2011

The effects of concept care maps on critical thinking in baccaalureate nursing students

Sarah Michelle Fry

THE EFFECTS OF CONCEPT CARE MAPS ON CRITICAL THINKING

IN BACCALAUREATE NURSING STUDENTS

_____

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

_____

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Nursing:

Academic Nursing Education

_____

by

Sarah Michelle Fry

December 2011

THE EFFECTS OF CONCEPT CARE MAPS ON CRITICAL THINKING

IN BACCALAUREATE NURSING STUDENTS

———————————————

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

———————————————

by

Sarah Michelle Fry

December 2011

Approved by:

Dr. Marilyn Stoner, Chair, Nursing   11/30/11

                                                      Date

Dr. Margaret Beaman

Dr. Ora Robinson

ABSTRACT

The purpose of this study with first year
Baccalaureate nursing students was to test the effects of
care mapping strategies on critical thinking skills.
In a constantly evolving field of nursing, it is evermore
important that new graduates are able to assimilate
assessment data and use critical thinking to derive sound
clinical judgment. Concept mapping is believed to support
this endeavor.

Using a quasi-experimental equivalent comparison
group, the aim of this study was to compare the critical
thinking of students using concept maps and students using
linear methods to care planning activities. The hypothesis
of this study suggests students that receive concept care
map instruction will demonstrate improved critical
thinking, evidenced by a 10% higher post instruction score,
when compared to students that receive traditional care
plan instruction.

Descriptive statistics were used to compare mean
scores on three care plans submitted throughout a 10-week
period. The experimental group used concept mapping
techniques for care planning purposes while the comparison
group used linear care planning methods. Student t-test

demonstrated no significant difference (p=.451, α=.05) between groups in the first care plan. The Mann-Whitney U test demonstrated a significant difference between group mean scores of the first care plan and the third care plan.

Results from this study indicate that concept mapping in a clinical setting supports meaningful learning and could therefore, support critical thinking in nursing education.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the assistance of several people.

I would first like to mention what a wonderful privilege it has been to be guided and encouraged by Dr. Marilyn Smith-Stoner, committee chair. Both her and Dr. Margaret Beaman's knowledge, experience, and unwavering support were the key to the completion of this study.

I would also like to thank Dr. Ora Robinson for her contribution. Thank you for taking me under your wing as I began my adventure in nursing education. I appreciate your guidance and support.

A big thanks to my research assistant and fellow postgraduate student, Kevin Durr, for all his help. Without your organization and tech skills, this endeavor could have been much more difficult.

A special thank you to my family for their patience and support. I appreciate my parents for encouraging me to pursue this degree. The journey has been challenging, emotional, and exciting and I am so happy to have had you standing by me in the attainment of my latest goal.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

Background and Significance

As part of their daily duties, nurses are required to use critical thinking skills to make clinical judgments and handle complex problems. Nurses need to have the ability to gather evidence and make conclusions based on their knowledge and assessment findings. Evidence shows that new graduate nurses are deficient in these skills (Wilgis & McConnell, 2008). Many of the traditional teaching strategies in nursing education focus on outcomes, and less on student learning. Concept mapping has been a proven strategy to improve the critical thinking skills of nursing students (Abel & Freeze, 2006; Baugh & Mellott, 1998; Daley, Shaw, Balistrieri, Glasenapp & Piacentine, 1999, Hicks-Moore & Pastirik, 2006; Pickens, 2007). Concept mapping has also been a proven strategy to improve meaningful learning (All, Huycke, & Fisher, 2003; Akinsanya & Williams, 2004; Baugh & Mellott, 1998).

Planning of Care

Planning of patient care has long been a part of nursing education. Regulatory and professional associations such as The American Nurses Association (ANA), The Joint Commission (TJC) and the American Association of Colleges of Nursing (AACN) address the importance of planning patient care. Care planning has improved patient outcomes by increasing the organization of care with collaborative team members. "Planning minimizes the impact that external and internal factors have on achieving a goal by directing all efforts and resources towards a common goal" (Leach, 2008, p. 1729). With this in mind, nursing education curricula focus on patient planning of care. The format for these care plans is typically linear, comprised of forms to be filled out by the students (Mueller, Johnston & Bligh, 2001, 2002).

In a move to change linear strategies in teaching and learning, Novak developed the concept map in 1972. This technique first was emphasized in learning science-based material, but more recently, has been used in various fields including nursing education (Baugh & Mellott, 1998).

Statement of the Problem

Care plans are used to assess the ability of the student to plan patient care. The teaching strategies, used for care planning, do not promote meaningful learning or critical thinking. The literature indicates that using concept mapping techniques for writing care plans improves critical thinking and promotes meaningful learning.

Purpose of the Study

The purpose of this study with first year nursing students is to test the effects of concept maps for care plan writing on critical thinking skills. This study looked at one hypothesis: Students that receive concept care map instruction will demonstrate improved critical thinking, evidenced by a 10% higher post instruction score, when compared to students that receive traditional care plan instruction.

Theoretical Framework

The strategy of concept mapping is based on the theory of Assimilation of Learning proposed by David Ausubel (1977). This theory proposed a distinction between rote and meaningful learning. Ausubel proposed that students

3

must be able to connect new discovery with previously learned knowledge. Students must be involved in the discovery of the information and then connect, relate and integrate the new information with previously acquired knowledge for meaningful learning to be present. This will assist in transfer of the information to long-term memory. Ausubel (1977) stated that one reason for rote learning is that "pupils are frequently required to learn the specifics of an unfamiliar discipline before they have acquired an adequate foundation of relevant and otherwise appropriate anchoring ideas" (p. 167).

Concept Mapping

In Novak and Gowin's Learning How to Learn (1984), the authors discuss concept mapping as a "way to help students and educators see the meaning of learning materials" (p. 1). The human brain has a poor memory for details, however the brain's ability to recall images is better. Concept mapping can allow a student to recognize patterns in images in order to learn and recall information. The authors theorize that knowledge is constructed not discovered. Discovery plays a role in production of new knowledge. "Construction of new knowledge begins with our observations of events or objects through the concepts we already

4

possess" (p. 4). Novak and Gowin also distinguish differences in learning and knowing. Learning is personal and idiosyncratic; knowing is public and shared" (p. 5).

Novak and Gowin's theory stresses the importance of educational strategies aimed at increasing meaningful learning. Concept mapping is an excellent example, "Concept mapping is a technique for externalizing concepts and propositions" (Novak & Gowin, 1984, p. 17).

Summary

To improve patient care and to satisfy regulatory demands, care planning remains crucial in nursing education curriculum. It is imperative that teaching strategies for care planning promote meaningful learning for nursing students to improve their critical thinking skills needed for their future careers. Concept maps remove the linear nature out of learning and conceptualize content. According to Schuster (2008), "students demonstrate critical thinking when organizing data logically in a concept care map" (p. 50). The use of these maps has been implemented in various areas of study, successfully improving the student learning, making it more meaningful. Concept mapping also

has been shown through many studies to improve critical
thinking.

CHAPTER TWO

LITERATURE REVIEW

To improve critical thinking in nurses and nursing

students, nursing education must move towards new teaching

strategies and methodologies. This shift from rote

learning towards meaningful learning has prompted research

on effective measures to improve critical thinking in

nursing education programs.

Operational Definitions

Critical Thinking

Studies have made numerous efforts to define and

measure critical thinking. According to information posted

on their website, in 1987, The Center of Critical Thinking,

defined critical thinking as the "intellectually

disciplined process of actively and skillfully

conceptualizing, applying, analyzing, synthesizing, and/or

evaluating information gathered by observation, experience,

reflection, reasoning or communication". Many researchers

(Abel & Freeze, 2006; Daley, 1999; Hicks-Moore & Pastirik,

2006) refer to the American Philosophical Association's

(APA) Delphi Report (1990) definition of critical thinking.

This definition states, "Critical thinking is the process
of purposeful, self-regulatory judgment. This process
gives reasoned consideration to evidence, contexts,
conceptualizations, methods, and criteria" (Facione, 1990,
p. 2). Conceptualization is a common theme in defining
critical thinking and is supported by concept mapping. For
the purpose of this study, critical thinking will be
measured using an evaluation tool from Schuster (2008).

Concept Map

A concept map uses a graphic display presented in a
hierarchal design that links concepts with linking words. A
concept map includes concepts that are usually contained in
some sort of shape; propositions, which are a statement
about the concept; and cross-links that designate a
relationship between concepts (Novak & Canas, 2008).
Concept maps can range from structured flow carts to
individualized creative graphics. A concept map is a
representation of the learner's interpretation of ideas
using concepts and linking words in hierarchical order
(Irvine, 1995). According to Novak and Canas (2008), a
concept map is a diagram used to represent various concepts
linked by propositions. See Appendix A. This map closely

resembles the learners' cognitive processes and displays thinking processes (Wheeler & Collins, 2003).

The literature describes various terms for mapping techniques. Concept mapping, by definition has a hierarchial design with the "most inclusive, most general concepts at the top of the map and the more specific, less general concepts arranged hierarchically below" (Novak & Canas, 2008, p.1-2). Other mapping terms used in literature include "mind-mapping" which does not require hierarchy where concepts "coexist on an equal playing field" (Mueller et al., 2002). The authors, Ellerman, Kataoka-Yahiro & Wong (2006), presented logic models to enhance critical thinking. These logic models are tools used to promote logic, of which concept mapping, is subsumed under this category. Smith (1992) utilized the Vee heuristic developed by Gowin in 1981. This method represents the coming together of theory and practice. Reynolds (1994), also used a heuristic method called patho-flow diagramming. This method "illustrates the physiological and/or pathophysiological basis for nursing process" (p. 333).

For the purposes of this study, the term concept mapping will represent the traditional definition without

the hierarchial component. Many studies have utilized this definition of a concept map (Abel & Freeze, 2006; Adema-Hannes & Parzen, 2005; Baugh & Mellott, 1998; Daley et al., 1999; Hicks-Moore & Pastirik, 2006; Kern, Bush & McCleish, 2006; Pickens, 2007).

Meaningful Learning

Meaningful learning is also referred to as discovery learning by Ausubel (1977). He states that the "essential feature of discovery learning, is that the principal content of what is to be learned is not given but must be discovered by the learner before he can internalize it" (p. 162). New concepts must be integrated with previous knowledge in order to be "meaningful". Ausubel states that meaningful learning "takes place if the learning task is related in a nonarbitrary and nonverbatim fashion to the learner's existing structure of knowledge" (p. 163). Essentially, meaningful learning is when learning is personalized to the student. Ausubel proposed three conditions of meaningful learning. First material should be presented in a conceptually clear manner with language familiar to the learner. Second, the learner must possess some prior knowledge in which to connect new information.

Third, the learner must choose to learn meaningfully, rather than by memorization (Novak & Canas, 2008).

Care Plan

A care plan, for purposes of this study, is an assignment that includes planning patient care. The care plans consists of forms to be filled out by the student based on information gathered on their assigned patient. The data are used to write nursing diagnosis, patient outcomes, nursing interventions and outcome evaluations. This information is documented within the forms and turned in to the instructor for feedback and a grade. See Appendix B.

Care Map

A "care map" is a term used by Schuster (2008) to describe a care plan that is in a concept map format. The care map includes all the data that a care plan includes. Instead of the usual linear forms in a care plan, the data are placed in a concept map that represents the students thought processes, hierarchy and conceptualization. See Appendix C.

Related Studies

Concept Mapping

Concept mapping has been used as learning and teaching strategy in nursing curricula. A common implementation of concept mapping is to utilize them in the clinical setting. Studies have implemented concept maps as clinical preparation in which students are responsible for gathering data on the patient and summarizing that data in a concept map format (August-Brady, 2005; Adame-Hannes, 2005; Daley et al., 1999; Kathol, Geiger, & Hartig, 1998; Mueller et al., 2002).

Concept mapping has been used to assess students' knowledge (Daley, 1996; Hsu, 2004; Hsu & Hsieh, 2005; Pilcher, 2009; Roop, 2002; Senita, 2008; Smith, 1992; Taylor & Wros, 2007; Taylor & Littleton-Kearney, 2011; Wilkes, Cooper & Lewin, 1999; Wilgis & McConnell, 2008). Daley (1996) used concept mapping to evaluate students' clinical preparation and assess students' knowledge of the nursing process. The concept maps pointed out discrepancies in understanding among staff, students and the syllabus as well as demonstrated the students' progress in their learning processes. Hsu (2004) used concept maps to examine the effects on learning outcomes with problem

based learning scenarios. Students watched a problem based scenario and then made a concept map by drawing or applying concepts presented in their nursing class. Although 43 of 92 students had previous instruction on concept mapping prior to this scenario presentations, the investigator found no significant differences between the two groups.

Due to the nature of nursing education and the limited number of students within individual programs, consistent findings in these studies are small sample sizes (Hsu & Hsieh, 2005; Pilcher, 2009; Wilgis & McConnell, 2008). The small sample sizes required these studies to use descriptive statistics rather than inferential. Although the studies may not have been statistically significant, the results certainly pointed to academic significance.

