheffer and Rubenfeld (2000) replicated a previous study by the APA in which the meaning of critical thinking was put to a panel of nurse experts from nine countries and 23 states in the United States. After five rounds of questions and analysis, 88% of the panel agreed that critical thinking utilized “habits of the mind” (p.356). These habits included confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance and reflection. In addition, critical thinkers used the cognitive skills of analyzing, applying standards, discriminating, information-seeking, logical reasoning, predicting and transforming knowledge (Scheffer and Rubenfeld, 2000). Scheffer and Rubenfeld (2000) recognized that creativity and intuition were not components of critical thinking in the APA Delphi Report.

Several studies were done comparing critical thinking and clinical competence (Maynard, 1996; May, Edell, Butell, Doughty & Langford, 1999; Behrens, 1996; Vaughan-Wrobel, O’Sullivan & Smith, 1997; McCarthy, Schuster & Zehr, 1999; Walsh & Hardy, 1999; Smith-Blair & Neighbors, 2000 & Bowles, 2000). Bowles (2000) utilized a correlation design that studied the relationship of critical thinking skills and clinical judgment skills of baccalaureate nursing students. This study explored the relationship between critical thinking, age, years in college, cumulative Grade Point Average (GPA) and clinical judgment. The California Critical Thinking Skills Test (CCTST) measured critical thinking and the Clinical Decision-Making in Nursing Scale (CDMNS) assessed clinical

judgment. Students ( $n=65$ ) in their fifth and final semester took both tests. The results indicated that there was a significant positive relationship ( $r=.21$ ,  $p < .05$ ) between critical thinking (CCTST) and clinical judgment (CDMNS). From the CCTST subscales, inference and inductive reasoning had a positive correlation to clinical judgment. Contrary to Behrens' (1996) study, age or number of years in college did not demonstrate a positive correlation to clinical judgment skills. There was a significant relationship ( $r=.55$  and  $p=.00$ ) between total score of CCTST and students' GPA while in the nursing program.

Behrens (1996) compared critical thinking of the traditional and nontraditional student in a hospital-affiliated diploma nursing school. Students ( $n=109$ ) in their freshman year from 1989 to 1991 took the Watson-Glaser Critical Thinking Appraisal (WGCTA) test. Critical thinking scores, number of credits, GPA, age and gender were compared. The data showed a positive relationship between chronological age, critical thinking ( $p=.01$ ) and GPA ( $p=.01$ ). The author attributed the results to higher motivation, additional educational experiences and personal maturity of many nontraditional students (Behrens, 1996).

One other focus of this study was to investigate reliability and validity of the WGCTA. One class was retested after five semesters of study. The WGCTA did demonstrate reliability but failed to show an increase in critical thinking scores as a result of nursing school. Behrens (1996) suggested that nursing school curricula may not affect the critical thinking skills measured by the WGCTA.

Vaughan-Wrobel, O'Sullivan and Smith (1997) found similar results in a later study in which there was a low correlation ( $r=.2$ ,  $p=.001$ ) between age and

WGCTA. In addition, those who held other educational degrees scored higher on WGCTA ( $t=3.02$   $p=.003$ ). The study did however report a drop in critical thinking scores between students junior and senior year. The authors implied that these results may be related to WGCTA not being the best measure of critical thinking in nursing education. Nursing curricula may not be designed to enhance critical thinking and teaching strategies may not encourage critical thinking (Vaughan-Wrobel, O'Sullivan & Smith 1997).

Contrary to these findings, McCarthy, McHugh-Schuster and Zehr (1999) conducted a comparison study in which sophomores ( $n=156$ ) and seniors ( $n=83$ ) were given the California Critical Thinking Disposition Inventory (CCTDI) and the CCTST. The results showed that the seniors scored significantly higher ( $p < .001$ ) than the sophomores on the CCTST and the CCTDI. Further analysis also showed that there was a significant correlation between the CCTST and the CCTDI ( $p=.001$ ). The authors also reported that seniors scored higher than sophomores on four out of seven subscales; truth-seeking, self-confidence, analyticity and inquisitiveness. Although students were similar in age and gender, the results of this study may be a result of group differences rather than passage of time (McCarthy, McHugh-Schuster and Zehr, 1999).

Another study compared differences in critical thinking dispositions in college students with different majors and across genders (Walsh and Hardy, 1999). Students ( $n = 334$ ) in their third year of college who were beginning their majors were given the CCTDI. Results showed that English majors scored higher than other majors on truth-seeking, open-mindedness, confidence and

inquisitiveness and maturity. Nursing majors scored lowest of all majors in truth-seeking. The researcher opined that an explanation could be that truth-telling is strongly emphasized in nursing curriculum; however, the instructor suggested that correctness as opposed to the truth may make students dogmatic in their approach to problem solving. In addition, nursing majors scored very low on the confidence subscale which may be related to the fear that decisions they make could lead to costly mistakes (Walsh & Hardy, 1999).

Critical thinking has several definitions and there are just as many tests to measure it. Adams, Whitlow, Stover and Johnson (1996) reviewed the four most frequently used instruments at the college level to evaluate critical thinking; Watson-Glaser Critical Thinking Appraisal test, California Critical Thinking Skills Test, Ennis-Weir Critical Thinking Essay Test (EWCTET) and the Cornell Critical Thinking Test (CCTT). According to Adams et al. the WGCTA serves as a general measure of problem solving abilities; the CCTST is based on common topics, issues or situations and is intended to be discipline neutral; the EWCTET measures the degree in which the student is able to evaluate a given argument by a written essay; and CCTT measures induction, deduction, value judgment, observation, credibility, assumptions and meaning. According to Adams et al. these tools are reliable and valid to measure abstract concepts of critical thinking; as WGCTA and CCTST measure a broad spectrum of critical thinking traits and EWCTET and CCTT focus on critical thinking behaviors. Nonetheless, the WGCTA has been the most widely used but, because of variation in results, this may not be the best choice for measuring critical thinking in nursing students

(Adams, Whitlow, Stover & Johnson, 1996; Behrens, 1996; Vaughn-Wrobel, O'Sullivan & Smith 1997).

Vaughn-Wrobel, et al. (1997) evaluated critical thinking skills in baccalaureate nursing students. The study measured if student's critical thinking scores improved from entry into the nursing program to graduation. Students (n=391) enrolled over four years (1993 - 1996) took the WGCTA upon entry into the nursing program, at the end of their junior year and at the end of their senior year. After adjusting for age, previous degrees and nursing experience, the scores revealed that the class of 1993, 1994 and 1995 showed no significant gain in the WGCTA scores ( $p = .18$ ). The study did reveal that age had a positive correlation with higher WGCTA scores ( $r = .2, p < .001$ ). However, students with previous nursing experience had significantly lower WGCTA scores than those without previous experience ( $t = 2.13, p = .03$ ). According to Vaughn-Wrobel, et al., these findings supported previous studies by Sullivan (1987) and Bauwens and Gerhard (1987) but not those of Berger (1984) or Miller (1992).

According to Bauwens and Gerhard (1987) the WGCTA places emphasis on logic rather than on the process. In addition, Vaughn-Wrobel, O'Sullivan & Smith (1997) feel that the "WGCTA may not be the best measure of critical thinking ability for nursing students" (p. 488). Nursing needs a domain-specific instrument to measure critical thinking (Vaughn-Wrobel, O'Sullivan & Smith, 1997).

The National League of Nursing (NLN) developed two critical thinking tests; one to be administered at the end of the first year (LPN level), and the

other at the end of the second year (RN level). These critical thinking tests assess the critical thinking skills of students in the context of the nursing process (NLN, 2004). The test evaluates students on 21 critical thinking behaviors that measure the critical thinking skills of; interpretation, analysis, evaluation, inference and explanation (NLN, 2004). This test is discipline specific as the items on the test are written in the framework of the nursing process which address legal/ethical, leadership, health promotion/risk management and therapeutic communication issues (NLN, 2004). This test is intended for students who have had several semesters of nursing courses. It tests over a variety of subjects however, content students have not had cannot be extracted out. Currently, there is no published research on the use of this test.

Critical thinking is defined as knowledge that is appropriate to a particular domain of thinking (nursing) and from this emerges a mastery of intellectual skills and abilities. Through a non-linear process of collecting, interpreting, analyzing data, drawing conclusions, presenting and evaluating information the individual will act accordingly to carry out those decisions, evaluating their actions along the way to determine if their actions were successful or what changes need to be made.

## CHAPTER THREE

## METHODOLOGY

The intent of this study was to examine the relationship between concept mapping and critical thinking in first year nursing students. This study employed both quantitative and qualitative methods. A pre and post-test experiment vs. control group quasi-experimental design was used as well as a phenomenological approach.

During the course of the study, enrollment dropped (n=11) due to failure in the theory portion of the course. A qualitative arm was implemented to assist the researcher to get a better understanding of the perceived experience of the individual. Interviews were conducted and at that time, it was discovered that the control group had been exposed to concept mapping as they had progressed on to the next set of courses. Utilizing both qualitative and quantitative methods has resulted in a better understanding of the use of concept mapping in the first year nursing student.

The research questions are: (a) does the use of concept mapping in the clinical setting have an impact on student's critical thinking scores; (b) what is the relationship between GPA, age, gender and number of credit hours taken have on critical thinking scores; (c) what are the students' perceptions of their clinical rotation; (d) what are the students' perceptions of concept mapping and what impact does this have on their critical thinking scores; (e) what are the students' perceptions of critical thinking and what impact does this have on their critical thinking scores?

The study was conducted at a community college in the Midwest. Students were conveniently selected from a basic adult medical nursing rotation during the spring semester of 2005. Students chose their hospital preference for each clinical course which is the current practice of the program. This course is the second in succession after the fundamental nursing course. To meet inclusion criteria, the participants had completed all prerequisite courses and had not been previously enrolled in the course. In addition, the participants were asked if they had ever used concept mapping prior to the study as this could threaten internal validity of the study. All participants used clinical focuses and care plans in the nursing fundamental course. The study spanned seven and one half weeks as students change to a new rotation every seven and one half weeks. Because of limited availability of clinical sites, the groups were at three different hospitals. The hospitals are competing hospitals within the same county and are very similar in size, services offered and patient population. The nursing units that the students were assigned are long established units.

There were two groups of participants; one control group and one experimental group. The participants were conveniently selected because they were already registered for a particular hospital. To keep the groups homogeneous and control for cross-contamination the groups were conveniently assigned to either the experimental groups or control group. The principal investigator and first research assistant each had an experimental group and the second research assistant had the control group. The PI began the semester with ten students; four met inclusion criteria. One of the four participants failed

theory so three remained in the study (n=3). The first research assistant began with ten students; seven met inclusion criteria however, five failed so only two remained (n=2) in the study. The second research assistant began with nine participants who all met inclusion criteria, however three failed and only six (n=6) remained in the study.

The principal investigator and research assistants who taught the clinical courses have greater than 60 years of nursing experience combined and more than 20 years of teaching experienced combined. The principal investigator and research assistants were supervising the clinical groups on the units. They were the students' main resource for patient care decisions throughout the day. They also make out patient assignments while the participants were at the hospital.

Students who chose not to participate in the research study completed the course requirements for which they were registered and not any demographic information, or complete the pre-test, post-test or interview. Students who did not participate in the study completed either a clinical focus or concept map, which is the current practice. Those students who did not participate went to the audio visual technology lab to study during pre and post testing. Otherwise, all students were treated equally.

