

EFFECTS OF UNFOLDING CASE STUDIES ON NURSING STUDENTS'
UNDERSTANDING AND TRANSFER OF OXYGENATION

by

SANDRA BRYANT

CECIL ROBINSON, COMMITTEE CHAIR

SUSAN APPEL

ALICE MARCH

DOUGLAS MCKNIGHT

KIMBERLY YORK

A DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Education in the
Department of Educational Leadership,
Policy, and Technology Studies
In the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2016

ABSTRACT

Utilizing unfolding case studies as a teaching strategy has a number of potential benefits towards enhancing student understanding and transfer of knowledge. A major goal of these strategies is to enhance the competence levels of nursing students and improve patient care outcomes. Literature has suggested that utilization of knowledge to align classroom, clinical, and laboratory learning experiences will lead to nursing students who are better able to discern critical aspects to focus on within clinical situations, allowing them to render more competent care (Benner, Sutphen, Leonard, & Day, 2010). Although unfolding case studies have the potential benefits, listed above, there is little empirical research in nursing education to warrant such claims. This study begins to address this gap by examining differences in understanding and transfer between a classroom that utilized a lecture-based approach ($n = 45$) and a classroom that utilized unfolding case studies ($n = 44$). Specifically, this study tested the effects of using unfolding case studies within an oxygenation module in a Fundamentals of Nursing Course at a community college in the southeastern United States. Pre and post module tests, a final examination, a teaching rubric, and personal perceptions of achievement through survey questions were utilized to measure achievement levels and students perceptions about using unfolding case studies. Results from an analysis of variance indicate that students in the unfolding case study classroom learned at a statistically significantly greater rate and demonstrated greater understanding after the module than students in the lecture-based classroom. Further, students in the unfolding case study classroom demonstrated significantly

higher transfer of understanding on the final examination. Results from the survey questions offer suggestions for educational design for nursing students by guiding pedagogical strategies for the alignment of classroom, clinical, and laboratory experiences.

LIST OF ABBREVIATIONS AND SYMBOLS

AC	Assessment-centered
ACCS	Alabama Community College System
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
CI	Confidence Intervals
CC	Community-centered
CINAHL	Cumulative Index of Nursing and Allied Health Literature
EBSCO	Elton B. Stephens Company
ERIC	Education Resources Information Center
IOM	Institute of Medicine
IRB	Institutional Review Board
KC	Knowledge-centered
LC	Learner-centered
LED	Learning Environment Design
NRC	National Research Council
PN	Practical Nursing
SPSS	Statistical Package for the Social Services

ACKNOWLEDGEMENTS

There are many people I would like to thank who have supported me throughout this amazing journey of my life. First, I would like to thank my dissertation chair, Cecil Robinson. His expertise, patience and guidance have paved the way for me to making this dream become a reality. I would also like to thank my committee members, Susan Appel, Alice March, Douglas McKnight, and Kimberly York, for their support and guidance of my research and progression towards success. Further, I would like to thank Robert Kelly Michael for his many hours of emotional support, as well as his assistance with the finalization of this study. I would like to thank my colleagues Gwyn Galloway and Gail Salter, as well as my fellow graduate student, Donna Guerra for their unending support and assistance.

I would especially like to thank my husband Jerrad and my daughter Madison, for their continuous support of me throughout this journey. Jerrad, you always reminded me that I was good enough to do this. Madison, thank you for always being my sunshine, and for “letting mommy write”. I love you both with all of my heart.

I dedicate this Dissertation to the memory of A.V. and Mary Shehane (parents), Roy and Jewell Floyd (grandparents), and Michael Shehane (brother).

CONTENTS

ABSTRACT	ii
LIST OF ABBREVIATIONS AND SYMBOLS.....	iv
ACKNOWLEDGEMENTS	v
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER I: INTRODUCTION	1
Background	4
Problem Statement	9
Statement of Purpose	9
Significance	11
Theoretical Framework	11
Research Questions	17
Summary	18
CHAPTER II: LITERATURE REVIEW	20
Overview of Findings	21
Student Attrition and Retention	21
Theory to Practice	22
Transfer of Knowledge	28
Summary	29

CHAPTER III: RESEARCH METHODOLOGY	30
Design	30
Setting	32
Participants	32
Materials	33
Unfolding Case Study	33
Laboratory Equipment	34
Student-Constructed Case Studies	34
Pretest	35
Posttest	35
Final Examination	35
Teaching Rubric	36
Student Perspectives Survey	36
Procedures	36
Lecture Group	37
Case Study Group	38
Data Collection	39
Data Analysis	40
Quantitative Analysis	41
Qualitative Analysis	41
CHAPTER IV: RESULTS.....	43
Overview	43
Quantitative Analysis of the Data	44

Research Question 1	44
Research Question 2	46
Research Question 3	47
Qualitative Analysis of the Data	48
Student Perspectives Surveys	48
Increased Preparedness/Understanding	49
Learning in a Safe Environment	50
Field Observation Notes	51
Summary	52
CHAPTER V: DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS.....	54
Summary of the Findings	55
Research Question 1	55
Research Question 2	56
Research Question 3	57
Research Question 4	57
Implications for Change	58
Recommendations for Future Research	61
Conclusion	62
REFERENCES	63
APPENDIX A: Plan of Instruction	67
APPENDIX B: Teaching Rubric	69
APPENDIX C: Student Perspectives Survey	71
APPENDIX D: Inquiry Email Requesting Permission to Use Rubric	73

APPENDIX E: Permission Email to Use Rubric	75
APPENDIX F: Unfolding Case Study	77
APPENDIX G: Common Respiratory Alterations	79
APPENDIX H: Informed Consent	81
APPENDIX I: Coded Student Perspectives Surveys	84
APPENDIX J: Field Observation Notes	90
APPENDIX K: Institutional Review Board Approval	93
APPENDIX L: Institutional Agreement	95

LIST OF TABLES

Table 1: Sequence of Events, Control Group	36
Table 2: Sequence of Events, Experimental Group	38
Table 3: Dependent Variables by Group	39
Table 4: Pretest and Posttest Descriptive Statistics and Group Differences	44
Table 5: Final Examination Descriptive Statistics and Group Differences.....	45
Table 6: Field Observations that Supported or Disputed the Quantitative Results	49

LIST OF FIGURES

Figure 1: Depiction of the Problem and the Link Identified Between the IOM Findings and Current Nursing Education Practices	10
Figure 2: Depiction of the Four Learning Environment Design Principles of the NRC	14
Figure 3: Pretest and Posttest Oxygenation Scores for Lecture (control) and Unfolding Case Study (treatment) groups	43
Figure 4: Student Perceptions of Unfolding Case Studies as Learning Strategy	47

CHAPTER I: INTRODUCTION

Within the national health care system, there is a growing need to address complex patient care by nurses. The increased complexities of patient needs must be met with care that involves clinical reasoning, rather than task-based care. With nurses being at the heart of those who will implement changes, barriers that face the nursing profession must be overcome in order to obtain positive patient outcomes. These barriers center around the ability of nurses to practice to their full education and training, obtain higher degrees with more readily access to academic progression, partner with other healthcare providers in the healthcare reform, and inform policy making to enhance information infrastructure (Institute of Medicine [IOM], 2010). The IOM (2010) has established recommendations to help fill the anticipated void, with the following recommendations for nursing education:

- Implement nurse residency programs;
- Increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020;
- Double the number of nurses with a doctorate by 2020;
- Ensure that nurses engage in lifelong learning;
- Prepare and enable nurses to lead change to advance health.

As research regarding nursing education and nursing care is emerging, new expectations surface. New nurse graduates are expected to assume greater roles, deliver more complex care,

and be able to utilize information in a safe effective manner, upon entry into the workforce. Unfortunately, these expectations are not being met in a widespread manner. A major source of this problem is the manner in which students are educated nation-wide within nursing programs. The *Carnegie Report* (Benner, Sutphen, Leonard, & Day, 2010) yielded three major findings that describe current nursing education. The three major findings conclude that nursing programs are effective at forming professional identity and ethical comportment and effective at providing learning experiences with clinical assignments, but are not effective at teaching nursing as a science. Generally speaking, there is a disconnect within programs. Different learning environments (clinical, lab, classroom) are not taught as one entity, but as disjointed areas with unrelated objectives. This type of curricular structure does not promote learning nursing as a continuum, but as segregated pieces that must be put together like a puzzle by the students. This type of disconnect does not enhance the transfer of knowledge or culture of building upon, utilization of, or synthesis of knowledge, in which nurses must practice. Further, this type of education does not foster the culture of anticipating the needs of patients as care is rendered. With disconnected or fragmented instruction, there is only superficial learning of knowledge. Learners are not afforded the opportunity to utilize the information to make clinical judgments (Benner et al., 2010). Nursing students must learn to be able to not only deliver task-based care, but meet the ever-changing needs of patients on a minute-to-minute basis and be able to quickly recognize a change in patient needs.

Benner et al. (2010) further identified that the answer to these findings is the integration of utilization of knowledge, skilled know-how and ethical comportment as the major change factors necessary within nursing education. In an effort to begin this type of change, nurse educators must intentionally design learning environments so that they are integrated and meet

the demands of today's nurses. This study attempted to meet these calls with greater learner-centered, knowledge-centered, assessment-centered and community centered instruction. The use of an unfolding case study to enhance student learning, and lead to appropriate utilization of knowledge, will hopefully lead to increased positive patient outcomes when they become practicing nurses.

While preparing to meet the challenges of healthcare reform, educators must look at key essential or fundamental areas of nursing education prior to moving forward. To develop a concrete understanding of nursing care, students must first develop a deep understanding of fundamental knowledge and concepts. Often students develop misconceptions through memorization that are never addressed once past the fundamental level. These misconceptions then follow the nursing students as they progress, providing an unstable foundation on which to build (Benner et al., 2010).

One of the most fundamental knowledge concepts within nursing is oxygenation, and is the focus of this study. Nursing students must understand the proper anatomy and physiology of oxygenation, prior to being able to assess, determine normality versus abnormality, and follow-up with appropriate intervention when necessary (Alabama Community College System [ACCS], 2008). However, if education and training have been constrained by memorization and regurgitation of facts, it is difficult to understand the application of knowledge within clinical situations (Benner et al., 2010). Fundamentally, students must know certain facts about normality versus abnormality and appropriate nursing interventions, in regards to oxygenation. If students have not been exposed to how or when nursing interventions are implemented, or how the clinical "picture" could present, the result might possibly be unsafe practice within a clinical situation. Simply knowing the facts for an examination, does not lead to safe, competent care at

the bedside. The study examined whether or not unfolding case studies allow for students to encounter situations, within the learning environment to “practice” as well as construct their knowledge based on actual situations; therefore, enhancing the depth to which knowledge is gained, as well as addressing common misconceptions (Benner et al., 2010).

Background

To meet new challenges in health care and calls for reform, nurse educators must be willing to implement substantial changes in instructional approaches to create learning environments that are consistent with how students learn. These challenges and reform are results of the *IOM Report (2010)*. The reform proposed by the *IOM Report* indicates a need for nurses to be able to deliver more complex care, potentially expanding scope of practice, as well as build upon basic nursing education for advanced degrees. In an effort to meet these challenges, nursing education is looking to the recommendations made within the *Carnegie Report*.

The *Carnegie Report* was released after the Carnegie Foundation completed national research regarding the professions of law, clergy, medicine, engineering, and nursing. Specifically, the research from the *Carnegie Foundation National Nursing Education Study* identified disconnects within current nursing education and made recommendations for future nursing education. The recommendations set forth suggest a change in the thinking of educators from a de-contextualized to a contextualized learning environment, as well as a change in the approach to nursing education, from its current state of disconnected learning environments (Benner et al., 2010). This means that the current and past practices of teaching multiple unrelated modules within a classroom setting, followed by lab time to focus on only one task for validation must be changed. Nurse educators will need to design learning environments that

allow learners to understand content material in context or in a manner that makes the knowledge useable, rather than just presenting facts. A concerted effort must be made to align classroom, lab, and clinical learning environments to foster a culture of nursing care that encompasses the whole patient, with attention to the changing needs of patients, not just tasks to be completed (Stokowski, 2011).

The goal of this study was to examine one pedagogical approach that may allow nurse educators to better meet these calls for change. Specifically, this study examined the utilization of an unfolding case study on student understanding of oxygenation in a fundamental level nursing course. An unfolding case study is a “comprehensive plan of learning that allows students practice time to solve individually and collectively problems they may encounter in clinical situations” (Glendon & Ulrich, 1997, p.15). It is an ever-evolving patient situation that requires learners to utilize knowledge as they progress through a case that begins with a patient. The patient begins to experience unexpected health concerns, and the case unfolds as students explore the cause and treatment of these concerns. As those treatments are evaluated, more changes in patient condition take place, requiring that students explore deeper into interventions and evaluation. Between each cycle of patient decline, a time for discussion and clarification of misconceptions takes place in the form of an instructor-student forum. (Glendon & Ulrich, 1997)

To align the calls for reform and potential pedagogical strategies, the framework of the National research Council (NRC) was utilized. The NRC identified four design principles, upon which a learning environment should be constructed. These principles are learner-centeredness (LC), knowledge-centeredness (KC), assessment-centeredness (AC), and community-centeredness (CC). LC focuses on the actual learners’ needs, so that students can use prior knowledge and their own ideas in understanding. KC focuses content around big ideas for

students to be able to see the relativity of each level, as big ideas are broken down. AC centers on timely feedback to allow self-regulation, therefore building metacognition. CC focuses on the allowance of risk-taking in a situation so learning can occur. The principals of LC, KC, AC, and CC are predicated on several decades of learning science research (NRC, 2000).

The type of proposed learning environment for the study is aligned with calls for reform in nurse education, because unfolding case studies are LC in that these cases build on the prior conceptions and cultural knowledge of students. Unfolding case studies are also KC in that these cases are grounded within a disciplinary framework of knowledge and practice that will better allow them to function effectively as nurses. Further, unfolding case studies are AC in that they allow timely feedback to learners as they progress through the case, allowing time for self-monitoring, which leads to metacognitive awareness. Finally, unfolding case studies are CC in that learners are allowed to take risks in a safe environment, while learning in a community of peers. Put another way, this study argues that the utilization of unfolding case studies allows learners to develop understanding in a meaningful, contextualized manner (NRC, 2000).