Numerous studies have examined the effects concept mapping has on critical thinking in nursing students (Abel & Freeze, 2006; Baugh & Mellott, 1998; Daley et al., 1999, Hicks-Moore & Pastirik, 2006; Pickens, 2007) or stimulates (Adema-Hannes & Parzen, 2005; Kern et al., 2006; King & Shell, 2002; Molaison, Taylor, Erickson & Connell, 2009; Mueller et al., 2001, 2002; Reynolds, 1994). Wilgis and McConnell (2008) compared the critical thinking skills of new graduate nurses in an orientation program by

implementing concept maps to clinical case studies. Wilgis and McConnell used a concept map tool developed by Schuster (2003) to score initial concept maps with the first scenario and then the final map with the third scenario. There was a positive increase in composite map scores indicating improved critical thinking. Similarly Abel and Freeze (2006) and Hsu and Hsieh (2005) used concept mapping scores to measure critical thinking of students in Associate Degree Nursing programs. Both studies showed an increase in concept map scores from the first concept map to the last concept map completed by students in the trial period indicating an increase in critical thinking. Studies conducted with baccalaureate nursing programs have yielded similar results in studies by Daley et al. (1999) and Hicks-Moore and Pastirik (2006). The instructor in the Hicks-Moore and Pastirik study (2006) reported increased critical thinking by students. The students in the study by Daley et al. (1999) increased their mean critical thinking scores from 40.38 to 135.55.

Given the data of how concept maps improve meaningful learning and increase critical thinking, many nursing instructors are using concept mapping for care planning activities (Abel & Freeze, 2006; Castellino & Schuster,

2002; Hicks-Moore & Pastirik, 2006; Hinck, et al., 2006; Kern et al., 2006; Logan, 2001; Maneval, Filburn, Deringer & Lum, 2011; Mueller et al., 2001; Pickens, 2007; Schuster, 2000, 2008; Wheeler & Collins, 2003). The Abel and Freeze (2006) study consisted of ADN students completing four concept maps that depicted the nursing process on their assigned clients in the hospital clinical rotation. Scores from an earlier concept map were compared to scores from a concept map completed later in the course work. Scores were obtained using criteria from Novak and Gowin (1984). Both the scores from the cross-links, which "reflect meaningful relationships among segments of the hierarchies" (p. 361) and overall mean scores significantly increased each semester.

Hinck, et al. (2006), conducted similar research using concept map care plans. The maps were compared at the beginning of the semester and the end of the semester. A total of seven maps were developed by students and the first and seventh were scored using criteria developed by the authors. The investigation revealed a "significant increase in comprehensiveness of CMs over the course was found with less variation among student scores, as evidenced by the standard deviation" (p. 27).

Maneval, et al. (2011) used the National League of Nursing's Critical Thinking Exam (NLNCT) to determine if students that used concept map care plans had an increased critical thinking score when compared to students that used linear care plans. The research demonstrated that students using linear care plans had a significantly higher critical thinking score on the NLNCT than those students that utilized concept map care plans.

Student Perceptions

Student reported opinions on concept mapping have varied. Students reported an increase in clinical preparedness (Abel & Freeze, 2006; Hicks-Moore & Pastirik, 2006; Pickens, 2007; Senita, 2008). Overall students provided positive feedback on the use of concept mapping but reported that the process was time consuming (Abel & Freeze, 2006; Baugh & Mellott, 1998; Daley, et al., 1999; Ellermann et al., 2006; Hicks-Moore & Pastirik, 2006; Kern et al., 2006; Pickens, 2007; Torre et al., 2007; Wilgis & McConnell, 2008). However, some students felt that concept maps saved time and decreased paperwork compared to linear care plans (Castellino & Schuster, 2002). Common feedback on concept mapping is that the process helps organize student thoughts and plan patient care (Adame-Hannes &

Parzen, 2005; Castellino & Schuster, 2002; Harpaz, Balik & Ehrenfeld, 2004; Kern et al., 2006). When students are introduced to concept maps towards the latter part of a program, students commented that learning concept maps early in the program would be more beneficial (Daley, et al., 1999; Torre et al., 2007).

Critical Thinking

There are many valid tools to measure critical thinking. The Watson-Glaser Critical Thinking Appraisal (WGCTA), the California Critical Thinking Skills Test (CCTST), the California Critical Thinking Disposition Inventory (CCTDI), and the National League for Nursing Critical Thinking in Clinical Nursing Practice (NLNCT) are all examples of standardized testing methods used to measure critical thinking. There are other examples of tools used to measure critical thinking that differ in methodology such as essay tests, indirect measures, and specifically concept mapping (Staib, 2003). Many of these tests have been reviewed to determine how they measure critical thinking in nursing students.

Evidence is inconclusive, but some of these measures seem more appropriate for general education instead of nursing education (Hicks-Moore, 2006). Hicks-Moore

suggested the Holistic Critical Thinking Scoring Rubric
(HCTSR) by Facione and Facione (1994) may be an effective
tool for measuring critical thinking in written concept
maps for nursing students.

As previously mentioned, Maneval et al. (2011), used
the NLNCT to measure critical thinking in relation to care
plan format. Pickens (2007) had a critical thinking test
developed to determine if concept map based care plans
increased critical thinking scores in nursing students.
The test was designed by HESI based on the guidelines to
develop custom critical thinking exams and the course
syllabus. Wheeler and Collins (2003) used the CCTST to test
the same hypothesis. Maneval et al. (2011) found that there
was a negative correlation and Wheeler and Collins (2003)
found a positive correlation.

An investigation by Stone, Davidson, Evans and Hansen
(2001) suggested "there appears to be support for the
framework underlying the test of critical thinking but less
support for the way in which the construct is specifically
measured" (p.72). Furthermore, the study demonstrated that
"the traits measured by the CCTDI did not relate to
critical-thinking skills" (p.73).

An article by Riddell (2007) suggests that there is no reliable or valid way to measure critical thinking in nursing students. The article attributes this to a lack of an operational definition, no valid or reliable way of measuring critical thinking skills and therefore a lack of research to support critical thinking improvement.

Evaluation Tools

Published research studies have used different methods of evaluation for concept mapping. Many studies used Novak and Gowin's scoring criterion that allots points for propositions, hierarchy, cross-links and examples (Abel & Freeze, 2006; August-Brady, 2005; Daley et al, 1999; Hsu, 2004; Kostovich, O'Brien, Poradzisz & Wood, 2007). Self-made rubrics were used in several studies (Hink et al., 2006; Hsu & Hsieh, 2005; Schuster, 2000, 2003, 2008; Taylor & Wros, 2007, Wilgis & McConnell, 2008). Hsu and Hsieh (2005) used an adapted version of the Novak and Gowin scoring criteria. Wilgis and McConnell (2008) and Pickens (2007) used an adapted version of an instrument developed by Schuster. An adapted version of Schuster's evaluation tool will also be used in this study. See Appendix D and E.

Summary

Many studies have investigated the use of concept mapping in nursing education as well as strategies to improve the critical thinking skills in students. The aim of this study is to investigate the use of concept mapping in the teaching strategy of nursing care plans as well as its effect on the critical thinking skills of first year BSN students.

CHAPTER THREE

METHODOLOGY

To assess the ability of the nursing student to plan

patient care, the student submits a written care plan that

is graded by the faculty. According to educational

literature on care plans, strategies frequently used to

teach care planning, are often linear in format and do not

promote meaningful learning or critical thinking like

concept mapping techniques for writing care plans.

The purpose of this study with first year nursing

students was to test the effects of care mapping strategies

on critical thinking skills. This project involved BSN

students assigned to different local area community and

private hospitals. The students were routinely assigned to

medical-surgical hospital units for patient care and were

given three care plan assignments throughout the ten-week

quarter. The students in the experimental group were given

instruction on concept mapping and how to use and develop

care maps. Care plans from the equivalent course in the

previous year were used as the comparison group.

One hypothesis guided this study: students that

receive concept care map instruction will demonstrate

improved critical thinking, evidenced by a 10% higher post instruction score, when compared to students who received traditional care plan instruction.

Study Participants

This study was conducted at a satellite campus of a state university in southern California. According to the California State University San Bernardino Office of Institutional Research, in 2010 the undergraduate baccalaureate program in the school of nursing has an enrollment of 387 students, 78.8% women and 21.1% men. The diversity make-up is Caucasian 29.7%; Asian 26.6%; Hispanic 25.5%; African American 5.9%; American Indian 0.2%; Native Hawaiian of Pacific Islander 1.2%; Unknown 9.3%; two or more races non-Hispanic 1.2%. The mean age is 25.1 ("California State University, San Bernardino," n.d.).

The demographics of the satellite campus include 68% female population and 32% male population. The average age of undergraduates at this campus is 33 years and the median is 25 years old. A large majority (80%) of the student population works full-time. The racial make-up of this campus differs slightly: Caucasians 40%; Hispanics 40%; Asian/Pacific Islander 6%; African Americans 4.2%; Native

Americans 1%; Non-Resident Alien 1.8%; Other/Unknown 7.2%.

Nursing students account for 10% of these demographics

("About," n.d.).

Sample Selection

This quasi-experimental equivalent comparison group

study involved first year nursing students all enrolled in

a required nursing fundamentals course with a co-requisite

clinical lab course. This course is the first in a series

of nursing courses. The experimental group began with 22

participants in the class of 22 students during the Fall

quarter of 2010. Two students did not consent to

participate in this study, with the final number of 20

students (n=20) in the experimental group.

The equivalent comparison group consisted of 21

students previously enrolled in the same course during the

Fall quarter of 2009. One student did not consent to

participate. Seven students did not submit some or all of

their care plans for analysis thus 13 students (n=13)

remained in the comparison group. The participants were

conveniently selected because they were registered for a

particular course. Students that chose not to participate

in the study continued in the course and completed the same

assignments as the participants but did not submit their
assigned care plans to the research assistant for this
study's purposes.

Ethical Considerations

Prior to Institutional Review Board (IRB) application
process, the primary investigator and research assistant
participated and passed a course in Human Subject Ethics
Training in the Protection of Human Participants provided
by the institution in which the study was conducted.

After IRB approval (Appendix F) the primary
investigator and research assistant approached participants
in the experimental group, during their clinical class
time. The primary investigator presented the proposed
research study, a recruitment letter (Appendix G), and
offered informed consent documents to the students. See
Appendix H and I. The research assistant obtained
voluntary informed consent while the primary investigator
left the room in order to maintain anonymity. The same
process was conducted when the comparison group was
approached during their lecture course. Students
participating in both experimental and comparison groups

provided voluntary written consent to use their completed care plans for academic study.

Guidelines from the IRB and Health Insurance Portability and Accountability Act (HIPAA) were followed to ensure patient privacy. No names or Personal Health Information (PHI) were included in the care maps or care plans submitted for analysis. Student names were present on the care maps and care plans during submittal. The research assistant assigned a study identification number (ID) to each participant, and generated a slit of participant names and their corresponding ID number. The list was kept confidential and only the research assistant had access to the documents with participant identification on them. These documents were kept under lock and key in the research assistant's office. The principal investigator did not have access to the student participation list. Once documents were submitted for analysis, the research assistant removed any identifying features from them and added the study ID before submitting, electronically, to the primary investigator.

Special consideration was made to the clinical group that received clinical instruction from the investigator. The care map assignments served as data for this research

study as well as graded assignments that were calculated into the student's final course grade. The students turned in their care map to their instructor for the purposes of their course grade, which was scored and returned with feedback to the students within the week. The students also submitted their care map, electronically, to the research assistant. The research assistant then removed any identifying features and replaced student names with their ID number only. The care maps were processed via web-based program so the investigator was not influenced by handwriting. The primary investigator did not receive the data from the research assistant until after course grades were submitted for the students involved in the experimental group.

Instrumentation

To score the concept maps and care plans, the investigator adapted, with permission from the author, an evaluation instrument developed by Schuster (2008). The instrument allotted points for key factors included in a nursing care plan: assessment, diagnostic data, diagnosis, setting appropriate outcomes and goals, implementation of interventions and evaluation of the interventions and

outcomes. The evaluation tool also gives a score for hierarchy and linking related concepts.

These key factors were divided into four sections of the rubric that were based on the American Nurse Association Standards: Assessment, Nursing Problem Analyses, Planning, and Evaluation. Section 1: Assessment, incorporated items such as medical diagnosis, surgical procedures, laboratory data, skin and fall assessments. Section 2: Nursing Problem Analyses included items based on the development of the Nursing Diagnosis such as identifying problems, identifying educational needs, linking problems, categorizing data, prioritizing problems and labeling nursing diagnoses. Section 3: Planning integrated scoring of SMART objectives, interventions and scientific rationales. Section 4: Evaluation incorporated evaluation of objectives and interventions, and attaching a reference page in APA format.

Reliability and Validity

Content validity of the instrument and scoring method was assessed through review by faculty members of the course. The instructors agreed that the four sections of the Schuster tool (assessment, nursing problem analyses,

27

planning, and evaluation) accurately described the care planning assignments. The Schuster tool has also been used in other studies offering further support for content validity (Pickens, 2007; Wilgis and McConnell, 2008).

