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Donna M. Ellis

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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

APPLYING LEARNER-CENTERED TEACHING IN THE NURSING
EDUCATION CLASSROOM: FROM THEORY TO PRACTICE

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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College of Natural and Health Sciences
School of Nursing
Nursing Education

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This Dissertation by: Donna M. Ellis

Entitled: *Applying Learner-Centered Teaching in the Nursing Education Classroom:
From Theory to Practice*

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the College of Natural and Health Sciences in the School of Nursing, Program of Nursing
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ABSTRACT

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The purpose of this descriptive research study was two-fold: (a) to describe the application of learner-centered teaching (LCT) in the undergraduate nursing education classroom using a researcher-developed instrument, and (b) to explore the relationships between nurse educators' characteristics and their application of LCT in the classroom. Learner-centered teaching was defined as guiding students in constructing understanding using an interactive, social context and assisting students to discover content through actively processing it using critical thinking and reflecting on their understanding. A sample of 122 nurse educators completed an online questionnaire, the Ellis Learner-Centered Teaching in Nursing Education Questionnaire, which explored learner-centered teaching behaviors, attitudes, and influences on implementation. Results demonstrated that nurse educators were utilizing the guiding, critical thinking, and reflection components of learner-centered teaching but using interactive practice less often. Other findings demonstrated that nurse educators who saw themselves as learner-centered were more likely to use guiding, critical thinking, and reflection in their classrooms. Nurse educators who strongly believed learner-centered teaching was beneficial in understanding and applying nursing concepts were also somewhat more likely to use guiding and critical thinking LCT behaviors in the classroom. Two unexpected findings

were that (a) previous exposure to LCT had no connection to the use of LCT in the classroom and (b) nurse educators teaching in an associate degree program were more likely to use reflection in their practice. Learner-centered teaching (LCT) is an innovative pedagogy that can address the challenges of educating nurses in the fast-paced, ever-evolving healthcare environment. This study adds to the body of nursing education literature by establishing a baseline measurement of LCT.

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CHAPTER I

INTRODUCTION

All education is learner-centered in the broadest sense--without a learner, there is no need for education. Nursing education has focused on a traditional model of teacher-centered education (Candela, Dalley, & Benzel-Lindley, 2006). This model has served nursing well but the profession is challenged to prepare students to practice in an increasingly complex, rapidly changing, interdisciplinary environment (Institute of Medicine [IOM], 2011). Technological advances, changes in the way healthcare is delivered, and decreasing length of patient stays in the acute care setting offer new challenges for nurses working in these environments. As a result, nursing education must seek innovative methods to prepare students to function in healthcare. Students need more background in clinical reasoning and teamwork, leadership, and applying theory to practice (American Association of Colleges of Nursing [AACN], 2008; IOM, 2011). Nursing education must accelerate the use of new pedagogies that can enhance student learning and success in these challenging times. Learner-centered teaching (LCT) can meet this challenge.

Learner-centered teaching (LCT) is an innovative pedagogy that positions the student to create meaning from experiences, thinking and information, and is rooted in constructivist philosophies (Weimer, 2002). It has been studied in fields as varied as

education and agriculture (Brown, 2003; Knobloch & Ball, 2006). Much is known about LCT from a theoretical perspective but research is needed to establish its efficacy in nursing education. The National League for Nursing (NLN; 2003) has recommended a move toward more learner-centered teaching but the lack of a clear definition and measurement of LCT in nursing education has hindered attempts to design research to investigate its efficacy. This study identified and examined factors that impact the use of LCT in the nursing education classroom. A clear conceptualization of how LCT is currently implemented in nursing education will assist in designing further research and measurements.

Background of the Study

The Call to Change

National organizations and nursing leaders have sounded the call for a transformation of nursing education over the last decade (Benner, Sutphen, Leonard & Day, 2009; IOM, 2011; NLN, 2003, 2005). The pace of new developments, coupled with the advent of new technologies and information management systems, have increased the amount of information and skills nurses need to practice effectively. Students in nursing programs face changing roles as the structure of healthcare continues to change. Nursing is the largest group in the healthcare workforce. The influential report by the Robert Wood Johnson Foundation Initiative on the *Future of Nursing* (IOM, 2011) points out that a “successful healthcare system in the future rests on the future of nursing” (pg. x).

The *Future of Nursing* (IOM, 2011) report highlights the need for lifelong learning and developing core competencies in nursing. This represents a different perspective from the traditional information transfer that has occurred in nursing

education. Educating for core competencies requires decisions about what is important for nurses to know upon entry to practice and what can serve as building blocks for future learning. One of the persistent topics in the call for transformation of nursing education is the effect of content saturation (Benner et al., 2009; IOM, 2011). Focusing on core competencies and larger concepts, rather than memorization of increasing content, helps develop nurses who can think critically, adapt core knowledge, and apply clinical reasoning in rapidly changing situations. Utilizing a conceptual teaching approach allows students to apply those concepts to new areas as they encounter them (IOM, 2011). For instance, memorizing medications is less useful in practice than understanding drug classes and acquiring the ability to transfer that knowledge to new medications as they are developed and used in healthcare settings.

Health information technology (HIT) received a boost from legislation in 2008 to expand the integration of information management systems in healthcare (IOM, 2011). This movement toward electronic information management is changing the way nurses document care and the way information is accessed. Other disciplines have ready access to nursing documentation and nurses have increased access to other disciplines' information. Content knowledge that used to require memorization such as drug specifics or intravenous drip formulas is now available at the click of a computer button. Using this technology requires skills and education regarding the impact, the potential, and the consequences of this technology. Health information technology is changing healthcare practice and nursing roles. To appropriately utilize decision support algorithms in electronic systems, nurses must be competent in content knowledge, problem solving, and critical thinking (IOM, 2011).

The National League for Nursing (2003, 2005) has produced several position statements discussing needed improvements in nursing education. The 2003 report concluded that the curriculum reform movement of the 1980s had not succeeded in changing the structure of nursing education. More innovation in nursing education is needed including collaboration between academia and practice and new pedagogies to address the rapidly changing healthcare environment. In addition, research-based innovations are needed (NLN, 2003) and must be initiated more rapidly than has been done in the past (NLN, 2005). Finally, students must be included as active participants in the learning process and in lifelong learning. Helping students cope with rapid changes in the healthcare environment must be addressed in nursing education (NLN, 2005).