Unfolding case studies can be utilized within a simulation lab or classroom setting, depending upon the needs and resources available. This particular study focused on the utilization of unfolding case studies within the classroom setting. According to Billings, Kowalski, and Reese (2011), an unfolding case study begins with the introduction of a patient who begins to encounter unexpected health concerns. Students gather assessment data and begin to formulate and implement a plan of care to address the initial complaints of the patient with oxygenation alterations. This plan of care should include actual alterations and risks for further alterations. At certain points within the case, students evaluate goals, discuss with an instructor at that point in the scenario regarding actions taken and outcomes achieved, and then revise the

plan of care as the patient situation continues to change. The time of discussion will help to confirm appropriate action and re-direct misconceptions prior to moving to the next level of care. After each time of feedback, students continue the cycle of assessment, planning, intervention, and evaluation. As the patient condition changes, learners are involved in planning care based upon “decision-making and clinical reasoning skills, in the safe environment” (Billings et al., 2011, p. 345) of a lab or classroom setting. As the patient continues to decline, further action is required of the learners to accommodate to the changes in the patient, as well as discussion regarding anticipated needs of the patient based on physiological data (Billings et al., 2011).

The unfolding case study should develop solid student understanding of concepts within the case for several reasons. This process builds on students’ prior understanding in that learners bring their backgrounds, combined with taught content to synthesize new knowledge as their meta-cognitive processes progress. It is centered on big ideas (knowledge) to develop understanding within practices that will be encountered by practicing nurses (NRC, 2000). In the matter of oxygenation, learners are guided by the instructor to focus on the major concept of importance of oxygenation. Without proper oxygenation, cells and tissues begin to become ischemic and die. Then a focus is placed on the clinical picture of what normal oxygenation is versus a picture of abnormal oxygenation. One might then begin the discussion regarding how optimal oxygenation is achieved. Each of these steps breaks down the importance of each piece of information, in context to the overall goal, which is achieving optimal oxygenation (Treas & Wilkinson, 2014).

By situating presentation of information and facts around a central concept or goal, students are able to understand how something that seems so small, such as positioning of the patient, can have such a major impact on the overarching goal, which is supporting proper

oxygenation. As the case continues to unfold, students must take action to deliver patient care. This is actually allowing them to take risks, just as they would in a real patient scenario. Further, as they take action, they are able to see the patient condition either improve or decline, based on the actions they took, which gives them feedback in a timely manner. This feedback, based on their actions, allows for self-regulation that something might be wrong. This is where they begin to experience metacognition of self-regulation. This type of learning allows students to work through exercises that are authentic, by situating the content into real practice context (Edelson & Reiser, 2006).

Situated cognition encompasses a learning environment where “learners work in a context where they are surrounded by social and intellectual supports so they can see how knowledge is used in authentic practice” (Quintanna, Shin, Norris, & Soloway, 2006, p. 123). Utilization of authentic practice and situated cognition encourage the learner to actively participate or become engaged in learning activities that are embedded in contextualized learning activities. This affords learners the safety net of making clinical judgment mistakes in a low-stakes setting, prior to entering a similar situation in which a patient’s life could be at stake. The main objective is to allow students to become active participants as they begin to construct knowledge, present the knowledge that has been constructed, and undergo critique for further construction (Hubball, 2004).

As such, unfolding case studies may positively affect student learning, as well as enhance the educative experiences of fundamental level nursing students, which can further meet the goal of success for future nurses. The findings of this research may serve to align nursing education with pedagogical strategies outlined by the *Carnegie Report* (Benner et al., 2010) and meet the challenges called for within the *IOM Report* (2010). Traditional didactic instruction has not been

able to allow learners to bring together all of the pieces of the puzzle, therefore limiting newly practicing nurses in their roles (Benner et al., 2010). Further, though formative and summative feedback is given in traditional settings, it is offered after learners have begun to self-regulate around the incorrect ideas, with no time for correction and re-construction. By using unfolding case studies, aligned with the learning principles introduced by the NRC (2000), nurse educators may be able to create educative experiences that allow students to learn in authentic situations, become metacognitively aware of their actions through risk-taking and timely feedback, and therefore increase their abilities to make sound clinical decisions (Benner et al, 2010).

Problem Statement

A lack of alignment of classroom, laboratory, and clinical learning environments has led to a lack of new nurses' abilities to deliver adequate care within rapidly changing patient situations. As students have progressed through programs of nursing education, there have been disconnects between learning environments which have led to this deficit of newly practicing nurses. The deficit encompasses an inability to deeply understand nursing science. Nursing education programs need to align classroom, laboratory, and clinical learning experiences, in order to foster learning environments which are conducive to enabling students to practice in rapidly changing patient situations. This type of education program would better prepare entry level nurses to deliver highly competent and effective patient care.

Statement of Purpose

This study addressed the problem of current nursing education practices failing to meet the goals and challenges set forth within the *IOM report*. More specifically, this study addressed the challenges of ensuring that nurses engage in lifelong learning and preparing and enabling nurses to lead change to advance health. Current pedagogical strategies rely on the memorization

of massive amounts of information in an effort to pass a licensing examination. However, the *Carnegie Report* calls for nursing education to challenge nursing students to develop a deeper understanding of knowledge. This effort would enhance practice within clinical situations, therefore potentially enhancing patient outcomes and improving healthcare in its entirety (Benner et al., 2010).

The purpose of this mixed-methodological, sequential explanatory, pre-post control group study was to address the gap between current pedagogical practices and the challenges set forth by healthcare reform and policy changes (IOM, 2010), met by recommendations identified within the *Carnegie Report* (Benner et al., 2010). The study attempted to address the gap by determining the effects of an unfolding case study on student learning outcomes. Unfolding case studies afford the design of a learning environment that is consistent with LC, KC, AC, and CC principles to foster student engagement and active participation within the learning experience. The focus of the study was a first level nursing course within the community college setting, and utilized the principles of authentic practice and situated cognition, in the form of unfolding case studies.

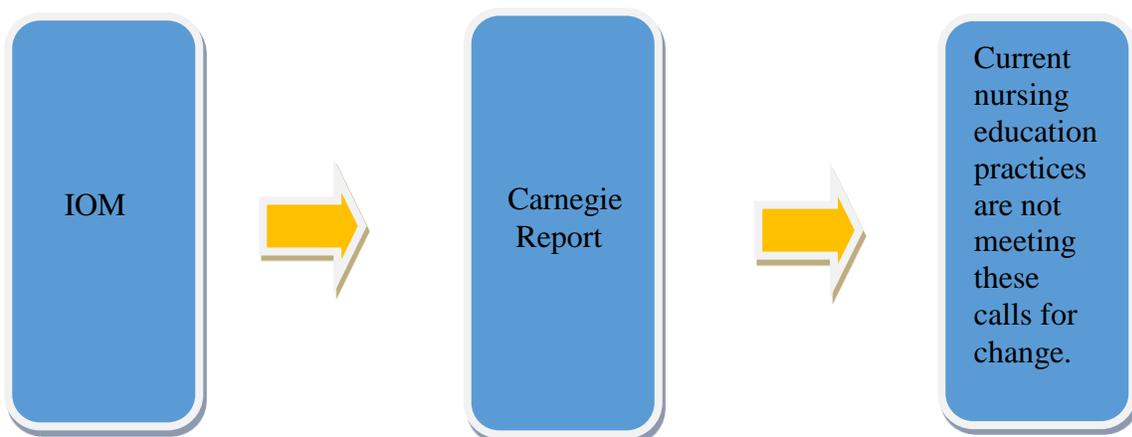


Figure 1. Depiction of the problem and the link identified between the IOM findings and current nursing education practices.

Significance

By addressing the problem of alignment of classroom, clinical, and laboratory learning experiences to deepen the understanding of nursing, this research is significant in the following ways. The study determined the effects of changes within pedagogical strategies to enhance student understanding of oxygenation, thus leading to enhanced learner outcomes. This means that more nursing students will develop a deeper, more meaningful understanding of nursing science content. Overall retention of nursing students can enhance the overall retention of undergraduate college students that actually complete a program of study, pass licensure examination, begin nursing practice, pursue higher degrees, and add to the body of nursing and nursing education. Enhancement of just one course within a school of nursing can lead to the transformation of every course within a program, therefore becoming a leader in nursing education reform as a whole. This type of transformation meets the call for radical transformation of the *Carnegie Report* (Benner et al., 2010), and further supports enhanced patient care outcomes to meet the challenges of the *IOM Report* (2010).

Theoretical Framework

To fully understand how this study will address the gap within the literature and meet the challenges set forth by the *IOM Report*, it is important to explore the following concepts and how they relate to nursing education and nursing practice. The theoretical framework chosen for the study is based upon the framework set forth by the NRC. The manners in which people learn can be categorized into three major areas. The first idea is that learners must build on prior knowledge. “There is a good deal of evidence that learning is enhanced when teacher’s pay attention to the knowledge and beliefs that learners bring to the learning task, use this knowledge as a starting point for new instruction, and monitor students’ changing conceptions as instruction

proceeds” (NRC, 2000, p. 11). The second idea is that organization of knowledge contributes to the ability to learn. “Knowledge of a large set of disconnected facts is not sufficient. To develop knowledge in an area of inquiry, students must have opportunities to learn with understanding. Deep understanding of subject matter transforms factual information into usable knowledge.” (NRC, 2000, p. 16) The third area identified to affect the ability to learn deals with introducing a meta-cognitive approach to instruction. This approach actually teaches learners to evaluate themselves in terms of progression. “Teaching meta-cognitive strategies must be incorporated into the subject matter that students are learning....the goal is independence and self-regulation” (NRC, 2000, p. 19).

Synthesis of several decades of learning sciences research led to these three big ideas, and the NRC identified 4 design principles for learning environments to ensure these three ideas are central to student learning within that environment. The design principles include learner-centeredness, knowledge-centeredness, assessment-centeredness, and community-centeredness. LC environments allow for the inclusion of learners’ beliefs, attitudes, skills, and knowledge. This type of learning environment demands that the educator utilize the experiences, theories, and intelligence of learners in which to assist with the construction of knowledge. Further demands of the educator are a close attention to student progression and planning appropriate learning activities/experiences that challenge the learners, but are not discouraging, causing disengagement (NRC, 2000). Within this study, learners will utilize their knowledge base to work through an unfolding case study presented by the instructor. Based on the progression through the case, the instructor will be able to direct the case to meet student needs.

KC environments maintain attention on content, understanding of the content, and what mastery of the content should include by focusing on the organization of knowledge around big

ideas within a disciplinary framework. Further, knowledge-centeredness incorporates the teaching of meta-cognitive strategies to facilitate future learning (NRC, 2000). For use within this study, the learners will be able to take the direction from the unfolding case study completed in class - at which time major concepts of oxygenation have been discussed and clarified - and begin to build their own group case studies to demonstrate mastery of the concepts. Through the organization of knowledge from all learning environments, learners can begin to build knowledge that is not fragmented or superficial, but embedded with the experience of utilizing the knowledge as it is built. This can lead to further synthesis of knowledge as learning continues throughout the learner's lifetime (Benner et al., 2010).

Assessment-centered environments are designed to allow both student and teacher to identify thought processes of the students, as well as offer timely feedback to the student. This allows for the instructor to identify students' preconceptions and assess, plan or design instruction according to the needs of the students. As learners work through the unfolding case study that is presented by the instructor, they will be receiving immediate feedback on concepts and ideas, as well as, have misconceptions clarified at that time. This allows for a more clear understanding from the initial onset, rather than waiting for examination results. Assessment-centeredness allows for students to identify misconceptions and revise thinking as they progress over a period of time, as well as assist instructors with identifying areas where remediation is necessary. This is completed by formative and summative assessments, giving guidance for further instruction, as well as allowing learners to develop their own meta-cognitive awareness. The feedback they are getting is in the form of the patient condition. If the wrong action is taken, and the patient condition declines, they are to immediately see the effects of that decision. The same is true if a correct decision is made which causes patient condition improvement. This type

of feedback is self-regulating in that it allows them to see the patient outcomes based on care rendered (NRC, 2000).

Community-centered environments allow for the instructor to develop the learning experience expectations. They are utilized to promote building of a sense of community among learners as they reveal misconceptions, thoughts, and ideas about the learning experience. They allow learners to explore and learn together as a learning community. Within the unfolding case studies, students take on the role of being a nurse. The nurse must take action within the scenario. This action, correct or incorrect is taking a risk. Students are allowed to take these risks as they learn, without putting a life in jeopardy. Within that community, learners are allowed to take risks, without penalty, as they continue to build knowledge and understanding (NRC, 2000).

Learner-centeredness	Assessment-centeredness
Knowledge-centeredness	Community-centeredness

Figure 2. Depiction of the four Learning Environment Design Principles of the NRC.

When identifying design principles and attributes of learning, the NRC identified learner-centeredness, knowledge-centeredness, assessment-centeredness, and community-centeredness as design principles that educators should utilize to meet the “needs” areas of building on prior knowledge, organization of knowledge, and meta-cognitive approaches. This study focused on the utilization of all four learning design principles. Examples of strategies for these types of environments include the utilization of problem-based learning, collaborative learning, concept

mapping and logic models (Kowalczyk, 2011). Maunye, Meyer and Velden (2009) suggest positive learner outcomes based upon the utilization of writing assignments, unfolding case studies, learner-led presentations, group sessions, clinical rounds, role-playing, and problem-based learning.

To enhance learning or direct an environment towards becoming LC, KC, AC, and CC, the educator must attempt to make the learning experience more authentic. The three major components of authentic learning are analysis/interpretation of the data/information (sense making), construction and justification of a conclusion of the audience (communication), and reflection (meta-cognition) (Edelson & Reiser, 2006). Examples of this type of learning within nursing curricula could include presenting content material regarding patient care devices by walking through patient scenarios and introducing the equipment as encountered within the scenario or utilizing patient simulators. Major design element challenges to creating an authentic learning environment are the activities in which learners are engaged, the social structures that learners participate in, including facilitation and instruction by the educator, and the tools and resources within the learning environment.