All students were expected to maintain the same safe quality of care as they had in the previous clinical semester. Each participant's grade was based on the requirements of the course and not the research requirements. Each student attained at least an 80% on their clinical evaluation to pass the course which is the current requirement (see Appendix B).

### *Sample Selection*

After Human Investigation Committee (HIC) approval, participants were approached by the principal investigator prior to the beginning of their first lecture. Students registered for the principal investigator and research assistants' clinical rotation were invited to attend a meeting after class if they were interested in participating in the research project. During the meeting, participants were screened to determine if they had previously taken the course or used concept mapping as this could threaten internal validity. Students who had taken the course previously were excluded from the study.

The research project was explained in detail by the principal investigator and a voluntary consent form was obtained from each participant. The consent form included the expectations of the researcher, the participants and the benefits and risks involved. There was no compensation monetary or otherwise for participation. Participants consented to allow the principal investigator to acquire demographic information (age, gender, GPA and number of credit hours), take a pre-test and post-test, and to participate in a one-on-one taped interview with the principal investigator.

Guidelines from the HIC and Health Insurance Portability and Accountability Act (HIPAA) were followed to ensure privacy of the participants. To protect the confidentiality of the participants, no names appeared on any of the tests or interview documents. However, names did appear on the concept maps, clinical focus and care plans as this clearly identifies the student's plan of care for their patient. The participants were assigned a number and a list was

generated with the name of the participant and corresponding number. Only the principal investigator and assistants had access to the identifying documents. The participants were required to remember their number for future testing. These documents and the consent forms were kept under lock and key in the principal investigators office.

There were a total of twenty participants (n=20) that met inclusion criteria and consented to participate, however, throughout the course of the semester enrollment dropped to eleven participants (n=11) because of failure in the theory portion of the course. Of the participants in this study, nine were Caucasian, and two were from European descent and ESL. All of the participants were female. The average age of the student ranged from 19 to 41 years of age with average age being 28.8 years of age.

#### *Procedure*

After the participants had consented to participate, demographic data was obtained from the students file and recorded. Both groups took the Health Education System Incorporated (HESI) pretest on the orientation to clinical day. The test was administered in a large computer classroom. The test took approximately one hour for the participants to complete. The tests were taken via computer and automatically sent to HESI testing center for scoring. These scores were identified by the participant's research code which was given to them during orientation to the study.

After consent was obtained, the control group was dismissed and the participants in the experimental groups (concept mapping group) met with the

principal investigator for approximately one hour of didactic on concept mapping. The principal investigator described the requirements of concept mapping such as assessment (medical diagnosis, medications, laboratory results, previous medical history, and physical assessment); nursing problem analysis, including prioritized North American Nursing Diagnosis Association (NANDA) diagnosis, goals, interventions and evaluations. Students were given a description of concept mapping and a handout of the required items that needed to be included in their concept maps. Students were required to show the relationship between the concepts. They were allowed to draw lines, circles, or grouping of concepts that show the relationships. Students were not exposed to samples of concept maps because the intent was to examine the student's perceptions of the concepts. The students were allowed to use either a computer generated maps or hand drawn maps.

The control group received didactic instruction of the course requirements from the research assistant during orientation of the first clinical day. The control group used clinical focuses, written physical assessment forms and care plans throughout the semester which is the current practice. The clinical focus is a five-page linear outline that includes medical diagnosis, signs and symptoms, nursing interventions, medications, lab and diagnostic tests. The nursing care plan is a six-column linear outline that addresses the NANDA diagnosis, scientific explanation, expected outcomes, nursing interventions and evaluation of the expected outcomes (Appendix C).

Over the course of the semester, the control group participants completed a clinical focus on each patient and a care plan with a written physical assessment on two patients. The participants turned in their weekly clinical focus and they were graded according to the current policy of satisfactory or unsatisfactory. A satisfactory score was awarded if the clinical focus was complete, relevant and comprehensive to the patient assignment (this is current practice). Students were allowed to update the clinical focus as it pertained to their patient prior to submitting. In addition, the nursing care plan was scored according to the nursing process evaluation criteria used at the college (Appendix D). The research assistant graded the students' weekly clinical focuses, two care plans and written assessments and returned them to the students. Clinical focuses were done a weekly basis and the care plans with assessments were done twice during the semester. Students were required to have NANDA diagnoses on each care plan, with expected outcomes, interventions and an evaluation. This is also the current requirement of the course.

Students in the experimental group completed weekly concept maps and turned them in on a weekly basis. After obtaining their patient assignment, the participants were required to have completed current medical diagnosis, signs and symptoms, one NANDA diagnosis, expected outcome and nursing interventions for the expected outcome on the first clinical day. During the clinical day they developed the second NANDA, expected outcome and nursing

interventions. At the end of the second day the participants evaluated all of the outcomes and submitted the CM for scoring.

The concept maps were scored according to the concept map evaluation tool (Appendix E). The principle investigator and research assistant of the experimental groups graded the weekly concept maps according to the scoring tool and returned them to the students with comments. The concept map scoring tool assures that both of the clinical and supervising faculty with the experimental groups are evaluating with consistency. Students were allowed to view the scoring tools but the concept maps were given back to the participants with comments.

All clinical days were consecutive, so students cared for their client two days in a row. Participants were assigned another patient if their patient was discharged prior to the second day and new clinical focus or concept map was completed on the new patient. During the semester pre and post conferences took place in both the experimental and control groups. Discussions surrounded case studies from the student assignments which is the norm. Students were allowed to discuss their client assignments however, when they had particular questions regarding concept maps, clinical focus or care plans they were discussed one-on-one with the student.

On the last clinical day of the semester only eleven participants (n=11) remained in the study. The participants took the computerized post-test and the results were scored by HESI and recorded. At this time, it was determined by the principal investigator to expand the study by using a qualitative method.

While awaiting HIC approval of adding the qualitative arm, time had lapsed and students were already enrolled in the next seven and one half week course. Participants were contacted by phone going down the list by research number. Phone messages were left by the principal investigator. A first come first served, was the basis of enrollment. The first to respond were four participants from the experiment group and three from the control group. At this time, the participants were scheduled for a one-hour taped interview with the principal investigator. The participants were again consented and a one-hour taped interview took place at the college. During analysis of the taped interviews one tape had audio difficulties so it was not included in the study (n=6), three from the experimental group and three from the control group.

#### *Instruments*

The pre-and post-test was designed by HESI. HESI develops several types of exams to assess student competency and achievement of curricular outcomes (Morrison, Adamson, Nibert & Hsia, 2004). HESI exams are based on Morrison, Smith and Britt (1996) guidelines for developing custom critical thinking exams. The course syllabus was sent to HESI and the test was developed by a team of nurse educators. The test was based on specific curriculum content and the questions are written at the application and higher cognitive level of Bloom's (1956) Taxonomy (Morrison, Adamson, Nibert & Hsia, 2004). Questions were also obtained from the HESI national database. A 100-item topic outline was returned to the principal investigator for review. The principal investigator and the HESI nurse educators discussed the final product to ensure validity for the

constructs being tested. The principal investigator did not view the actual test only a content outline. Nine items were removed from the outline as these were content areas not covered in the current syllabus. A 50-item test was then designed specifically from the content in the course syllabus. The pre- and post-test content was identical however, the questions were randomized. Students were not allowed to view the answers or rationale after the pre-test. They were allowed to review them at the conclusion of the post-test.

The concept map care plan evaluation tool is based on the McHugh-Shuster (2002) tool that evaluates the student's assessment, analysis, planning and evaluation of client care written in a concept map. Maps were evaluated to see if the student correctly identifies problems through assessment and analysis, correctly links problems to goals, identifies nursing interventions and evaluates patient responses to nursing interventions and progress toward outcome goals. The concept maps were scored using scoring the tool (Appendix E). The tool has three choices: complete, incomplete or partially complete for the specific concept being evaluated. Students were allowed to review the scoring tools with comments made by the faculty.

The clinical focus was scored as satisfactory or unsatisfactory; however an 80% must be achieved to receive a satisfactory grade. A satisfactory score was awarded if the clinical focus was complete, relevant and comprehensive to the patient assignment (this is current practice).

The nursing care plan was scored according to the nursing process evaluation criteria tool (Appendix D). This is a dichotomous tool that is labeled

with a yes or no to depict that the care plan meets the criteria. An 80% must be achieved to receive a satisfactory grade (which is the current practice).

### *Reliability and Validity*

The HESI predictability model (HPM) is a proprietary mathematical model, which is used to calculate all HESI scores in terms of probability (HESI, 2004). The HPM considers several factors, including difficulty of test items and performs regression analyses for each score reported on all HESI exams. Reliability of the HESI custom exam is calculated by using the Kuder-Richardson formula 20. The data is then stored in the HESI database and used in the calculation of projected reliability for the test. The Kuder-Richardson 20 a measure of internal consistency reliability for this test was 0.69. Although this magnitude is below traditionally accepted levels, it is more likely an outcome of KR-20's attenuation due to small sample size.

Validity is based on reviewing the syllabi of the nursing courses that these exams are designed to evaluate. HESI has 1203 custom exams in the national data base and several course syllabi are reviewed along with the current syllabi prior to the development of the custom exam. Finally, the HESI nurse educators and the principal investigator conferred over content validity.

The principal investigator and research assistant have both used concept mapping in previous courses. The requirements of the concept map and the scoring tool were discussed between the two and the research assistant attended the one hour didactic along with the participants.

The evaluation of the concept maps was measured by inter-rater reliability. The principal investigator and research assistant who evaluated the CM were also the same individuals who conducted the clinical teaching portion. Inter-rater reliability was measured to evaluate if the concept map tool was reliable and to assure that feedback students received on their concept maps were consistent between the two groups. The principal investigator and research assistant evaluated three concept maps separately and then compared scores. The total numbers of agreements were divided by the total number of agreements plus the number of disagreements (total number of agreements / total number of agreements + number of disagreements). The  $r$  correlation was .73 which is an acceptable value for a small sample reliability study.

Because the principle investigator conducted all the interviews the chance for variation between interviewers is non-existent. However, assurance to keep the interview context accurate is supported by audio taping measures. Clarification was sought from all participants prior to evaluation.

#### *Data Analysis*

The number of participants are  $n=11$ . The pre- and post-tests were scored by HESI. The scores were reported as raw scores and probability scores for categories in Nursing Process (assessment, analysis, planning, implementation, and evaluation), Client Needs and Specialty area. In addition, a report of the school's average scores for each item, along with a description of the difficulty level, specialty area, category and topic of each item will be reported.

The participants were asked to describe their experience during Nursing 106 clinical rotation. NVivo7 software was used to analyze the qualitative data. This software is designed to analyze non-numerical data and provides the researcher the ability to code, index and search the data for patterns (NVivo7). The typed interviews were imported into the program. These data documents were analyzed to identify common themes, patterns and ideas in the groups. From this, the researcher interpreted the findings keeping within the context from the taped interviews. The data was analyzed to explore reoccurring themes among the participants.

SPSS version 14.0 was used for statistical analysis. Descriptive statistics for the pretest and post-test scores were computed for the mean and standard deviation. A t-test for independent samples was performed to determine if there is a difference between the pretest means of the control and experimental groups. ANCOVA was used to control for variation among the individuals pre-test scores in relation to gender, age, GPA and number of credit hours taken. A paired t-test was conducted to determine significant change in pre-test and post-test scores. An independent sample t-test was conducted to evaluate if the mean score change of the experiment group was significantly different than the mean score change of the control group. ANCOVA was utilized to determine if the mean score change between the two groups was significantly different while controlling for the covariates. Finally, the effect size was obtained to determine the differences between the two groups. Tables were employed to report all quantitative data.