Construct validity is based on the Theory of Concept Maps developed by Novak and Gowin in 1984. Concept maps can be used to represent knowledge by organizing cognitive thoughts of the creator. Novak and Gowin based their theory on the works of Ausubel's Theory of Assimilation (1977). "The fundamental idea in Ausubel's cognitive psychology is that learning takes place by the assimilation of new concepts and propositions into existing concept and propositional frameworks held by the learner" (Novak & Canas, 2008, p. 3). This structure is also known as the learner's cognitive structure.

Concept mapping meets the first two criteria of Ausubel's assumptions of meaningful learning: 1) The material must be related to the learner's prior knowledge. 2) The learner's prior knowledge must be relevant (Ausubel, 1977). Because a concept map is created by the learner using the learner's knowledge base, concept mapping meets Ausubel's third assumption that the learner is choosing to learn in a meaningful manner.

Prior to the study, faculty members were trained to use the Schuster tool by the investigator. Faculty members reviewed each of the four sections of the tool as well as each item within the sections and determined what aspects of the care plans would be appropriate for evaluation based on each item. Reinforcement of this training was conducted by scoring the students' first care plan as a group with dialogue and foundation of scores assigned.

The primary investigator conducted the intervention and teaching of care planning. The investigator also reviewed and scored all submitted care plans from both experimental and comparison groups. To assure scoring reliability and to reduce the introduction of investigator bias, 10% of the care plans were subjected to scoring by two faculty members.

According to Schuster (2004), "An important aspect of reliability is to standardize procedures for grading concept map care plans" (p. 1). The investigator assigned a numerical score to each of the submitted assignments using the Schuster tool. In preparation for the inter-rater reliability assessment, the investigator and the other experienced faculty member both received training on the evaluation tool and its use prior to grading. As part

29

of the training, they examined one care plan and scored the items together and discussed rationales of scores assigned. They independently scored four of the 34 care plans, representing 10% of the care plans collected. Their level of agreement on the care plan scores was 77% (r=0.77), which was an acceptable value for a small sample size.

Procedure

After participants signed consent forms to take part in the study, the research assistant collected demographic data via electronic survey. See Appendix J.

As presented in Figure 1, during the third week of the ten-week quarter, students routinely receive instruction on care plans from their respective clinical instructors in their clinical lab class. See Appendix K. Participants of the experimental group received the care map intervention during a four-hour clinical class. A one-hour introduction to concept mapping was followed by a demonstration of concept mapping using a non-nursing topic in which students participated. See Appendix L.

Students in this experimental group were then divided into small groups and asked to develop a concept map based on one vital sign learned in the previous week of class.

The instructor provided feedback during creation of the concept map. Students in the experimental group were then introduced to care planning.

Week	Experimental Group (2010)	Comparison Group (2009)
Week 3	Study presented. Consent obtained. 4-hour intervention (Introduction to concept mapping, care planning, and care map).	2-hour introduction to care planning.
Week 4-6	Demographic Survey completed. Reinforcement of care planning and concept mapping exercises during courses	Reinforcement of care planning exercises during courses.
Week 7	Submitted care map assignment (CP1)	Submitted care plan assignment. (CP1)
Week 8	Submitted care map assignment. (CP2)	Submitted care plan assignment. (CP2)
Week 9	Submitted care map assignment. (CP3)	Submitted care plan assignment. (CP3)

Figure 1. Study Procedure Timeline.

This portion of the class consisted of the purpose of care planning as an interdisciplinary communication tool and means to document patient outcomes, and an introduction to the North American Nursing Diagnosis Association (NANDA)

diagnosis, goals, interventions and evaluation. Students were given an instructional packet on the process of developing a care map with course requirements. See Appendix M. The group then watched a video of a patient scenario and was asked to develop a care map. See Appendix N. The investigator provided feedback during the development of the care maps. The care maps were also collected and returned to the group members ungraded with feedback one week later.

The comparison group received the same instruction on care planning as the experimental group, as well as a demonstration of how to develop a linear care plan during the third week of the quarter in 2009. The comparison group also watched a video of a patient scenario and developed a linear care plan. The clinical instructor collected these care plans and returned them ungraded with feedback.

As part of their routine clinical assignments, students in the experimental group completed three care maps for grades. Similarly, the students in the comparison group completed three linear care plans for grades as a part of their routine clinical assignments. The three assignments took place during weeks 7-9 of the ten-week

33

course period. Patient planning was based on the patients the students were assigned during their clinical rotation. The care maps from week seven and week nine were collected electronically from all experimental group participants.

The comparison group participants' care plans from week seven and week nine of Fall 2009 were collected electronically. A research assistant who removed any identifying marks i.e., name, instructor name, etc. collected all assignments electronically and gave them the assigned study ID before submitting them to the investigator.

Both the care map and care plan consisted of patient assessment data, NANDA diagnosis, patient goals and outcomes, nursing interventions and evaluation of the outcomes.

Students were allowed to discuss their assignments with their instructors in post conference as a group or one-on-one with their instructor.

A numerical score was assigned to each collected assignment, using the Schuster (2008) tool. The numerical score on the week seven assignments of all participants served as a baseline. The mean baseline scores of the experimental and comparison group were compared to assure

group equivalence. Scores of week seven for both groups were compared to scores from week nine for both groups. Both groups' scores were expected to improve, but the experimental group was expected to have higher scores than the comparison group.

Data Analysis Plan

Sample Characteristics

Descriptive statistics were calculated using frequencies and percentages for categorical variables of gender, race, marital status, ethnicity, previous concept mapping experience, language, and work experience with both groups. For the ratio variables of age and years of college experience, the mean, median and standard deviation (SD) were calculated. Bivariate analysis of the Fischer-Exact test compared the group differences in gender, ethnicity, health care experience, concept map experience, and language. Multivariate analysis of Kendall's tau-c test determined the group equivalence of marital status, employment status, and race. To test the hypothesis regarding the most effective teaching strategies for care planning, student t-tests were utilized to compare mean care planning scores. Ideally, each student would submit

three care plans (CP1, CP2, CP3) during weeks 7-9 of the ten week quarter: The investigator expected CP1 of the experimental and comparison groups to have similar scores. Comparing the mean scores of CP1 would determine group equivalence.

Comparing the mean scores of CP2 and CP3 was done using nonparametric testing to evaluate the effectiveness of care mapping versus linear care planning.

The rubric consisted of four sections. Each of those sections had several items within that were individually scored. During analysis, each of the sections were summed and then assigned an average. Any appropriately missing data were accounted for in the average (i.e., only 6/7 items were present — the average was calculated based on six rather than seven items).

Each participant submitted a total of three care plans for the study that were reviewed and scored. Next, the section scores were totaled and a total mean score was calculated. Any participant who had the last two of the three care plans missing was removed from the study because the second and third care plans were essentially the outcome measures.

Limitations

The investigator of this study provided clinical instruction to a portion of the comparison group and to a portion of the experimental group, which may have provided some bias to the study. Other limitations included variances in patient assignments; the students in any clinical rotation encountered different patients and opportunities, therefore care plan assignments reflected the various degrees of acuity found on a medical-surgical unit. It should also be noted that each group had different clinical instructors providing individual instruction that may or may not coincide with other teachings.

The retrospective portion of the study with the comparison group involved a time lapse between the care plan assignment and submittal for research. This may have contributed to the small sample size of the comparison group as well as the number of missing data.

Section scores of the Schuster tool included some missing data due to students not completing all assignments, or not completing portions of assignments. The creation of mean scores for the sections accommodated the missing data, but may be another study limitation.

Another limitation of this study may involve a programmatic issue. The institution in which this study was conducted has a high percentage of part time faculty (50%). This large proportion of faculty may contribute to a lack of consistency in the instruction. Overall, this study had a small sample size, which may also be a contributing limitation to the study.

Summary

This quasi-experimental equivalent comparison group study involved first year BSN students. Using a concept map grading tool by Schuster (2008), the care plan assignments from both the comparison group and experimental group were scored and a mean score was calculated for each group. The comparison group previously completed the care plan assignments for three weeks using the routine care plan. The experimental group conducted the care plan assignments for three weeks using the care map. During week nine the care plan assignments were collected and scored using the Schuster (2008) tool and a mean score was calculated for each group. Student *t*-test and nonparametric tests were calculated to determine the significance of the difference in mean evaluation scores for both groups.

CHAPTER FOUR

RESULTS

As seen in Figure 1, 43 students met the inclusion criteria for this study. Only 40 students agreed to participate and 38 participants submitted their care plans for research.
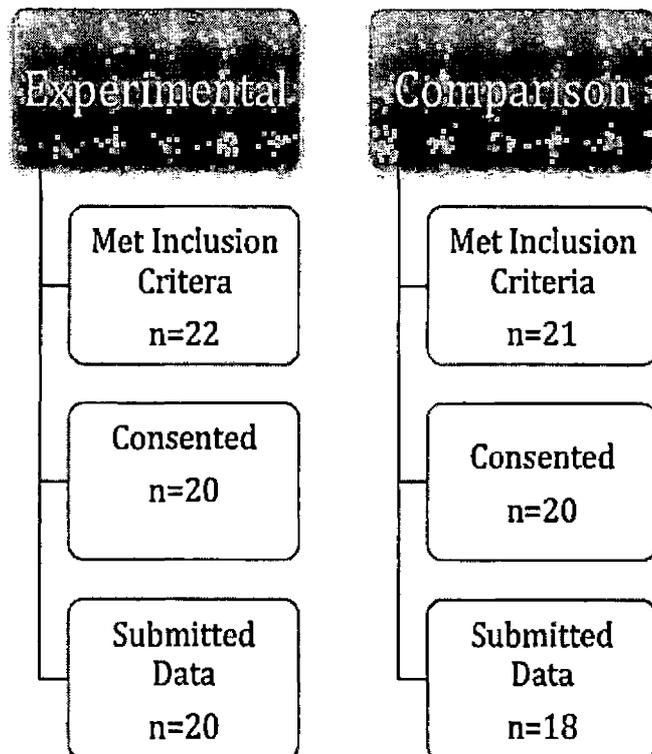

Figure 2. Number of Participants by Group

At the conclusion of data collection five comparison group participants had not turned in all three care plans. Subjects were removed from the study if they were missing all three care plans and/or were missing the second and third care plan, as the outcome measures. As a result the total number for the comparison group was 13, for a total sample size of 33.

Demographics

Demographic data were collected on all participants (N=33) with the exception of one participant who declined requests to complete the demographic portion of the survey. The demographic data on the remaining 32 participants included gender, race, marital status, ethnicity, previous concept mapping experience, language, and work experience.

Fisher's exact test is used to evaluate statistical significance between two groups where sample sizes are small (Norman & Streiner, 2003). Both experimental and comparison group demographic data were evaluated for equivalence using the Fisher's exact test for the bivariate analysis including gender (p=.37), ethnicity (p=.63), health care experience (p=1.0), concept mapping experience (p=.17). Kendall's tau-c test revealed the groups were

40

equivalent on language (p=.54), marital status (p=.55), employment status (p=.68), and race (p=.62) (Table 1). Kendall's tau-c test is used to measure the association between two values. It is considered to be a nonparametric test therefore it is appropriate to use in small sample sizes. Comparison demonstrated equivalence between both groups with regards to all points of demographic data (α=.05) ("Kendall tau rank correlation coefficient," n.d.).

Table 1. Participant Demographics.

Group		Age				Years of College Experience		
	n	M (SD)	Range	Median	n	M (SD)	Range	Median
Experimental	20	27.9 (8.2)	20-45	25	20	2.7 (1.3)	0-6	2
Comparison	12	26.5 (7.1)	20-40	23.5	12	3.6 (1.2)	2-6	3

As shown in Table 2, the majority of the sample were female, Caucasian, and single. The majority of the sample did not work (54.5%), allowing for more time to dedicate to their studies. A large portion of the sample (78.8%) reported previous concept map experience.

Table 2. Participant Demographics.

Group	Characteristic	Whole Sample %	Experimental[a] %	Comparison[b] %
Gender	Male	18.2	25.0	8.3
	Females	78.8	75.0	91.7
Race	Caucasian	57.6	60.0	58.3
	Asian	24.2	15.0	41.7
	Other	18.2	25.0	0.0
Ethnicity	Hispanic or Latino	15.2	20.0	8.3
	Non Hispanic or Latino	81.8	80.0	91.7
	Other	3.0	0.0	0.0
Marital Status	Single	66.7	65.0	75.0
	Married	21.2	25.0	16.7
	Other	8.4	10.0	8.3
Language	English used in home	90.9	90.0	100.0
	English not used in home	6.1	10.0	0.0
Employment Status	Part-time	30.3	20.0	50.0
	Full-time	15.2	25.0	0.0
	Other	54.5	55.0	50.0
Health Care experience	Yes	36.4	40.0	33.3
	No	60.6	60.0	66.7
Concept map experience	Yes	78.8	10.0	33.3
	No	18.2	90.0	66.7

Note. 1 participant opted out of submitting demographic data (N=32) therefore total sample is 97%. [a] n=20. [b] n=12

Data Analysis

To determine group equivalence, prior to comparison, the total mean scores of CP1 of the experimental group and the comparison group were compared using Student t-test. The variances of the scores were equivalent. There was no significant difference ($p=.45$, $\alpha=.05$) between experimental and comparison groups in the CP1 mean scores.