Four design strategies to address these challenges include situating authentic practices in meaningful texts, reducing the complexity of the authentic practice, making implicit ideas explicit, and sequencing learning activities according to the developmental progression of the idea (Edelson & Reiser, 2006). By utilizing the principles of authentic learning, learners are able to engage in “situated cognition” exercises that further immerse them into the role of nursing, rather than the tasks of nursing, thus allowing them to utilize knowledge as it is constructed. As learners are introduced to unfolding case studies, the three elements of authentic learning are utilized. Sense-making of the patient’s condition as it progresses, communication with peers and

instructors regarding appropriate actions or anticipations, and meta-cognition as students become aware of their meta-cognitive progression. This construction of knowledge leads to fewer misconceptions and a deeper understanding of the content, which acts as the foundation for which to build future education and practice (Edelson & Reiser, 2006).

Development of initial deep understanding is necessary, but not sufficient to become a good nurse. Students must also be able to transfer what they know to nursing practice. “Transfer of learning occurs when learning in one context or with one set of materials impacts on performance in another context or with other related materials” (Perkins & Salomon, 1992, p. 1). Put simply, students must be able to utilize the knowledge gained at a later time and in different contexts. Thus, nursing students should be able to use and recall this understanding after the initial learning has occurred. Within this study, transfer of learning was assessed by giving the final examination three weeks after the oxygenation module was tested within the course. This assessment was chosen based upon the fact that understanding could be assessed at a different time and in the context of other materials, rather than on an exam explicitly focused upon oxygenation. Contextualized learning offers “a richer understanding of the complexity of professional nursing practice” (Noone, 2009, p.471). Goldman, Petrosino, and the Cognition and Technology Group at Vanderbilt (1999) presented that students must not learn massive amounts of facts, but must develop deep understandings of important concepts and in a meaningful context. “This type of understanding is necessary for flexible and adaptive learning that supports transfer” (Goldman et al., 1999, p. 616). Unfolding case studies meet this need by allowing learners to bring theory and practice together in a contextualized manner, build on prior knowledge, while misconceptions are addressed and self-monitoring practices begin to develop.

Research Questions

Different learning strategies are necessary for different levels and areas of learning. However, enhancement of educative experiences for learners must start with a trial of new pedagogical strategies. As the new strategy was implemented, the basis for implementation of the strategy and alignment with course objectives was based upon certain questions and hypotheses that were tested.

Research Question 1: Does the utilization of an unfolding case study enhance students' understanding of the oxygenation process?

Hypothesis 1:

H₀: There is no statistical difference in the scores of the oxygenation module exam between the control and experimental groups.

H₁: There is a statistical difference in the scores of the oxygenation module exam between the control and experimental groups.

Research Question 2: Does the utilization of an unfolding case study enhance students' transfer of knowledge of the oxygenation process?

Hypothesis 2:

H₀: There is no statistical difference in the scores of the final examination between the control and experimental groups.

H₁: There is a statistical difference in the scores of the final examination between the control and experimental groups.

Research Question 3: Do performance outcomes on an unfolding case study reflect students' understanding or transfer of knowledge of the oxygenation process?

Hypothesis 3:

H₀: There is no statistical difference in the scores of the posttest or final examination based on the case study rubric scores.

H₁: There is a statistical difference in the scores of the posttest or final examination based on the case study rubric scores.

Research Question 4: How do students perceive the implementation of an unfolding case study into the traditional teaching strategy of an oxygenation module?

With the answers to the accuracy of these questions and hypotheses, the author will utilize the research findings to further critique/develop/redesign the courses within the community college practical nursing program in which she is employed, as well as add to the body of research regarding utilization of these strategies within nursing education. The overarching goal is to enhance the success of nursing students, which is a direct guide to enhanced patient care delivery. Further, redesign of a learning environment can affect all learning experiences and opportunities.

Summary

As patient needs become more complex, the challenges facing nursing and nursing education become more complex. Policy reform for nursing and nursing education has identified goals to help meet these increased complexities. However, it is nurse educators who must design and implement curricular changes to build stronger curricular structures for nursing students. A stronger foundation of nursing education can lead to improved learner outcomes, thus meeting the challenges that have been established. Once a strong foundation has been established that is already part of what is fundamentally known to the learner, “bridges to new understandings” (NRC, 2000, p. 136), can be established. This is exactly the type of thought processes that are

required of nurses on a daily basis. According to Hsu (2010), educators should be assessing and addressing issues within the metacognitive abilities of nursing students. Just the memorization and regurgitation of facts is not enough to foster transfer of knowledge and safe, competent patient care. Nurse educators must enhance the learning environment in an effort to enhance the expectations, as well as, heighten the ability of students to actually be able to utilize and apply knowledge rather than just “knowing.”

CHAPTER II

LITERATURE REVIEW

Over the past few years, great attention has been drawn to the development of learning environments towards a more LC, KC, AC and CC environment in the field of education. With this effort, a push has also emerged to create nurses who develop a deeper understanding of nursing knowledge and practice, with a focus on alignment between theoretical and practical ideas. Practically, this means that educators are to strive to develop nursing students into nurses who are able to recognize the subtle nuances within clinical situations that require early intervention, for better patient outcomes (Benner et al., 2010). Finally, urgency, brought forth by healthcare reform, has created a workforce environment that demands graduate nurses to deliver more complex care.

This chapter will provide a review of literature that will address the issues of Learning Environment Design (LED), in an effort to meet the aforementioned challenges. The databases utilized for the searches were the Elton B Stephens Company (EBSCO) Education Resources Information Center (ERIC), ProQuest Nursing and Allied Health, and Cumulative Index of Nursing and Allied Health Literature (CINAHL). The search descriptors utilized were “learning environment design”, “unfolding case studies in nursing”, “unfolding case studies in education”, “unfolding case studies in practical/vocational nursing” and “nursing”. The articles, abstracts, and books utilized for this focused review range from 1999 to 2015.

Overview of Findings

The literature reviewed for this study is organized around three general themes: student attrition/retention, theory to practice (learning environment design and strategies), and transfer of knowledge. Of the themes regarding theory to practice, there was more of a focus on LC design. However all four of the design principles outlined by the NRC (2000) will be discussed. Further, strategies, as well as transfer of knowledge literature will be reviewed through the lens of design principles outlined in the book *How People Learn: Brain, Mind, Experience and School: Expanded Edition* (NRC, 2000), in relationship to LC, KC, AC, and CC learning. Each category will be discussed regarding relativity to support the purpose of this study and future research.

Student Attrition and Retention

“Attrition in nurse education is a major worldwide concern for governments, higher education institutions and the nursing profession” (Prymachuk, Easton, & Littlewood, 2008, p. 149). In juxtaposition to this, retention can be defined as “persistence, or choosing to continue in a nursing program, and successful academic performance, or meeting the necessary academic standards to continue in the nursing program” (Shelton, 2012, p. 1). As nursing shortages continue, it is difficult for nursing education to produce higher numbers of competent nurse graduates, while experiencing rising attrition rates. In an effort to decrease the nursing shortage, programs must be able to retain students for completion of the program, as well as success on a licensure examination (Stickney, 2008). International attrition rates vary from 15-65%, with the United States at 37% (Prymachuk et al., 2008). Areas of opportunity or causative factors focused on the ideas of financial resources, psychosocial resources, and academic resources.

The focus of psychosocial and academic resources is greatly influenced by the instructor and learning environment. Students must be offered the appropriate resources, to not only be

admitted to a nursing program, but throughout the course of the entire curriculum. Internal factors that can affect success include the psychosocial needs such as self-efficacy, goals, and commitment. Self-efficacy is one's ability to maintain motivation to carry out a task through completion to attain a goal. Further, if a learner feels like a part of the learning community, his/her integration into and interactions with the community become more meaningful (Shelton, 2012). Williams (2010), also suggests that students must feel a sense of community or connectedness.

Through intentionally designed activities and learning environment, learners begin to depend upon each other and become empowered within their educative journeys (Williams, 2010). This clearly can be impacted by CC learning environment design, where learners form a community of learning within the profession (NRC, 2000). External factors include obtaining support from faculty, more specifically, functional support. Functional support refers to those educative experiences, offered by the learning environment that allows students to perform specific tasks and obtain specific goals or successes. Those successes in turn can lead to enhanced motivation and learning, which then lead to increased retention of students (Shelton, 2012). AC design allows for learners to not only view progress, but allows for self-monitoring and the progression of metacognitive processes (NRC, 2000). These learning design principles are what the study has attempted to identify by using unfolding case studies.

Theory to Practice

Over the past two decades, there has been emerging conversation regarding LED. However, this conversation has not been one-sided. Wells and Dellinger (2011) suggest that there is no correlation between LED and student outcomes. Further they suggest that the quality of instruction and a feeling of connectedness with the instructor are the greatest determinants of

student outcomes. While this may be true of that particular study, further research suggests that there is a direct correlation between LED and student outcomes (Billings et al., 2011; Gallagher, 2009; Thompson, Licklider, & Jungst, 2003).

While there is some research available regarding unfolding case studies in education or in nursing and the health sciences, there is either limited significant data from the studies or lack of a comprehensive learning environment design framework; meaning that design elements of the NRC (2000) framework are present, but not all of the principles are present. One example is of utilization of unfolding case studies in high-fidelity simulation. Mills et al. (2014) imply that unfolding case studies help students to build on prior knowledge, while utilizing clinical data to create a plan of care. Nursing students' perspectives regarding the experience were analyzed, but further assessment of student outcomes was not available (Mills et al., 2014). Yousey (2013) completed a study utilizing unfolding case studies in an online undergraduate nursing program, under the framework of problem-based learning. This study focused on the successful completion of a written unfolding case study and student perspectives regarding how they felt the activity enhanced their knowledge bases (Yousey, 2013). The "flipped classroom" is a LED that has become more popular over the past few years, in an effort to develop more engaging learning environments (Hawks, 2014), but the available research, like others previously mentioned, lack consistent framework and empirical data to support any specific strategy (Hendrickx, Foerster, Hansen, & Tschetter, 2014).

A major idea in professional nursing is that of lifelong learning. "Lifelong learning is influenced by how learners interact with their own world and their own learning experiences" (Reynolds, 2000, p.7). As learners are empowered to participate in the learning experience, as well as learn to evaluate personal learning and progression, meaningful learning is occurring.

Reynolds (2000) further suggests that learners should have some control over how things are learned. To create this type of environment, a change in the culture of the LED must take place. Goldman et al. (1999) state that this type of design suggests self-reflection and learning in communities. Rather than learning that is fragmented and meaningless, learners are allowed to construct knowledge, receive feedback, revise work, and reflect on their own learning. These ideas are critical components of metacognition that allows learners to develop how they learn, while being based on four design principles:

- Instruction is organized around meaningful learning and appropriate goals
- Instruction provides scaffolds for achieving meaningful learning
- Instruction provides opportunities for practice with feedback, revision, and reflection
- Instruction is arranged to promote collaboration, distributed expertise, and entry into a discourse community of learners. (Goldman, et al., 1999, p. 603)

Noone (2009) suggests that in learning for the professional practice of nursing, LED must be based on cognitive apprenticeships, skill-based apprenticeships, and an apprenticeship that speaks to the ethical compartment of nursing. Once again, this type of LED aligns or integrates the ideas of nursing. This LED allows for contextualized learning based on authentic practice, or aligning theory with practical experiences. “Contextualized learning that integrates theoretical knowledge and clinical practice within a social context provides students with a richer understanding of the complexity of the professional nursing practice” (Noone, 2009, p. 471).

Specific strategies to build a more aligned LED are necessary to move forward. These strategies may be LC, KC, AC, or CC, as outlined by the NRC (NRC, 2000). LC environments allow for the inclusion of learners’ beliefs, attitudes, skills, and knowledge. This type of learning environment demands that the educator utilize the experiences, theories, and intelligence of

learners in which to assist with the construction of knowledge. Further demands of the educator are a close attention to student progression and planning appropriate learning activities/experiences that challenge the learners, but are not discouraging, causing disengagement (NRC, 2000). By building on prior knowledge, learners are able to develop a deeper understanding. Unfolding case studies allow for students to learn in this manner, due to the simple fact of emulating the actual work environment, where students will be practicing (Page, Kowlowitz, & Alden, 2010).

Unfolding case studies allow students to begin to recognize the subtle nuances within a clinical situation, make sense of the information while beginning to formulate a plan of care, and then reflect on the outcomes of the patient, based on clinical decisions within the case. (Kantar & Massouh, 2015) KC environments maintain attention on content, understanding of the content, and what mastery of the content should include by focusing on the organization of knowledge around big ideas within a disciplinary framework (NRC, 2000). Unfolding case studies allow students to learn by focusing on big ideas or concepts and then utilize the information to work through patient scenarios to continue to build a stronger knowledge base within nursing (Billings et al., 2011). Through the organization of knowledge from all learning environments, learners can begin to build knowledge that is not fragmented or superficial, but embedded with the experience of utilizing the knowledge as it is built. This can lead to further synthesis of knowledge as learning continues throughout the learner's lifetime (Benner et al., 2010).

AC environments are designed to allow both student and teacher to identify thought processes of the students. This allows for the instructor to identify students' preconceptions and assess, plan or design instruction according to the needs of the students. AC allows for students to identify misconceptions and revise thinking as they progress over a period of time, as well as

assist instructors with identifying areas where remediation is necessary. This is completed by formative and summative assessments, giving guidance for further instruction, as well as allowing learners to develop their own meta-cognitive awareness (NRC, 2000). As students are able to see patient outcomes that are based on the choices they made, they are able to reflect on those choices (self-reflection) and become more aware of their own knowledge and thought processes (meta-cognition) (Kantar & Massouh, 2015). The utilization of unfolding case studies are AC in that they allow students and instructors to clarify confusing concepts, while also allowing time for learners to reflect on their own actions and thought processes, causing metacognitive awareness (Herrman, 2011).