Benner et al. (2009) advocated for the transformation of nursing education into a system responsive to the future needs of nurses as well as their immediate job requirements. Skills of continued inquiry and clinical learning must be integrated in both classroom and clinical education through application of knowledge. Benner et al. noted the strengths and weaknesses of the current system by identifying gaps between theory and clinical application. New pedagogies are needed that close that gap and bring nursing education closer to what nurses actually need for practice. Nursing education journals regularly showcase new ideas and strategies for teaching but these innovations are often anecdotal and reference single cases. Conducting research on the feasibility and effectiveness of these new ideas is imperative to encourage widespread adoption of teaching innovations such as LCT to meet the needs of nurses in the rapidly changing healthcare system.

Transforming systems requires innovative thinkers who are skilled at using critical, reflective thinking to solve problems and who are not afraid of reform and innovation (NLN, 2005). Principles of innovation provide the venue for implementation of new pedagogies in nursing education. Innovative pedagogies involve breaking down traditional views and assumptions and reconstructing in a way that is new or a new utilization (NLN, 2004a; Pardue, Tagliareni, Valiga, Davison-Price, & Orehowsky, 2005; Rogers, 2003). Innovation is often based on dissatisfaction with the status quo or with current progress toward a goal and begins with an opportunity. Learner-centered teaching is that opportunity.

Learner-Centered Teaching as Innovative Pedagogy

Learner-centered teaching can help close the learning gap between the classroom and practice by creating learning opportunities for students to apply theory to practice and develop clinical reasoning (Benner et al., 2009). Learner-centered teaching helps students create meaning from new information and relate it to previous mental constructions as the teacher guides students in constructing understanding and applying it using an interactive, social context (Bilimoria & Wheeler, 1995; Candela et al., 2006; Paulson, 1999; Weimer, 2002). This assists students to discover nursing content through actively processing it using critical thinking and reflecting on their understanding. Learner-centered teaching advocates work toward deeper learning of concepts and principles rather than surface knowledge (Candela et al., 2006; Weimer, 2002). This ideally leads to students who become invested in their learning because, in the constructivist tradition, they have created their own understanding of the subject.

Learner-centered teaching increases engagement in learning for both students and instructors so learning becomes evident and observable.

Problem Statement

Many nurse educators are familiar with the term “learner-centered” but their practices might actually be more teacher-centered (Blumberg, 2009; Kohtz, 2006). Research was needed to measure the application of LCT in the practice of nursing education. Learner-centered teaching strategies have been explored individually. Some barriers and facilitators to learner-centered teaching were identified in individual research studies but not enough is known about how LCT is applied in nursing education to establish its efficacy and to use it as a basis for outcomes research.

Purpose

The purpose of this descriptive research study was two-fold: (a) to describe the application of LCT in the undergraduate nursing education classroom using a researcher-developed instrument--the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ), and (b) to explore the relationships between nurse educators' characteristics and their application of LCT in the classroom. The dependent variable measured in this study was the composite LCT score on the ELCTNEQ, which included the four subcomponents of LCT derived from the literature review: guiding, interactive practice, critical thinking, and reflection. The independent variables measured were the demographic characteristics of the participants as well as previous exposure of the nurse educator to LCT, nurse educators' self-perception of their use of learner-centered teaching, type of degree program, and beliefs about learner-centered teaching.

A clear description of how LCT is being used and factors influencing utilization will help promote further research by defining the current state of LCT. Understanding the current status will assist in designing research to begin testing its efficacy as a teaching framework.

Research Questions

- Q1 What is the relationship between nurse educators' characteristics and their use of LCT in the classroom as measured by nurse educators' LCT scores on the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ)?
- Q2 What is the relationship between nurse educators' previous exposure to LCT (through formal education courses, workshops, conferences, faculty development, continuing education, or self-study) and their use of LCT in the classroom as measured by their LCT scores?
 - H1 Previous exposure to LCT is positively correlated to higher LCT scores.
 - H2 There is a statistically significant difference in LCT scores between nurse educators with previous exposure to LCT and nurse educators without previous exposure.
- Q3 What is the relationship between educators' self-perception of their learner-centeredness (teacher-centered, somewhat teacher-centered, somewhat learner-centered, learner-centered) and their use of LCT in the classroom as measured by their LCT scores?
 - H1 Self-perception as more learner-centered is positively correlated with higher LCT scores.
 - H2 There is a statistically significant difference between those who identify themselves with each choice: teacher-centered, somewhat teacher-centered, somewhat learner-centered, and learner-centered.
- Q4 What is the relationship between nurse educators' beliefs about LCT and their use of LCT in the classroom as measured by their LCT scores?
 - H1 Beliefs that LCT enhances deeper understanding of nursing concepts and the ability to apply classroom learning to practice has a positive correlation with higher LCT scores.

- H2 There is a statistically significant difference between the scores of those who identify with each choice: Strongly Agree, Agree, Disagree and Strongly Disagree.

The study used survey methodology and a researcher-developed questionnaire to measure the use of LCT by nurse educators. The sample was restricted to educators in undergraduate nursing programs because these programs traditionally have more face-to-face classes, giving more potential opportunities to include this pedagogy. Learner-centered teaching can be adapted to the online environment but that application might be different from face-to-face classes. Graduate programs were excluded from investigation because graduate education programs are not necessarily comparable to undergraduate education programs in teaching methodologies.

Definition of Terms

Actively constructed learning experiences. These are integrated, systematic learning experiences based in knowledge about student learning constructed by the nurse educator to facilitate practice with and thinking about the material (Weimer, 2002).

Constructivism. This theory was first articulated by Piaget (1964) as a theory of cognitive development stating that children learn about the world around them by experiencing it in different ways. He called this constructivism because he viewed knowledge development as being constructed by the child rather than originating externally (Piaget, 1964). In this study, constructivism is the philosophical background that refers to the learning process that nursing students use to create a mental construction of their understanding of nursing and healthcare. Learning is an active process of synthesizing information and building on previous knowledge (Brandon & All, 2010).

Critical thinking. The American Association of Colleges of Nursing (AACN; 2008) defines critical thinking as “part of the process of questioning, analysis, synthesis, interpretation, inference, inductive and deductive reasoning, intuition, application, and creativity...underlies independent and interdependent decision making” (AACN, 2008, p. 36).

Guiding. In learner-centered teaching (LCT), the nurse educator is seen as a guide in a collaborative learning environment (Candela et al., 2006; Schaefer & Zygmunt, 2003; Verst, 2010; Weimer, 2002). A guide assists students in discovering material but does not dictate that understanding. This study used Weimer’s (2002) explanation of the guide: “Guides show people the way, and sometimes they even go along, but guides do not make the trek for the traveler” (p. 77).