As the total scores of the care plans were tallied a pattern began to emerge within each of the groups. As demonstrated in Table 3, each section of the rubric, displayed a consistent increase in the experimental group's mean scores including total scores. The comparison group's mean scores varied in every section including total scores, except Section 4 (Evaluation).

Table 3. Section and Total Mean Scores of Care Plans.

| | | Experimental | | Comparison | |
		n	M (SD)	n	M (SD)
Section 1					
	CP 1 Total	15	5.0 (3.1)	11	3.1 (0.9)
	CP 2 Total	19	5.7 (1.5)	11	3.7 (2.0)
	CP 3 Total	18	6.2 (1.4)	4	2.5 (1.5)
Section 2					
	CP 1 Total	20	5.1 (1.4)	13	5.2 (1.0)
	CP 2 Total	20	5.6 (1.9)	13	4.8 (0.9)
	CP 3 Total	19	5.9 (2.0)	5	5.4 (0.2)
Section 3					
	CP 1 Total	20	5.3 (1.2)	13	5.5 (1.0)
	CP 2 Total	20	5.4 (1.4)	13	5.2 (1.3)
	CP 3 Total	19	5.6 (1.3)	5	5.5 (0.6)
Section 4					
	CP 1 Total	20	1.5 (1.1)	13	1.3 (0.6)
	CP 2 Total	20	1.7 (0.9)	13	1.5 (0.5)
	CP 3 Total	19	2.1 (0.8)	5	1.5 (0.6)
Total Scores					
	CP 1 Total	20	0.63 (0.2)	13	0.67 (0.1)
	CP 2 Total	20	0.71 (0.2)	13	0.70 (0.1)
	CP 3 Total	19	0.77 (0.2)	5	0.69 (0.0)

Note: CP1 (First care plan), CP2 (Second care plan), CP3 (Third care plan).

The experimental group scores exhibit a 14% increase in mean score from CP1 to CP3 in support of the investigator's hypothesis. The comparison group scores reveal only a 2% increase in mean score from CP1 compared to CP3 (See Figure 2).
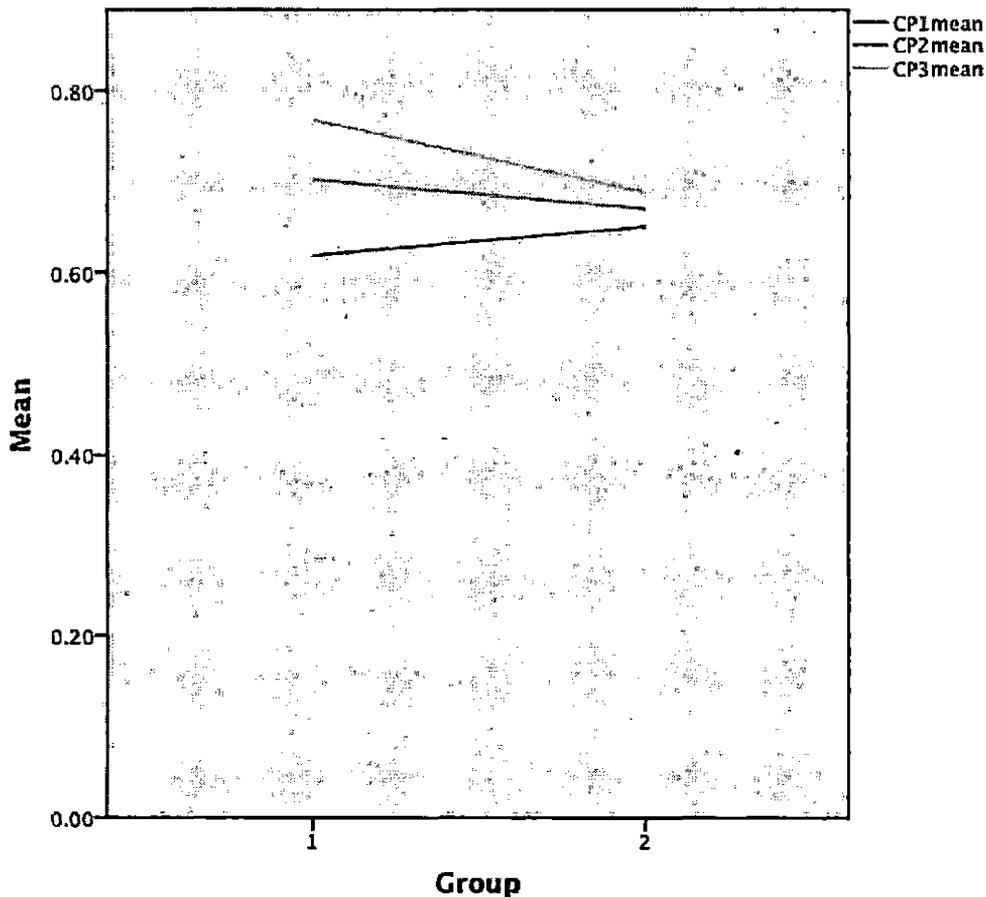
Note: Group 1: Experimental. Group 2: Comparison

Figure 3. Total Mean Scores by Group.

The total mean scores were used to create a change score using the difference between CP1 and CP2 (CP12), CP2 and CP3 (CP23), and CP1 and CP3 (CP13). The Mann-Whitney U test was used to compare these change scores between the experimental and comparison groups. The Mann-Whitney U test was chosen because of the small sample size. The

distribution of CP23 and CP13 scores were the same across categories of the groups therefore the null hypothesis was rejected (p=.002, α=.05) thus the mean score differences between CP1 and CP3 were significantly different between the experimental and comparison groups.

Summary and Discussion

Demographic data collected from participants indicated equivalent characteristics of the experimental and comparison groups. The majority of participants were female, Caucasian, single, not working, were lacking previous health care experience, and used the English language in the home. The participants ranged in age from 20-45 and college experience ranged from zero to 6 years.

There was a noted discrepancy in the demographic survey demonstrated by a report of "0" years of previous college experience. In order to be admitted to the nursing program used in this study, students had a minimum of one year in which to complete pre-requisite courses required for application to the nursing program. The question of "previous concept mapping experience" may have been misleading as well. Students completed the demographic survey after the intervention that included a concept

mapping lesson. Participants of the experimental group might have claimed the intervention as previous concept mapping experience. The comparison group might have gained previous concept mapping experience after the course in which the care plan assignments were completed and before the consent to participate in this study that took place one year later.

Care plan assignments were submitted and scored by the investigator for research purposes. A mean score was derived for each care plan assignment among each group. The first of these care plan assignments (CP1) was evaluated using the student t-test to determine equivalence between the experimental and comparison group. The Student t-test scores revealed baseline equivalence of experimental and comparison group on CP1.

The group mean scores of CP1, CP2, and CP3 were evaluated and compared. Nonparametric testing was utilized due to the small sample size of the comparison group. The results of the mean scores support the hypothesis suggested by this study. Students using concept map based care plans, or care maps, consistently improved in their care plan scores and improved by a 14% margin from CP1 to CP3. The comparison group mean scores from each care plan

assignment varied between the first and last care plan. Using linear care planning methods, the comparison group also showed a 2% improvement between CP1 and CP3.

The results from this investigation support the hypothesis of this study that students receiving concept care map instruction will demonstrate improved critical thinking. The experimental group had a 10% higher post instruction score, compared to students that received traditional care plan instruction. The results also present academic value for nursing educators.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Summary

According to the Institute of Medicine's report on The Future of Nursing: Focus on Education (2010), "New approaches and educational models must be developed to respond to burgeoning information in the field" (p.2). Promoting meaningful learning and critical thinking in nursing education is essential in nursing. Patient acuity is higher and the scope of practice in nursing requires clinical application, clinical skills, and clinical judgment daily. "Care within the hospital continues to grow more complex, with nurses having to make critical decisions associated with care for sicker, frailer patients…that require skills in analysis and synthesis" (p. 3).

Current methods used to teach care planning in nursing education frequently include multiple linear forms. These may include a laboratory information form, another document to include medications, and a separate form that includes physical assessment data. Within each of these, is vital patient information that should be used to arrange appropriate plan of care. Students may have difficulty

connecting data from each of these forms and then applying it to the patient's needs. Linear methodology leads to linear thinkers and contributes to task oriented students. "Competencies also must move from task-based proficiencies to higher-level competencies that provide a foundation for care management knowledge and decision-making skills under a variety of clinical situations and care settings" (*The future of nursing: Focus on education*, n.d., p. 2). Concept mapping can be used to promote meaningful learning and clinical judgment by organizing thoughts and displaying the patient's whole picture enabling nursing students to utilize their critical thinking skills. Where forms can be used to gather data and thoughts, concept maps display that data and connect it to concepts related to the patient's reason for seeking health care and the patient needs. This is all displayed on one diagram in which students can connect information from all aspects of care such as laboratory, diagnostic tests, medications, physical assessment data and patient reports.

Nursing education content and assignments should promote meaningful learning. Care mapping increases both meaningful learning and promotes critical thinking skills. Although critical thinking is difficult to quantify, it is

reasonable to assume that meaningful learning is a step

towards promoting critical thinking. This study and its

results support meaningful learning through concept mapping

activities such as care maps. The increase of mean scores

in the experimental group demonstrates an increase in

learning through care mapping activities.

Conclusions

The study's hypothesis: students that receive concept

care map instruction will demonstrate improved critical

thinking, evidenced by a 10% higher post instruction score,

when compared to students that receive traditional care

plan instruction was supported by a 14% increase in post

instruction scores in the experimental group as opposed to

the 2% increase of mean scores in the comparison group.

Critical thinking may be too large a concept to

measure. There is no universally accepted method or

criteria to define or measure critical thinking therefore

it is difficult to determine if student critical thinking

skills were improved during this research study. However

meaningful learning may be a step towards improved critical

thinking. The investigator demonstrated meaningful

learning for this group of students through care mapping

which may indicate an increase in critical thinking.
However, among various sections of the Schuster tool, the
Analyses section represents the best indication of critical
thinking. This section describes analytical skills of
identifying problems, inferring and analyzing data as well
as prioritizing and labeling problems. Individual section
scores reveal an improvement in the Nursing Problem
Analyses section for the experimental group with a 0.82
point increase from CP1 to CP3. The comparison group also
demonstrated an improvement in this section of 0.26 points
from CP1 to CP3. This indicates that care planning
activities may increase critical thinking skills, and
concept mapping may increase critical thinking skills more
than linear care planning activities.

Meaningful learning was demonstrated through the
increased improvement within the care plan scores from care
plan 1 (.63) to care plan 3 (.77) in the experimental
group. Through nonparametric testing methods using the
Mann-Whitney U test, the null hypothesis was rejected.
Students utilizing care maps in the clinical setting
demonstrate an improvement in meaningful learning over
students utilizing linear care plans.

Although not qualitative in its purposes, throughout this study, the investigator received multiple positive reports from participants on concept mapping and appreciation for viewing the whole picture of the patient during clinical settings.

Recommendations

Recommendations for future studies would include a prospective comparison of critical thinking scores between students using linear care plans and students using care maps once an established method of measuring critical thinking has been accepted in the field of nursing. The investigator would also recommend using a larger sample in which inferential statistics could be utilized.