CC environments allow for the instructor to develop the learning experience expectations, with an emphasis on being able to take risks in a safe environment, in order to enhance the educative experience. The CC design principle is utilized to promote building of a sense of community among learners as they reveal misconceptions, thoughts, and ideas about the learning experience. It allows learners to explore and learn together as a learning community (NRC, 2000). Collaborative work has been determined to enhance community in learning experiences, as well as provide environments where students are willing to take risks among peers (Gallagher, 2009)

Within the literature, numerous researchers have developed and/or studied the impact of different strategies to promote active learning and enhance the learning environment. Some of the more common strategies for LED include icebreakers, journaling, group activities, scavenger hunts, film clips, case studies, unfolding case studies, collaborative testing and group discussions (Billings et al., 2011; Blumberg, 2009; Gallagher, 2009; Herrman, 2011; Kim, Brown, Fields, & Stichler, 2009; Kowalczyk, 2011; Page et al., 2010; Thompson et al., 2012). These types of

activities are utilized to help learners construct knowledge and make connections within the learning environment. However, care must be taken to ensure that strategies are aligned with course objectives, while allowing students to visualize the impact of actions, outcomes, and possibly influencing future clinical decision-making (Herrman, 2011). A strategy such as collaborative testing or group work can have a positive impact on learning course objectives, as well as promote active learning, sense of community, and problem-solving within a safe environment (Gallager, 2009).

The major concern, when making a decision to implement any type of strategy in the learning environment is alignment with the overarching goals. Further, for this study, alignment with the principles identified by the NRC (2000) was a determining factor. Unfolding case studies are aligned with the four design principles of LC, KC, AC, CC, in that they allow learners to build on prior knowledge, focus on big ideas, allow for timely feedback, and promote risk-taking. This alignment was greater than the alignment found with any of the other strategies that were researched and reviewed. Utilization of unfolding case studies has several focuses to include a deeper understanding by construction of knowledge, promoting active learning, facilitation of the ability to apply knowledge, reflection in a group setting, and the ability to develop clinical decision making skills or clinical reasoning within a safe environment (Billings et al., 2011).

As stated earlier, when choosing the type of LED and strategies to implement within the new environment, care must be taken to ensure alignment with course objectives. Further, care must be taken to align theory, clinical, and lab components through utilization of these activities (Blumberg, 2009). The purpose of utilization of these types of strategies is to move learning from a passive model to an active model, to allow students to invest in their own educative

experiences. Overarching goals are to enhance students' abilities to critically think, therefore leading to enhance clinical reasoning (Kowalczyk, 2011), as well as enhance student learning outcomes (Kim, et al., 2009).

Transfer of Knowledge

As nursing education continues to call for an enhanced ability to transfer knowledge, faculty must continue to develop and implement strategies to facilitate this change of culture. With intentionally planned LED and implementation of strategies, learners can develop a more in-depth understanding of content. This type of learning and understanding helps learners comprehend how to be flexible in clinical reasoning and supports transfer of knowledge (Goldman et al., 1999). Utilization of case based learning has led to enhanced transfer of knowledge among health professional students. With cuing, it facilitates and situates the knowledge within a context that allows learners to make connections for future recall (Speichner, Bell, Kehrhahn, & Casa, 2012).

The context in which students are presented material does make a difference in the overall understanding and utilization of knowledge, rather than just memorization of facts. Learners are allowed to make knowledge useable and make sense of the knowledge that is constructed from contextualized learning. The utilization of case studies with clicker technology has proven to have a significant positive impact on learning outcomes, with students retaining the information at the end of the semester, as well as unit examination. This type of learning strategy has proven to have positive impact on small, as well as large classroom settings. As the case unfolds, students are emerged into the situation, are aware that risk taking is allowed, and become actively engaged in the learning process. (Lundeberg et al., 2011).

Summary

The literature has suggested that in an effort to meet nursing shortages, as well as educate safe, highly competent nurses, LED must be intentional, as well as active and engaging. The culture of design described does align with the key findings found in the theoretical framework of this study regarding building on prior knowledge, organization of knowledge, and a metacognitive approach. The literature also supports that learning environments should be designed with a balance of LC, KC, AC, and CC principles. Edelson and Reiser (2006) identified four design strategies to address the challenges of LED that were reflected within the literature; “situate authentic practice in meaningful contexts, reduce the complexity of the authentic practice, make implicit elements of authentic practice explicit, sequence learning activities according to a development progression” (p. 336). However, there were very few documents that detailed the implementation of actual unfolding case studies or research data to support or dispute the implementation of unfolding case studies. Other articles focus, on “subject-centered classrooms” and utilize unfolding case studies to enhance the educational experience, actually including ideas such as safe learning environments for risk taking, but no empirical data is available to support or dispute the claims (Day, 2011). This study attempted to address the gap in the literature, as well as create an exemplar of implementation of LED utilizing unfolding case studies.

CHAPTER III

RESEARCH METHODOLOGY

This section of the study will provide a detailed description of the methodology and processes that were utilized to conduct the study. The research design, with an explanation of purpose of the research design will be presented. Next the participants and setting of the study will be described, followed by a discussion of the materials, procedures, and measures that were taken to protect participants of the study. A detailed explanation of data collection will be explained, as well as reliability and validity of measurement instruments. Finally, data analysis, as well as validity and reliability of the study will be discussed.

Design

The purpose of this mixed-methodological, quasi-experimental, pre-post control group study was to examine the effects of unfolding case studies on nursing students' learning and ability to transfer concepts related to oxygenation, and student perceptions on the use of unfolding case studies. The study incorporated triangulation of qualitative and quantitative data. The study was considered naturalistic in that there were no artificial manipulations within the current learning environment. Unfolding cases studies were utilized within the study as consistent with the NRC (2000) design principles and principles of authentic practice (Edelson & Reiser, 2006).

The purpose of the design methodology chosen was to enhance and strengthen the design of the study. A mixed-methodological approach allowed the qualitative results to support or

dispute the quantitative results that were derived from pretests, posttests, and a final examination. The student perspectives and field observations notes further explained the successes and shortcomings of the intervention, therefore, strengthening the results of the study. A quasi-experimental design was chosen due to the nature of sampling that was required for this study. When there is not an option for random sampling, the procedure is described as a quasi-experiment, rather than a true experiment. The participants were assigned to groups based upon class assignment, therefore creating a convenience sample for each group. Finally, a sequential explanatory, pre-post control group allowed for a “follow-up phase building on and helping to explain the initial quantitative phase” (Creswell, 2009, p. 122), by utilizing archival data compared to data from an experimental group (Creswell, 2009).

Quantitative Phase

The quantitative phase of the study incorporated a quasi-experimental design with a control group from spring semester 2014 (referred to as the lecture group), and the experimental group from spring 2015 semester (referred to as the case study group). There was a pretest and posttest module examination from the respiratory module for both groups. Further, there was a comparison of scores between the lecture (archival data) and case study groups from a final examination. Scores from a teaching rubric were utilized for the experimental group.

Qualitative Phase

The qualitative phase of the study utilized a basic interpretive design in an attempt to understand the learners’ perspectives regarding the learning process. A qualitative survey was distributed to participants within the case study group. The researcher attempted to identify recurrent themes to better understand the integration of the unfolding case study into the learning

environment design. Field observation notes during activity construction were used to support or dispute the findings of the study.

Setting

The study took place within a practical nursing (PN) program at a community college in southeast United States. Specifically, the study was within the Fundamentals of Nursing course which is offered the first semester of the PN curriculum. “This course provides opportunities to develop competencies necessary to meet the needs of individuals throughout the lifespan in a safe, legal, and ethical manner using the nursing process. Students learn concepts and theories basic to the art and science of nursing”.(Alabama Community College, 2008, p.1; Appendix A).

Past delivery methods for the oxygenation learning module included utilization of a six-hour class period for lecture and lab time. One half of the time was utilized to lecture the material in a traditional manner, while the second half was designated as a laboratory time to work with models/equipment, complete a lab assignment and questions within small groups, and clarification of concepts. Students were then tested at the next class meeting on the principles and objectives of the module by utilization of an unit exam, as well as a final examination at the end of the semester. This delivery method was used for the lecture group from which the archival data were collected.

Participants

The participants within the study were students who have previously completed the course and those who were currently enrolled within the Fundamentals of Nursing course at the time of the study. There was a convenience sample for the lecture group, as well as the case study group. The lecture group consisted of 45 students that were enrolled in the course during spring semester 2014. Demographic data for the lecture group included three African-American

males, twelve African-American females, and thirty Caucasian females. The age range for the group was 19-42 years of age.

The unfolding case study group consisted of 44 students from spring semester 2015 that were currently enrolled at the time of implementation of the new learning environment.

Demographic data for the case study group included one Asian male, three Caucasian males, three Hispanic females, twenty-one African-American females, and sixteen Caucasian females.

The age range for the group was 19-55 years of age.

Spring semester students were purposely compared since they represent similar academic backgrounds and academic achievement. Exclusion data for each group was anyone who was under the age of nineteen, as well as anyone who was repeating the course. The rationale for exclusion of those under the age of nineteen was to exclude those who would be deemed vulnerable by the Institutional Review Board (IRB). The decision to exclude individuals who were repeating the course was based upon the desire to have more pure data regarding similar examination items. Exclusion criteria resulted in three students not being included in the study.

Materials

The proposed new learning environment combined lab with the utilization of an unfolding case study and student constructed case studies. To assess the effectiveness of the learning module, a pretest, posttest, final examination, teaching rubric, and narrative student perspectives surveys were utilized.

Unfolding Case Study: Module content and objectives were delivered via an unfolding case. The instructor presented the students with an unfolding case study to work through as a group forum. Guided discussion took place within the classroom as misconceptions were verbalized. Learning objectives and major content concepts were discussed utilizing PowerPoint

presentation and learner needs as verbalized. The unfolding case study (Appendix F) that was utilized begins with an individual who has been taken to the physician's office with respiratory alterations. The case allowed learners to work through the assessment and diagnostic measures within the physician's office. Learners then followed the patient's progression through hospitalization, treatment, and discharge home from the inpatient hospital setting. This process allowed learners to utilize knowledge of normal respiratory function and see the effects of respiratory alterations on the body, in an effort to ground the knowledge in a contextual manner.

Laboratory Equipment: Laboratory equipment such as pulse oximeter, nasal cannula, facility oxygen outlets, oxygen concentrator, non-rebreather mask, rebreather mask, chest tube appliances/suction, wall suction, and Yanker suction/tubing, were available and utilized throughout the learning experience. Each piece of equipment, as well as treatments such as postural drainage and medication administration, were utilized and demonstrated as necessary throughout the integration of the unfolding case study.

Student-Constructed Case Studies: Upon the completion of the large group unfolding case study activity, students were required to work in small groups of three to four students per group to construct their own case studies during the lab session. There were a total of thirteen groups. This enabled them to utilize the facts they were learning to map a patient's potential respiratory alterations. Each group was to write a case of a specific patient who was encountering a respiratory alteration. Requirements for each case study were to include facts that support normal respiratory function, as well as any respiratory alteration. Each case study was written to follow a patient through the alteration, discussing potential treatments and care. Further, questions regarding normal lung structure and function were required to be included.

Students were given a list of common respiratory alterations to choose from, on which to base their case study construction. (Appendix G) Each group presented constructed cases to the class.

Pretest: The pretest assessed students' knowledge of oxygenation prior to the learning module. It consisted of 30 multiple choice/short answer questions. The questions were aligned with the course and module objectives. The questions were chosen from multiple published resources and included knowledge/application type questions. The questions were divided into 15 knowledge based questions and 15 application based questions. Questions were derived from test banks developed by the publisher of the course text (Elsevier Incorporated, 2011).

Posttest: The posttest assessed students' knowledge of oxygenation after the learning module. It consisted of 30 multiple choice/short answer questions. The questions were similar to the questions from the pretest, including the same question stems and distractors. The case study and lecture groups received the same examinations. The questions were aligned with the course and module objectives. The questions were chosen from multiple published resources and included knowledge/application type questions. The questions were divided into 15 knowledge based questions and 15 application based questions. The questions were similar to the questions from the pretest, including the same question stems and distractors. Questions were derived from test banks developed by the publisher of the course text (Elsevier Incorporated, 2011).

Final Examination: The final examination was a transfer task that assessed students' knowledge of oxygenation at the end of the semester; three weeks after the learning module. The entire exam was 100 items and took 100 minutes. There were 15 items related to oxygenation that consisted of multiple choice/short answer questions. The questions were aligned with the course objectives. Questions were derived from test banks developed by the publisher of the

course text (Elsevier Incorporated, 2011). Both lecture and unfolding case study groups received the same final exam questions.

Teaching Rubric: A teaching rubric (Appendix B) was utilized to guide the construction of case studies by the students. It was used to guide the students' progress through the student-constructed case study building process. The rubric was used as a covariate to identify which students, if any within the experimental group were more likely to gain from the experience.

Student Perspectives Survey: A narrative student perspectives survey (Appendix C) was completed by participants within the case study group. This was a qualitative survey administered to the students within the same groups they worked within, while constructing the case studies. Each group submitted one narrative survey. Field observation notes during activity construction were used to support or dispute the findings of the study.

Procedures

Upon obtaining approval from researcher's educational IRB, permission was obtained from the educational institution where the study was to be completed, to conduct the study. Informed consent was obtained from participants within the case study group from an individual not involved within the research. Informed consent was not necessary for the lecture group, per the researcher's educational IRB, based on the fact of archival data being provided to the researcher, with no identifiable information. An individual not involved with the research served as the research assistant to code and input data from the participants of the study to protect identity. Data were stored on a password protected computer hard drive and jump drive. All materials remain within a locked cabinet within the researcher's office, to protect the privacy of the participants and information derived from the study.

Lecture Group

Prior to the lecture session and assignment of reading materials, students were asked to complete a pre-test regarding content from the respiratory module. Within the lecture session, module objectives and content regarding the respiratory system were presented, via traditional lecture using PowerPoint presentation. Students were given specific reading assignments and module objectives prior to the lecture session to help prepare. Specific content items that were lectured included anatomy and physiology of the respiratory system, assessment technique, laboratory values, diagnostic testing, screening tools, normal findings, abnormal findings, common respiratory alterations, possible nursing interventions, and methods of evaluation.

In the lab session, students were introduced to equipment such as pulse oximeter, oxygen concentrators/tanks, and appliances such as tubing, face masks, nasal cannula, and chest tubes. Students were allowed to manipulate the equipment and ask questions regarding utilization of individual items. At the next class meeting, students completed a post-test examination. At the end of the semester, students completed a final examination.

Table 1.