Interactive practice. The Merriam-Webster Online Dictionary (2012) defines the word *interactive* as “mutually or reciprocally active, requiring people to talk with each other or do things together” and the word *practice* as “to perform or work at repeatedly so as to become proficient.” This study used these definitions to define interactive practice as any activities in which students work together and/or with the nurse educator to work toward understanding and applying nursing knowledge.

Learner-centered teaching. This guides students in constructing understanding using an interactive social context and assists students to discover content through actively processing it using critical thinking and reflecting on their understanding. Blumberg (2009) stated that LCT is an “approach that shifts the role of the instructor from one of giver of information to one of facilitating student learning or creating an environment for learning” (p. 273).

Learner-centered teaching strategies. These are methods of teaching and plans for student learning that adhere to the principles of LCT as defined in the definition above.

Reflection. Reflection is deliberately reviewing an experience, describing the salient features of the experience, analyzing influencing factors,, and synthesizing learning and ways to incorporate it in the future (Duffy, 2007; Duke & Appleton, 2000).

Teacher-centered teaching. This was defined as learning experiences designed to transmit nursing knowledge using a traditional approach. Examples included methods such as lecture and question and answer sessions designed to elicit memorized knowledge (Candela et al., 2006). It does not include group work or interactive activities.

Undergraduate nursing programs. These are nursing programs leading to a diploma, associate, or baccalaureate degree, resulting in eligibility to sit for the national Registered Nurse licensing exam.

Assumptions

It was assumed that change and innovation could improve the delivery of nursing education.

Limitations

1. There is a lack of empirical research on LCT.
2. Survey research depended on participants to answer questions honestly.
3. The number of potential participants was dependent on the cooperation of the department heads in forwarding the initial email invitation to the survey.

4. It was not possible to identify non-responders due to the data collection method or to determine if there was a difference between responders and non-responders.
5. The sample might not be representative of the general population of nurse educators in the country.
6. The research was limited to one state.
7. The research was limited to undergraduate nursing programs and face-to-face classes. Results are not generalizable to online or graduate education.
8. Clinical and laboratory classes were not included.

Professional Significance

The literature on learner-centered teaching (LCT) is very theoretical with little empirical research in nursing education. This study adds to the body of nursing education knowledge by providing a baseline of the current use of LCT in nursing education. This meets the call from nursing leaders to create reform and test innovative pedagogies (Benner et al., 2009; NLN, 2003, 2004b, 2012). The definition of learner-centered teaching used in this study was developed from the literature and defined LCT in nursing education as consisting of four components or variables: the teacher as guide, interactive practice, critical thinking, and reflection. These areas have been investigated separately in nursing education but the synergy between them in LCT as a whole has received very little research attention.

CHAPTER II

REVIEW OF LITERATURE

This review of literature begins with a synthesis of the theoretical basis for constructivism and learner-centered teaching followed by an investigation of empirical studies focusing on learner-centered teaching. Discussion of the current gaps in knowledge is then summarized.

Databases searched included the Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest, Education Resources Information Center (ERIC), and PsycInfo. Literature reviewed included items about learner-centered teaching, innovative teaching, self-efficacy in teaching, motivation in teaching, transformation in nursing education, and specific teaching methods. Items were reviewed in nursing, education, psychology, and other fields. Literature was included in this review if the purpose or subject fit the definition of LCT even if it was not specifically identified as such by the author(s).

Background

The major teaching methods in use in nursing schools today have their origins in behaviorism. Most teachers teach as they were taught--in a program that probably emphasized behavioral outcomes (NLN, 2003). The concept of learning as a knowledge transfer method fits easily with this model: give the knowledge and then test for the

desired answers or behaviors to assess if learning has taken place (Brandon & All, 2010). The problem with teaching nursing using only traditional methods is that knowledge is not static. Behavioral methods of teaching and assessment have a definite place in nursing education but overreliance on this one theory might lead to nurses who do not possess the flexibility to adapt to the rapidly changing healthcare environment. Learner-centered teaching, with its focus on constructivist philosophy, assists students with deeper learning, thereby enhancing flexibility and adaptation in thinking.

Constructivism

The philosophical framework for this study on learner-centered teaching was constructivism. Some of the tenets of constructivism are that learning is not something that happens outside of the person. People integrate new knowledge and create their own understanding using previous knowledge and ways of knowing the world (Brandon & All, 2010; Dewey, 1933; Driscoll, 2005; Piaget, 1964; Weimer, 2002). If students can be expected to construct their own understanding of their experiences and knowledge that they are taught, teachers can use this characteristic to design learning experiences that have meaning for students (Weimer, 2002).

Constructivism states that the understandings created by people are not necessarily valid. Students often hold ideas that stem from a narrow worldview and their ideas about health and illness might reflect their limited experience. Vygotsky (1978) expressed that learners test their understandings against their particular social system and context. Learner-centered teaching helps nursing students test their understanding of concepts through interactions with the instructor, other students, and practicing nurses.

The ideas in constructivism helped identify the variables that define learner-centered teaching in the literature review.

Learner-Centered Teaching

Paris and Combs (2006) pointed out that the term *learner-centered* is ubiquitous in the literature but it can have different meanings depending on the author. The idea of learner-centered teaching is intuitively positive. According to Paris and Combs, “Claiming to be learner-centered in one’s personal philosophy or school or district mission statement is commonplace” (p. 572). Learner-centered teaching is often taken to mean a specific teaching method such as group work or problem-based learning but it is not one method--it is more comprehensive. Learner-centered teaching is an umbrella framework that encompasses many different teaching strategies.

Learner-centered teaching might be partially explained by contrasting what it is not. Learner-centered teaching is not traditional teacher-centered teaching, which can be defined as teaching where the information flows in one direction from teacher to student. Traditional methods are often characterized as predominantly lecture. Discussion, case studies, and other teaching methods often characterized as LCT can also be part of traditional teacher-centered teaching but the premise is still that the teacher retains control over the content and structure of the discussion. Objections to LCT are often based on the necessity for someone to be the expert in content. Learner-centered teaching does not refute that point; it acknowledges that the teacher is the expert and that knowledge of content is important (Brandon & All, 2010; Weimer, 2002). Teacher-centered learning often focuses on explaining and restating material to students--teaching as telling. The teacher is seen as the expert and the source of information. Freire

described this as “banking pedagogy” (The Freire Project, n.d, para. 1) as if by depositing knowledge into students, one can assume that learning has taken place. This is a key assumption LCT addresses. Learning cannot be assumed to take place simply because information is presented.