APPENDIX A

CONCEPT MAP
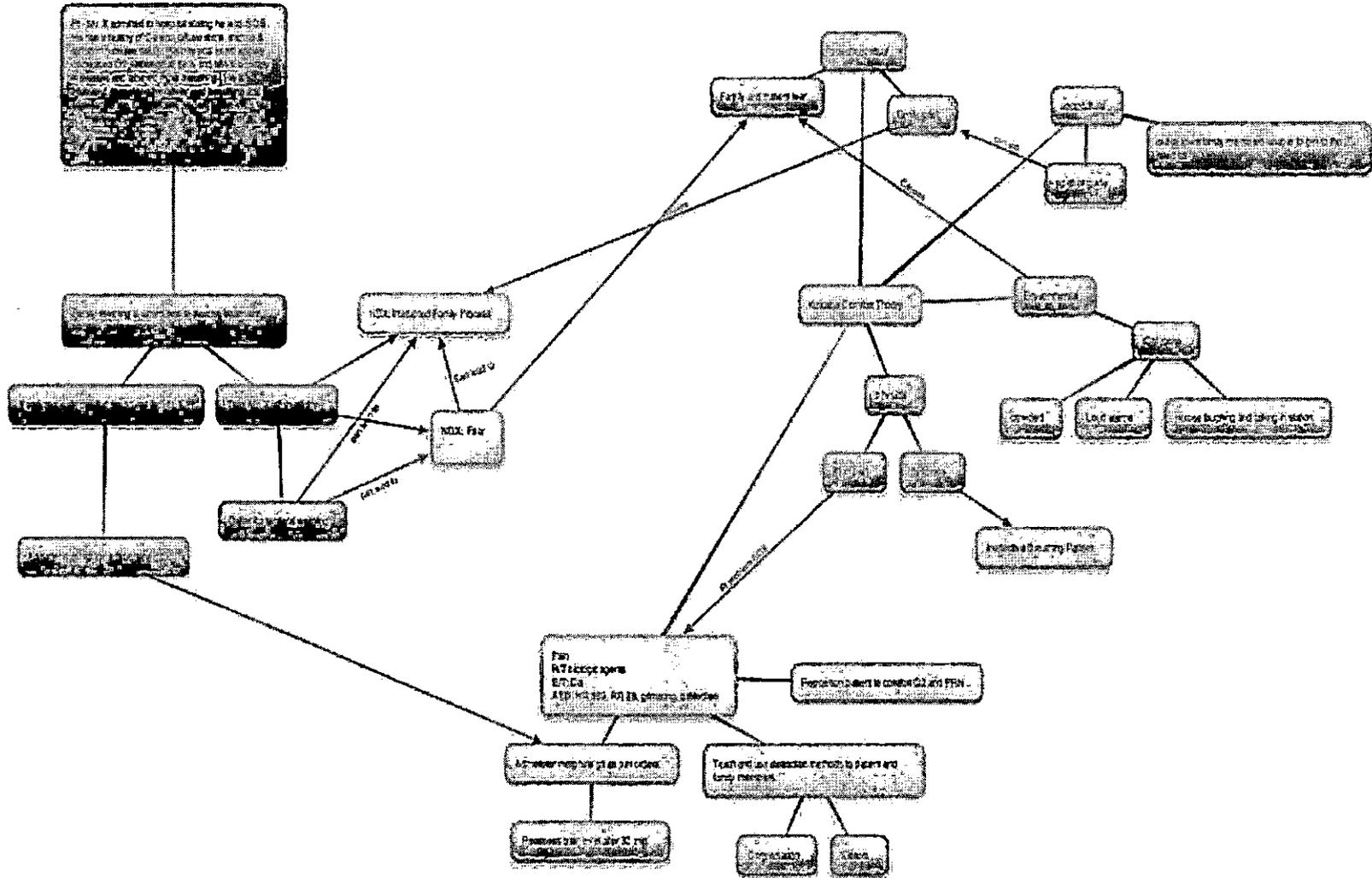
Fry, S. (2011). *Patient scenario using Kolcaba's Comfort Theory.* Unpublished document, Department of Nursing, California State University, San Bernardino, California.

APPENDIX B

LINEAR CARE PLAN

1. Name:_____ Date: / /09   Section:___ Facility:_____ Date admit:_____
Care Plan
(This page and citation page must be typed and single spaced, can expand the rows to include more than one page, 12 pt font)

Nursing Diagnoses (3)	Goal	Interventions	Evaluation (goal)	Citation
1.				
2.				
3.				

Smith-Stoner, M. (2009). *Care Plan Template*. Unpublished document, Department of Nursing, California State University, San Bernardino, California.

57

APPENDIX C

STUDENT EXAMPLE OF A CARE MAP
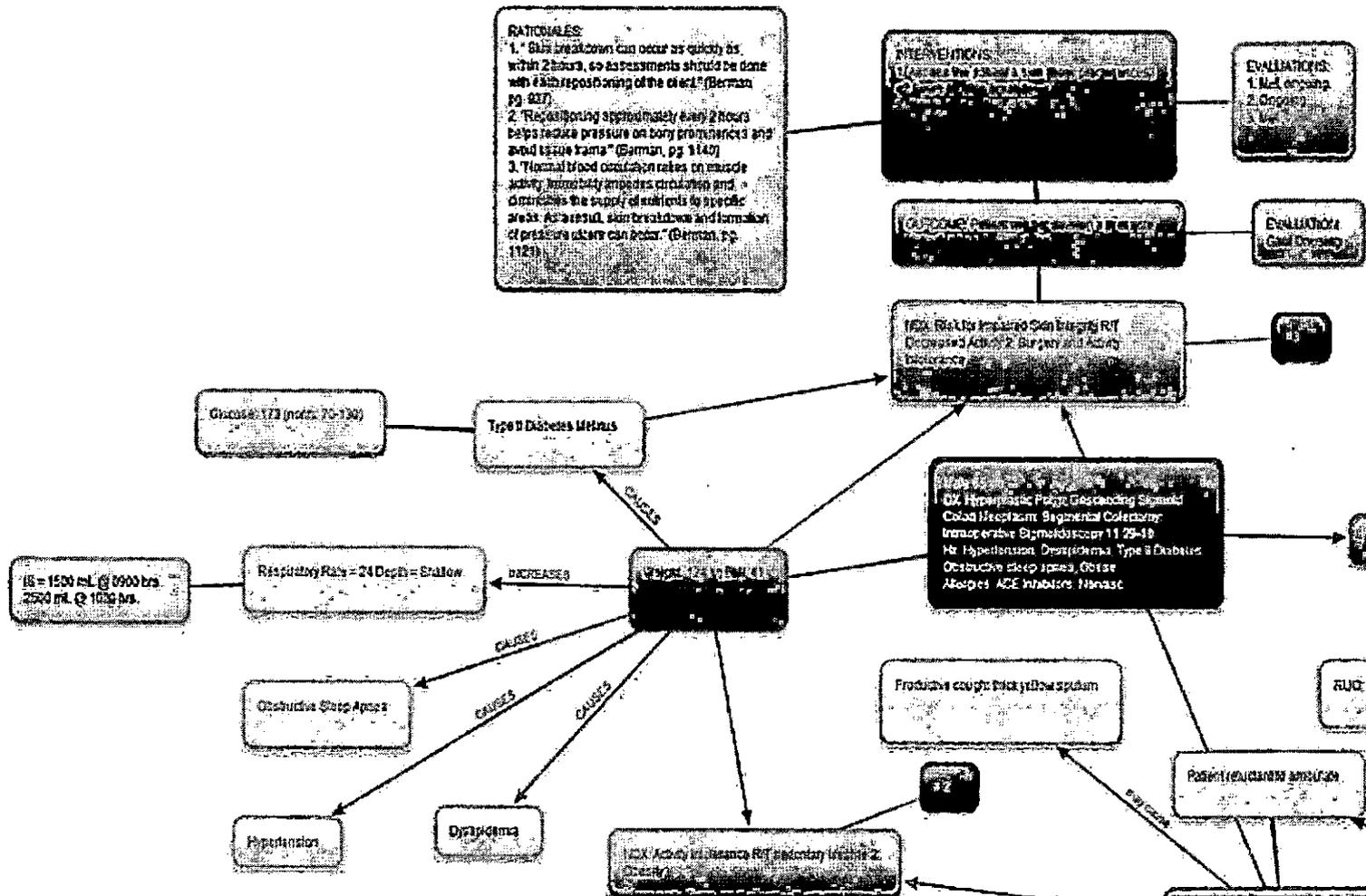
Unknown author. (2010). *Care map assignment*. Unpublished document, Department of Nursing, California State University, San Bernardino, California. Reprinted with permission.

APPENDIX D

ADAPTED SCHUSTER EVALUATION TOOL

Grading Rubric for Care Map Nursing 201

Name: _____ Date: _____

1 point - information is summarized adequately;
½ point - some correct information and some incorrect or missing information;
0 point - poor job on the information.

ANA Standard I Assessment (documented on SBAR)	Scoring		
Health Assessment	0	½	1
Medical Diagnoses	0	½	1
Surgical Procedures	0	½	1
Laboratory data	0	½	1
Skin Assessment	0	½	1
Falls Assessment	0	½	1
Pain Assessment	0	½	1
ANA Standard II Nursing Problem Analyses			
Identifies Physiological Problems	0	½	1
Identifies Psychosocial Problems	0	½	1
Identifies Education Needs	0	½	1
Correctly Links Problems	0	½	1
Abnormal Assessment Data in correct boxes	0	½	1
Relative Treatments categorized in correct boxes	0	½	1
Relative diagnostic tests in correct boxes	0	½	1
Correctly Prioritizes problems	0	½	1
Correctly labels nursing diagnoses (NANDA) in PRSE format	0	½	1
ANA Standards III, IV, V, Planning			
Lists SMART objectives for all			
Physical problems	0	½	1
Psychosocial problems	0	½	1
Lists all nursing interventions to attain objectives			
Assessments to be performed "Assess"	0	½	1
Physiological Interventions "Do"	0	½	1
Communication/psychological interventions "Teach"	0	½	1
Nursing Interventions provide for patient/family participation	0	½	1
Interventions include scientific rationale	0	½	1
ANA Standards VII & VIII Evaluation			
Evaluates patients behavioral responses to nursing interventions	0	½	1
Evaluate patient progress towards objectives	0	½	1
Reference page attached and in APA format	0	½	1
Total Points	/26		

Instructor Signature: _____ Date: _____

From *Concept Mapping: A Critical-Thinking Approach to Care Planning* (p. 168), by P.
M. Schuster, 2008, Philadelphia, PA: F.A. Davis Company. Copyright 2008 by F. A.
Davis Company. Adapted with permission.

APPENDIX E

PERMISSION TO USE EVALUATION TOOL

From: Pamela Schuster ████████████████

Subject: Re: Permission for Grading tool

Date: June 18, 2010 5:04:42 AM PDT

To: Sarah Fry ████████████

Hello Sarah- as long as you have citations to the original work, no problem with it. PS

On 6/18/10 12:29 AM, Sarah Fry wrote:

> Dr Schuster
>
> My name is Sarah Fry and I am currently a graduate student at Cal State Univ. San Bernardino working on my MSN in nursing education. Currently, I am researching the effects of care mapping on critical thinking in BSN students.
>
> I would like to request permission to reference and use your grading tool for care maps from your book "Concept Mapping: A Critical Thinking Approach to Care Planning". I would also like to request permission to adapt the tool in order to make it more appropriate for the first year students of my target population.
>
> I would greatly appreciate your authorization to use this tool for my research study. Thank you for your time.
>
> Sarah Fry RN, BSN, PHN
> Clinical Instructor
> California State University San Bernardino
> Nursing Department
> ████████████
> ████████████

Pamela McHugh Schuster, PhD, RN

Professor of Nursing

Youngstown State University

Youngstown, Ohio 44555

████████████

APPENDIX F

INSTITUTIONAL REVIEW BOARD

APPROVAL LETTER

Academic Affairs
Office of Academic Research • Institutional Review Board

September 21, 2010

Ms. Sarah Fry
c/o: Prof. Marilyn Stoner
Department of Nursing
California State University
5500 University Parkway
San Bernardino, California 92407

```
┌─────────────────────────┐
│        CSUSB            │
│    INSTITUTIONAL        │
│   REVIEW BOARD          │
│   Expedited Review      │
│     IRB# 10011          │
│       Status            │
│      APPROVED           │
└─────────────────────────┘
```

Dear Ms. Fry:

Your application to use human subjects, titled "The Effects of Concept Care Maps on Critical Thinking in Baccalaureate Nursing Students" has been reviewed and approved by the Institutional Review Board (IRB). The attached informed consent document has been stamped and signed by the IRB chairperson. All subsequent copies used must be this officially approved version. A change in your informed consent (no matter how minor the change)- requires resubmission of your protocol as amended. **Your application is approved for one year from September 21, 2010 through September 20, 2011. One month prior to the approval end date you need to file for a renewal if you have not completed your research. The protocol renewal form is on the IRB website. See additional requirements of your approval below.**

The CSUSB IRB has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval notice does not replace any departmental or additional approvals which may be required.

Your responsibilities as the researcher/investigator reporting to the IRB Committee include the following requirements. You are required to notify the IRB of the following: 1) submit a protocol change form if any substantive changes (no matter how minor) are made in your research prospectus/protocol, 2) if any unanticipated/adverse events are experienced by subjects during your research, and 3) when your project has ended by emailing the IRB Coordinator. Please note that the protocol change form and renewal form are located on the IRB website under the forms menu. Failure to notify the IRB of the above may result in disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, IRB Compliance Coordinator. Mr. Michael Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely *Sharon Ward, Ph.D*

Sharon Ward, Ph.D., Chair
Institutional Review Board

SW/mg

cc: Prof. Marilyn Stoner, Department of Nursing

909.537.7588 • fax: 909.537.7028 • http://irb.csusb.edu/
5500 UNIVERSITY PARKWAY, SAN BERNARDINO, CA 92407-2393

The California State University • Bakersfield • Channel Islands • Chico • Dominguez Hills • East Bay • Fresno • Fullerton • Humboldt • Long Beach • Los Angeles
Maritime Academy • Monterey Bay • Northridge • Pomona • Sacramento • San Bernardino • San Diego • San Francisco • San Jose • San Luis Obispo • San Marcos • Sonoma • Stanislaus

65

APPENDIX G

RECRUITMENT LETTER

California State University San Bernardino

The Effects of Concept Care Maps on Critical Thinking in Baccalaureate Nursing Students

Dear CSUSB Nursing Student,

I am inviting CSUSB nursing students who were/are enrolled in Nursing 201 during the Fall 2009 or 2010 quarter at the Palm Desert Campus to participate in this study. This research study is required in order to complete my MSN in nursing education. The study will be conducted during the fall quarter of 2010. The study will evaluate teaching methods for care planning. The study will include a lecture on concept mapping and include comparison of critical thinking scores on linear care plans and concept care maps. The care plan scores from the Fall 2009 quarter will be compared to the care map scores from the Fall 2010 quarter.