## CHAPTER FOUR

## RESULTS

There were a total of  $n=20$  participants that met inclusion criteria, however, over the course of the semester only  $n=11$  students remained in the study. Although the participants in the study were homogeneous, the sample size was small. There were five ( $n=5$ ) remaining in the experiment group and six ( $n=6$ ) in the control group. Limited availability of participants, limited time frame, and failure in theory contributed to the small sample size. Additional issues arose during the interviews, when it was discovered that the control group had been exposed to concept mapping in the next class. While awaiting HIC approval of adding the qualitative arm, students had progressed on to the next seven and one half week course. Students used concept mapping in the clinical course following the research study. Due to these confounding issues, the experimental group was re-assigned as Treatment Group One (Tr1/Ex) and the control group was re-assigned to Treatment Group Two (Tr2/C). However, during the study, and at the time of pre- and post-testing, the control group was not exposed to concept mapping only the experimental group. As a result of the small sample size and confounding issues, these results must be interpreted with caution.

Data was collected on age, gender, GPA and number of credit hours. HESI designed a 50 question pre- and post-test. Kuder-Richardson 20, a measure of internal consistency reliability was 0.69. Although this magnitude is below traditionally accepted levels, it is more likely an outcome of KR-20's

attenuation due to small sample size. SPSS 14.0 was employed to analyze the data. Alpha was determined at .05.

### *Quantitative Analysis*

All the participants in the study were female. The average age of the participants in the Tr1/Ex (experimental) group was 30 years (range 20-41). The average age in the Tr2/C (control) group was 29.2 years (range 26-31). Two of the participants spoke English as a second language.

The GPA of Tr2/C had a mean score of 3.57 with a SD=.24. The Tr1/Ex group had a mean GPA score of 3.58 and a SD=.27. The mean number of credit hours for the Tr2/C group was 65.9 with a SD=21.18 and the Tr1/Ex group mean was 53.9 with a SD=12.86 (see Table 1).

Table 1

### *Demographics*

Group	Age	Range	GPA	SD	Number of	
					Credit hours	SD
0	29.2	26-31	3.57	.24	65.9	21.18
1	30	20-41	3.58	.27	53.9	12.86

0=Tr2/C

1=Tr1/Ex

The pre- and post-tests scores are reported on a scale from 0 to 1500. Based on HESI (mathematical conversion) a satisfactory level of performance is >850 with the recommended level being >900. An independent samples t-test was conducted to compare the pretest means between the Tr2/C and Tr1/Ex.

Levene's test for equality of variances revealed a  $p=.073$ , so equal variances are assumed. The Tr1/Ex group mean score was 616.20, with a  $SD=106.58$ , (range 496-747) and the Tr2/C group mean score was 640.5, with a  $SD=216.61$  (range 417-916). Although the mean in the Tr1/Ex group was lower than in the Tr2/C group, the results revealed that there was no significant difference in the scores for the two groups [ $t(9)=-.228$ ,  $p=.825$ ] (see Table 2).

Table 2

*Pretest Scores*

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Std. Deviation</u>
0	6	640.5	216.61
1	5	616.2	106.58

0=Tr2/C

1=Tr1/Ex

Levene's Test for Equality of Variances

	<u>F</u>	<u>Sig.</u>	<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>	<u>95% confidence interval</u>	
						<u>Lower</u>	<u>Upper</u>
Equal variances assumed	4.1	0.73	-.228	9	.825	-265.92	217.32
<u>Equal variances not assumed</u>							

An analysis of covariance was conducted to explore the impact that age, GPA and number of credit hours had on pretest scores while also investigating group differences. Levene's test of error homogeneous variances was retained ( $p=.054$ , Table 3). The results showed that no variable had significant impact on the pretest scores; age [ $F(1,6)=.000$   $p=.991$ ], GPA [ $F(1,6)=.023$   $p=.884$ ] and

credit hours [ $F(1,6)=.004$   $p=.953$ ], group [ $F(1,6)=.023$   $p=.884$ ] (see Table 3). This was to be expected given the low power of  $n=11$ .

Table 3

*Analysis of Covariance: Pretest*

Source	df	F	Sig.
Between subjects			
Age	1	.00	.991
GPA	1	.02	.884
Crnthrs	1	.01	.953
Group	1	.02	.884

Computed using alpha = .05

R squared = .10 (adjusted R squared = -.650)

A paired t-test was conducted within each group to evaluate if there was a significant change in the participants' post test from the pretest scores (Table 4). The results revealed that both groups showed a statistically significant increase in the post test scores. The Tr2/C group mean was 768.5, with a  $SD=148.88$ , [ $t(5) = -3.08$   $p=.028$ ]. The Tr1/Ex group obtained a mean of 958.8, with a  $SD=138.0$ , [ $t(4) = -5.28$ ,  $p=.006$ ]. The eta squared statistic for paired sample t-test revealed a large effect size of .67 (Pallant, 2005).

An independent samples t-test was conducted to evaluate if the mean change score of the Tr1/Ex group was significantly different than the mean change score of the Tr2/C group (see Table 5). The Tr2/C group obtained a mean of 128 with a  $SD=101.93$ , and the Tr1/Ex group had a mean score of

342.6, with a SD=145.08. The Tr1/Ex group mean change score were statistically higher than the control group [ $t(9) = 2.88, p=.018$ ].

Table 4

*Paired Samples Test Pretest – Post test*

<u>Group</u>	<u>Mean</u>	<u>Std. Deviation</u>	<u>t</u>	<u>df</u>	<u>Sig. 2-Tailed</u>	<u>95% Confidence</u>	
						<u>Lower</u>	<u>Upper</u>
0	-128.00	101.93	-3.08	5	.028	-234.97	-21.03
1	-342.6	145.08	5.28	4	.006	-522.74	-162.46

0=Tr2/C

1=Tr1/Ex

Table 5

*Independent Samples Pre and Post Change*

<u>Group</u>	<u>Mean</u>	<u>Std. Deviation</u>
0	128.66	101.92
1	342.6	145.08

<u>Levene's Test for Equality of Variances</u>		<u>F</u>	<u>Sig</u>
Equal Variances assumed		.58	.466
<u>Equal Variances not assumed</u>			

<u>t-test for Equality of Means</u>		<u>t</u>	<u>df</u>	<u>Sig. (2-tailed)</u>
Equal Variances assumed		2.88	9	.018
<u>Equal Variances not assumed</u>				

<u>t-test for Equality of Means</u>	<u>95% Confidence Interval</u>
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Table 5 cont.

	<u>Lower</u>	<u>Upper</u>
Equal Variances assumed	46.13	383.07
<u>Equal Variances not assumed</u>		

An analysis of covariance was conducted to compare the effectiveness of concept mapping to clinical focuses. The mean change scores were significantly different between the two groups. The ANCOVA results revealed even after adjusting for the other covariates and taking into consideration the small sample size, there was still a significant difference between groups in terms of mean change score  $p=.022$  (Table 6). The results revealed that age, GPA and credit hours all had no relationship with change score. The Tr1/Ex (concept mapping) group had a significantly greater improvement on their post test scores when compared to the Tr2/C (control) group scores while controlling for other covariates.

Table 6

*ANCOVA: Pre and Post test change*

<u>Source</u>	<u>df</u>	<u>F</u>	<u>Sig.</u>
Between Subjects			
Age	1	4.56	.077
GPA	1	1.28	.302
Crdthrs	1	.056	.821
<u>Group</u>	<u>1</u>	<u>9.34</u>	<u>.022</u>

Computed using alpha = .05    R squared = .720

### *Qualitative Analysis*

The participants were asked to describe their experience during Nursing 106 clinical rotation. After obtaining the participants consent to audio tape, the interviews were conducted with seven of the participants. One interview had audio difficulties and was not used in the analysis (n=6). Each interview was approximately one hour long. The participants were asked to share their experience during their Nursing 106 clinical rotation. Throughout the interview, probing and exploring questions were used for clarification.

NVivo7 software was used to analyze the qualitative data. The software is designed to analyze non-numerical data and provides the researcher the ability to code, index and search the data for patterns (NVivo7). The typed interviews were imported into the program. The data documents were to identify common themes, patterns and ideas in the groups. From this, the researcher interpreted these findings keeping within the context from the taped interviews.

Six (n=6) participants were interviewed, three from the experiment group and three from the control group. To reiterate, the Tr2/C (control) group had been exposed to concept mapping in the next seven and one half week course. Therefore, the control group was re-assigned as Treatment Group Two (Tr2/C) and the experimental group was re-assigned as Treatment Group One (Tr1/Ex). Tr1/Ex received the one hour of didactic on concept mapping prior to the clinical course. Tr2/C received didactic on the clinical focus and care plans during orientation to the clinical rotation. It is unclear what type of instruction Tr2/C received on concept mapping. The results of the two groups will be reported

separately, first contrasting Tr1/Ex use of concept mapping with Tr2/C use of clinical focuses and care plans. In addition, Tr2/C has an additional section discussing their use of concept mapping.

As the participants began to discuss their clinical experiences there were six general reoccurring themes among both groups: (a) the participant's feelings of anxiety regarding hospital clinicals, (b) development of the concept map or clinical focus, (c) relevance to the client, (d) knowledge attained, (e) satisfaction or dissatisfaction and (f) utilization of either the concept map or clinical focus.

#### *Treatment Group One*

##### *Feelings of Anxiety*

The participants described feeling anxious when it came to hospital clinicals. One participant explained that they felt "paranoid" and "scared" at first because there were more expectations than the previous semester. The participant stated, "Lot more (was) expected of us than 105." The participant described that they were now required to "take care of the patient and making decisions." This was further compounded by feeling as though they were not prepared. The participant felt as though they did not know the content.

The participants also expressed that the instructor had a great deal to do with alleviating the anxiety. The participants described that during the clinical day the instructor would quiz them about medications, labs, etc. The participants described that they liked being quizzed because, "made you know for sure kind of like validation". One participant stated that they felt as though they are missing something when other instructors did not quiz them. One participant stated, "I

feel like I am missing out on that learning aspect.” The participants also described that they felt that the instructor “wanted more and more.” They felt that they were always being pushed to achieve more.

Over time the participants started to feel more confident. One participant explained that towards the end of the semester they started to feel as though, “I can do it.” All participants described that they felt like they had learned a great deal.

#### *Development of the Concept Map*

The development and organization was based on how much time the participants spent on developing or completing the concept map. Tr1/Ex group identified that the biggest decision or difficulty was deciding the layout of the concept map (CM). One participant stated, “I spent four days thinking about how I was going to set up this map.” Another participant described “mentally preparing” themselves to develop their map. Another participant described that using the maps were “stressful at first” because they did not know the right way to do them. However, after a few attempts they felt comfortable and figured out “the way a map should be.”

The participants described that the development of the CM took approximately 45 to 90 minutes to complete. One participant described that the initial CM took up to five hours. Participants felt that the more maps they attempted the easier and quicker they became. One participant described being “skeptical at first” at the amount of time required to complete a CM. But as time went on the CM became easier and the participants felt very comfortable in the

end. Participants described they currently do not spend a great deal of time on CM because they feel they can write them quickly.

Tr1/Ex group described in great detail the step by step process that they employed to create their maps. Students described how they arranged their books and resources at their finger tips before beginning the maps. They described how they began with their guidelines and began to organize their maps. One participant described starting with signs and symptoms whereas another started with medical diagnosis. This group went on to describe that they continue to structure their maps in the same way that they originally developed.