Learner-centered teaching promotes interactive, cooperative learning (Bilimoria & Wheeler, 1995; Candela et al., 2006; Paulson, 1999) and attention to multiple learning styles (Brown, 2003; Stage, Muller, Kinzie, & Simmons, 1998). The interactive, social context of learning is emphasized. The teacher is not seen as the only source for knowledge; peer teaching is also seen as beneficial. Learner-centered teaching encompasses principles of adult learning theory to help develop self-efficacy and enhance critical thinking skills (American Psychological Association, 1997; Bilimoria & Wheeler, 1995; Candela et al., 2006; Stage et al., 1998). Attention to the learning process and deep, rather than superficial, learning is emphasized and encouraged, utilizing teaching methods that promote interaction with the content and ideas (Candela et al., 2006; Weimer, 2002). Downing (n.d.) used the term “educational architect” to illustrate the role of the teacher (para. 6). This term follows the shift in philosophy for teachers--from expert knowledge delivery to learning facilitator.

Weimer (2002) created a framework of learner-centered teaching and articulated five key areas where change is needed to move toward a more learner-centered perspective in teaching: the balance of power, the function of content, the role of the teacher, the responsibility for learning, and the purposes and processes of evaluation. These domains align with constructivist principles and are a useful general framework of LCT. Knobloch and Ball (2006) and Greer, Pokorny, Clay, Brown, and Steele (2010)

cited Weimer's model in their exploration of LCT. Weimer's model is a useful foundation to begin to assess LCT but is not explicit enough to provide a blueprint for LCT in nursing education.

Similar terms to learner-centered teaching include innovative teaching, diverse teaching methods, and alternative teaching methods. Some examples of teaching methods that can be learner-centered include active learning, cooperative learning, problem-based learning, solution-focused learning, group projects, simulation, role-play, case study, and discussion (Bilimoria & Wheeler, 1995; Candela et al., 2006; Paulson, 1999; Stage et al., 1998; Weimer, 2002).

The ideas in constructivism and learner-centered teaching provided the theoretical framework used in this study. Many nurse educators embrace an eclectic philosophy of teaching and learning that combines aspects of behaviorism and constructivism. Learner-centered teaching represents a paradigm shift toward designing learning experiences in a collaborative manner--a new understanding of how knowledge is formed and retained by nursing students. The definition used in this study stated that LCT guides students in constructing understanding using an interactive, social context and assists students to discover content through actively processing it using critical thinking and reflecting on their understanding. This definition clearly articulates the components of LCT that were used in this research to measure LCT use in the classroom by nurse educators. These components and other similar concepts are explained in the next section.

Empirical Research

One of the difficulties in compiling a picture of the literature was the nature of LCT. Many of the research studies reviewed in this chapter did not explicitly name their

subject as learner-centered teaching but the description was congruent with the definition used in this study. The research literature on learner-centered teaching was varied and often used different terms to describe it, e.g., student-centered teaching, alternative pedagogies, and innovative teaching.

One of the first attempts to define LCT was created by the American Psychological Association (APA; 1997). Their *Learner-Centered Psychological Principles: A Framework for School Reform and Redesign* (1997) is a set of 14 guiding statements compiled from research and originally designed as a framework to assist primary and secondary school reform. The principles focused on the learner and the learning process, cognitive and metacognitive factors, motivational and affective factors, developmental and social factors, and individual differences. McCombs (1997) referred to the APA's *Learner-Centered Psychological Principles* in her article assisting teachers to reflect on their teaching and adds,

None of the practices that follow from the Principles need take a particular form or look a particular way, but they must be consistent with the knowledge base represented by the Principles and with the beliefs, characteristics, dispositions and practices of teachers. (p. 5)

This viewpoint of a framework rather than a distinct definition is understandable when the constructivist origins of LCT are taken into consideration but it did not help narrow down the use of LCT in research studies.

This section of the literature review examines empirical nursing research on concepts very similar to LCT and outlines the research into the components of LCT identified as the research variables in Chapter I: guiding, interactive practice, content, critical thinking, and reflection. There is a dearth of actual research studies on LCT in nursing education, possibly due to the lack of a clear definition for reference.

Research on Similar Concepts

These studies investigated concepts that demonstrated close similarity to LCT, e.g., brain-based learning and earlier studies of innovative teaching. These studies lend context to the study of LCT and show the development of the ideas behind LCT.

Schell's (2001) study of innovative teaching was one of the earliest studies using learner-centered teaching principles in nursing education. She investigated the process of innovative teaching using a multiple case study method with four nurse educators. She found that innovative teaching involved several domains: teacher qualities, beliefs about teachers and teaching, beliefs about learning and learners, instructional and evaluation methods, and relationships with students. She also explored facilitators and barriers to innovative teaching. Facilitators included positive environment and attitude toward innovative teaching from administrators and colleagues, adequacy of resources, previous education about and exposure to innovative teaching, and teacher confidence. Barriers included lack of respect or value for innovative teaching, lack of administrative support, and perceived accreditation limitations. Her participants indicated that traditional teaching using lecture was comfortable and familiar both to the teachers and the students. Their perceptions of student resistance and immaturity and lack of time to learn about and implement innovative teaching were significant barriers. Her findings indicated that innovative teaching involved a shift in thinking for nurse educators and an examination of their beliefs about teaching and learning.

In 2006, Schell again investigated the process of innovative teaching, this time using a Delphi study of nurse educators. The Delphi process resulted in consensus by a panel of experts, in this case, in nursing education; thus, the results could be assumed to

reflect prevailing thoughts about innovative teaching at the time of the study. She identified essential components, facilitators, and barriers of innovative teaching. Twenty-eight educators came to a consensus in three rounds of the Delphi process. Facilitators of innovative teaching identified by the expert panel included faculty motivation, time for development and preparation, administrative and peer support, and opportunities to learn about innovative teaching. Barriers identified included lack of motivation, fear of failure, lack of knowledge, lack of time, and lack of administrative support. Schell was investigating innovative teaching, not specifically LCT, but her resulting components of innovative teaching included several components of LCT: critical thinking, active and discovery learning, faculty-student interaction, and focus on the learning process. Schell stated the size of the respondent expert sample was smaller than she intended but noted the difficulty in identifying expertise with a new concept such as learner-centered teaching. This study established a number of important considerations: the wisdom of providing a definition of learner-centered teaching to facilitate participants' understanding of the concept and a beginning categorization of the thematic components of LCT.