There will be no additional work or assignments necessary. There is no cost to participate in this study. Participating in this research study may improve the methods used to teach care planning to future students.

I will protect your privacy. All participants will be assigned a study identification number. The results will not be identified with you. Your participation is voluntary. There is no penalty if you decide not to participate or to discontinue participating in the study at anytime. If you choose to participate in this study, informed consent will be obtained. You will complete a short baseline demographic survey. The survey takes less than 5 minutes to complete. You will be asked to email a copy of your care plans/care maps to a research assistant who will be responsible for removing any personal identification and replacing it with the study identification numbers. I will not have access to the email account or the locked office and file cabinet that the data will be kept in until after grades are submitted on December 15, 2010.

If you have any questions or concerns regarding this study, you may contact me at sfry@csusb.edu. The Institutional Review Board (IRB) at CSUSB has approved this study. If you have concerns about your rights as a participant in this study you may contact the IRB coordinator/compliance at mgillesp@csusb.edu or by telephone (909) 537-7588. A summary of my findings will be available at your request to sfry@csusb.edu.

Sincerely,

Sarah Fry, RN, BSN
CSUSB MSN Graduate Student

APPENDIX H

EXPERIMENTAL GROUP INFORMED CONSENT

College of Natural Sciences
Department of Nursing

THE EFFECTS OF CONCEPT CARE MAPS ON CRITICAL THINKING IN BACCALAUREATE NURSING STUDENTS
INFORMED CONSENT

The study in which you are being asked to participate is designed to investigate the effects of concept care maps on critical thinking in baccalaureate nursing students. Sarah Fry, RN, BSN is conducting this study as part of her graduate program under the supervision of Dr. Marilyn Stoner, Professor of Nursing, California State University, San Bernardino. This study has been approved by the Institutional Review Board, California State University, San Bernardino.

PURPOSE: The purpose of this study with first year nursing students is to test the critical thinking effects of concept maps for care plan writing.

DESCRIPTION: Nursing students are routinely assigned to medical-surgical hospital units for patient care and complete four care plan assignments throughout the ten-week quarter. Students invited to participate in the control group were taught how to create care plans using a linear teaching approach in Nursing 201 in Fall 2009. In the Fall 2010 Nursing 201 course, a concept mapping approach will be used to teach students to create concept care maps. The care plans created by each group will be compared for evidence of critical thinking.

PARTICIPATION: Study participation is voluntary, refusal to participate will involve no penalty and the student may discontinue participation at any time without penalty. No student's course grade will be affected regardless of participation.

CONFIDENTIALITY: Confidentiality will be maintained throughout the study by assigning identification (ID) numbers to each participant. The ID number will be attached to the data rather than a name or other identifier. The study research assistant will assign an ID number to each participant upon initial consent and will also maintain the identification information throughout the remainder of the study. Special consideration must be made to the experimental clinical group that will receive clinical instruction from the investigator. The care map assignments serve as data for this research study as well as graded assignments that are calculated into the student's final course grade. Students routinely submit care plan assignments in typed format to the clinical instructor for grading. As usual, the students in the experimental group will submit one typed copy of their care map assignment with their name attached to their instructor for a grade. The students who have consented to participate in the study will submit an additional electronic copy via email to the research assistant. The research assistant will remove the name and assign the ID and store the care maps in a locked file cabinet in a locked office. The investigator will not have access to the list of students who have agreed to participate or the care maps they submitted for the study until all the grades have been submitted for the Fall 2010 quarter (December 20, 2010). Safety of information transmitted through email cannot be guaranteed. Any participant who is concerned about the safety of email, may bring the care plan(s) to the PDC Nursing office (HS-120 - 37500 Cook Street, Palm Desert 92211) in a sealed envelope addressed to FRY CARE PLAN STUDY: Graduate Assistant.

DURATION: Active data collection will be completed by December 15, 2010. Data analysis and reports will be completed by May 2011.

RISKS: There are no foreseeable risks from participation in this study.

BENEFITS: There is an expected increase of critical thinking among the study participants in the experimental group. There is also an expected increase in knowledge and clarity of patient care planning.

VIDEO/AUDIO: A video recording will take place during week 3 of the fall quarter. This recording will be of the instructor and class participants during the teaching of concept maps and care planning. This video will be used for debriefing and critiquing the teaching methodology and to train future instructors and classes on the subject. The camera will be placed to show only participants who agree to be videotaped.

I agree to participate in the video recording for this research.   Initials____

CONTACT: Dr. Marilyn Stoner may be reached at 909-537-5448 or mstoner@csusb.edu for any questions about the research and research subjects' rights.

RESULTS: Results will be posted on the faculty research board in the nursing department at California State University San Bernardino. An abstract of study results will be available to students once data analysis is completed.

SIGNATURE: Signature: _____ Date: _____

CALIFORNIA STATE UNIVERSITY, SAN BERNARDINO
INSTITUTIONAL REVIEW BOARD COMMITTEE
APPROVED _09/21/10_ VOID AFTER _09/20/11_
IRB# _10011_ CHAIR _____, Ph.D.

APPENDIX I

COMPARISON GROUP INFORMED CONSENT

THE EFFECTS OF CONCEPT CARE MAPS ON CRITICAL THINKING IN BACCALAUREATE NURSING STUDENTS
INFORMED CONSENT

The study in which you are being asked to participate is designed to investigate the effects of concept care maps on critical thinking in baccalaureate nursing students. Sarah Fry, RN, BSN is conducting this study as part of her graduate program under the supervision of Dr. Marilyn Stoner, Professor of Nursing, California State University, San Bernardino. This study has been approved by the Institutional Review Board, California State University, San Bernardino.

PURPOSE: The purpose of this study with first year nursing students is to test the critical thinking effects of concept maps for care plan writing.

DESCRIPTION: Nursing students are routinely assigned to medical-surgical hospital units for patient care and complete four care plan assignments throughout the ten-week quarter. Students invited to participate in the control group were taught how to create care plans using a linear teaching approach in Nursing 201 in Fall 2009. In the Fall 2010 Nursing 201 course, a concept mapping approach will be used to teach students to create concept care maps. The care plans created by each group will be compared for evidence of critical thinking.

PARTICIPATION: Study participation is voluntary, refusal to participate will involve no penalty and the student may discontinue participation at any time *without penalty*. No student's course grade will be affected regardless of participation.

CONFIDENTIALITY: Confidentiality will be maintained throughout the study by assigning identification (ID) numbers to each participant. The ID number will be attached to the data rather than a name or other identifier. The study research assistant will assign an ID number to each participant upon initial consent and will also maintain the identification information throughout the remainder of the study. The students who have consented to participate in the study will submit an electronic copy of the four care plan assignments via email to the research assistant. The research assistant will remove the name and assign the ID and store the care maps in a locked file cabinet in a locked office. The investigator will not have access to the list of students who have agreed to participate. Safety of information transmitted through email cannot be guaranteed. Any participant who is concerned about the safety of email, may bring the care plan(s) to the PDC Nursing office (HS-120 - 37500 Cook Street, Palm Desert 92211) in a sealed envelope addressed to FRY CARE PLAN STUDY: Graduate Assistant.

DURATION: Active data collection will be completed by December 15, 2010. Data analysis and reports will be completed by May 2011.

RISKS: There are no foreseeable risks from participation in this study.

909.537.5380 · fax: 909.537.7089 · http://nursing.csusb.edu
5500 UNIVERSITY PARKWAY, SAN BERNARDINO, CA 92407-2393

The California State University · Bakersfield · Channel Islands · Chico · Dominguez Hills · East Bay · Fresno · Fullerton · Humboldt · Long Beach · Los Angeles Maritime Academy · Monterey Bay · Northridge · Pomona · Sacramento · San Bernardino · San Diego · San Francisco · San Jose · San Luis Obispo · San Marcos · Sonoma · Stanislaus

BENEFITS: There is an expected increase of critical thinking among the study participants in the experimental group. There is also an expected increase in knowledge and clarity of patient care planning.

VIDEO/AUDIO: A video recording will take place during week 3 of the fall quarter. This recording will be of the instructor and class participants during the teaching of concept maps and care planning. This video will be used for debriefing and critiquing the teaching methodology and to train future instructors and classes on the subject. The camera will be placed to show only participants who agree to be videotaped. If I am selected to participate in the experimental group, I give permission to be Video Recorded.   Initials _____

I understand this research will be Video Recorded   Initials ____

CONTACT: Dr. Marilyn Stoner may be reached at 909-537-5448 or mstoner@csusb.edu for any questions about the research and research subjects' rights.

RESULTS: Results will be posted on the faculty research board in the nursing department at California State University San Bernardino. An abstract of study results will be available to study participants once data analysis is completed.

SIGNATURE: Signature: _____ Date: _____

APPENDIX J

DEMOGRAPHIC SURVEY

Demographic Survey

1. Age _____

2. Gender:
   - ☐ Male
   - ☐ Female

3. Race
   - ☐ American Indian/Alaska Native
   - ☐ Asian
   - ☐ Black of African American
   - ☐ Native Hawaiian/Other Pacific Islander
   - ☐ White

4. Ethnicity:
   - ☐ Hispanic or Latino
   - ☐ Not Hispanic or Latino

5. Years of college completed: _____

6. Health care related work experience:
   - ☐ Yes. If yes, please describe _____
   - ☐ No

7. Previous concept mapping experience:
   - ☐ Yes. If yes, please describe _____
   - ☐ No

8. Language or languages spoken in the home: (check all that apply)
   - ☐ English
   - ☐ Spanish
   - ☐ Filipino
   - ☐ Other _____

9. Marital status:
   - ☐ Single
   - ☐ Married
   - ☐ Divorced
   - ☐ Widowed/Widower
   - ☐ Separated
   - ☐ Other

10. Employment status:
    - ☐ Full Time
    - ☐ Part Time
    - ☐ Not applicable

Created by Fry, S. (2010).

APPENDIX K

LESSON PLAN FOR CARE PLANNING

Instructional Unit Evaluation Plan

Purpose: To educate students on necessity and purpose of Care planning					
Goal: Students will verbalize necessity, purpose of use of Care plans in the nursing field					
Objectives	Content Outline	Method of Instruction	Time Allotted	Resources Needed	Method of Evaluation
Describe care planning and its purpose	Written guide that organizes information about the client's care. Regulatory Agencies require care planning, TJC, ANA, Nurse Practice Act, AACN. Directs all efforts and resources towards a common goal. Continuity of Care Tailored to the patients needs, it is individualized!. Family involved Means of communication	Discussion	5 minutes	NA	Question and Answer
Will understand the difference between school and hospital care plans	Differences in CPs	Discussion	2 min	Standardized CP	Question and Answer

77

Instructional Unit Evaluation Plan

Students will list, and describe components of the CP	Must include Nursing Diagnosis	Discussion, example Return demonstration	1 hour	Wilkinson, white board Maslow's pyramid	Question and answer
	• NANDA • Wilkinson Book • 3 or 4 part statement • prioritize as per maslow's hierarchy • patient centered and derived from patient data. Use example of Weight loss Goals/outcomes • SMART • Should show improvement! Interventions • Evidenced based • Independent vs dependent • Within scope • Assess, do teach Evaluations • May not be able to eval each outcome Rationale • WHY? • In own words • citation Citation • superscript or numbered. Correspond with reference page. • NO nursing care plan books • At least 2 sources.				

78

APPENDIX L

LESSON PLAN FOR CONCEPT MAPPING

Instructional Unit Evaluation Plan

Purpose: To inform students about Concept Mapping

Goal: Students will, independently, create their own concept map.

Objectives	Content Outline	Method of Instruction	Time Allotted	Resources Needed	Method of Evaluation
Explain the purpose of CM	Provide meaningful learning linking new information to previous knowledge. Provide a mechanism for meaningful learning without memorization. Promotes long term retention and long term recall. Leads to recall of information during patient care. Increased learning leads to increased critical thinking and better/safer pt care.	Discussion	2 Min	NA	Questions
Students will be able to apply useage to their studies.	How do you study? Do you memorize? Flashcards? Charts? 1. CM any prior knowledge of subject before your reading. 2. Add concepts during your reading 3. Add concepts from lecture 4. Re work the CM for study purposes. CM are never really finished. You need to rework the ideas for clarity. This is the greatest strength of CMs and what promotes deeper understanding. Concept maps are organizational charts that use shapes and cross links to display concepts and their relationships.	Discussion	5 min.	White board	Questions
Describe CMs	Your concept map will be YOUR knowledge framework, everyone's knowledge framework is different. Use shapes, it is the creators choice.	Discussion	5 minutes	White board CM examples.	Question and Answer

Instructional Unit Evaluation Plan

	Change shapes for different levels, main concept, sub concepts and so forth. Cross links are lines made between concepts using arrows for directional purposes. Add descriptive words to cross links to explain the relationship.				Return demonstration, Question and Answer
Students will participate in a class CM	1. Use the concept of pulse oximetry as a main concept. 2. List everything you consider when thinking about pulse oximetry. 3. Place main concept in center of board 4. Group factors together into categories that share a common features, (sub categories) 5. Place sub categories on board. 6. Draw lines from concept to sub concepts. 7. Write a few words in each line articulating the relationship between the concepts (usually verbs) 8. Draw lines between sub concepts based on existing relationships. 9. Describe relationships with descriptors. 10. Compare your knowledge framework to others 11. Explain the relationships made and words used to explain.	Demonstration	20 minutes	White board, magnets, paper, markers, student helpers	
Students will pair up and create their own concept map on 1 Vital Sign	Use Markers, post its, construction paper to create your own concept map based on 1 of the 5 vital signs that we learned last class. Pair up with someone from the other class.	Demonstration	15 minutes	Markers, post its, construction paper	Return demo, CMs

81

Created by Fry, S. (2010).