Sequence of Events for the Lecture (control) Group

Session Prior to Oxygenation Module	Lecture Session of Oxygenation Module	Lab Session of Oxygenation Module	Session After Oxygenation Module	End of Semester
Pre-Test	Lecture	Introduction of Lab Equipment	Post-Test	Final Examination
Reading Assignment				
Module Objectives				

Case Study Group

A pilot study was conducted during fall 2012 semester and spring 2013 semester to guide selection of learning environment strategies for the proposed study. The implementation of the new learning environment applied only to the case study group. Just as with the lecture group, the class meeting prior to the introduction of the oxygenation module and assignment of reading materials, students completed a pre-test and received a reading assignment and module objectives to help them prepare. In the lecture session, unlike with the lecture group, module objectives and content material were presented through guided discussion, while students were introduced to the unfolding case study, as well as a rubric for the writing of case studies. The rubric was utilized to help learners understand the importance of key ideas and requirements by which to construct an effective case study. Unlike with the lecture group, students utilized the information gained through preparation to work through the unfolding case as the “patient” progressed through a range of oxygenation alterations, rather than being lectured to. As students progressed through the unfolding case, necessary equipment and laboratory models were demonstrated / utilized as questions arose and as necessary to support the case and plan of care devised by the students. Equipment was introduced in this manner in an effort to “situate” the content in an authentic setting/scenario. In the final part of the lecture session, time was allowed for students to further question/discuss basic normal oxygenation versus alterations in oxygenation to clarify areas of concern. This discussion time was in the form of a forum where students were allowed to “think out loud” about what they felt “should” have happened or question further specific misgivings that they encountered during the scenarios of the unfolding case.

At the beginning of the lab session, students were assigned to small groups (three-to-four students per group with a total of thirteen groups). Students worked together in class to develop a case study for each group, as well as presented each case study to the entire class. At the end of each presentation, time was focused upon discussion and clarification of application of knowledge to each case. Construction of case studies was utilized as a learning process with formative assessment and feedback regarding understanding of content material. This allowed for further discovery and discussion/correction of misconceptions. At the end of the lab session, students completed a narrative student perspectives survey. The total time allowed for both sessions for the case study group was six hours. This is the same amount of time allotted for the lecture group, which leads to the fact that there was no additional time on task allowed for the case study group. As with the lecture group, at the next class meeting, students completed a post-test. At the end of the semester, students completed a final examination, which was the same procedure followed by the lecture group.

Table 2

Sequence of Events for the Unfolding Case Study (Treatment) Group

Session Prior to Oxygenation Module	Lecture Session of Oxygenation Module	Lab Session of Oxygenation Module	Session After Oxygenation Module	End of Semester
Pre-Test	Discussion	Student-Constructed Case Studies	Post-Test	Final Examination
Reading Assignment	Teaching Rubric	Student Perspectives Survey		
Module Objectives	Utilization of Unfolding Case Study			

Data Collection

During the data collection processes, the researcher reassured the unfolding case study group of the intent of the research study and reminded students that participation in the study was

voluntary. Further, an individual not associated with the study assisted with the data collection, in an attempt to enhance the validity of the study. The individual collected and recorded data on a flowsheet that was provided to the researcher after the completion of data collection. At that point, the researcher began the data analysis process for both the quantitative and qualitative data phases. Scores from the pre-test, post-test, final examination, teaching rubrics and narrative student perspectives surveys were collected for the case study group. Scores from the pre-test, post-test, and final examination were collected for the lecture group.

Data Analysis

As stated earlier, this study utilized a mixed-methodological, quasi-experimental, sequential explanatory, pre-post control group design with a convenience sampling of participants. The independent variable was classroom design. The levels were traditional lecture method and unfolding case study method. The dependent variable was the outcomes of pre-test/post-test scores, scores upon a course final examination, teaching rubric and narrative student perspectives surveys regarding the learning experience. The case study group had pre-test/post-test scores, final examination scores, teaching rubric scores, and completed the narrative student perspectives surveys. Since the lecture group consisted of previous student records, there was only pre-test scores, post-test scores, and the final examination scores.

Table 3

Dependent Variables by Group

Lecture Group	Unfolding Case Study Group
Pre-Test Scores	Pre-Test Scores
Post-Test Scores	Post-Test Scores
Final Examination Scores	Final Examination Scores
	Teaching Rubric Scores
	Student Perspectives Survey

Quantitative Analysis

Statistical analysis for quantitative data of the study was performed by utilization of the Statistical Package for the Social Sciences (SPSS). Differences in learning outcomes were analyzed using a 2x2 (time x condition) Analysis of Variance (ANOVA). The interaction between time (pretest; posttest) and condition (experimental; control) was used to examine differences between the unfolding case study and lecture groups. Post-hoc analyses used confidence intervals and independent t-tests to identify potential cohort differences at pre-test and post-test. Differences in the transfer task were analyzed using an independent t-test that compared differences between the experimental and control groups' performance on the final examination. Effects of group performance on the case study were analyzed using a one-way Analysis of Covariance (ANCOVA) that tested whether groups differed on post-test and final examination performance with case study scores as a covariate.

Qualitative Analysis

Responses to the narrative student perspectives surveys were analyzed utilizing a basic interpretive design to assess for recurrent themes to support or dispute the quantitative findings of the study. Responses were coded by themes and/or categories related to the inquiry of the study. Field observation notes during activity construction were used to support or dispute the findings of the study.

CHAPTER IV

RESULTS

This chapter offers an overview of the purpose and research questions guiding this research study. Discussion will follow each research question including an explanation of the findings from quantitative and qualitative aspects of the research.

Overview

The purpose of this study was to evaluate whether or not the incorporation of unfolding case studies would have an effect on students' understanding and transfer of knowledge of oxygenation. Further, the study looked at student perspectives in regards to utilizing unfolding case studies, rather than traditional lecture. The study proposed four research questions:

1. Does the utilization of an unfolding case study enhance students' understanding of the oxygenation process?
2. Does the utilization of an unfolding case study enhance students' transfer of knowledge of the oxygenation process?
3. Do performance outcomes on an unfolding case study affect students understanding or transfer of knowledge of the oxygenation process?
4. How do students perceive the implementation of an unfolding case study into the traditional teaching strategy of an oxygenation module?

Quantitative Analysis of the Data

Research Question 1:

Does the utilization of an unfolding case study enhance students' understanding of the oxygenation process?

Hypothesis 1:

H₀: There is no statistical difference in the scores of the oxygenation module exam between the control and experimental groups.

H₁: There is a statistical difference in the scores of the oxygenation module exam between the control and experimental groups.

Hypothesis 1 was tested utilizing a 2 x 2 Repeated Measures ANOVA (condition; time) to examine differences between the lecture and case study groups. Raw scores were utilized to depict number of correct questions on the pretest and posttest (out of 30 total questions). All assumptions of the ANOVA were satisfied.

Results indicate a statistically significant interaction between time and condition $F(1,87) = 28.7, p = < .001, partial \Sigma^2 = .248$. Students in the unfolding case study group improved from pretest to posttest at a statistically significantly greater rate than students in the lecture group. These results are graphically represented in Figure 3.

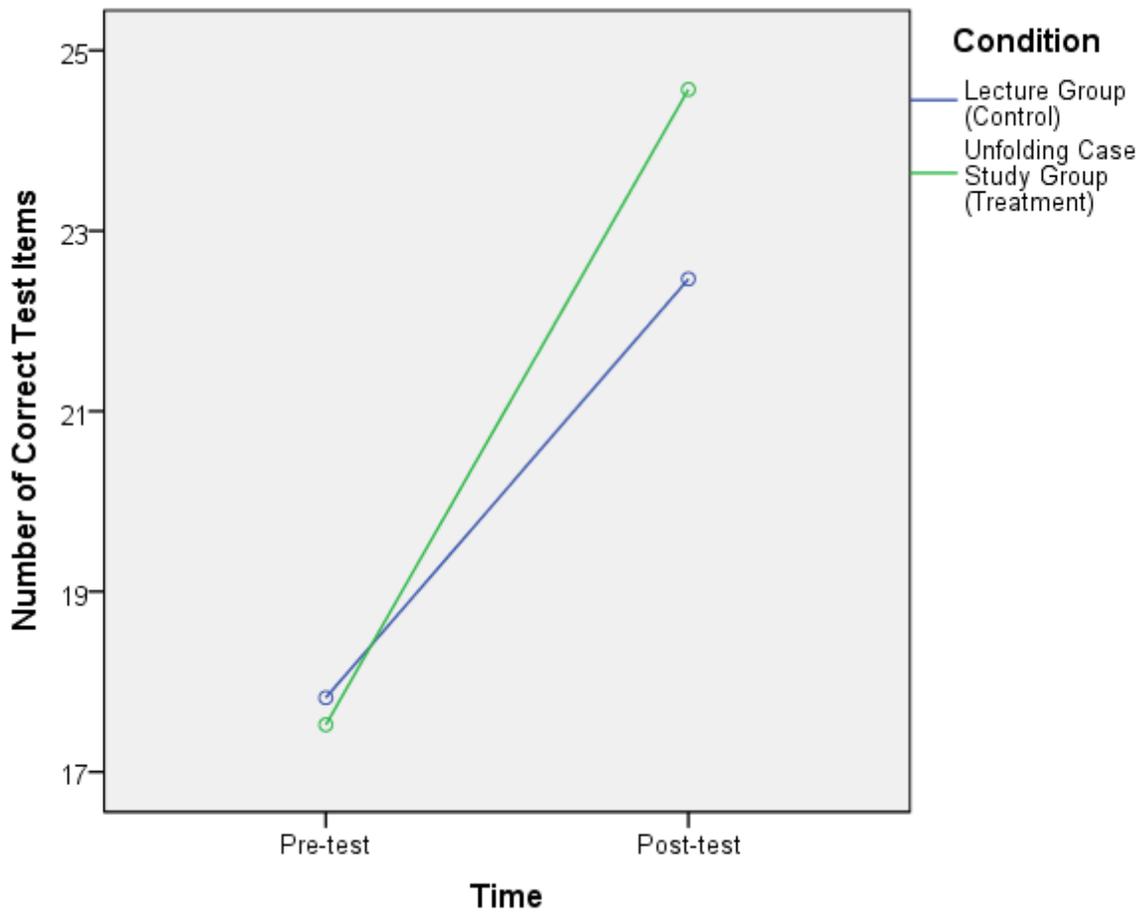


Figure 3. Pretest and posttest oxygenation scores for lecture (control) and unfolding case study (treatment) groups.

To test for potential cohort differences between the groups, confidence intervals (CI95) and post hoc t-test analyses were utilized to test for pretest and posttest differences between the groups. The results demonstrate that there were no statistically significant differences between the groups at pretest. However, the unfolding case study group statistically significantly outperformed the lecture group at posttest (Table 4).

Table 4

Pretest and Posttest Descriptive Statistics and Group Differences between Lecture and Unfolding Case Study Groups (N = 89)

Time	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>CI95</i>	<i>t</i> (87)	<i>p</i>	<i>d</i>
Pretest	Lecture	45	17.8	3.0	[17.0, 18.6]	.151	.880	.03
	Unfolding Case Study	44	17.5	2.5	[16.7, 18.4]			
Posttest	Lecture	45	22.5	3.2	[21.6, 23.3]	2.407	.018	.51
	Unfolding Case Study	44	24.6	2.40	[23.7, 25.4]			

Combined, the results from the ANOVA, confidence intervals, and t-tests indicate that there were no differences between the groups at the beginning of their respective course experiences around the topic of oxygenation, but that the unfolding case study group learned at a statistically significantly greater rate during instruction, and performed statistically significantly better at posttest. Based on these results one must reject the null hypothesis, as students in the unfolding case study group learned more about oxygenation over the course of the lessons from pretest to posttest than students in the lecture group.

Research Question 2:

Does the utilization of an unfolding case study enhance students' transfer of knowledge of the oxygenation process?

Hypothesis 2:

H₀: There is no statistical difference in the scores of the final examination between the control and experimental groups.

H₁: There is a statistical difference in the scores of the final examination between the control and experimental groups.

Hypothesis 2 was tested utilizing the independent samples *t* test to compare differences in final exam scores between the lecture group and case study group. The assumptions of the independent samples *t* test were satisfied. Results indicate that there was a statistically significant difference between the groups on final examination, and this difference also yielded a large effect size (Table 5). As the data demonstrate, the unfolding case study group outperformed the lecture group. Based on these results, the null hypothesis was rejected, and it is concluded that the experimental group had greater transfer of knowledge than the control group.

Table 5

Final Examination Descriptive Statistics and Group Differences between Lecture and Unfolding Case Study Groups (N = 89)

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>CI95</i>	<i>t</i> (87)	<i>p</i>	<i>d</i>
Lecture	45	7.4	3.0	[6.5, 8.3]	4.64	< .001	.98
Unfolding Case Study	44	10.0	2.3	[9.3, 10.6]			

Research Question 3:

Do performance outcomes on an unfolding case study reflect students' understanding or transfer of knowledge of the oxygenation process?

Hypothesis 3:

H₀: There is no statistical difference in the scores of the posttest or final examination based on the case study rubric scores.

H₁: There is a statistical difference in the scores of the posttest or final examination based on the case study rubric scores.

In the experimental group only, an Analysis of Covariance (ANCOVA) was used to determine whether or not there were group differences on posttest and final examination, while controlling for rubric scores. Results indicate that group posttest scores did not vary as a function of performance on the unfolding case study $F(1,43) = .49, p = .906, \text{partial } \Sigma^2 = .163$. Similarly, final examination scores also did not vary as a function of performance on the unfolding case study $F(1,43) = 1.28, p = .278, \text{partial } \Sigma^2 = .339$. Stated another way, the posttest and final exam scores were not dependent on how well students performed on the case study rubric scores. This illustrated that student participation, not performance on, the unfolding case study activities was important. Therefore, the null hypothesis was not rejected.

Qualitative Analysis of the Data

The qualitative piece of the study was completed by utilization of basic interpretive design to answer Research Question 4. After completion of the oxygenation module for the case study group, students completed Student Perspectives Surveys (Appendix C), in the same groups with which they constructed and presented case studies. There were a total of thirteen groups to represent the entire group ($N = 44$). Further, during the time of construction of case studies, the researcher completed field observation notes in an effort to support or dispute the findings. The field observation notes were derived from watching and interacting with the groups during this phase of the study.