Kohtz (2006) explored alternative pedagogies (critical, feminist, postmodern, and phenomenological) in medical-surgical nursing education using qualitative methods. She interviewed nurse educators about their adoption of alternative pedagogies and their beliefs about non-conventional teaching methods. Some of the themes that emerged concerned difficulties with content overload, wanting to help students learn how to learn, teaching as facilitating, time constraints, emphasis on passing NCLEX (National Council Licensure Exam), and the efficiency of lecture. Some of the same themes were

discovered in Schell's (2001, 2006) studies of innovative teaching. Themes Kohtz discussed were the nurse educators' beliefs in the ideas behind learner-centered teaching and their strong need to maintain control in the classroom--the perceived need to cover content drove what happened in the classroom. This ambiguity between teacher beliefs and learner-centered methods on the part of nurse educators was present in many studies involving learner-centered teaching and was discussed in much of the material written about the subject (Blumberg, 2009; Greer et al., 2010; Schaefer & Zygmunt, 2003; Weimer, 2002). Kohtz increased the validity of the study by using classroom observations and document review to triangulate with the participant interviews. For a qualitative research study, the sample size of 12 was adequate and the participants were drawn from a three county area, increasing the diversity of the sample.

The previous three studies utilized qualitative research methods. Concepts similar to LCT were investigated by Merrill (2008) and Phillips (2009) using quantitative methods. Merrill examined the effectiveness of brain-based instructional strategies. Brain-based instruction was defined by Merrill as "teaching and learning processes designed to work with the brain's built-in method for acquiring, storing, retaining, and retrieving information" (p. 7). Brain-based instruction is similar to LCT--both concepts portray learning as something that happens in conjunction with the learner as opposed to being transmitted from the teacher in a one-way flow. Both concepts include active learning and critical thinking. Merrill compared two brain-based teaching strategies, a jigsaw activity and concept mapping, with traditional lecture. She found that the brain-based activities were effective in producing a positive change in learning. Her sample size was small ($n = 72$) so the findings might not be very generalizable. However,

Merrill's quasi-experimental study was the only study found using higher-level quantitative research techniques to directly test learner-centered concepts in practice.

Phillips (2009) researched factors related to the use of socioculturally-based teaching strategies in clinical nursing education by surveying 99 faculty who had completed an online course in clinical teaching and learning. Socioculturally-based teaching strategies are teaching strategies designed to facilitate student learning using techniques such as scaffolding knowledge and coaching. They are similar to LCT because both concepts include the teacher as a guide or coach, critical thinking, and reflection. Her results demonstrated that assisting with articulation, or "the explication of a person's thoughts either verbally or in writing" (Phillips, 2009, p. 44), and coaching were the two most frequently used strategies by her participants. These results added to understanding the guiding and coaching role of the teacher in LCT. The role of nursing educators as coaches in the clinical setting is an integral part of the apprentice model that has been the foundation of clinical nursing education, so it is not hard to imagine that educators were comfortable in this role in clinical settings. Her convenience sample carried a high risk of bias because it was gathered from a population of nurse educators who attended an online class in teaching. This sample might be more adventurous in teaching and more assertive in pursuing alternate teaching methods than the average nurse educator, making generalizations difficult. The researcher did report this limitation. Phillips used a researcher-developed instrument that was created with expert input and demonstrated acceptable reliability with a Cronbach's alpha coefficient of .69-.94. The instrument was also piloted and revised accordingly.

The research into similar concepts demonstrated many commonalities with LCT. Schell's (2001, 2006) and Kohtz's (2006) qualitative studies revealed a beginning understanding of the components of LCT in nursing education. They identified the idea of the teacher as a guide, the desire to help students learn differently, and the importance of active learning and critical thinking. They also identified that changing teaching practices to become more innovative was challenging for their participants and involved changing their beliefs about learning. Both Phillips' (2009) and Merrill's (2008) quantitative studies utilized convenience samples that were not very diverse. This greatly limited the generalizability of the results but both studies demonstrated further exploration of concepts similar to LCT in nursing education.

Research into Components of Learner-Centered Teaching

Very little in the nursing literature described research into LCT specifically. Often, the various components of LCT were described but in disciplines other than nursing. Nursing research studies examined in this section investigated some or all of the components identified in the definition of LCT used in this study: guiding, interactive practice, critical thinking, and reflection. These concepts were the components most often identified in the literature as part of learner-centered teaching.

Teacher as guide. One of the characteristics of LCT that was identified described teachers as guides. One of the central thought processes identified was that teachers felt LCT required a shift in thinking from the teacher as expert giver of knowledge to the teacher as guide and user of multiple teaching strategies to help students learn. Teachers assist students to understand the content as opposed to merely memorizing and restating it. This is a difficult shift for many teachers to make because it

requires relinquishing some control over the learning process to the student. The teacher as guide scaffolds learning for the learner and the student is assisted to understand and connect to previous knowledge.

Schaefer and Zygmunt (2003) surveyed 187 randomly selected nurse educators using the Principles of Adult Learning Scale (PALS) to establish whether their teaching style was teacher-centered or learner-centered and compared this to their instructional methods. The results demonstrated that their participants used more teacher-centered than learner-centered activities. They also asked participants to describe their philosophy of teaching. One of their most interesting findings was that nurse educators mentioned the role of facilitator or guide but often framed this role in teacher-centered ways such as guiding by providing content. Schaefer and Zygmunt concluded that their participants were philosophically learner-centered but, in practice, displayed more teacher-centered teaching. The participants were recruited through cluster sampling 100 nursing programs across the country, which provided for generalizing the results to the population of nurse educators. This study documented the difference between what nurse educators felt was appropriate teaching and what they actually did in the classroom. Schaefer and Zygmunt also noted some participants' confusion with terminology such as the meaning of the term "facilitate" in the context of LCT. This echoed Schell's (2006) similar study findings as discussed above.

Interactive practice. Interactive practice includes activities specifically aimed at student interaction with each other and the teacher. Activities have a focus on learning concepts and understanding application of content. Researchers have examined students'

evaluation of their learning using active strategies and some work has been done to compare outcomes.