APPENDIX M

COURSE REQUIREMENTS FOR CARE MAP

201 Clinical Care Map
2010

A care plan is a concise document that the entire health care team can use to move the patient toward an optimal level of function in the shortest amount of time. Think of a care plan as "showing the steps in a math problem". When you first learned math you had to show all the steps you used to solve a problem. But as you got more experience you learned to do the math in your head. The same is true of care plans. Once you have experience, after you graduate, you may not need to write as much down. A care plan is required for every patient. The requirement is both in the nurse practice act and in standards of accreditation and reimbursement. While you may not always see one in a patient chart, one is expected to be there.

A care plan is developed first through knowledge gained from your nurse client interaction. The second source of data for a care plan is the health care team. The patient's physician, nurses and therapists are all contributing to the understanding of the patient's needs. The final source of information is the patient chart. This is where you should spend the least amount of time gathering data.

Questions you might want to ask members of the health care team:
- Is this patient following an expected course for this illness?
- Do you expect the patient to be more or less functional as a result of information and treatment from this hospitalization?
- What needs do you anticipate the patient will have at home?
- What are the most common complications a patient might experience from this condition?
- Do you expect the patient will be able to return home/to work?

A care map is a care plan in the form of a concept map. The purpose of this activity is to maintain the care plan guidelines while developing and demonstrating the thinking process.

Steps to creating a care map

1. Place the most pertinent patient information in the center of your concept map. This should include diagnosis and/or reason for hospitalization and basic patient demographics.
2. Review the assessment data and categorize it in groups surrounding your main concept. Determine your patient's key problem of each group (ex: Nutrition problem, anxiety problem, skin problem). These will be your concepts. Place these concepts around your main concept.
3. Label your concepts with NANDA approved Nursing Diagnosis (NDX).
4. Prioritize your NDX by numbering the concepts using Maslow's Hierarchy (Kozier pg. 274). Keep in mind that potential problems should not be prioritized higher than an actual problem that your patient is experiencing.
5. Develop your patient's plan of care for the top 3 NDX including:
   a. 3 part statement of NDX (total of 3)
   b. 1 patient outcome for each NDX (total of 3)
   c. 3 interventions for each outcome (total of 9)
   d. Evaluation of outcomes if appropriate (total of 3)
   e. Rationale of each intervention with citation (total of 9)
6. Analyze the relationships between the concepts to make meaningful associations by using cross-links. Use word descriptors as applicable. (These may be handwritten if necessary depending on computer software)

Guidelines for the Nursing Care Map
Nursing Diagnosis- Kozier Chapter 12.
- Must be NANDA approved.
- Must be patient centered and derived from patient data.
- Prioritized as per Maslow's Hierarchy
- Must be three (or 4) part statement:
  1. Problem
  2. Etiology (not a medical diagnosis)
  3. Defining characteristics

Goals/Outcomes – Kozier Chapter 13. Use SMART outcomes.
- Reflect and improvement to the problem and are patient centered.
- Must be stated in SMART format
  - S – Specific
  - M – Measureable
  - A – Achievable
  - R – Realistic
  - T – Timely

Examples: Patient will have pain ≤ 3 on 0-10 scale 80% of the time OR Oxygen saturation $\geq 93\%$, within 1 hour. Goals must include the normal variables for physiologic goals, such as the oxygen saturation goal.

Interventions – Kozier Chapter 13 pg 223. There are at least 3 types of the MOST IMPORTANT interventions for each diagnosis.
- Evidenced based
- Are independent
- Within the student's scope of practice.
- Each diagnosis must have at least 1 intervention that is an assessment activity (monitor BP q 4 hours); 1 intervention a doing activity (Will maintain HOB >30 degrees) and 1 intervention a teaching action (Educate patient on infection control).

Evaluation – Kozier Chapter 14. You may not be able to evaluate each nursing outcome.

Rationale – Kozier page 215.
- Must be 1-3 sentences that describe IN YOUR OWN WORDS why you have identified the intervention you have described. Each rationale must have a citation on a separate sheet of paper. Use citation numbers).

Citation page- Each rationale should have a number at the end of the description; this number must correspond with the reference you are using to provide this rationale.
You may NOT use a nursing care plan book as a reference book. You must use at least 2 sources.

Smith-Stoner, M. (2009). *Care plan instructional guide.* Unpublished document, Department of Nursing, California State University, San Bernardino, California. Adapted with permission.

APPENDIX N

LESSON PLAN FOR CARE MAPS

.

Instructional Unit Evaluation Plan

Purpose: Educate students on the process of developing a Care Map					
Goal: Students will independently develop a Care Map					
Objectives	**Content Outline**	**Method of Instruction**	**Time Allotted**	**Resources Needed**	**Method of Evaluation**
Describe what a Care Map is and its purpose	What is a Care Map? Purpose is to act as a care plan for the student while providing meaningful learning to the students.	Discussion	2 min	NA	
Develop a class example of a care map	Follow guidelines in instructional guide. Show YouTube video Follow steps. 1-6	Demonstration	45 minute	Computer, instructional guide White board	Participation, questions and answer
Develop own care maps based on nursing process assignment.	Pair up with someone different than CM work Distribute nursing process assignment. Circulate.	discussion	45 minute	Nursing process assignment Poster boards Post its markers	Care maps, collect.

Created by Fry, S. (2010).

REFERENCES

Abel, W. M., & Freeze, M. (2006). Evaluation of concept

mapping in an associate degree nursing program.

Journal of Nursing Education, 45(9), 356-364.

Retrieved May 16, 2010.

About. (n.d.). *Palm Desert Campus*. Retrieved November 02,

2011, from http://pdc.csusb.edu/about/index.htm

Adema-Hannes, R., & Parzen, M. (2005). Concept mapping:

Does it promote meaningful learning in the clinical ·

setting? *College Quarterly, 8*(3). Retrieved July 15,

2010, from http://www.senecac.on.ca/quarterly/2005-

vol08-num03-summer/adema-hannes_parzen.html

Akinsanya, C., & Williams, M. (2004). Concept mapping for

meaningful learning. *Nurse Education Today, 24*.

Retrieved June 3, 2010.

All, A. C., & Havens, R. L. (1997). Cognitive/concept

mapping: a teaching strategy for nursing. *Journal of

Advanced Nursing, 25*, 1210-1219.

All, A. C., & Huycke, L. L. (2007). Serial concept maps:

Tools for concept analysis. *Journal of Nursing

Education, 46*(5), 217-224. Retrieved May 16, 2010.

All, A. C., Huycke, L. I., & Fisher, M. J. (2003).

Instructional tools for nursing education: Concept

maps. *Nursing Education Perspectives, 24*(6), 311-317.

Retrieved August 24, 2011.

American Association of Colleges of Nursing. (2008).

Faculty tool kit: The essentials of baccalaureate

education for professional nursing practice. Retrieved

September 28, 2009, from

http://www.aacn.nche.edu/Education/pdf/BacEssToolkit.p

df

American Association of Colleges of Nursing. (2008). *The*

essentials of baccalaureate education for professional

nursing practice. Retrieved September 28, 2009, from

http://www.aacn.nche.edu/Education/pdf/BaccEssentials0

8.pdf

August-Brady, M. M. (2005). The effect of a metacognitive

intervention on approach to and self-regulation of

learning in baccalaureate nursing students. *Journal of*

Nursing Education, 44(7), 297-304. Retrieved May 16,

2010, from Wilson Web.

Ausubel, D. P. (1977). The facilitation of meaningful

verbal learning in the classroom. *Educational*

Psychologist, 12(2), 162-178. Retrieved May 11, 2010,

from EBSCHO.

Bastable, S. B. (2007). *Nurse as educator principles of teaching and learning for nursing practice*. New York: Jones & Bartlett.

Baugh, N. G., & Mellott, K. G. (1998). Clinical concept mapping as preparation for student nurses' clinical experiences. *Journal of Nursing Education, 37*(6), 253-256. Retrieved May 16, 2010, from Wilson Web.

Beitz, J. M. (1998). Concept mapping navigating the learning process. *Nurse Educator, 23*(5), 35-41. Retrieved February 24, 2011.

Bowles, K. (2000). The relationship of critical-thinking skills and the clinical-judgment skills of baccalaureate nursing students. *Journal of Nursing Education, 39*(8), 373-376. Retrieved May 12, 2011, from CINAHL Plus with Full Text.

Bretz, S. L. (2001). Novak's theory of education: Human constructivism and meaningful learning. *Journal of Chemical Education, 78*, 1107. Retrieved November 7, 2010, from http://www.users.muohio.edu/bretzsl/manuscripts/Bretz.JCE2001.pdf

Caelli, K. (1998). Shared understandings: Negotiating the meanings of health via concept mapping. *Nurse*

Education Today, 18, 317-321. Retrieved August 29, 2011.

California State University, San Bernardino - About CSUSB. (n.d.). *California State University, San Bernardino.* Retrieved January 30, 2011, from http://www.csusb.edu/aboutCSUSB/

California State University, San Bernardino - About CSUSB - Facts and Stats. (n.d.). *California State University, San Bernardino.* Retrieved January 30, 2011, from http://www.csusb.edu/aboutCSUSB/FactsStats.aspx

California State University, San Bernardino - About CSUSB - History. (n.d.). *California State University, San Bernardino.* Retrieved January 30, 2011, from http://www.csusb.edu/aboutCSUSB/History.aspx

Castellino, A., & Schuster, P. M. (2002). Evaluation of outcomes in nursing students using clinical concept map care plans. *Nurse Educator, 27*(4), 149-150.

Clayton, L. H. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27*(4), 197-203.

Conceicao, S. D., & Taylor, L. D. (2007). Using a constructivist approach with online concept maps: Relationship between theory and nursing education.

Nursing Education Perspectives, 28(5), 268-275.

Retrieved November 30, 2010.

Concept Mapping. (n.d.). *CORD Home Page - Center for Occupational Research and Development.* Retrieved September 01, 2010, from

http://cord.org/txcollabnursing/onsite_conceptmap.htm

Daley, B. J. (1996). Concept maps: Linking nursing theory to clinical nursing practice. *The Journal of Continuing Education in Nursing, 27,* 17-27. Retrieved May 2, 2010, from Wilson Web.

Daley, B. J., Shaw, C. R., Balistrieri, T., Glasenapp, K., & Piacentine, L. (1999). Concept maps: A strategy to teach and evaluate critical thinking. *Journal of Nursing Education, 38*(1), 42-47. Retrieved May 16, 2010, from Wilson Web.

Ellermann, C. R., Kataoka-Yahiro, M. R., & Wong, L. C. (2006). Logic models used to enhance critical thinking. *Journal of Nursing Education, 45*(6), 220-227. Retrieved May 16, 2010, from Wilson Web.

Facione, P. A. (1990). *The Delphi Report* (Rep. No. ED 315 423). Retrieved June 2, 2010, from American Philosophical Association website:

http://www.insightassessment.com/pdf_files/DEXadobe.PD

F (ERIC Document Reproduction Service)

Facione, P. A., & Facione, N. C. (n.d.). The Holistic

critical thinking scoring rubric: A tool for

developing and evaluating critical thinking. *Insight

Assessment*. Retrieved from

http://www.insightassessment.com/

*Foundation for Critical Thinking: Books, Conferences and

Academic Resources for Educators and Students.* (n.d.).

Retrieved June 2, 2010, from

http://www.criticalthinking.org/

Gaines, C. (1996). Concept mapping and syntehsizers:

instructional strategies for encoding and recalling.

*Journal of the New York State Nurses Association,

27*(1), 14-18. Retrieved November 30, 2010.

Harpaz, I., Balik, C., & Ehrenfeld, M. (2004). Concept

mapping: An educational strategy for advancing nursing

education. *Nursing Forum, 39*(2), 27-30. Retrieved

November 30, 2010.

Hay, D., Kinchin, I., & Lygo-Baker, S. (2008). Making

learning visible: The role of concept mapping in

higher education. *Studies in Higher Education, 33*(3),

295-311. Retrieved August 29, 2011.