#### *Relevance of Concept Mapping to the Client*

The relevance of concept mapping was described by the participants' as how applicable the map was to their clients needs. The participants described that concept mapping was much more specific to their clients and therefore they could plan nursing care accordingly. The participants described having a "clear picture" of the client and a "better understanding" of the exact needs of the client than previously. Another participant described concept mapping as being more "personal" to the client than clinical focuses. One participant described that the information on the concept map was much more relevant to the client because, "there wasn't any of the extra stuff like with clinical focus." Additionally, participants described that concept mapping helped them put the whole picture together when delivering patient care.

Participants described CM helped them organization their thoughts for patient care. Participants described that concept mapping helped them organize

the information and focus on what was most important for their clients. One participant described that concept mapping was more easily applicable because they had organized it and they could see relationships. The participant felt that this was important because, "the clinical focus was organized by someone else." One participant described, "The way you organize it (concept mapping) makes perfect sense because you organized it". All the necessary information "is right in front of you." The participants felt that CM gave them clear direction in caring for their client. One participant explained, "I know what I am going to do at the hospital."

As the participants organized and developed their CM they described a sense of significance that it gave to them. CM gave them direction for patient care but on a higher level; it gave them a sense of meaning to the profession. One participant described that concept mapping gave meaning to their nursing care and stated, "It was my reason for being there." Another participant described the feeling of confidence they felt, "felt like I was in charge, like a real nurse." Another participant described, "It felt like it was growth as a nurse."

#### *Knowledge Attained*

All participants described that concept mapping improved their knowledge of patient care and helped them prioritize client's needs. Participants described that concept mapping gave them a better understanding of what they were to do and helped them correlate the concepts. One participant described that concept mapping helped them see how, "everything is related." Participants described understanding why interventions would be implemented and how they were

related to the NANDA, interventions and expected outcomes. The participants stated, "light bulb went off", "I felt like I was getting it", and "I am smart today." Medications were repeatedly described as understanding the correlation with the client's condition or history. One participant described, "At first I didn't understand why or how this went to that but the more I did it the more I understood how things go together."

Participants described that concept mapping required higher level thinking. The participants felt that they spent much more time thinking about the client's needs and ways to accomplish them. Participants described a great deal of time was spent thinking about the relationship between the nursing diagnosis, outcomes and how to accomplish those goals. One participant described it as, "You weren't just copying things you were thinking about them." Another participant described the development of concept mapping as, "more critical thinking" and "it pulls it together in my head." The participant further referred to how her thinking became easier and felt she knew right away what to do.

The participants described that concept mapping required a specific way of thinking. The participants described that concept mapping requires specific skills. One participant described, "It's like a detective mystery trying to figure it all out." While another participant described concept mapping as, "problem solving" and "research." In addition, one participant explained that concept mapping, "helps you learn to be ready for unexpected." Another participant described that utilizing concept mapping gave her more confidence when preparing for patient care.

This type of thinking helped the participants develop a better understanding of their clients and the more they actively thought about their clients needs, the easier it became. One participant described that, "The more I think, the easier it gets." Another participant stated, "I am using my brain instead of copying stuff and not thinking about it."

#### *Satisfaction and Dissatisfaction with the Concept Map*

All of the participants described how they liked the convenience of everything on one sheet of paper. One participant explained, "there wasn't flipping back and forth between the pages, everything is right in front of you." All participants stated that once they became accustomed to concept mapping they liked it better than clinical focuses. One participant compared the use of concept maps and clinical focuses. The participant described that by utilizing clinical focuses, "Probably deprived me of the chance to see things because you really don't have a picture."

#### *Use of the Concept Map*

The participants described their concept maps as working documents. Participants described utilizing their concept maps to correlate the NANDA with the expected outcomes, interventions and to evaluate if outcomes were met or unmet. The participants stated that they utilized their concept map throughout the day as they were easy to "tweak" or revise if necessary. One participant described that she only referred to the concept map for the evaluation of the outcomes because she had the CM memorized because she developed it.

#### *Treatment Group Two*

*Feelings of Anxiety*

The participants in treatment group two described feelings of anxiety related fear of making mistakes. One participant described, "You get yourself so worked up that you make a mistake." Another participant described feeling so "nervous" and "unsure" of herself that she would ask other students to verify her nursing care. The participant stated that they would, "call another student in to make sure I was doing it right."

Another source of anxiety was described by one participant that the instructor expected "us to know stuff that we didn't." Another participant felt that in the previous semester too much time was spent on unimportant things like bedmaking and handwashing. The participant felt that the previous courses did not prepare them for subsequent semesters. However, all participants described having more confidence at the end of the semester

All participants described feeling as though they had learned a great deal. One participant expressed that, "everything I learned was in the clinical setting." The participants also described that the instructor helped alleviate the anxiety. One participant stated, "Instructor(s) can make you feel good or inadequate." The participant further added that feedback was very important. She really made you think that made you feel very confident. The participant described that the instructor pushes you to do and know more.

*Development of Clinical Focus*

Tr2/C participants felt that preparation of the clinical focus took a great deal of time, anywhere from two to five hours depending upon the number of

medications prescribed for their patient. Two participants did feel that clinical focuses were necessary as they provided information about their clients like diagnosis, medications and interventions. However, all participants felt they spent hours reading and looking up information that often did not pertain to their clients. One participant described the clinical focus as “overwhelming” with the amount of information required on them and the information not being relevant to the client’s needs.

#### *Relevance of Clinical Focus to the Client*

The relevance of the clinical focus was described by the participants as how the clinical focus pertained to their client. The participants described that the clinical focus required a great deal of time and effort but the information was not really useful. The participants described that the clinical focus lacked individualization. All of the participants felt that using the clinical focus form did not capture the essence of their clients needs. Participants did express that the form required a great deal of information but much of it did not pertain to their client and was not specific to their needs. One participant stated, “Half the time what I would read about, what I should do for the patient, didn’t even apply to my patient”, “it was very frustrating; it felt like busywork, there were so many pages, half the time I was writing things down over and over”. One participant described the clinical focus as not being specific to client outcomes or how to achieve those outcomes, “the clinical focus doesn’t do that for you it’s just not set up that way.”

Participants also described that the clinical focus lacked direction in preparing the participants for their clients needs. One participant described that

the scenario of a client with an admitting diagnosis a knee fracture. The student completed the clinical focus on the diagnosis of knee fracture. However, the client's current problem was a deep vein thrombosis (DVT), so the clinical focus did not pertain to the current problem. The participant described that the clinical focus was "pretty much a waste of time because the whole care now was on the DVT."

Participants described that the clinical focus as lacking in direction. The clinical focus form did not provide the student with a good understanding of what was going on with the client at that time or what goals to focus on. Three participants described that the clinical focus "did not point you in any direction" nor did it "give you goals to focus on." One participant described, "You're nervous anyway so you go in there and then you don't know what you are supposed to do." Specific goals or interventions were obtained from the nurse or instructor.

Participants described that when preparing the clinical focus some of the nursing interventions did apply to their client but they were not "good interventions" and one participant described her interventions as being "dumb ones" as they were not main focus of the clients care. Participants described that they would "just put anything down to complete the form", "it was just a form to be filled out." One participant described that she felt the clinical focus lacked accuracy but she stated "I was just exhausted and just wanted to fill out the dumb form." "I didn't want empty pages." All of the participants described that they felt that the interventions were not realistic to the client and one participant felt that maybe an "updated version" (clinical focus) would be more helpful.

*Knowledge Attained*

Knowledge was described by the participant's expression of actively thinking or understanding of relationships that were required to provide care to their clients. All of the participants described that they did not feel that clinical focuses promoted critical thinking. One participant described that, "you don't have to think with the focuses" because it is a, "fill in the blank" type of assignment. Another participant described, "I think when you copy something out of the book it doesn't get you thinking critically, it doesn't help you." The participants felt that the clinical focus was a form that needed to be completed by, "just look up in the book and write it down." Participants felt they "didn't have to think about it (clinical focus), you just put it on the paper." One participant described the section on lab values in the clinical focus. This participant described that the "labs in the back meant absolutely nothing to me, just numbers to fill in." Participants felt as though they were filling in the blanks or just answered questions that provided no value to them. The clinical focus was, "just something that had to be done to hand into instructor."

Participants also described that the clinical focus was repetitive in nature. The participants described that the clinical focus was "monotonous" using the same form. The participants acknowledged that the information of each client may differ slightly; nonetheless, using the same form each week did not promote thinking. One participant described that there was a great deal of copying of information however, "there is no tying into anything." Participants felt they frequently were writing things over and over and it became lesson in writing. One

participant described that she had accumulated so many clinical focuses that she would just copy what she had written before.

The participants indicated that the clinical focus did not give them a comprehensive understanding of their clients' needs or give them any direction. One participant stated, "It did not get you thinking about the patient", nor did it "point you in any which way to understand what was going on with the patient." Another participant described, "doesn't get you to thinking you know, the critical thinking that you need, it doesn't put it all together for your patient." The "clinical focus doesn't pull it all together for you; it didn't get your mind going."

#### *Satisfaction and Dissatisfaction of the Clinical Focus*

Satisfaction and dissatisfaction was described by the participant's expression of the satisfaction or dissatisfaction in using the clinical focus when planning patient care. Participants described feeling very frustrated when completing the clinical focus because what they anticipated in terms of care did not pertain to their client. Participants described feeling very discouraged because the form "doesn't fit exactly what the client needs." Two of the participants described how frustrating it was to look up all the information required for the clinical focus and only use it for medications. One participant described it as "defeating." One participant stated, "Felt like it was a waste while I was doing it."

#### *Use of the Clinical Focus*

Utilization is defined as the participant's expression of the usefulness of the clinical focus to patient care during the clinical day. The participants

described that they felt the clinical focus was necessary to prepare for their clinical day but not useful. The participants felt that the clinical focus was an assignment to be turned in to the instructor as a requirement for the course but had little value to patient care. The participants described that they did not refer to clinical focus during the clinical day because they felt it was not helpful. One participant stated, "I don't think I ever looked at it once I filled it all out." This participant went on to state, "it (clinical focus) really truly did sit in my book bag," The participants did describe that they found the clinical focus very useful with medications. Participants described utilizing the clinical focus when being questioned about medications one participant described, "The only time I pulled it out (clinical focus) was for medications." Participants explained that the clinical focus was not used for anything else.

The participants also described that frequently they did not turn in their clinical focus on a daily basis. After the clinical focuses were collected, the instructor would make comments and return them to the students. Participants described that the focuses were not discussed in detail with the instructor during the clinical day. Most of the priority interventions came from the instructor or the nurse with whom they were working. The teaching method of clinical focus and minimal feedback could have a significant impact on students learning.

#### *Development of Concept Map*

Tr2/C participants did not describe in detail the development of the map or the length of time it took to complete a concept map. One participant did express that over time there was a marked difference between the beginning maps and

the last maps. The participant described that, "My first one (map) was a nightmare, but the last two were pretty good."

Organization of the map, especially layout was important to the participants. Participants described that their maps had to progress in a logical manner to be useful to them. One participant described that the development of a concept map was like starting with a blank slate which allowed the participant to organize and create their map the way they wanted. Another participant described that when developing the map, "you had to have a map that flowed right or it wasn't right, the whole thing had to make sense or none of it really made sense." All participants described that it took a couple of weeks before they became comfortable with the development of concept maps.