Greer et al. (2010) explored learner-centered characteristics of 694 nurse educators by using secondary analysis on a subset of data from another large research study that was implemented as an online survey. They utilized Weimer's (2002) framework of five key changes to the practice of learner-centered teaching in their research. Their descriptive study examined learner-centered characteristics of nurse educators who self-reported use of contemporary pedagogy (the authors' term for learner-centered teaching) at least 50% of the time. The results supported Weimer's framework and highlighted the participants' strong sense that active, collaborative learning equated with being learner-centered. Although their results added to the body of general understanding of LCT, their sample was drawn from nurse educators who belonged to the Sigma Theta Tau International Honor Society of Nursing. These educators might not represent the general population of nurse educators in the United States.

Pugsley and Clayton (2003) investigated attitude changes toward research by comparing a traditional research course with an experiential course that included active learning and group projects. They surveyed a total of 48 nursing students. They found that students exhibited a much more positive attitude toward research in the experiential course. However, there were some significant limitations to this study: the small sample size, a change in teachers between courses, and a change in textbook and course resources.

Hoke and Robbins (2005) used active learning strategies with 23 nursing students in an intensive 30 day, six hours a day summer session of medical-surgical nursing. The

strategies used included group work, role-play, class presentations, and alternative testing options such as group quizzes. The focus of the experiment was enhancing the transfer of classroom content to clinical performance. The method of measurement was clinical grades for the study participants compared to clinical grades of a previous traditionally taught session. The researchers found the clinical grades higher in the active learning group (mean = 87.03) compared to the traditional group (mean = 84.19). Course evaluations were very positive and included specific comments about enjoying the course and feeling as though the strategies had helped them learn. This research added to the understanding of student response to active learning strategies. However, utilizing grades as gain scores had some serious difficulties. Gain scores had low reliability as a measure of change (Gall, Gall, & Borg, 2007), even when a pretest-posttest format was used. This study used clinical grades to draw conclusions about the didactic teaching, which was not an appropriate comparison. The results could not be generalized but might be seen as anecdotal evidence of some effect of interactive practice in a specific sample.

Content. Expectations of students and nursing programs were a frequently cited barrier to LCT. The need to cover content so students are prepared for NCLEX is always on teachers' minds (Greer et al., 2010; Schaefer & Zygmunt, 2003; Shell, 2001). This heavy focus on content could lead to overreliance on teacher-centered teaching methods, such as lecture, in the hopes students learn all the content that has been presented. Teacher-centered methods could result in surface learning as students struggle to remember all the content rather than engaging in deeper understanding and learning to transfer knowledge to new situations. The need to assure that students have all the

knowledge they need to pass the NCLEX and practice safely is understandable but can inhibit use of learner-centered teaching methods.

Candela and Bowles (2008) surveyed 352 nurses who had graduated in the previous five years about their perceptions of their educational preparation. They used a researcher-developed instrument with a reported Cronbach's alpha coefficient of .87. They conducted a pilot study and used the feedback to improve the clarity and understanding of the tool. Fifty-one percent of participants felt their nursing programs had prepared them more for NCLEX than for practice. They also verbalized the need for more pharmacology content, management experiences, and the desire for more clinical hours. The largest percentage of respondents felt they were unprepared to use electronic medical records (EMRs). The authors pointed out that nationally, healthcare systems are moving toward the use of EMRs and that nurse educators should be pursuing opportunities to expose their students to these documentation and medication administration systems. The response rate in this study was 12%, which was rather low for generalizing conclusions. Candela and Bowles posited that it would have been useful to include questions asking about the strengths and weaknesses of the programs in preparing students for their first jobs as nurses.

Critical thinking. The need for critical thinking in nursing has been established but methods of incorporating it into nursing education have been much debated among nurse educators (Billings & Halstead, 2009). Shell (2001) investigated perceived barriers to teaching critical thinking using a researcher-developed questionnaire. She surveyed 175 nursing faculty and found several inhibiting factors: perceived student resistance, lack of time to prepare and/or class time to implement critical thinking. Her participants

also noted the need to cover content as a major barrier to teaching critical thinking. One drawback of this research was that the method for determining the inhibiting factors was not explained. Two of the eight subscales contained three items each, yet those subscales yielded two of the three highest factor scores. Polit and Beck (2008) stated that factors (subscales) with less than four items could result in problems with factor analysis as part of scale validation.

Reflection. Reflection entails thinking about thinking, reflecting on what thought processes were used to come to conclusions and make decisions. Reflection can enhance students' decision-making by explicating areas of their thinking that need improvement. When the student can articulate their thought process, the nurse educator can evaluate learning.

Forneris and Peden-McAlpine (2006) described research with novice nurses using an educational intervention based on a model of contextual learning. They defined contextual learning as including reflective journaling, individual interviews, preceptor coaching, and leader-facilitated discussion groups. The focus of contextual learning is improving critical reflection in practice. They described the educational intervention in great detail but did not describe the sample size. One of their conclusions was that novice nurses need direction in the reflection process; it did not necessarily come naturally. They suggested focusing on fewer reflective questions to prepare for discussions to avoid overwhelming the novice nurses. This study was helpful in understanding reflection in LCT because it connected reflection as an important part of critical thinking and gave suggestions for adapting the intervention to nursing education. Greer et al's (2010) previously mentioned study also highlighted the role of reflection in

LCT. Their participants noted using reflection with nursing students to promote insight and as an evaluation tool.

Research into Factors Contributing to Use of Learner-Centered Teaching

Rogers (2003) discussed categories of people involved in innovation and identified “innovators” as those who relished the challenge of a new idea or saw the necessity for change and innovation before their colleagues. The second category he identified was the “early adopters,” or those who adopt a new idea and share their evaluation of the innovation with their peers. Dissemination of ideas could take place in many ways: conferences, workshops, publications, informal discussions, etc. Learner-centered teaching represents an innovation and a major change in thinking for nurse educators but no literature addressed the ways nurse educators learned to use LCT. Schell’s (2001) research did note that previous education about and exposure to innovative teaching was a facilitator of its use. To identify some factors that contributed to implementation, this research study included a question about previous exposure to LCT through such avenues as continuing education, conferences, and self-study.

Measurement

Few instruments were found in the literature that actually measured LCT. There were published instruments that measured similar concepts but most relied on teacher self-assessment rather than evaluating the process of LCT itself. Three instruments were located that attempted to measure the concept of learner-centered teaching.