Student Perspectives Surveys

While compiling, coding, and interpreting the responses to the Student Perspectives Surveys, the researcher continuously referred back to Research Question 4, “How do students

perceive the implementation of an unfolding case study into the traditional teaching strategy of an oxygenation module?” During the compilation phase, student responses were transcribed verbatim from their responses to the surveys. During the coding and interpretation phase, the researcher looked for recurrent phrases and themes within the responses, regarding academic achievement and module outcomes, in response to the utilization of unfolding case studies. During this time, two major themes emerged within the data.

The two major themes that emerged from the data interpretation and analysis were increased preparedness or understanding (clinically and theoretically) and learning in a safe environment. Figure 4 depicts the major themes and sub-categories.

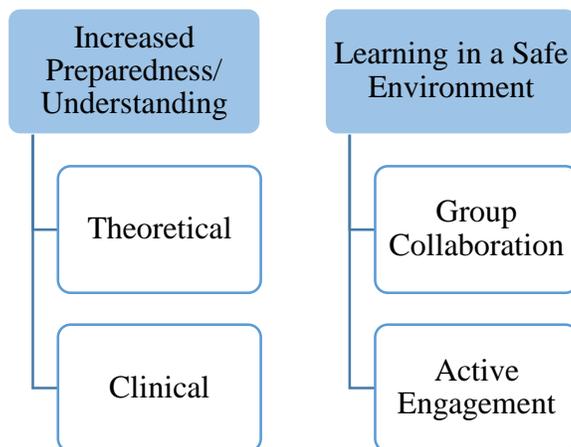


Figure 4. Student perceptions of unfolding case studies as a learning strategy.

Increased Preparedness/Understanding

The main category of increased preparedness/understanding was broken into two sub-categories: theoretical and clinical. Several of the groups identified these areas in which they felt the learning method of unfolding case studies helped to prepare them. Group comments that supported increased preparedness theoretically included, “We learned how different conditions

effect the oxygenation of the body.”, “It made us review the material more in depth because we had to be able to ask and answer the questions related to our patient diagnosis.”, and “It enhanced our learning, made us want to study more on oxygenation.” Group comments that supported increased preparedness clinically included, “The case studies gave a lot of different scenarios which provided detailed information about symptomology and treatments.”, “Because it showed how oxygenation was affected in medical situations.”, and “It gave us a better understanding of what types of questions to ask the patient. We learned how to prioritize what comes first.” Twelve of the thirteen groups indicated that the use of unfolding case studies had a positive impact on preparation for the module exam, while thirteen of the thirteen groups indicated that the unfolding case studies did not hinder their learning process.

Learning in a Safe Environment

The main category of learning in a safe environment was broken down into two sub-categories: group collaboration and active engagement. Several of the groups identified these areas in which they felt the learning method of unfolding case studies helped to prepare them. Group comments that supported group collaboration included “Everyone focused on different information and brought it all together.”, “It provided us numerous angles about different disease and intervention ideas.”, and “In a group you gain ideas from each other.” Group comments that supported active engagement included, “By using an open forum where it is safe to discuss the problems.”, “Asking the audience about the case study.”, and “Talking through the scenarios as a class.” Ten of the twelve groups identified collaboration as a strategy that was most helpful in assisting the learning process.

Field Observation Notes

During the entire implementation phase of the new learning environment, the researcher made field study notes to support or dispute the results of the research study. The categories that supported the results were safe environment, collaboration with peers, and engagement with peers (Table 6). The categories that disputed the results were struggling with information, lack of preparation, and lack of confidence. Each of these categories are be discussed below.

Table 6

Field Observations that Supported or Disputed the Quantitative Results

Support Findings	Dispute Findings
Safe Environment	Struggling with information
Collaboration with peers	Lack of preparation
Engagement with peers	Lack of confidence

The major themes found to support the research results were centered on environment and the interaction of peers. Specifically, these were safe environment, collaboration with peers, and the engagement of peers. The researcher found that the more students worked through the unfolding case and began construction of their own case study presentations the more they became involved in the subject matter. Further, it appeared that students actually took more control of the learning environment as they became accustomed to a different way of learning and thinking, as well as, displaying more accountability and holding each other accountable for their actions within the scenarios. The researcher felt that this demonstrated positive movement towards building a foundation of thought processes in regards to oxygenation, versus memorization of specific details regarding oxygenation.

The major themes found to dispute the research were centered on students struggling with information or content, lack of preparation, and lack of confidence. The fact of struggling with the information was in most cases directly related to those who had not completed the pre-class assignments. Other struggles noted were recalling information from another course regarding the anatomy and physiology of the respiratory system. The area of lack of confidence seemed to resolve, as students collaborated and became comfortable with the new learning environment design. The researcher felt that this demonstrated the need for a better foundation upon which to set up the learning environment, in an effort to get earlier “buy-in” from the learners.

Summary

This chapter discussed the results of the research study. Descriptive statistics were utilized to describe the overall characteristics of the participants of the study. Inferential statistics utilized included ANOVA for the pretest and posttest, an independent *t* test for the final examination, with an ANCOVA for analysis of the posttest and final examination with the teaching rubric. Basic interpretive design was utilized for analysis of student perspectives surveys.

The quantitative results of the study illustrated a statistically significant difference in the performance outcomes between the lecture and case study groups. The case study group showed a statistically significant higher understanding of the oxygenation module. There was also a statistically significant higher score for the case study group in transfer of knowledge. The scores from the teaching rubric revealed that there was no difference in the students as far as potential gain from the experience. The qualitative data from the study utilized basic interpretive design to determine patterns, trends, and recurrent themes, which emerged from the Student Perspectives Surveys. The major themes that emerged were increased preparedness/understanding and

learning in a safe environment. Although not all student groups felt adequately prepared for this type of learning, 100% agreed that there was no negative impact from or hindrance on their learning the module content. The field observation notes from the researcher did support these findings.

The results of the pretest, posttest, final examination, teaching rubric, and surveys concluded that utilization of unfolding case studies does, indeed, have a positive impact on student achievement. Although there were weaknesses identified by the students, triangulation of the data helped support and enhance the findings of this study. In the next chapter, there will be a discussion the interpretation of these findings, implication for change, and recommendations for future research.

CHAPTER V

DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

A mixed-methodological, sequential explanatory, pre-post control group study was conducted to look at the effects of unfolding case studies on nursing students' understanding and transfer of knowledge. More specifically, this study utilized unfolding case studies that were consistent with the NRC (2000), to assess the achievement of students in regards to test scores. Pretest and posttest exams, a teaching rubric, as well as a final examination were the measurement instruments that were utilized for the quantitative analysis within the study. Further, the study looked at students' perspectives of utilization of unfolding case studies as a method of learning, in juxtaposition to traditional lectures and lab activities. For qualitative analysis, narrative responses to a Student Perspectives Survey were coded for recurrent themes.

The results of the study indicated that students did have an increased understanding of the oxygenation module. Further, the findings indicated an increased transfer of knowledge of the oxygenation module. The qualitative findings of the study supported the data in that students felt that the utilization of unfolding case studies enhanced their learning. Since there is a gap in the research regarding the use of unfolding case studies within recent years, this study addressed four research questions to add to the body of research literature. Research questions one through three were utilized to address the quantitative component of study. Research question four was utilized to address the qualitative component of the study.

Research Question 1: Does the utilization of an unfolding case study enhance students' understanding of the oxygenation process?

Research Question 2: Does the utilization of an unfolding case study enhance students' transfer of knowledge of the oxygenation process?

Research Question 3: Do performance outcomes on an unfolding case study reflect students' understanding or transfer of knowledge of the oxygenation process?

Research Question 4: How do students perceive the implementation of an unfolding case study into the traditional teaching strategy of an oxygenation module?

With prior discussion of the introduction to the problem, a review of the literature, discussion of methodologies, and analysis of the data, this chapter will discuss the findings of the study. The upcoming discussion will center upon the interpretations of the study findings, implications for change, and recommendations for future research. Finally, the researcher will share concluding thoughts from the study outcomes.

Summary of the Findings

Research Question 1: Does the utilization of an unfolding case study enhance students' understanding of the oxygenation process?

Research Question 1 was answered by testing one statistical hypothesis of a module examination. The data revealed a statistically significant difference between the lecture group and the case study group at posttest, with the case study group module exam score being significantly higher, with a large effect size. The interaction term was significant with a large effect. This supports the inference that while both groups displayed increased knowledge over time, the case study group had greater increase due to the implementation of the unfolding case study activities. The post-hoc t-tests and confidence intervals revealed that there were no

statistically significant differences between the two groups at pretest, meaning that the groups started from a relatively similar base. The significance of the combined results of the ANOVA, post-hoc t-tests, and confidence intervals, is that regardless of where each group started, there was a greater level of learning that occurred from beginning to end, within the case study group. While empirical data regarding utilization of unfolding case studies is difficult to identify within the research, these findings are consistent with researchers such as Mills et al.(2014), and Yousey (2013) who reported positive student perspectives regarding achievements, after utilization of unfolding case studies. This study adds to the literature by providing quasi experimental data that demonstrates the effectiveness of the utilization of unfolding case studies in education. Narrative statements obtained from the qualitative portion of the study validated the claim that the utilization of unfolding case studies had a positive effect on student outcomes.

Research Question 2: Does the utilization of an unfolding case study enhance students' transfer of knowledge of the oxygenation process?

Research Question 2 was answered by testing one statistical hypothesis of a final examination. The independent t-test revealed there was a statistically significant difference between the lecture group and case study group, with the case study group final exam significantly higher, with a large effect size. The importance of this finding is that it adds empirical data to the literature regarding the effect of utilizing unfolding case studies on the transfer of knowledge in education. As stated earlier, there is a gap in the literature regarding empirical data in association with utilization of unfolding case studies. The results of the study are consistent with feedback from nursing educators regarding utilization of learning environments that are more aligned with the NRC (2000). Fahlberg et al. (2014), described enhancement in student learning outcomes as they transitioned to a more collaborative learning

environment program of nursing. While there was a significantly higher score on the aforementioned outcomes, it is important to point out that on the final examination, students only scored at 67%. In other words, there is still a great deal of work to be done

Research Question 3: Do performance outcomes on an unfolding case study reflect students' understanding or transfer of knowledge of the oxygenation process?

The results from the ANCOVAs indicated performance on the unfolding study did not affect student performance on the post-test or on the final examination. In other words, the gains on the post-test and final examination that students experienced in the unfolding case group were not a function of performance during the case study; the only requirement appears that students participated in the unfolding case study activity. Further, it appears that students were able to build a deeper understanding of the oxygenation process through participation with the case study activities, rather than listening to six hours of lecture, containing the same information. However, the difference is that learners had to organize and monitor the information in a meaningful context and manner.

Research Question 4: How do students perceive the implementation of an unfolding case study into the traditional teaching strategy of an oxygenation module?

The qualitative portion of the study revealed that the majority of students felt that the treatment had positive impact on their learning; however, some students indicated that there was not enough time to see the impact upon their learning at the time of the survey completion. The themes that emerged were in regards to increased understanding and learning in a safe environment. Some comments from the groups regarding increased understanding included, "We learned how different conditions effect the oxygenation of the body.", "It made us review the material more in depth because we had to be able to ask and answer the questions related to our

patient diagnosis.”, and “It enhanced our learning, made us want to study more on oxygenation.”. Some of the group comments regarding learning in a safe environment were “By using an open forum where it is safe to discuss the problems.”, “Asking the audience about the case study.”, and “Talking through the scenarios as a class.” The group comment that indicated a need for more time to visualize success was, “It was very limited.” To support this statement, the field observation notes indicated that this group did experience issues with timing and staying on task. However, there also could have been an issue with the timing of the surveys. Surveys were completed prior to the module examination.

All of the group surveys indicated that the treatment had no negative impact upon their learning. Further, some of the comments were “It enhanced our learning, made us want to study more on oxygenation.”, “It helped us to better understand.”, “We believe it helped.”, and “It was very helpful.” This is consistent with the findings of previous researchers such as Robb (2013) and Yousey (2013), who reported positive student perceptions after utilizing unfolding case studies or other engagement activities.

Implications for Change

This study revealed the effects of utilization of unfolding case studies on students’ understanding and ability to transfer concepts related to oxygenation. Upon analysis of the data, the results revealed that the use of unfolding case studies did indeed have a positive impact on student achievement in regards to understanding and transfer of oxygenation module content. The findings of this study have the potential to make changes in learning environment design and nursing education design. The findings will be shared within the researcher’s institution, as well as generalized to other nursing programs. These implications will be discussed within this section.

Based upon the theoretical framework of the NRC (2000) which was introduced earlier, this study supported the design principles of a LC, KC, AC, and CC learning environment. Learners were allowed to bring their backgrounds and prior knowledge to the learning activities. The environment and activities were centered on big ideas that students were able to work through. Immediate feedback was given through discussion and questions as learners worked through the activities, allowing time and opportunity for the meta-cognitive processes to develop. Finally, learners were able to develop ideas and express their ideas within a safe learning environment, while taking risks. Each of these findings remain consistent with learning environment design.

The associations that were revealed from findings were that, although students were nervous with active learning activities, once they were able to figure out the safety of the environment, they became extremely active in the learning process. The unfolding case studies allowed students to think out loud and begin to question things, rather than be fed a lecture of facts. Although this can be very uncomfortable for faculty, since students' questions are not scripted, it does open up a new type of learning environment and atmosphere of discovery. This is the type of learning that is aligned with NRC (2000) guidelines and addresses the calls for change from the *Carnegie Report* (2010) to align classroom, lab, and clinical experiences. This type of learning environment takes away outdated six-hour lectures and empowers students to become discoverers and builders, while faculty become facilitators.

The findings of the study clearly revealed that the use of unfolding case studies in place of traditional lecture made a positive effect on the student's understanding and transfer of oxygenation. Quantitative results indicated that students' scores were higher. Qualitative findings indicated that students had a positive impression of unfolding case studies in place of traditional

lecture. These findings validated the researcher's overarching goal that students can attain a deeper level of understanding, while retaining that understanding and being able to utilize the information in different contexts at different times.

The implications for change for the PN program and faculty are to take the information gained from this study as they continue to implement strategies and environments each semester to better meet student needs. The PN program is based upon a state-mandated curriculum design that was instituted in 2005. Although revisions were made at that time regarding course content, there was no discussion regarding course delivery methods. At this time, faculty continue to search for ways to enhance the knowledge building and critical thinking of learners. It is the researcher's goal to implement this type of learning environment in all of courses within the program, beginning with the first semester courses. As students are able to build a more solid foundation upon which to learn and continue to build, they would hopefully become more equipped to strengthen and build critical thinking skills, but more importantly life-saving thought processes.