#### *Relevance of Concept Mapping to the Client*

Tr2/C Group described the significance of the relationships between the concepts. Participants described how seeing those relationships gave them understanding of the patient care needs. One participant described, "I totally did not get the whole concept of goals and focusing on interventions until I did the maps, it connected." This participant further described, "Concept mapping really helped with labs, I never correlated them, before they meant nothing to me." One participant described that, "some of my interventions did not go with my diagnosis, when I started using maps then it started to click for me."

The participants further described that concept mapping was more specific to their clients and kept them focused on the most important aspects in the clients care. One participant described that concept mapping, "makes you focus

on one or two nursing diagnosis, it helps to narrow things down.” The participants further described that concept maps by design were very succinct. Interventions are not generic but very specific to their clients. One participant stated, “You’re not just throwing on interventions.” Another participant felt that concept maps were very applicable to patient care because, “if you didn’t do the right interventions you couldn’t meet your outcomes.”

#### *Knowledge Attained*

Group two described that concept mapping required a higher level thinking. The participants explained that concept mapping required active thinking on their part as they thought about the relationships between the concepts and how those concepts correlate. One participant stated, “Maps make me think harder.” Another participant stated, “It (concept mapping) makes me think way more than I did with the clinical focus.” Another participant explained that a more in depth type of thinking takes place when developing a concept map. The participant explained, “When students have to create something they have to think about it, and what’s going on in the body.” This promoted a structured process in their thinking. The participant explained, “You’re really thinking like one thing leads to the next.” This process of thinking was further described by another participant, “I really had to correlate with mapping where I didn’t have any connections with the focuses.”

The participants further described how concept mapping assisted with their level of inquiry. The participant described how concept mapping required them to further investigate when concepts did not correlate. One participant

gave an example of how they did not understand the relationship between medications and lab values. The participant described that, "if it (medications and lab values) didn't fit you had to dig harder to find out why and correlate it."

In addition to higher level thinking, participants felt that concept mapping provided direction by a particular way of thinking. One participant stated that concept mapping, "gets you thinking, gets your mind going and points you in a certain way." Another participant felt as though she had a better understanding of what was required of them when delivering patient care, "you have to think about what you are going to create and what I need to do." Another participant felt that by utilizing concept mapping to prepare for patient care improved her performance on tests. "It helps you understand on a test which is more right, because it points you in a direction." She further went on to state, "it doesn't help you know more answers it gets your mind thinking critically."

The participants described that concept mapping provided them the opportunity to see relationships. Seeing those relationships helped the participant develop meaning out of all the information thus increasing their knowledge. One participant described that concept mapping made more sense once they "could see the correlation and pattern." "Concept mapping makes you understand the patho(physiology) and what's going on with the patient, it just all plugs in together."

#### *Satisfaction or Dissatisfaction with the Concept Map*

The participants described that they preferred concept mapping over clinical focuses. The participants found them much more useful and effective.

The participants described that the clinical focus did not provide direction nor did see the relationships between the concepts. One participant stated, "Clinical focus is just information you're not thinking about it." Another participant stated, "I totally did not get the whole concept of goals and interventions until I did maps, it connected." Another participant described that concept mapping provides direction whereas the clinical focus does not, "a clinical focus is just information."

#### *Use of the Concept Map*

The participants in treatment group two did not describe specifically how they utilized their concept maps throughout the clinical day. They did describe in great detail a comparison of concept maps to the clinical focus.

## CHAPTER FIVE

## DISCUSSION

*Discussion of Findings*

One question this study sought to answer was; does the use of concept mapping in the clinical setting have an impact on students' critical thinking scores and, what does the relationship between GPA, age, gender and credit hours have on critical thinking scores? A t-test was performed to determine if the two groups were similar in pretest mean scores. The analysis revealed that the Tr1/Ex group did have a lower pretest mean score (616.2) than the Tr2/C group (640.5). However, the pretest mean scores between the two groups were not significant ( $p=.73$ ).

An ANCOVA was computed to determine if age, GPA and number of credit hours had an impact on the pretest scores. The results revealed that age and number of credit hours did not have an impact the pretest scores between the two groups ( $p=.884$ ). As a result, the two groups were similar in knowledge of the content, age, GPA and credit hours.

The two groups did show a significant increase in post test verses pretest scores. The post test scores revealed that the Tr1/Ex group had a mean of 958.8 ( $p=.006$ ) and the Tr2/C group had a mean of 768.5 ( $p=.028$ ). These results revealed that both groups had learned over the course of the semester. The participant's knowledge of the content had increased and therefore scored higher on the post test than on the pretest.

Both groups showed an increase in post test scores, it was necessary to determine which groups scores had significantly improved. ANCOVA was performed to control for differences in age, GPA, and credit hours as well as taking into consideration the small sample size (n=11). The results revealed that there was a significant difference between groups in terms of change score (p=.022). Tr1/Ex group (concept maps) had a significant increase in post test scores when compared to the Tr2/C group (clinical focus) scores. However, with a small sample size (n=11) it is recommended that this study be reproduced to establish if concept mapping has a significant impact on the post test scores.

According to the HESI criteria, students who score >900 have mastered that particular content whereas, scores under <850 need to do some sort of remediation of the content. The post test scores in the experiment group had a mean score of 958.8 which meets the recommended performance level of >900. However, the Tr2/C group mean score was 768.5 which does not meet the acceptable level of performance >850. These results however, should not be used to predict NCLEX success as the test was a custom exam that was content specific for a particular course. However, this does reflect that the Tr1/Ex group did master the content better than the control group.

The third question of this study was to explore the student's perception of their clinical rotation. The qualitative analysis revealed six general reoccurring themes among the two groups; (a) feelings of anxiety related to hospital clinicals, (b) development of the concept map or clinical focus, (c) relevance to the client,

(d) knowledge attained (e) satisfaction or dissatisfaction, and (f) the utilization of concept maps or clinical focuses in the clinical setting.

### *Feelings of Anxiety*

All participants described feeling anxious about hospital clinicals. The nature of the anxiety was fear of making a mistake or making a wrong decision while caring for their clients. Participants also described they felt a great deal of anxiety as the expectations of the course were higher; they were required to know more and do more, in the clinical setting. Both groups felt as though the fundamental nursing course had not sufficiently prepared them; too much time was spent on less important things.

These feelings of anxiety were also heightened by the participant feeling unprepared. A participant in Tr1/Ex group felt they did not know the content from lecture when they had to apply it at the bedside. Participants in group two felt unprepared in the clinical setting because the preparatory work of the clinical focuses was frequently irrelevant to their clients needs.

All participants agreed that the instructor had a great deal to do with alleviating anxiety. Participants expressed that they liked feedback on their performance from the instructor. The participants liked being questioned about various aspects of their nursing care from the instructor. The instructor's action of questioning provided a sense of validation to the participant's thoughts which decreased their anxiety.

In addition, both groups felt that the instructor challenged them to achieve more. Both groups felt as though they were pushed to accomplish more and

therefore had more experiences which made them feel more comfortable. Both groups felt they had learned a great deal over the semester and had much more confidence in their abilities. This also decreased their feelings of anxiety.

The fourth and fifth research question sought to identify what impact concept mapping had on students critical thinking scores and what impact did perceptions of critical thinking have on critical thinking scores. The results will be discussed according to the last five themes of the analysis in which both groups will be compared and contrasted.

#### *Development of Concept Maps*

Participants in both groups did describe some initial frustration with the development of the map. This was related to the participants feeling unsure as to how they wanted their maps to look. Tr1/Ex group described that initially it took longer to complete a concept map but the more they wrote maps the easier and quicker (45-90 minutes) they became. Tr2/C group did not describe the amount of time it took to develop the concept map. What they did relate was that they felt overwhelmed with the clinical focus as it took a great deal of time to complete (two to five hours).

Both groups felt concept mapping took some time getting used to, but once they became accustomed to it they preferred it to clinical focuses. The development of the maps, particularly the organization and design, were very important to both groups. Tr1/Ex group spent a great deal of time cognitively thinking and planning about how they would design their maps. They described at length, the process they took to create their maps and what resource material

they used. Tr2/C group did not describe a step by step process or the amount of thought they put into the development of their maps. This may be due to the fact that Tr1/Ex group received pre-instruction on concept mapping during the orientation to the study and treatment group two did not. It is unknown what type of instruction Tr2/C group received in subsequent courses.

An interesting finding that the participants in Tr1/Ex group described was that they continued to structure their maps the same way throughout the semester. Furthermore, as the participants advanced on to different courses they continued to design their maps in the same way. Concept mapping provided the participants with a template for thinking about patient care. The participants continued to arrange the information, interpret it, synthesize it and evaluate in the manner that made sense to them.

Tr2/C group did not express if they continued to structure their maps in the same manner. What they did express is that in later semesters when given the choice they continued to use mapping instead of clinical focuses. As one participant stated, "I' am all about maps now."

#### *Relevance of Concept Mapping*

Participants in both groups perceived that concept mapping was much more relevant to the client. Participants felt that maps gave them direction as to what was required of them. Maps helped the participants organize information and focus on the important aspects. Information they obtained was specific and easily applicable to their client's needs. In contrast, Tr2/C group felt that the clinical focus was not specific to their clients needs. They felt that clinical

focuses were more hypothetical in nature and lacked individualization. The participants described that the clinical focus does not provide direction or how to achieve outcomes. As one participant described the clinical focus, “felt like it was a waste” in preparing for their clinical assignment. However, the participants in Tr2/C group did feel that some sort of tool was needed to prepare for clinical assignments.

Participants in both groups described that concept mapping provided meaning to their nursing care. Participants described understanding correlations and relationships to concepts. This understanding allowed the participants to understand their client needs and correlate them to their nursing actions. They described having a better understanding of their client’s needs and how to address those needs. A participant in Tr1/Ex group described that concept mapping helped them understand their “reason for being there”.

Tr2/C group described that clinical focuses lacked correlations and provided no connection for the participants. One participant realized that they had written many interventions which did not relate to the diagnosis. The participant never correlated these until they completed their maps. They described that they felt as though the clinical focus was merely “busywork” and redundant because they would write the same things repeatedly. One participant described that they would “just put anything down to complete the form.” Therefore, the goals and interventions did not have meaning and were neither realistic nor relevant to the clients needs. They did not provide meaning to nursing care nor did it assist the participants in seeing relationships.

Members of both groups felt that concept maps needed to be structured in such a way that it made sense to them. Both groups felt they understood their own maps because they designed them and there was some logic or “flow” to them. Tr1/Ex felt that the clinical focuses were designed by someone else and they did not have the same meaning for them. Tr2/C group two felt concept mapping helped achieve the outcomes, where clinical focuses were not designed that way.

Participants in Tr2/C group did however refer to their clinical focus for medications but not for expected outcomes or nursing interventions. The clinical focus was designed to ensure that the student was prepared to care for the client in the clinical setting. The clinical focus provided the student with a tool to obtain information about the client regarding the pathophysiology of the illness, signs and symptoms, nursing interventions and diagnostic tests. However, the participants described writing the clinical focus just “busywork” or copying “word for word” from the textbook. This view does not allow the participant to attach meaning to the information nor link together the concepts. These are only isolated facts that have little meaning to the student. By using the clinical focus, one can only speculate how much the student understood the actual needs of the client; let alone internalize the information and build on previous knowledge. This may be the reason that the participants in group two heavily relied upon the room nurse and instructor for important nursing interventions. However, weekly written and oral feedback could have significant impact on student learning and expected outcomes.