The Quality Standards Inventory (QSI; Egerton, 2007) was developed to assess learner-centered instruction in online nursing courses. Egerton made the case that online instruction should be learner-centered to compensate for the lack of face-to-face

interaction present in a classroom. She stated that the interactive component of online instruction should not be neglected and cites Vygotsky's (1978) theory of context and community influence on learning as supporting this idea. The instrument was based on research into principles of learner-centered instruction for online courses and assisted instructors in assessing the learner-centeredness of their online instruction. The instrument consisted of 37 indicators in five categories with Likert scale scoring. An overall score was derived from averaging the indicator scores. Egerton reported a reliability coefficient of 0.94 for the QSI, which indicated high reliability. Face validity was established through a pilot test with nurse educators teaching online courses and feedback was used to refine the instrument. According to Egerton, the QSI has been well received in online education circles. While it addressed many of the facets of LCT and was easy to use, the tool was designed for online instruction. Some of the indicators applied more to that setting than the classroom. For example, some of the indicators dealt with managing discussion threads online to facilitate learning. It provided a score from low to high of learner-centered instruction and included components of LCT such as active learning, collaboration, critical thinking, and reflection. The sample size was small ($n = 40$), and the research was conducted at one university, which limited generalizability of the results.

Conti's (1990) Principles of Adult Learning Scale (PALS) tool consists of 44 statements with Likert scale scoring. The items address the principles of adult learning identified by Conti and allow the teacher to self-assess teaching style. The seven factors Conti identified were examined individually and compared to an established mean. A total overall score was also calculated to determine whether the teacher fell on the

teacher-centered or learner-centered side of the scale. Schaefer and Zygmunt (2003) used the PALS with nurse educators and found the reliability to be 0.78. The tool was easy to use and easy to score. Although principles of adult learning were encompassed in learner-centered teaching, these principles did not completely assess the concept as defined in this study.

Blumberg's (2009) Learner-Centered Teaching Practice rubrics comprehensively assessed learner-centered teaching practices and were developed to follow Weimer's (2002) *Five Key Changes to Practice* framework. Blumberg created rubrics to measure the five dimensions of Weimer's framework: the balance of power, the function of content, the role of the teacher, the responsibility for learning, and the purposes and processes of evaluation. The rubrics depicted a continuum from teacher-centered to learner-centered. Directions for the instrument stated that it could be used for self-assessment or program evaluation. The original instrument did not have numerical scoring; it was an interval scale, moving from teacher-centered to learner-centered. A recent study by Blumberg (2011) assigned numbers to each level of teaching on the rubrics to determine a learner-centered score. Content and construct validity for the original rubrics were established through field testing and expert review. Inter-rater reliability for the overall scoring was reported as a concordance correlation coefficient of above .90, which indicated high inter-rater agreement. By reviewing the items chosen on the rubrics, the participant could develop an idea of where their course fell on the continuum of teacher-centered to learner-centered teaching. A disadvantage of using Blumberg's rubrics was that they were somewhat complex and lengthy. They were not

as easy to administer as a simple checklist, although they did provide in-depth information.

None of the three instruments reviewed was the best choice to measure LCT in the nursing classroom. Egerton's (2007) and Conti's (1990) instruments did not correlate closely enough with the definition of LCT used in this study. This study used a more specific definition of LCT than Weimer's (2002) framework so Blumberg's (2011) instrument (based on Weimer) was not a good fit either. A new instrument was developed using these instruments as inspiration and is described in Chapter III.

Summary

The definition of learner-centered teaching used in this study was derived from the literature: Learner-centered teaching guides students in constructing understanding using an interactive, social context and assists students to discover content through actively processing it using critical thinking and reflecting on their understanding. Figure 1 illustrates the relationship between the components of LCT: guiding, interactive practice, critical thinking, and reflection.

This review of literature demonstrated the scope of theoretical and empirical research into LCT. From the literature, we can derive some support for the characteristics of LCT: a shift in the perspective of teaching to the teacher as guide rather than sole source of knowledge; attention to the process of learning by students; intentional design to interact with content; active, collaborative learning; critical thinking; and reflection. The concept of content was also identified in the literature as an important part of LCT but it was intentionally excluded from the model in Figure 1 because it was assumed that without content, there was nothing to teach or learn. Learner-centered

teaching reinforces the importance of content but changes the way educators think about teaching it.

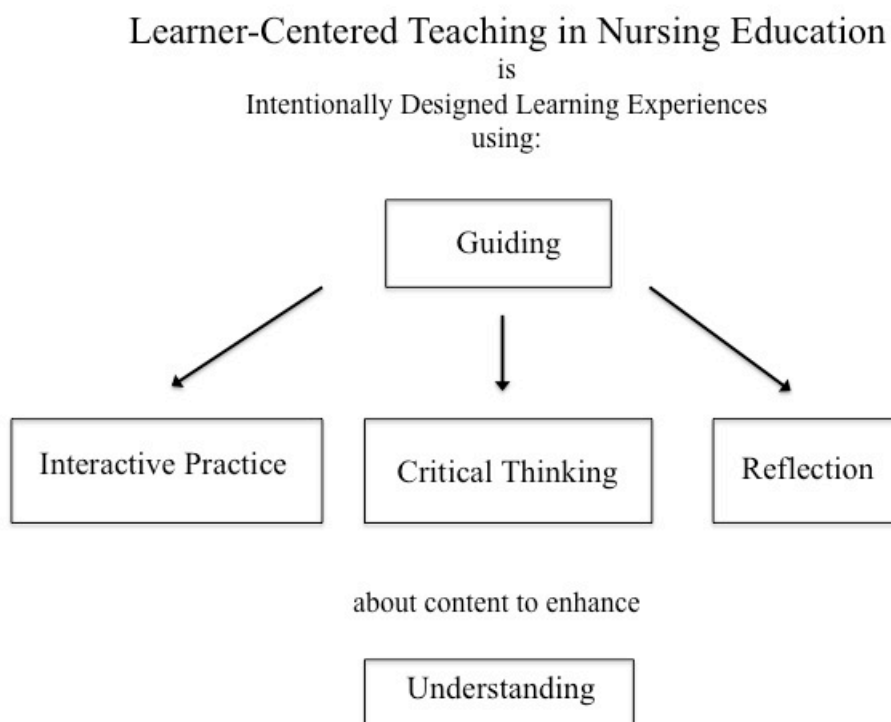


Figure 1. The relationship of the components of learner-centered teaching.

There has been some work investigating LCT but not enough effort to clearly identify its usefulness in nursing education. This study will add to the body of nursing research on this issue by describing the current use of LCT in nursing education and establishing a clear, practical, and applicable definition to measure its use. Existing definitions and instruments for measuring LCT were inadequate for this purpose.