The current curriculum that is in place does not require a certain type of content delivery method. However, the departmental standard for testing does require formative and summative examinations. Within the state-mandated curriculum, there is a requirement for standardized testing at the conclusion of each nursing course, to measure mastery of course content. As nursing education trends change, there is a great deal of support for concept-based curriculums. Utilization of learning environments structured as the environment of this study would align well with the premise of a concept-based curriculum because unfolding case studies use big ideas as major concepts, rather than multiple specific disease processes/memorization within a medical model. Regardless of the curriculum a nursing education program implements, there is one

common factor for every graduate within the nation. Upon graduation from a nursing education program, each graduate must pass a licensure examination, which is the National Council Licensure Examination.

Recommendations for Future Research

The findings of the study examined the effects of unfolding case studies on students' understanding and transfer of oxygenation in a fundamentals level course of a PN program. The results of the study revealed a further need for research in the areas of sample size, instrumentation timing, and further pedagogical strategies.

1. A major weakness found with the study was sample size. Despite the fact that the study did reveal statistically significant differences between the control and experimental groups, a larger sample population would have given more power and validity to the results of the study. Further, this study only focused on the first semester of the students' nursing education. The possibility of completing a longitudinal study to look at the results of student achievement over the course of the entire PN program, through licensure examination, would have yielded more powerful data collection, analysis, and interpretation. This would have made the results more generalizable to nursing education as a whole.
2. Another weakness identified was the timing of the Student Perspectives Survey. The study yielded responses from students prior to completion of the module and final examinations. Had the survey been completed at a later time, the qualitative data may have been more in depth or more accurate to the students outcomes. Further, conducting

student interviews, rather than narrative surveys, would have allowed the researcher more in-depth responses and time for clarification.

3. Finally, more research needs to be conducted into further pedagogical strategies to enhance student engagement and to further align classroom, laboratory, and clinical experiences. More empirical data is needed to continue to support alignment with NRC (2000) guidelines, as well as transform nursing education.

Conclusion

This study examined the effects of unfolding case studies on students' understanding and transfer of oxygenation module, within a first semester PN course. While positive student outcomes resulted, this is merely the beginning of where nursing education needs to ignite change. In order to continue to see improved student outcomes, nursing education must always strive to meet student need, including student perception, to attain those goals. By following the guidelines established by the NRC (2000), nursing educators can continue to meet the calls of the Carnegie Report (2010), to develop nursing graduates who are ready to practice as clinicians, not just merely task completers.

As research continues, as recommended by this study, it would be quite possible to totally alter nursing education. A need for further research regarding other pedagogical strategies would help to identify, empirically, those ideas that help strengthen student outcomes. Further, a more in-depth look at student perspectives to allow their input into nursing education, would be another way to help mold this world that we call nursing education. As positive changes continue to be made, it is ultimately the nursing graduate who is being molded into a competent, qualified nurse, to enter the profession of caring for others. Every nurse affects the lives of others. Through better education and training, those effects on patient lives can be more positive.

REFERENCES

- Alabama Community College System. (2008). Fundamentals of Nursing, Plan of Instruction, Retrieved 5/5/12 from <http://www.accs.cc/CurDev.aspx>.
- Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation*. Stanford, California: Jossey-Bass.
- Billings, Kowalski, & Reese (2011). Unfolding case studies. *Journal of Continuing Education In Nursing*, 42:8, 344-345.
- Blumberg, P. (2009). Maximizing learning through course alignment and experience with different types of knowledge. *Innovative Higher Education*, 34:93-103.
- Creswell, J. (2009). *Research design: qualitative, quantitative, and mixed methods approaches*. (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Day, L. (2011). Using unfolding case studies in a subject-centered classroom. *Journal of Nursing Education*, 50:8, 447-452.
- Edelson, D.C. & Reiser, B.J. (2006) Making authentic practices accessible to learners. *The Cambridge handbook of the learning sciences*. New York, New York: Cambridge University Press.
- Fahlberg, B., Rice, E., Muehrer, R., & Brey, D. (2014). Active learning environments in nursing Education: the experience of the University of Wisconsin-Madison School of Nursing. *New Directions for Teaching and Learning*, 137, 85-94.
- Gallagher, P. (2009). Collaborative essay testing: group work that counts. *International Journal of Nursing Education Scholarship*, 6(1):37, 1-13.
- Glendon, L., & Ulrich, H. (1997). Unfolding case studies: an experiential learning model. *Nurse Educator*, 22:4, 15-18.
- Goldman, S.R., Petrosino, A.J., & Cognition and Technology Group at Vanderbilt. (1999). Design principles for instruction in content domains: lessons from research on expertise and learning, in *Handbook of Applied Cognition*, 595-627. F.T. Durso (Ed), NY: Wiley & Sons.
- Hawks, S.J. (2014). The flipped classroom: now or never? *Education News*, American Association of Nurse Anesthetists.

- Hendrickx, L., Foerster, B., Hansen, J., & Tschetter, L. (2014). Exposing nursing students to rural healthcare practice: creating a rural simulation experience. *Online Journal of Rural Nursing and Healthcare*, 14(1), 100-113.
- Herrman, J.W. (2011). Keeping their attention: innovative strategies for nursing education. *The Journal of Continuing Education in Nursing*, 42:10, 449-456.
- Hubball, H., & Burt, H., (2004). An integrated approach to developing and implementing learning-centered curricula. *International Journal for Academic Development*, 9 (1), 51-65.
- Hsu, L. (2010). Metacognitive inventory for nursing students in Taiwan: instrument development and testing. *Journal of Advanced Nursing*, 66 (11), 2573-2581.
- Institute of Medicine. (2010). *The future of nursing: Leading change, advancing health, report recommendations*.
- Kantar, L.D., & Massouh, A. (2015). Case-based learning: what traditional curricula fail to teach. Elsevier, Ltd. Retrieved 04/25/14 from <http://eds.b.ebscohost.com.;ibdata.lib.ua.edu/eds/detail?vid=6&sid=d93a1fb0-de0f-416a-a2f2-84cd1527d299@sessionmgr114&hid=103&bdata=JnNpdGU> .
- Kim, S.C., Brown, C. E., Fields, W., & Stichler, J.F. (2009). Evidence-based practice-focused interactive teaching strategy: a controlled study. *Journal of Advanced Nursing*, 13, 1218-1227.
- Kowalczyk, N. (2011). Review of teaching methods and critical thinking skills. *Radiologic Technology*, 83 (2), 120-132.
- Lundeberg, M.A., Kang, H., Wolter B., delMas, R., Armstrong, N., Borsari, B., Boury, N., Brickman, P., Hannam, K., Heinz, C., Horvath, T., Knabb, M., Platt, T., Rice, N., Rogers, B., Sharp, J., Ribbens, E., Maier, K.S., Deschryver, M., Hagley, R., Goulet, T., & Herreid, C. (2011). Context matters: increasing understanding with Interactive Clicker case studies. *Education Technology Development*, 59:645-671.
- Maunye, T.J., Meyer, S.M., & Velden, C.E., (2009). An assessment of teaching strategies used by lecturers at a nursing college in Mpumalanga. *Curationis*, 32 (3), 30-37.
- Mills, J., West, C., Langtree, T., Usher, K., Henry, R., Chamberlain-Salaun, J., & Mason, M. (2014). 'Putting it together': unfolding case studies and high-fidelity simulation in the First year of an undergraduate nursing curriculum. *Nurse Education in Practice*, 14(1):12-17.

- National Research Council, Commission on Behavioral and Social Sciences. (2000). *How people learn: Brain, mind, experience, and school*. Bransford, J.D., Brown, A. L., Cocking, R.R., Donovan, M.S., & Pellegrino, J.W. (Eds). Washington, D.C: National Academy Press.
- Noblitt, L., Vance, D.E., & DePOy Smith, M.L. (2010). A comparison of case study and Traditional teaching methods for improvement of oral communication and critical-thinking skills. *Journal of College Science Teaching*, 39:5.
- Noone, J. (2009). Teaching to the three apprenticeships: designing learning activities for professional practice in and undergraduate curriculum. *Journal of Nursing Education*, 48:8, 468-471.
- Page, J.B., Kowlowitz, V., & Rhodes, K. (2010). Development of a scripted unfolding case study focusing on delirium in older adults. *The Journal of Continuing Education in Nursing*, 41:5, 225-230.
- Perkins, D., & Salomon, G. (1992). Transfer of learning. *International Encyclopedia of Education*. Oxford, England: Pergama Press.
- Prymachuk, S., Easton, K., & Littlewood, A. (2008). Nurse education: factors associated with attrition. *Journal of Advanced Nursing*, Blackwell Publishing Ltd.
- Quintana, C., Shin, N., Norris, C., & Soloway, E. (2006). *Learner-centered design: Reflections on the past and directions for the future in The Cambridge handbook of the learning sciences*. New York, New York: Cambridge University Press.
- Reynolds, J. (2000). Learning-centered learning: Theory into practice. *Inquiry*, 5:2.
- Robb, M. (2013). Effective classroom teaching methods: a critical incident technique from millennial nursing students' perspective. *International Journal of Nursing Education Scholarship*, 10(1):301-306.
- Shelton, E. (2012). A model of nursing student retention. *International Journal of Nursing Education Scholarship*, 9(1):6, 1-16.
- Speicher, T.E., Bell, A., Kehrhahn, M., & Casa, D.J. (2012). Case-based analogical reasoning: a pedagogical tool for promotion of clinical reasoning. *Athletic Training Educational Journal*, 7(3):129-136.
- Squires, J., Faulkner, J., & Hite, C. (2009). Do the math: Course redesign's impact on learning and scheduling. *Community College Journal of Research and Practice*, 33, 883-886.
- Stickney, M.C. (2008). Factors affecting practical nursing student attrition. *Journal of Nursing Education*, 47:9, 422-424.

Stokowski, L.A. (2011). Overhauling nursing education. *Journal of Nursing Education*, 47:9, 422-424.

Thompson, J., Licklider, B., & Jungst, S. (2003). Learner-centered teaching: postsecondary strategies that promote “thinking like a professional”. Retrieved from http://findarticles.com/p/articles/mi_m0NQM/is_2_42/ai_102696729/?tag=content

Treas, L.S., & Wilkinson, J.M. (2014). *Basic nursing; concepts, skills, and reasoning*. F.A. Davis: Philadelphia, PA.

Wells, M.I., & Dellinger, A.B. (2011). The effect of type of learning environment on perceived learning among graduate nursing students. *Nursing Education Perspectives*, 32:6, 406-410.

Williams, M. (2010). Attrition and retention in the nursing major: understanding persistence in beginning nursing students. *Nursing Education Perspectives*, 31:6, 362-367.

Yousey, Y.K. (2012). The use of unfolding case studies: innovation in online undergraduate nursing education. *Journal of Nursing Education and Practice*, 3:4, 21-29.

Appendix A
Plan of Instruction

MODULE K – MAINTAINING OXYGENATION		
PROFESSIONAL COMPETENCIES	PERFORMANCE OBJECTIVES	KSA Indicators
K1.0 Maintain oxygenation.	Given scenarios and various clinical settings: K1.1 Maintain airway. K1.2 Demonstrate emergency techniques. K1.3 Apply the nursing process to maintaining oxygenation.	1b 1b 1b
LEARNING OBJECTIVES		
K1.1.1 Define terms associated with oxygenation.		A
K1.1.2 Explain the physiology of oxygenation.		B
K1.1.3 Explain the process of oxygen administration.		b
K1.1.4 Explain the process of nasopharyngeal suctioning.		b
K1.1.5 Explain the process for specimen collection.		b
K1.1.6 Identify diagnostic values related to oxygenation.		B
K1.1.7 Explain pulse oximetry.		B
K1.1.8 Explain the process of connecting a pulse oximeter.		b
K1.2.1 Identify emergency techniques for restoring oxygenation.		A
K1.2.2 Explain the process of using various emergency techniques for restoring oxygenation.		b
K1.3.1 Explain the process of applying the nursing process to maintaining oxygenation.		b
CLINICAL/LAB SKILLS		
<ul style="list-style-type: none"> • Oxygen administration • Pulse oximetry • Nasopharyngeal suctioning techniques • Specimen collection • Lab values • Cardiopulmonary Resuscitation (CPR) • Nursing process • Document and record 		
MODULE K OUTLINE		
<ul style="list-style-type: none"> • Oxygen administration • Nasopharyngeal suctioning • Oxygen maintenance • Lab values • Pulse oximetry • Emergency procedures 		

Appendix B
Teaching Rubric

Critical-thinking or communication factor	4 Accomplished <i>Exceeds course expectations</i>	3 Competent <i>Meets course objectives</i>	2 Developing <i>Incomplete in meeting course objectives</i>	1 Beginning <i>Inadequate in meeting course objectives</i>
Critical thinking: effectively researches information	Message is fully supported and challenges listener(s).	Message is supported with relevant information.	Message is supported by information but may at times be inaccurate.	Message is not supported with accurate, relevant, or recent information.
Critical thinking: effectively organizes information	Message is logical and easy-to-follow and compelling.	Message is logical and easy to follow.	Message structure is somewhat logical, but listener(s) may struggle to follow.	Message is not well organized; is difficult to follow.
Critical thinking: effectively integrates information	Orally cites research that adds insights in the message.	Orally sites research in the message.	Uses research to support message sometimes.	Fails to use “outside” support and/or fails to acknowledge supporting information.
Critical thinking: adapts oral communication styles to contexts	Strategically uses communication for context.	Tailors language and nonverbal cues to the listener(s).	Understands needs of audience but not consistently adapts.	Uses inappropriate communication so that listener(s) are “distanced”.
Oral communication: successfully implements verbal delivery	Language free of serious errors, appropriate, and unusually interesting.	Language is appropriate and free of serious errors.	Language is usually appropriate to context; may contain some errors.	Inappropriate, unethical, and/or potentially offensive language is used.
Oral communication: successfully implements nonverbal delivery	Nonverbal cues are strategically used to emphasize the message.	Nonverbal cues support and do not distract from message.	Nonverbal cues are sometimes incongruent or distracting to message.	Speaker is largely unaware of the use or importance of nonverbal cues.