*Knowledge*

The participants in both groups felt that concept mapping increased their knowledge of patient care. The participants described that concept mapping required a higher level of thinking to see relationships and make connections. They described that mapping required a more intense and in-depth type of thinking. A participant in Tr2/C group described it as they had to “think harder” with concept maps. In contrast, Tr2/C group also described that clinical focuses required no thinking on their part. They were nothing more than a “fill in the blank” form. The participants made no connections or related the concepts to anything.

Concept mapping required the participants to develop a higher level of inquiry. The participants in both groups described that concept mapping required “detective” work. The information had to fit their template and make sense to them. The participants describe a level of inquisitiveness because if they did not understand a relationship they felt the need to investigate further to understand why.

Both groups described that the clinical focus did not require active thinking; it only required copying information out of a textbook. Both groups felt that the clinical focus was just an assignment that had to be turned into the instructor. One participant explained that after a period of time they had accumulated so many they could just copy a previous one to use. Both groups agreed that there was no critical thinking involved.

Participants in both groups described an increase in their confidence level. A participant in Tr1/Ex group felt mapping helped them develop more confidence in the clinical setting and prioritize their client's needs. They described feeling more prepared for the unexpected. Likewise, a participant in Tr2/C group two mapping improved their performance on tests. Mapping did not provide the participant with the correct answers; it gave them the tools to make decisions about which answer was more correct. The participant described, "It gets your mind thinking critically."

#### *Satisfaction or Dissatisfaction*

Both groups expressed that they enjoyed concept mapping. They liked seeing the relationships and making correlations. Although there was some frustration with the initials maps both groups found them very useful and effective. Tr1/Ex group liked having all the relevant information on one sheet of paper. Tr2/C group described the clinical focus as "frustrating", "discouraging" and "defeating" because it was a great deal of work that was frequently irrelevant to their client. This group felt that the clinical focus was not beneficial to them.

#### *Use of Concept Maps or Clinical Focus*

Tr1/Ex group described their concept maps as working documents. During the clinical day the one-page concept map was more useful and easier for the participants to refer to than a five-page clinical focus. They described using the concept map throughout the day to evaluate their patient outcomes and adjust the care as necessary. Furthermore, the participants adjusted their maps to reflect these changes in their clients care.

Tr2/C group did not discuss utilization of the concept maps; just the use of clinical focuses. Group two did not use their clinical focus during the clinical day. They did not refer to them for nursing interventions or to evaluate client outcomes. Any specific interventions came from the room nurse or the nursing instructor. The only time they referred to it was to review patient medications. In addition, participants frequently did not turn them in. Participants described they felt writing a clinical focus was a waste of their time and effort. Participants perceived they were just copying information out of textbook; this requires no active thinking on the part of the student. If there are no relationships to correlate then no meaningful learning takes place. Therefore, they held little value to the participant.

#### *Implications for Nursing Education*

Both groups expressed a great deal of anxiety when it came to their clinical rotation. This anxiety was related to feelings of being unprepared and making dangerous mistakes. These findings are not unusual for first year nursing student, as errors are always a great concern to all nurses. However, feeling unprepared in the clinical setting could be alleviated by using concept mapping. Concept mapping provides direction and assisted the participants in organizing their care. Participants felt better prepared because mapping provided relevance and meaning to nursing care.

Concept mapping applied in the classroom setting may offer the same benefits. Frequently, students struggle with theoretical concepts and feel overwhelmed with the amount of material to be covered. At the same time,

nursing faculty strive to utilize teaching methods to assist students in understanding concepts. Concept mapping should be utilized as a teaching methodology in the classroom because it provides direction and assists students to organize their thoughts. This would provide a focused study plan; and require students to correlate and investigate relationships. Also, it would assist students in focusing on the bigger picture and not just a few important facts.

As the participants developed their maps it became a model for thinking. The model assisted the participants to see relationships and correlate the concepts together. The participants gathered information; organized their thoughts, analyzed the information and synthesized it into the format that had meaning and made sense to them. Based upon this information the participants then made decisions about the care of the client. It also assisted the student to discover new relationships by linking them to previous knowledge.

As participants utilized concept mapping it became their guide for inquiry. As previously noted, maps had to make sense to the individual or it did not “flow right.” The participants had to ensure the goals and interventions were congruent. If they were not, they could not achieve their goals. The participants continued to “dig deep” to find the information so the concepts fit their template and made sense to them. This level of inquiry promotes critical thinking. Participants utilized a specific type of thinking when developing their maps. They not only identified a problem but they sought to solve it through inquisitiveness while ensuring accuracy.

The participants in both groups provided good insight into comparing two approaches for clinical instruction. The participants in Tr2/C described the clinical focus as “just a form to hand in,” or they would write anything down just so they would not hand in an incomplete form. The clinical focus held no meaning; therefore, there was no need to delve any further. Participants were not actively thinking about the relationships between the concepts or linking it to patient care.

As the participants researched, and made correlations they developed a sense of ownership. As the participants developed their maps it took on meaning because they designed it, it was their map. The information became part of their knowledge base. Participants were allowed the freedom to create a map as they see it, without feeling as though they must fit their information into a format developed by someone else. The maps were designed by them and not just a rote assignment designed by someone else.

The feeling of ownership also promoted a sense of empowerment. The participants described the feeling of being in control and having the authority to carry out the necessary care. As one participant described, “I am in charge, like a real nurse.” This promoted a feeling of self confidence. The participants understood exactly what was expected of them and they felt confident in their abilities in the clinical setting. In addition, participants felt mapping provided a way of thinking that gave them more confidence and increased test performance. They did not feel that they knew more of the answers on tests; it was a way of thinking. Mapping provided a model to think about concepts.

Concept mapping provided students with a model on how to think about patient care. It provided direction to the participants on how to organize information, visualize relationships, make correlations, analyze concepts, make interpretations, and evaluate outcomes. These are tools that help students develop critical thinking skills. Throughout this process, participants developed a sense of ownership and empowerment, became more inquisitive, and developed more self confidence. These attributes are all characteristics of critical thinkers.

It is apparent that as faculty, we need to ask the right question and link it with the right activity. We expect students to complete a six-column care plan, provide answers to questions in a written assessment and complete a 5-page a fill-in-the-blank clinical focus. Students are doing exactly what is asked of them. However, as faculty we become frustrated when students fail to see the bigger picture. Here is the problem, expecting higher level thinking with lower level activities. The right questions to ask are; how do these concepts correlate, what is the relationship between concepts, what relevance does this have to your client, what knowledge did you gain and how is that related to what you previously learned? These types of question will promote higher level thinking and as nurse educators we must match the higher level thinking with higher level activities. Nurse educators must move away old methods of the columned care plans, fill-in-the-blank, and question and answer activities and find activities to promote higher level thinking.

#### *Limitations of the Study*

Several problems were encountered during the study. There was limited availability of participants, limited time frame, and failing the theory portion of the course contributed to the small sample size (n=11). Confounding issues arose when it was discovered that the control group had been exposed to concept mapping in the next consecutive class prior to the interviews. However, during the study and at the time of testing, the control group was not exposed to concept mapping only the experimental group.

A potential bias was that the principal investigator knew content that student's were to be tested over. The principal investigator did review the content of the pre- and post-test prior to the test development; however, only the content outline was reviewed by the principal investigator not the test. The research assistants did not review the test outline. The principal investigator and research assistants were knowledgeable about content of the curriculum, but not specific test questions. This would eliminate this bias; however, it does not eliminate the bias of gearing pre and post conferences toward content that could be tested. The principal investigator took precautions to prevent cross contamination; however, it is common practice of faculty to utilize pre and post conferences in this manner to help students apply theory at the bedside.

During the course of the study, feedback given to students on concept maps appeared more in depth than those with clinical focuses. This could have definite impact on student learning and outcomes. Participants who receive regular in depth feedback would have the opportunity to identify misconceptions

and learn from previous mistakes. They would also be reinforcing old knowledge and building on new and improving their skills in writing maps.

Another limitation was the lack of diversity in the population. The sample population of the community college is predominately female and all participants were Caucasian females. There were no males in the study. Two of the participants were ESL.

#### *Further Research*

While conducting this study, several lessons were learned from a researcher's point of view; anticipating and controlling for obstacles. Loosing almost half of the participants to failure in theory and inability to progress in the clinical portion of the course was not anticipated. Limited population contributed since only (n=20) of the participants met inclusion criteria. A small sample size (n=11) made it necessary to add the qualitative arm. However, after obtaining HIC approval time had lapsed and students had already had the next course in curriculum. By the time the interviews were conducted the participants in the control group had been exposed to concept mapping in the next course. At this time, it was necessary re-assigned the participants into treatment groups one (Tr1/Ex) and two (Tr2/C).

Conducting educational research in the clinical setting offers great insight to nurse educators. The qualitative and quantitative methods assisted the researcher in understanding concept mapping, student learning and perceptions. However, when there is limited control over the environment one must anticipate the possibility of all obstacles and plan accordingly.

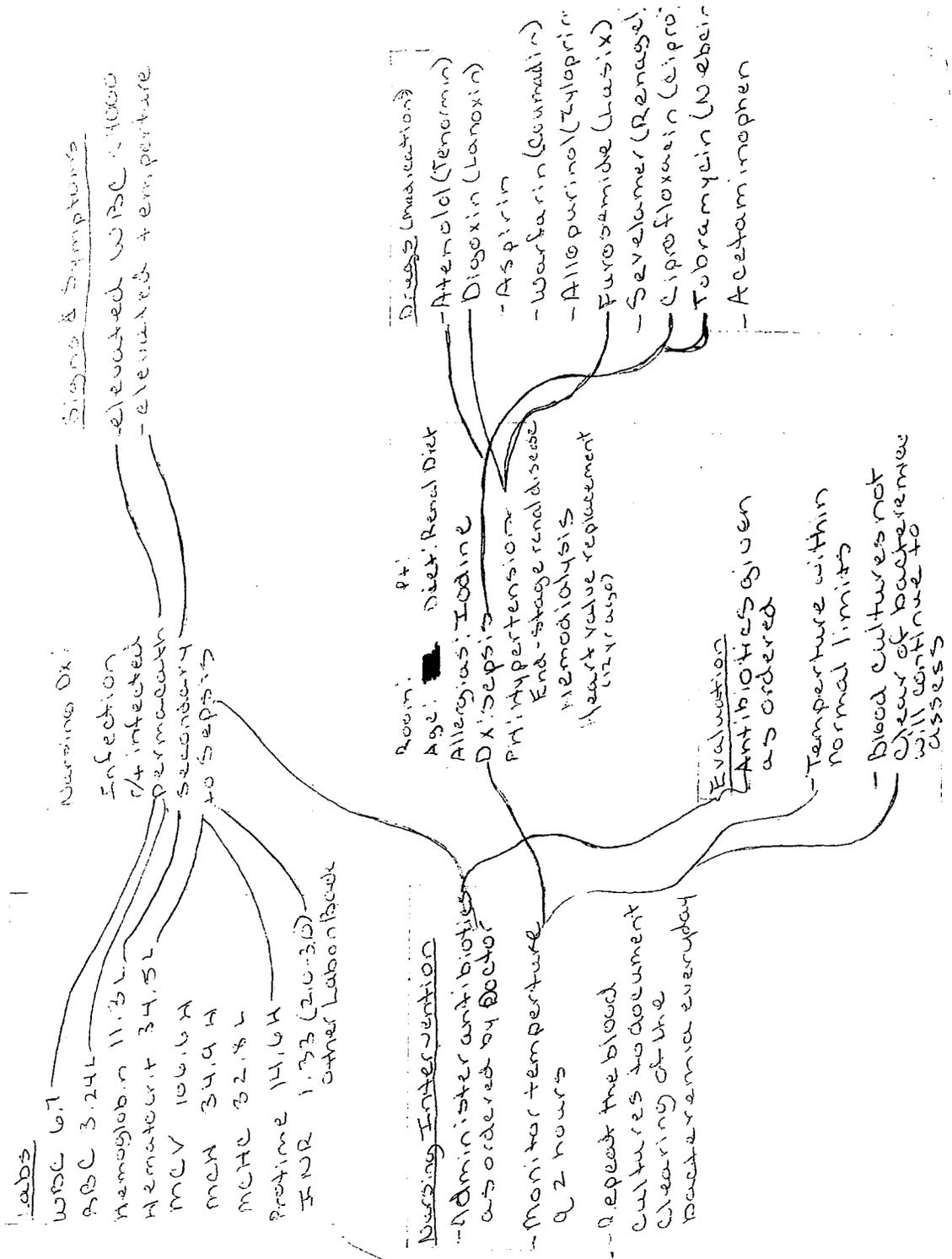
Further research is needed in the area of concept mapping. As this study revealed, concept mapping can have a positive impact on student learning. However, there is limited research on faculty's perception of concept mapping and the impact it has on its use? Does nursing faculty value concept mapping as a teaching methodology? Concept mapping can be time consuming to grade and requires following the student's model of thinking instead of them following the teacher's. Does this deter faculty from using concept mapping?