Hicks-Moore, S. L., & Pastirik, P. J. (2006). Evaluating critical thinking in clinical concept maps: A pilot study. *International Journal of Nursing Education Scholarship, 3*(1). Retrieved May 2, 2010, from CINAHL.

Hinck, S. M., Webb, P., Sims-Giddens, S., Helton, C., Hope, K. L., Utley, R., ... Yarbrough, S. (2006). Student learning with concept mapping of care plans in community-based education. *Journal of Professional Nursing, 22*(1), 23-29. Retrieved May 2, 2010, from CINAHL.

Horton, P. B., McConney, A., Gallo, M., Woods, A., Senn, G., & Hamelin, D. (1993). An investigation of the effectiveness of concept mapping as an instructional tool. *Science Education, 77*(1), 95-111. Retrieved May 12, 2011, from Applied Science and Technology Full Text.

Hsu, L. (2004). Developing concept maps from problem-based learning scenario discussions. *Journal of Advanced Nursing, 48*(5), 510-518. Retrieved May 16, 2010, from EBSCHO.

Hsu, L., & Hsieh, S. (2005). Concept maps as an assessment tool in a nursing course. *Journal of Professional*

Nursing, 21(3), 141-149. Retrieved May 2, 2010, from

CINAHL.

Innovation in Nursing Education: A Call to Reform (Rep.).

(n.d.). Retrieved May 31, 2011, from National League

for Nursing website:

http://www.nln.org/aboutnln/positionstatements/innovat

ion082203.pdf

Irvine, L. M. (1995). Can concept mapping be used to

promote meaningful learning in nurse education?

Journal of Advanced Nursing, 21(6), 1175-1179. doi:

10.1046/j.1365-2648.1995.21061175.x

Kathol, D. D., Geiger, M. L., & Hartig, J. L. (1998).

Clinical correlation map: A tool for linking theory

and practice. *Nurse Educator, 23*(4), 31-34.

Kennison, M. M. (2006). The evaluation of students'

reflective writing for evidence of critical thinking.

Nursing Education Perspectives, 27(5), 269-273.

Retrieved March 13, 2010, from EBSCO.

Kern, C., Bush, K., & McCleish, J. (2006). Mind-mapped care

plans: Integrating an innovative educational tool as

an alternative to traditional care plans. *Journal of

Nursing Education, 45*(4), 112-119. Retrieved May 10,

2011, from CINAHL Plus with Full Text.

Killeen, M. B., & King, I. M. (2007). Viewpoint: Use of

    King's conceptual system, nursing informatics, and

    nursing classification systems for global

    communication. *International Journal of Nursing*

    Terminologies and Classifications, 18(2), 51-57.

    Retrieved October 11, 2010, from Academic Search

    Premier.

Kinchin, I., & Hay, D. (2005). Using concept maps to

    optimize the composition of collaborative student

    groups: a pilot study. *Journal of Advanced Nursing,*

    51(2), 182-187. doi: 10.1111/j.1365-2648.2005.03478.x

King, M., & Shell, R. (2002). Teaching and evaluating

    critical thinking with concept maps. *Nurse Educator,*

    27(5), 214-216.

Kostovich, C. T., O'Brien, K. L., Poradzisz, M., & Wood, K.

    (2007). Learning style preference and student aptitude

    for concept maps. *Journal of Nursing Education, 46*(5),

    225-231.

Lane-Tillerson, C. (2007). Imaging practice in 2050: King's

    conceptual framework. *Nursing Science Quarterly,*

    20(2), 140-143. Retrieved October 11, 2010, from Sage.

Lawton, J., Saunders, R., & Muhs, P. (1980). Theories of

    Piaget, Bruner, and Ausubel: Explications and

implications. *Journal of Genetic Psychology, 136*(1), 121.

Leach, M. J. (2008). Planning: a necessary step in clinical care. *Journal of Clinical Nursing, 17*(13), 1728-1734. doi: 10.1111/j.1365-2702.2008.02281.x

Logan, M. (2001). The concept map: A systems-oriented approach to education. *Communicating Nursing Research, 34*(9), 243-243. Retrieved August 29, 2011.

Luckowski, A. (2003). Concept mapping as a critical thinking tool for nurse educations. *Journal for Nurses in Staff Development, 19*(5), 225-230. Retrieved August 28, 2011.

MacNeil, M. S. (2007). Concept mapping as a means of course evaluation. *Journal of Nursing Education, 46*(5), 232-234. Retrieved August 28, 2011.

Mahler, S., Hoz, R., Fischl, D., Tov-Ly, E., & Lernau, O. (1991). Didactic use of concept mapping in higher education: applications in medical education. *Instructional Science, 20,* 25-47. Retrieved May 12, 2011, from Academic Search Premier.

Maneval, R. E., Filburn, M. J., Deringer, S. O., & Lum, G. D. (2011). Concept Mapping: Does it improve critical thinking ability in practical nursing students?

Nursing Education Perspectives, 32(4), 229-233.

Retrieved September 11, 2011.

McCarthy, P., Schuster, P. M., & Zehr, P. (1999).

Evaluation of critical thinking in a baccalaureate

nursing program. *Journal of Nursing Education, 38*(3),

142-144. Retrieved July 15, 2010.

McEwen, M., & Wills, E. M. (2011). *Theoretical basis for

nursing.* Philadelphia: Wolters Kluwer/Lippincott

Williams & Wilkins.

Messmer, P. R. (2006). Professional model of care: Using

King's theory of goal attainment. *Nursing Science

Quarterly, 19*(3), 227-229. Retrieved October 11, 2010,

from Sage.

Miller, M. A. (1992). Outcomes evaluation: Measuring

critical thinking. *Journal of Advanced Nursing,

17*(12), 1401-1407. doi: 10.1111/j.1365-

2648.1992.tb02810.x

Molaison, E., Taylor, K., Erickson, D., & Connell, C.

(2009). The use and perceptions of concept mapping as

a learning tool by dietetic internship students and

preceptors. *Journal of Allied Health, 38*(3), 97-103.

Retrieved May 12, 2011, from Rapid Interlibrary Loan.

Mueller, A., Johnston, M., & Bligh, D. (2001). Mind-mapped
care plans: A remarkable alternative to traditional
nursing care plans. *Nurse Educator, 26*(2), 75-80.
Retrieved February 25, 2011.

Mueller, A., Johnston, M., & Bligh, D. (2002). Joining mind
mapping and care planning to enhance student critical
thinking and achieve holistic nursing care (J.
Wilkinson, Ed.). *Nursing Diagnosis, 13*(1), 24-27.
Retrieved August 28, 2011.

Novak, J. D., & Canas, A. J. (2008, January 22). *The theory
underlying concept maps and how to construct and use
them* (Tech.). Retrieved May 10, 2010, from Florida
Institute for Human and Machine Cognition website:
http://cmap.ihmc.us/publications/researchpapers/theory
cmaps/theoryunderlyingconceptmaps.htm

Novak, J. D., & Gowin, D. B. (1984). *Learning how to learn.*
Cambridge [Cambridgeshire, NY: Cambridge University
Press.

Oermann, M. H., & Gaberson, K. B. (2009). *Evaluation and
testing in nursing education* (3rd ed.). New York:
Springer.

Pickens, C. L. (2007). *Concept mapping: methods to improve
critical thinking* (Doctoral dissertation, Wayne State

University, 2007). Ann Arbor, MI: ProQuest Information

and Learning Company. Retrieved February 25, 2010.

Pilcher, J. (2009). Using concept maps in a nurse

internship program. *Journal for Nurses in Staff

Development, 35*(6), 299-303. Retrieved May 12, 2011,

from Rapid Interlibrary Loan.

Polit, D. F., & Beck, C. T. (2008). *Nursing research:

generating and assessing evidence for nursing practice*

(8th ed.). Philadelphia, PA: Wolters Kluwer

Health/lippincott Williams & Wilkins.

Quickfall, J. (2000). Concept mapping-An evaluation of its

use in community nursing research. *NT Research, 5*(4),

1361-4096. Retrieved December 1, 2010.

Reynolds, A. (1994). Patho-flow diagramming: A strategy for

critical thinking and clinical decision making.

Journal of Nursing Education, 33(7), 333-336.

Retrieved August 28, 2011.

Riddell, T. (2007). Critical assumptions: thinking

critically about critical thinking. *Journal of Nursing

Education, 46*(3), 121-126. Retrieved February 11,

2011.

Rooda, L. A. (1994). Effects of mind mapping on student achievement in a nursing research course. *Nurse Educator, 19*(6), 25-27. Retrieved August 29, 2011.

Roop, K. M. (2002). *Effects of concept mapping as a learning strategy on certificate practical nursing students' academic achievement and critical thinking development* (Doctoral dissertation, Wilmington College, 2002) (pp. 73-77). Ann Arbor, MI: ProQuest Information and Learning. Retrieved September 11, 2011.

Sabo, J. A., Knudtson, B., Conbere, P. C., Howard, P., Rusch, A., Dalen, S., ... Tourville, C. (2005). Developing an outcome-based multidisciplinary care planning tool. *Journal of Nursing Care Quality, 20*(2), 145-153. Retrieved February 11, 2010.

Schuster, P. (2003, November). Concept Maps in clinical settings: Improved clinical performance and effective patient care. *Dean's Notes. National Student Nurses Association, 25*, 1-4. Retrieved June 15, 2010, from http://www.ajj.com/services/publishing/deansnotes/nov0 3.pdf

Schuster, P. (2004, January). Grading concept map care plans: Validity and reliability (J. A. Tyler, Ed.).

Dean's Notes. National Student Nurses Association, 25,

1-4. Retrieved June 15, 2010, from

http://www.ajj.com/services/publishing/deansnotes/jan0

4.pdf

Schuster, P. M. (2000). Concept mapping: Reducing clinical

care plan paperwork and increasing learning. *Nurse*

Educator, 25(2), 76-81.

Schuster, P. M. (2008). *Concept mapping: a critical-*

thinking approach to care planning (2nd ed.).

Philadelphia, PA: F.A. Davis.

Senita, J. (2008). The use of concept maps to evaluate

critical thinking in the clinical setting. *Teaching*

and Learning in Nursing, 3(1), 6-10. Retrieved

February 21, 2011.

Smith, B. E. (1992). Linking theory and practice in

teaching basic nursing skills. *Journal of Nursing*

Education, 31(1), 16-23. Retrieved November 30, 2011.

Staib, S. (2003). Teaching and measuring critical thinking.

Journal of Nursing Education, 42(11), 498-508.

Retrieved February 11, 2010.

Standards of Accreditation of Baccalaureate and Graduate

Degree Nursing Programs. (2008). *Commission on*

Collegiate Nursing Education, 2-21.

Stone, C. A., Davidson, L. J., Evans, J. L., & Hansen, M.
    A. (2001). Validity evidence for using a general
    critical thinking test to measure nursing students'
    critical thinking. *Holistic Nursing Practice, 15*(4),
    65-74. Retrieved September 11, 2011.

Taylor, J., & Wros, P. (2007). Concept Mapping: A nursing
    model for care planning. *Journal of Nursing Education,
    46*(5), 211-216.

Taylor, L. A., & Littleton-Kearney, M. (2011). Concept
    mapping: A distinctive educational approach to foster
    critical thinking. *Nurse Educator, 36*(2), 84-88.
    Retrieved August 31, 2011.

Toofany, S. (2008). Critical thinking among nurses. *Nursing
    Management, 14*(9), 28-31.

Torre, D. M., Daley, B., Stark-Schweitzer, T., Siddartha,
    S., Petkova, J., & Ziebert, M. (2007). A qualitative
    evaluation of medical student learning with concept
    maps. *Medical Teacher, 29*, 949-955. Retrieved May 3,
    2010.

Vacek, J. E. (2009). Using a conceptual approach with a
    concept map of psychosis as an exemplar to promote
    critical thinking. *Journal of Nursing Education,
    48*(1), 49-53. doi: 10.3928/01484834-20090101-12

Vacek, J. E. (2009). Using a conceptual approach with concept mapping to promote critical thinking. *Journal of Nursing Education, 48*(1), 45-48. doi: 10.3928/01484834-20090101-11

Vizoso, H., Lyskawa, M., & Couey, P. (2008). Standardized nursing care plan: A case study on developing a tool for clinical research. *Western Journal of Nursing Research, 30*(5), 578-587.

Wheeler, L. A., & Collins, S. K. (2003). The influence of concept mapping on critical thinking in baccalaureate nursing students. *Journal of Professional Nursing, 19*(6), 339-346. Retrieved May 2, 2010, from CINAHL.

Wiggins, G., & McTighe, J. (2005). *Understanding by Design, Expanded 2nd Edition*. Upper Saddle River: Prentice Hall.

Wilgis, M., & McConnell, J. (2008). Concept mapping: An educational strategy to improve graduate nurses' critical thinking skills during a hospital orientation program. *Journal of Continuing Education in Nursing, 39*(3), 119-126. Retrieved May 3, 2010, from EBSCHO.

Wilkes, L., Cooper, K., & Lewin, J. (1999). Concept mapping: promoting science learning in BN learners in

Australia. *The Journal of Continuing Education in Nursing, 30*(1), 37-44. Retrieved August 30, 2011.