(Noblitt, et. al, 2010)

Appendix C
Student Perspectives Survey

Student Perspectives Survey

Please provide a detailed, narrative answer to each of the items below. If additional space is needed, please feel free to attach a separate sheet.

1. In what fashion did the utilization of unfolding case studies enhance your learning of the oxygenation module?
2. In what ways did the utilization of unfolding case studies enhance your preparation for the module exam?
3. Did the utilization of unfolding case studies hinder your learning? If so, in what manner?
4. In what ways did the utilization of group discussion enhance your learning?
5. Which strategy do you feel was the most helpful in assisting your learning?

Appendix D

Inquiry Email Requesting Permission to use Rubric

Requesting permission to use "Scoring rubric for communication assignment"

Sandra Bryant <smbryant1@crimson.ua.edu>
To: diane.vance@eku.edu

Wed, Mar 20, 2013 at 5:41 PM

Dear Dr. Vance,

I am a doctoral student at the University of Alabama in the School of Education and a Registered Nurse. I am currently developing my dissertation under the direction of my dissertation committee chaired by Dr. Cecil Robinson.

Through my review of literature on learning environments and assessment of utilization of case studies in the fields of nursing and education, I came across your, Dr. Lynnette Noblitt, and Dr. Michelle L. DePoy Smith's 2010 paper: A Comparison of Case Study and Traditional Teaching Methods for Improvement of Oral Communication and Critical-Thinking Skills. I found that your paper was a perfect fit for the research that I would like to perform. I am emailing to request permission to use the "Scoring rubric for communication assignment" instrument in my dissertation study and to cite it in an appendix.

If you do grant permission to use the rubric, would you be willing to share any reliability and validity data you may already have on the instrument? Additionally, if you desire I will send all data to you once I have completed the study so you may use it in further developing your reliability and validity data.

Thank you and I look forward to hearing from you.

Respectfully,

Sandra M. Bryant
Doctoral Student
The University of Alabama

Appendix E

Permission to use Rubric Email

Vance, Diane

7:02 AM (6 hours ago)

to me

Hi -

We'd be happy to have you use the scoring rubric for your research.

We did not do any formal reliability and validity studies with the rubric, so we don't have any data on that. We appreciate your offer of shared data, but we probably would not have time at this point to make good use of it.

Best of luck with your dissertation work!

Diane Vance

Dr. Diane E. Vance
Director, Forensic Science Program
Eastern Kentucky University
Chemistry Department NSCB 4126
521 Lancaster Avenue
Richmond KY 40475-3102

[859 622 2908](tel:8596222908) (office)

[859 622 8197](tel:8596228197) (fax)

diane.vance@eku.edu

Appendix F
Unfolding Case Study

Case Presentation

Mae, a 76 year old female was seen in the physician's office for complaints of dyspnea, orthopnea, fatigue, dizziness, and fever/chills. Auscultation of the lung fields reveals rales and wheezing over the right lung fields. Chest x-ray reveals fluid in the RUL and RLL.

1. What is the focus of your initial assessment?
2. List and define each of Mae's symptoms in your own words.
3. Define auscultation and chest x-ray. Describe what each revealed in your own words.

Mae begins to exhibit alterations in LOC and the physician sends her to the hospital for admission, with a diagnosis of pneumonia. Vital signs on admission are: T 102 F, P 104 and regular, R 26 and labored, BP 182/108.

4. Now what is the focus of your assessment?
5. What does vital signs mean and why were Mae's significant?
6. What instruments or equipment would you expect to utilize for these assessments?
7. What tests would you expect the physician to order?

The physician treats Mae with IV antibiotics, postural drainage, breathing treatments, IV steroids, and oxygen 2L/NC.

8. What would you expect as your assessment results during Mae's hospitalization?
9. List and describe the treatments Mae received in your own words.

After a four day hospitalization, Mae is to be discharged home. She has responded well to the treatments. Discharge instructions include for Mae to take oral antibiotics, report temperature > 101, and follow-up with her physician in 10 days.

10. Explain the importance of each of these discharge instructions, and the reason for the medication change upon discharge.

Appendix G
Common Respiratory Alterations

Please choose from the following list, the oxygenation alteration your group would like to write your case study about.

Allergic Rhinitis

Sinusitis

Bronchitis

Pneumonia

Asthma

Anaphylaxis

Appendix H
Informed Consent

UNIVERSITY OF ALABAMA
HUMAN RESEARCH PROTECTION PROGRAM
Informed Consent for a Non-Medical Study

Study title: Effects of Unfolding Case Studies on Nursing Students'

Understanding and Transfer of Oxygenation

Investigator's Name: Sandra Bryant, RN, MSN, Faculty, Practical Nursing, Wallace Community College and Doctoral Student, University of Alabama

CONSENT FORM

FOR QUESTIONS ABOUT THE STUDY, CONTACT: Sandra Bryant, 1141 Wallace Drive, Dothan, AL 36303, (334) 983-3521, extension 2328.

DESCRIPTION: You are invited to participate in a research study on enhancing the retention of knowledge about a major body system. You will be asked to complete course work as scheduled and participate within different learning activities for the learning module. Participants will be asked to attend regular class meetings and participate in discussions, lab, and lecture as a part of regular class requirements. Further, participants will be asked to participate in completing an unfolding case scenario activity, as well as work with a group to construct a case study for presentation to the class, as part of the research study. Evaluation methods will include those utilized as outlined within your syllabus for regular course evaluation. A final element of the research study will include the completion of a five-question survey, requesting narrative responses.

RISKS AND BENEFITS: No foreseeable risks have been associated with this study. The benefits which may reasonably be expected to result from this study are enhanced knowledge and ability to utilize information to further build your nursing education and practice. We cannot and do not guarantee or promise that you will receive any benefits from this study. Your decision whether or not to participate in this study will not affect your grade this course.

TIME INVOLVEMENT: Your participation in this experiment will take approximately six hours of class time. The six hours will be in small increments over two class periods.

PAYMENTS: You will receive no payment for your participation.

SUBJECT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. Your individual privacy will be maintained; no individual names will be published or identified from the study.

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 7/2/14
EXPIRATION DATE: 7/1/2015

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact Ms. Tanta Myles, the Research Compliance Officer of the University, at 205-348-8461 or toll-free at 1-877-820-3066.

You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at http://osp.ua.edu/site/PRCO_Welcome.html or email the Research Compliance office at participantoutreach@bama.ua.edu.

After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

The extra copy of this consent form is for you to keep.

SIGNATURE _____ DATE _____

Protocol Approval Date: _____

Protocol Expiration Date: _____

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 7/2/14
EXPIRATION DATE: 7/1/2015

Appendix I
Coded Student Perspectives Surveys

Coded Student Perspectives Surveys

Legend by Theme:

Increased understanding of knowledge

Increased preparedness for clinical practice

Increased test preparation

Limitations/not enough time

No hindrance

Learning in a safe environment

Interview Questions:

1. In what fashion did the utilization of unfolding case studies enhance your learning of the oxygenation module?

GR1: It gave us a better understanding of what types of questions to ask the patient.
We learned how to prioritize what comes first.

GR2: By asking questions in the case studies, it helped to determine if we understood the material.

GR3: Demonstrated a lot of cause and effects to better equip us for providing adequate treatment.

GR4: We learned how different conditions effect the oxygenation of the body.
Also how therapeutic methods enhance the outcomes of the different conditions.

GR5: Applying it to real life applications and understanding what interventions to take.

GR6: Improved way of thinking to better understand oxygenation and how to treat it in a variety of situations.

- GR7: The importance of oxygenation as it applies to many cases seen in the healthcare setting.
- GR8: It helped to have a guide of sorts to go by and compare notes.
- GR9: It enhanced by teaching us what to assess first and steps to take.
- GR10: Provided us with information we were unsure of.
- GR11: Because it showed how oxygenation was affected in medical situations.
- GR12: By using outside sources we don't normally use.
- GR13: It was able to show us the different levels of oxygenation disorders.

2. In what ways did the utilization of unfolding case studies enhance your preparation for the module exam?

- GR1: It helped to focus on how to study for what the nurse is supposed to do instead of just remember stuff.
- GR2: It helped to understand the scenarios.
- GR3: The case studies gave a lot of different scenarios which provided detailed information about symptomology and treatments.
- GR4: Increased our understanding of oxygenation and its processes.
- GR5: Helped us understand what the different tests are ordered for and what conditions can affect oxygenation.
- GR6: Helped with prioritization and how the body works and reacts.
- GR7: We were able to apply terms to actual scenarios.
- GR8: It was very limited.
- GR9: It better explained aspects throughout the modules.

- GR10: Doing research, talking with and discussing stuff with our group.
- GR11: Learning what different oxygen saturations meant.
- GR12: By understanding how breathing influences the patient.
- GR13: It made us review the material more in depth because we had to be able to ask and answer the questions related to our patient diagnosis.

3. Did the utilization of unfolding case studies hinder your learning? If so, in what manner?

- GR1: No
It enhanced our learning, made us want to study more on oxygenation.
- GR2: No
- GR3: Not at all
- GR4: No
It helped us to better understand.
- GR5: No
- GR6: No
We believe it helped
- GR7: No
It was very helpful
- GR8: Not really.
- GR9: No
It helped.
- GR10: No
It enhanced our learning.

GR11: No

GR12: No

GR13: No

4. In what ways did the utilization of group discussion enhance your learning?

GR1: It gave us all a different perspective and difference of opinion.

GR2: By going through it as a group.

GR3: Because there were different styles of presentations which enhanced learning for the many different types of learners.

GR4: Patients could have the same symptoms with different outcomes.

GR5: How different conditions coordinate with each other.

How vital signs and symptoms affect the body and oxygenation.

GR6: Compiling ideas and working together.

GR7: Listening to different explanations on the care of various diseases related to oxygenation, gave a better understanding of the material.

GR8: In a group you gain ideas from each other.

GR9: Everyone focused on different information and brought it all together.

GR10: Different viewpoints from each person's perspective.

GR11: Different ideas of how to help you better understand.

GR12: By using an open forum where it is safe to discuss the problems.

GR13: It provided us numerous angles about different diseases and intervention ideas.

5. Which strategy do you feel was the most helpful in assisting your learning?

GR1: Collaboration and doing research.

GR2: Talking through the scenarios as a class.

GR3: Study guides we made from the cases.

GR4: Different scenarios.

GR5: Students saying it their own words.

Having to answer questions in front of everyone.

GR6: The questions asked and the classroom responding to them.

GR7: Asking the audience about the case study.

GR8: Internet research and participating in all of the other groups' presentations of cases.

GR9: Hearing different case studies and the questions they asked.

GR10: Discussion

GR11: Asking and answering the questions.

GR12: Analyzing the patient problems.

GR13: Listening to all of the different groups gave us a better overall understanding of the material

Appendix J

Field Observation Notes

Field Observation Notes

Legend by Theme:

Struggling with information

Safe environment

Collaboration with peers

Engagement of peers

Lack of preparation

Lack of confidence

Unfolding Case Study Presentation

Issues with recollection of anatomy and physiology

A few issues with terminology

Could definitely tell who had completed the pre-class assignment

Those who had completed assignment controlled the discussion until I redirected

Half-way through, more students figured out that it was okay to be wrong and joined in

More students asked questions as the case unfolded

There was no way to predict the direction the students were taking. This led to more

benefi

Student Construction Phase

Students really struggled to get going. (roles within the group, workload)

Saw some struggling with the specific task regarding rubric, confusing

Frustration with having to “start from scratch” to build in some groups

Excitement from having permission to create a case in some groups

Saw beneficial collaboration when they really got down to the disease processes and

pathophysiology, in regards to “how to” show the process within the case

Student Presentation Phase

Early on students struggled with public presentation and with audience response.

About half-way through, students seemed to become more engaged and this continued to grow as more cases were presented.

Students began correcting each other’s misgivings before I had the opportunity. This wasn’t done out of arrogance, but appeared to be out of genuine excitement, confidence, and a sense of accomplishment of content mastery.

Appendix K
Institutional Review Board Approval

Office for Research
Institutional Review Board for the
Protection of Human Subjects



June 29, 2015

Sandra Bryant, RN, MSN
Capstone College of Nursing
The University of Alabama
Box 870358

Re: IRB # 14-OR-256-ME-R1 "Effects of Unfolding Case Studies on
Nursing Students' Understanding and Transfer of Oxygenation"

Dear Ms. Bryant:

The University of Alabama Institutional Review Board has granted approval
for your renewal application.

Your renewal application has been given expedited approval according to 45
CFR part 46. Approval has been given under expedited review category 7 as
outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited
to, research on perception, cognition, motivation, identity, language, communication, cultural
beliefs or practices, and social behavior) or research employing survey, interview, oral
history, focus group, program evaluation, human factors evaluation, or quality assurance
methodologies.*

Your application will expire on June 28, 2016. If your research will continue
beyond this date, complete the relevant portions of the IRB Renewal
Application. If you wish to modify the application, complete the
Modification of an Approved Protocol Form. Changes in this study cannot
be initiated without IRB approval, except when necessary to eliminate
apparent immediate hazards to participants. When the study closes,
complete the appropriate portions of the IRB Study Closure Form.

Should you need to submit any further correspondence regarding this
proposal, please include the above application number.

Good luck with your research.

Sincerely,

Carpantano T. Myies, MSM, CSM, CIP
Director of Research Compliance & Research Compliance Officer
Office of Research Compliance



358 Rose Administration Building
Box 870127
Tuscaloosa, Alabama 35887-0127
(205) 348-8461
fax (205) 348-7189
TDD (205) 348-3066

Appendix L
Institutional Agreement



WALLACE
COMMUNITY
COLLEGE

To Whom It May Concern:

Sandra Bryant, Doctoral student at The University of Alabama, has been granted permission to conduct research at Wallace Community College, Dothan, Alabama. She will be allowed to collect archival data, as well as data concurrent with the time of implementation of her proposed research intervention. If you have any questions or concerns, please feel free to contact Kathy Buntin (334) 556-2292 or kbuntin@wallace.edu.



Tony Holland, Dean Instructional Affairs

Date: 6/17/14



Kathy Buntin, Associate Dean Instructional Affairs

Date: 6/16/14

DOTHAN * EUFAULA
www.wallace.edu