Another research finding that needs further investigation is the use of concept mapping in the classroom. This study had nine participants withdraw from the study due to failure in the classroom. Utilization of concept mapping in the classroom will provide students with a model in which to organize their thoughts, analyze and seek relationships and critically think in the classroom.

Further areas of interest would be to start concept mapping in prerequisite and fundamentals courses. The intent would be to evaluate if students who utilize concept mapping throughout all of their nursing courses score higher on HESI exit exams than students who use clinical focuses. HESI exit exams do correlate with NCLEX success rates and would students be more likely to pass the NCLEX exam using concept maps throughout their academic years.

Lastly, a replication study is necessary that employs a larger sample size with a more diverse population. As the sample size is small, a study that includes males and females as well as other cultures would be interesting to see if the results are reproducible.

In summary, both groups showed an increase in post test scores. These findings revealed that all participants did learn over the course of the semester however, the concept mapping group did show a significant increase in post test scores when compared to the clinical focus group. The findings also revealed that age, GPA and number of credit hours did not have an impact on the participant's pre or post test scores. The qualitative analysis identified several themes in regard to concept mapping. The participants in both groups provided good insight into comparing two approaches for clinical instruction. Nonetheless, the results must be interpreted with caution because the sample size is small.



## Division of Health Sciences

**STUDENT CLINICAL PERFORMANCE EVALUATION**  
**NURS 106 Basic Adult Nursing/Medical**

Student \_\_\_\_\_ Date \_\_\_\_\_

Student ID# \_\_\_\_\_ Absences \_\_\_\_\_

Faculty \_\_\_\_\_ Facility \_\_\_\_\_

**EVALUATION CRITERIA:**

- Starred (\*) items have been identified as critical behaviors and must all be met satisfactorily (S). An unsatisfactorily (U) grade in any critical behavior will constitute an automatic clinical failure.
- A minimum of 80% (eighty percent) of all evaluated behaviors must be achieved.
- Satisfactory (S) clinical grade: Meets clinical objectives as outlined. Performs safely with minimal guidance.
- Unsatisfactory (U) clinical grade: Does not meet clinical objectives as outlined. Unable to perform safely without constant direct guidance.
- NA - behaviors not assessed or not applicable

**I. PROVIDER OF CARE**

<b>A. ASSESSMENT</b>	<b>S</b>	<b>U</b>	<b>COMMENTS</b>
1. Begins to apply the medical theory concepts in clinical practice.			
2. Begins to collect data relative to the adult client from the client, family, significant others, health record, health care team members and other resources.			
* 3. Carries out a systematic physical assessment of the adult client.			
4. Identifies biopsychosocial needs of the adult client.			
5. Records/reports assessment accurately, neatly, concisely, and in a grammatically correct manner.			

<b>B. ANALYSIS</b>	<b>S</b>	<b>U</b>	<b>COMMENTS</b>
1. Recognizes deviations from normal in the data collected.			
* 2. Identifies appropriate nursing diagnoses which include supporting subjective/objective data.			
3. Begins to provide scientific analysis for each nursing diagnosis.			
4. Begins to prioritize adult clients' problems.			

C. PLANNING	S	U	COMMENTS
1. Identifies individualized adult client goals which are observable, measurable, and realistic.			
* 2. Identifies nursing actions that are realistic and consistent with expected patient outcomes.			
3. States scientific rationale for each nursing action.			
4. Begins to identify teaching opportunities.			

D. IMPLEMENTATION	S	U	COMMENTS
* 1. Implements plan of care for adult clients.			
2. Carries out appropriate nursing interventions in response to the adult client's needs.			
3. Utilizes therapeutic communication skills in interacting with the adult client.			
* 4. Demonstrates the ability to provide safe nursing care.			
5. Demonstrates an attitude of empathy, respect and genuineness in delivering care.			
* 6. Calculates dosages correctly and administers medication utilizing related principles.			
7. Records/reports appropriate information accurately, neatly, concisely and in a grammatically correct manner.			
8. Implements an established teaching plan for adult client with assistance.			

E. EVALUATION	S	U	COMMENTS
1. Compares the results of nursing actions with expected outcomes.			
2. Identifies the need for reassessment for further planning.			
3. Assists in revising care plans as necessary.			
4. Records/reports the adult client's response to nursing interventions accurately, neatly, concisely and in a grammatical correct manner.			

## II. MANAGER OF CARE

	S	U	COMMENTS
1. Seeks assistance from appropriate resources as necessary.			
2. Interacts appropriately with the adult client, family and/or significant other.			
3. Establishes positive rapport with instructor, peers and clinical personnel.			
4. Demonstrates consistent punctuality in all aspects of			

clinical performance.			
5. Begins to demonstrate knowledge of medical diagnoses, medications and lab tests related to adult client's care.			

III. MEMBER OF THE DISCIPLINE

	S	U	COMMENTS
1. Demonstrates responsibility/accountability for own actions.			
2. Identifies own strengths and weaknesses and accepts suggestions.			
3. Conforms to dress and behavior codes.			
* 4. Maintains legal and ethical standards.			
* 5. Maintains appropriate standards of confidentiality.			
6. Participates effectively as a member of a group.			
* 7. Meets attendance requirements per policy.			

SUMMARY:

1. PAPERS: S \_\_\_\_\_ U \_\_\_\_\_ NA \_\_\_\_\_

Comments:

2. CRITICAL BEHAVIORS: S \_\_\_\_\_  
U \_\_\_\_\_

TOTAL: S \_\_\_\_\_ U \_\_\_\_\_  
NA \_\_\_\_\_

Clinical Grade:

Satisfactory (S) \_\_\_\_\_ %

Unsatisfactory (U) \_\_\_\_\_ %

\*\*\* If this is a clinical failure, is this a safety failure?

Yes \_\_\_\_\_ No \_\_\_\_\_

Faculty Signature \_\_\_\_\_

Date: \_\_\_\_\_

**DISCLAIMER:**  
Student evaluations are based on individual clinical performance during a specified time frame within a semester.  
  
Evaluations do not necessarily constitute written endorsement or recommendation for a student for potential employment.

Comments:

Student Signature \_\_\_\_\_

Date: \_\_\_\_\_

Comments:

**NURSING CARE PLAN FORM**

Client's Initials \_\_\_\_\_ Age \_\_\_\_\_ Student Name \_\_\_\_\_  
 Gender \_\_\_\_\_ Room # \_\_\_\_\_ Date(s) Cared For \_\_\_\_\_  
 Date of Admission \_\_\_\_\_ Instructor's Name \_\_\_\_\_  
 Medical Diagnosis \_\_\_\_\_  
 Surgery (if any) \_\_\_\_\_  
 Current Physicians Orders:  
 Activity \_\_\_\_\_ List Meds/IV's Below:  
 Diet \_\_\_\_\_  
 Daily Labs \_\_\_\_\_  
 Treatments \_\_\_\_\_

Nursing Diagnosis	Analysis of Problem (Pathophysiology)	Client Expected Outcomes (short & long term) With Expected Outcome Criteria	Nursing Interventions	Scientific Principles	Evaluation of Expected Outcomes

**\*\*\* Keep all assessments and care plans for your future reference and to have available upon request for future instructors.**

**DIVISION OF HEALTH SCIENCES  
NURSING PROGRAM  
NURSING PROCESS GUIDE/EVALUATION CRITERIA**

**1. NURSING DIAGNOSIS (NANDA APPROVED, CAPITALIZED)**

- Yes \_\_\_ No \_\_\_    A. Is there a three-part statement for actual problems?  
 Yes \_\_\_ No \_\_\_    B. Is there a two-part statement for potential problems?  
 Yes \_\_\_ No \_\_\_    C. Is the stated etiology related to the problem?  
 Yes \_\_\_ No \_\_\_    D. Are the objective and subjective data ("defining characteristics" for this NANDA) adequate, identified in the patient's data, complete and labeled as such?

**2. ANALYSIS (SCIENTIFIC EXPLANATION OF THE PROBLEM/PATHOPHYSIOLOGY)**

- Yes \_\_\_ No \_\_\_    A. Does the analysis include an explanation of how the etiology created this client's problem?  
 Yes \_\_\_ No \_\_\_    B. Does the analysis/explanation include pathophysiology, physical signs, and/or psychosocial principles?  
 Yes \_\_\_ No \_\_\_    C. Has the source of the information been credited?  
 (Ex. Lewis, Heitkemper & Dirksen, 2000, p. 1291-2)

**3. CLIENT EXPECTED OUTCOMES**

- Yes \_\_\_ No \_\_\_    A. Are the outcomes client oriented?  
 Yes \_\_\_ No \_\_\_    B. Are the expected outcomes related to the stated nursing diagnosis and corresponding subjective and objective data?  
 Yes \_\_\_ No \_\_\_    C. Are there short-term (one week or less) and long-term (longer than one after discharge from hospital) expected outcomes for each nursing and are they labeled as such (i.e. ST and LT, with dates for  
 Yes \_\_\_ No \_\_\_    D. Are the expected outcomes realistic, attainable and individualized?  
 Yes \_\_\_ No \_\_\_    E. Are the expected outcomes written in measurable terms (active verbs) with realistic dates and times?  
 F. Are there criteria/indicators upon which to base the evaluation of each expected outcome?

**4. NURSING INTERVENTIONS**

- Yes \_\_\_ No \_\_\_    A. Are the interventions written clearly (what, when, how often, how long  
 Yes \_\_\_ No \_\_\_    B. Does the planning reflect creativity (i.e. using a variety of resources for interventions)?  
 Yes \_\_\_ No \_\_\_    C. Are the interventions individualized?  
 Yes \_\_\_ No \_\_\_    D. Has the client/family teaching been included?  
 Yes \_\_\_ No \_\_\_    E. Has the discharge planning been included, if appropriate?  
 Yes \_\_\_ No \_\_\_    F. Do the interventions reflect the increasing complexity of care that is expected of the student as they progress through the nursing program?

**5. SCIENTIFIC PRINCIPLES/RATIONALE**

- Yes \_\_\_ No \_\_\_    A. Is the scientific principle given for each of the interventions?  
 Yes \_\_\_ No \_\_\_    B. Does the scientific principle explain physiological and/or psychosocial

principles of how the intervention is therapeutic for this client?  
 Yes \_\_\_ No \_\_\_ C. Has the source of the information been credited?

#### 6. EVALUATION OF EXPECTED OUTCOMES

- Yes \_\_\_ No \_\_\_ A. Is there an evaluation of each expected outcome and is it labeled as  
 Yes \_\_\_ No \_\_\_ B. Are there adequate reassessment data to compare with the expected  
 criteria /indicators?  
 Yes \_\_\_ No \_\_\_ C. Does the evaluation of the expected outcome reflect the time you last  
 the client? (i.e. Don't pretend you were there on a day you were not)  
 Yes \_\_\_ No \_\_\_ D. Does the evaluation indicate whether the expected outcome was met, partially  
 met, or unmet?  
 Yes \_\_\_ No \_\_\_ E. If the expected outcome is not met or is partially met, does the evaluation  
 indicate either the need for: a new or revised outcome, additional interventions,  
 or continuation with the current plan of care?

## Concept Map Evaluation Tool

	Incomplete	Partially Complete	Complete
Assessment	0	½	1
Medical diagnosis identified			
Pathophysiology is defined			
Surgical Procedure is defined			
Past medical/surgical history			
Labs & Diagnostic tests identified			
Labs & Diagnostics linked to Nursing Diagnosis/Interventions			
Medications identified			
Medications linked to Interventions			
Signs & Symptoms identified			
Correctly links assessment to Nrsg. Diagnosis			
Analysis			
Correctly identifies NANDA (2 Diagnosis)			
Correctly prioritizes NANDA			
Correctly identifies key assessment data (subjective/objective) to NANDA			
Correctly identifies physiological or psychological problems			
Correctly identifies educational needs			
Planning			
Correctly lists appropriate Expected Outcomes (ST & LT) with time frame			
Correctly links Expected Outcomes to NANDA			
Correctly states all aeb objectives (NOC)			
Correctly lists all interventions (NIC)			
Correctly links interventions to E.O.			
Correctly lists communication/ psychological interventions			
Evaluation			
Evaluation of Expected Outcomes w/ date			
Describes reassessment data toward outcome objectives			
Evaluates if goal met, unmet or partially met			
Evaluates how POC should be revised			
Correctly links evaluation to E.O.			
Total Score			

Total Points \_\_\_\_\_ /26 = \_\_\_\_\_ %



HUMAN INVESTIGATION COMMITTEE  
 4201 St. Antoine Blvd., UHC 6-G  
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## NOTICE OF EXPEDITED APPROVAL

TO: Candice L. Pickens  
 (College of Education)  
 2357 Delwood Drive  
 Clio, MI 48420

FROM: Ellen Barton, Ph.D. Ellen Barton  
 Chair, Behavioral Institutional Review Board (B3)

DATE: April 21, 2005

RE: HIC#: 0310705B3E Expiration Date: April 20, 2006  
 Study Title: Concept Mapping: Method to Improve Critical Thinking  
 Sponsor: Mott Community College

The above-referenced Protocol and Informed Consent were **APPROVED** following Expedited Review (Category 7\*) by the Chair for the Wayne State University Institutional Review Board (B3) for the period of **April 21, 2005 through April 20, 2006**.

**MARK YOUR CALENDAR**  
**Deadline for Re-Review: Monday, February 27, 2006**  
**To be reviewed and reported at the next convened B3 IRB meeting**

This approval does not replace any departmental or other approvals that may be required.

Federal regulations require that all research be reviewed at least annually. **It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.** You may not continue any research activity beyond the expiration date without HIC approval.

- If you wish to have your protocol approved for continuation after the above approval period, please submit a completed Continuation Form at least six weeks before the expiration date. It may take up to six weeks from the time of submission to the time of approval to process your continuation request.
- **Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unapproved research and can never be reported or published as research data.**
- If you do not wish continued approval, please submit a completed Closure Form when the study is terminated.
- All changes or amendments to your protocol or consent form require review and approval by the Human Investigation Committee (HIC) **BEFORE** implementation.
- You are also required to submit a written description of any adverse reactions or unexpected events on the appropriate form (Adverse Reaction and Unexpected Event Form) within the specified time frame.

\*Based on the Expedited Review List, revised November, 1998

C: Dr. Shlomo Sawilowsky, 351 Education



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www.hic.wayne.edu

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## Notice of Expedited Amendment Approval

To: Candice L. Pickens  
(College of Education)  
2357 Delwood Dr.  
Clio, MI 48420

From: Ellen Barton, Ph.D.   
Chair, Behavioral Institutional Review Board (B3)

Date: April 28, 2005

Re: HIC#: 0310705B3E  
Study Title: Concept Mapping: Teaching Method to Improve Critical Thinking  
Sponsor: Mott Community College

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The following requested change(s) to the above-referenced protocol have been **APPROVED** following **expedited review**, and are effective immediately.

The following changes were initiated by the PI:

Consent Form (revised 04/20/05): Revised to reflect an increase in the number of participants to 30 and to include the G.P.A. and demographics.

Protocol (Enrollment Criteria/Other): Changes same as above.

All items submitted on 4/27/2005 and received in the HIC Office on 4/28/2005 .

This protocol, as amended, will expire on 04/20/06 .



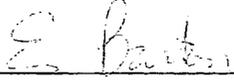
HUMAN INVESTIGATION COMMITTEE  
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FAX: (313) 993-7122  
<http://hic.wayne.edu>

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## NOTICE OF EXPEDITED AMENDMENT APPROVAL

To: Candice Pickens  
Teacher Education

From: Ellen Barton, Ph.D.   
Chairperson, Behavioral Institutional Review Board (B3)

Date: October 11, 2005

RE: Protocol #: 0506002211  
Protocol Title: Concept Mapping: Method to Improve Critical Thinking  
Sponsor: 062135  
Reference #1: 0310705B3E  
Reference #2:

Expiration Date: April 20, 2006

The following requested change(s) to the above-referenced protocol have been **APPROVED** following **expedited review**, and are effective immediately.

- Addition of a qualitative arm to the study (one hour taped interview), reflected in the consent form (dated 4/20/05).



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## NOTICE OF EXPEDITED CONTINUATION APPROVAL

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To: Candice Pickens

From: Ellen Barton, Ph.D.   
 Chairperson, Behavioral Institutional Review Board (B3)

Date: May 17, 2006

RE: IIC #: 0310705B3E  
 Protocol Title: Concept Mapping: Method to Improve Critical Thinking  
 Sponsor: MOTT COMMUNITY COLLEGE  
 Coeus #: 0506002211

Expiration Date: May 16, 2007

The above-referenced Continuation and following information (if applicable) were **APPROVED** following Expedited Review by the IRB Chairperson for the Wayne State University Behavioral Institutional Review Board (B3) for the period of 05/17/2006 through 05/16/2007.

- Closed to accrual 12/1/05.
- Note to PI: Data for this protocol collected between April 20, 2006 and May 17, 2006 is unapproved research, cannot be included with data collected during an approved period, and can never be reported or published as research data.

This approval does not replace any departmental or other approvals that may be required.

Federal regulations require that all research be reviewed at least annually. **It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.** You may **not** continue any research activity beyond the expiration date without HIC approval.

- If you wish to have your protocol approved for continuation for another year, please submit a completed Continuation Form\* at least six weeks before the expiration date. It may take up to six weeks from the time of submission to the time of approval to process your continuation request.
- **Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unapproved research and can never be reported or published as research data.**
- If you do not wish continued approval, please submit a completed Closure Form\* when the study is terminated.
- All changes or amendments to your protocol or consent form require review and approval by the Human Investigation Committee (HIC) **BEFORE** implementation.
- You are also required to submit a written description of any adverse reactions or unexpected events on the appropriate form (Adverse Reaction and Unexpected Event Form\*) within the specified time frame.

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**ABSTRACT****CONCEPT MAPPING: METHOD TO IMPROVE CRITICAL THINKING**

by

CANDICE L. PICKENS

August 2007

Advisor: Dr. Shlomo Sawilowsky

Major: Curriculum and Instruction

Degree: Doctor of Education

In an effort to prepare nursing students to deliver safe quality care, critical thinking becomes essential to nursing education. Nurse educators are continually looking for methods that will enhance or improve critical thinking skills. One method that educators have used is concept mapping. Concept mapping allows students to organize their thoughts and see relationships between concepts and plan nursing care accordingly.

The intent of this study was to examine the relationship between concept mapping and critical thinking in first year nursing students. The study employed a quantitative and qualitative design. The quantitative was a pre and post test quasi-experimental design with a non-randomized control group and intervention group. The qualitative design utilized a phenomenological approach to examine the participants lived experience. A pre and post test was custom designed by

HESI based on the participants' current curriculum. Demographic data (n=11) was collected on GPA, number of credit hours, age and gender.

The pretest mean scores were not significant between the two groups ( $p=.825$ ). ANCOVA revealed that there was no variable (GPA, age, gender or number of credit hours) that had significant impact on pretest scores ( $p=.884$ ). A paired t-test revealed that both groups had a significant increase in post test scores (control group  $p=.028$ , experiment group  $p=.006$ ). An independent t-test revealed that the experimental group mean change score was significantly higher than the control group ( $p=.018$ ). ANCOVA was then utilized to examine if the mean change scores were significant while adjusting for the other covariates and taking into consideration the small sample size (n=11). The results revealed that the concept mapping group had a significantly greater improvement on their post test scores when compared to the control group scores while controlling for other covariates ( $p=.022$ ).

The qualitative analysis revealed that concept mapping provided the participants with direction on how to prepare for clinical assignments. As the participants developed their concept maps it became their model for thinking. As the participants created their model they developed a sense of ownership and empowerment of the knowledge. The participants further described that concept mapping required a higher level of thinking. Participants described that concept mapping helped them to critically think as it required them to research and investigate relationships.

## AUTOBIOGRAPHICAL STATEMENT

CANDICE L. PICKENS

Currently, teaching full-time at Mott Community College Associate Degree Nursing Program. 22 years of work experience in critical care with positions held as staff nurse, case management, clinical nurse specialist and research coordinator.

### Educational Background

- 2002-present: Doctoral candidate at Wayne State University in Curriculum & Instruction. Dissertation: Concept Mapping: Methods to Improve Critical Thinking
- 1995-1999: Saginaw Valley State University. Master of Science in Nursing with a major in Nursing Education. Thesis: Relevance of Post-op Education in Mid-Life Women Recovering from CABG Surgery.
- 1991-1993: University of Michigan graduate with a Bachelor of Science in Nursing.
- 1982-1985: Mott Community College with an Associate Degree in Nursing.

### Professional Activities

2004-2005: Committee Member Masters Thesis: Saginaw Valley State University graduate student. Topic: Predictability of Confusion in Elderly.

2003–present: Parish Nurse for St. Charles and Helena Catholic Church. Organize educational offerings and health screenings.

1999-2001 Committee Member Masters Thesis: University of Michigan-Flint graduate student. Topic: Congestive Heart Failure.

### Professional Memberships

2001-2002 American Heart Association – Advisory Board of Genesee County

1998- present Sigma Theta Tau

### Certifications

1987- present ACLS certified