CHAPTER III

METHODOLOGY

Research Design

The purpose of this descriptive, correlational study was two-fold: (a) to describe the application of learner-centered teaching (LCT) in undergraduate nursing education using the Ellis Learner-Centered Teaching in Nursing Education Questionnaire; and (b) to explore the relationships between nurse educators' application of LCT in the educational setting based on characteristics of nurse educators: previous exposure to learner centered teaching, perception of learner-centeredness in teaching, and selected demographic characteristics. A non-experimental, correlational design was chosen since little is known about LCT in nursing education. Correlational designs can be utilized to discover variables influencing behavior and to discover the strength of the relationships between those variables (Gall et al., 2007). However, correlation does not determine causality because the researcher does not manipulate the independent variable (Polit & Beck, 2008). The research instrument, the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ), was developed to measure the application of LCT in the nursing classroom (see Appendix A). This measure was then analyzed with the independent variables to explore any relationships.

Sample

Nurse educators in all undergraduate nursing programs in a southern state were recruited for participation in the study. The inclusion criterion was all nurse educators who teach a face-to-face undergraduate nursing course in a diploma, associate, or baccalaureate degree nursing program in the state. All nurse educators meeting this criterion were invited to participate including part-time educators. Nurse educators who taught in both graduate and undergraduate courses were included in the invitation; however, the ELCTNEQ directed them to focus on an undergraduate course they taught when answering the questions. The instrument was configured to screen out those who taught only graduate courses. Graduate programs were excluded in order to make appropriate comparisons. Graduate courses are more likely to have smaller class sizes, a seminar format, and a different educational focus than undergraduate courses.

The instrument was designed to address face-to-face teaching; thus, nurse educators teaching exclusively online were also screened out and excluded. Those who completed the instrument comprised the sample. The population of possible participants was ~400 undergraduate nurse educators throughout the state. Although it is not acceptable to generalize study conclusions with a nonprobability sample, the population of undergraduate nurse educators could be considered somewhat homogenous on several characteristics (licensure as registered nurses, educational preparation, job description), which improved the chance of identifying significant variance in the study results (Polit & Beck, 2008). Excluding graduate programs from consideration also strengthened the sample.

Coverage bias is the chance that the population of all potential respondents is not complete in some way. If the sample is drawn from a population that is not representative of the desired characteristics, then errors could occur (Dillman, Smyth, & Christian, 2009). Coverage bias was reduced for this study because all nursing programs in the state use email addresses for communication. It was reasonable to expect that nationally, nurse educators would be expected to use email technology. It was also reasonable to expect that department heads/deans would maintain current lists of faculty members so the potential for participants who were not faculty members would be greatly reduced.

A power analysis was completed to establish the number of participants necessary to discover a meaningful effect in this research study (Rempher & Miller, 2008). Power analysis is a statistical test that looks at the chance of creating a Type II error or not rejecting the null hypothesis when it is false. Power is estimated for different effect sizes and can give the sample size that would be sufficient to detect meaningful effects. A power of .80 is the minimum suggested acceptable for most inferential statistics. The pool of possible participants was ~400. Common return rates average 20%, which would be 80 participants. This number would facilitate sufficient power (the possibility that there is a treatment effect) to detect a statistically significant difference between groups if alpha (α), the probability of a type-I error, is set at .05. An alpha of .05 was selected because it is commonly acceptable in research (Glass & Hopkins, 1996).

Average effect size values for small, medium and large effects vary for different inferential statistics. Utilizing the G* Power (version 3.1.3; Faul, Erdfelder, Lang, & Buchner, 2009) software program, a medium effect size, power of .80, and an alpha of .05, calculations resulted in an average sample size of 108 participants necessary to

establish meaningful results and reduce the chance of a Type II error in this study. The data collection resulted in a final sample size of 122.

Ethical Considerations

Permission to conduct this research was granted by the University of Northern Colorado Institutional Review Board (IRB) and the IRB of the primary investigator's employer, Southeastern Louisiana University (see Appendix B). The Internet survey software (Survey Monkey®) was configured to eliminate outright tracking of email addresses, which helped ensure the confidentiality of the participants. Any time electronic communication takes place, there is always the possibility of tracking Internet Protocol (IP) addresses but the software was not configured to do this. Participants had the option upon completion of the instrument of contacting the primary investigator by email if they wished to receive a copy of the results of the research. There was no expectation of distress in completing the instrument and the time commitment was approximately 10-15 minutes to complete. A waiver of standard consent procedures was granted by the IRB because the study involved minimal risk to the participants and the data were reported in groups. Individual participant identities were not necessary to the study results. Participants were informed of the research purpose and the confidentiality of their responses in a cover letter attached to the instrument (see Appendix C). It was explained in the cover letter that informed consent was implied when participants accessed the instrument. Accessing the instrument required clicking on the embedded email link that directed the participant to the secure survey site. All data were stored on a password-protected computer only accessible by the primary investigator. Any printed data were stored in a secure file cabinet in the primary investigator's home office.

Data Collection Procedure

The state Board of Nursing maintains a publicly available list of every nursing program in the state with the names and phone numbers of current department heads and deans. A list of department heads' or deans' email addresses was compiled by checking the nursing programs' websites and calling to request one if the email address was not available on the website. Department heads' or deans' email addresses were chosen as the research invitation delivery method because many websites did not post individual faculty members' email addresses but the department head's or dean's address was posted or could be obtained by calling the department. The researcher hoped the dean/department head forwarding the invitational email to their faculty would effect an introduction, which could possibly improve the response rate.

The study was implemented using the Internet survey software Survey Monkey®. Dillman et al.'s (2009) tailored approach to surveys was used to focus on reducing survey error and developing survey procedures to enhance the return rate. Dillman et al.'s method discussed four sources of survey error: coverage, sampling, nonresponse, and measurement. Coverage and sampling error were discussed previously under the Sample section. Nonresponse error is addressed below and measurement error is addressed under Instrumentation. Data collection procedures were developed to maximize response including the method of delivery, wording of the email invitation, and procedures for handling the various challenges that might have arisen after the research began. The strength of this method was that it was proactive in identifying potential issues and proposing problem-solving plans.

Nurse educators were recruited by email through their department heads or deans for participation (see Appendix D). Data collection was accomplished during January and February of 2013. The invitational email was sent to the department heads or deans asking them to forward it to their faculty; a link was embedded in the email directing the participant to the website. Several emails were returned as undeliverable so the researcher called the nursing program in question, verified the correct name and email address, and then resent the emails. At the end of the second week, a follow-up email was sent to the department heads to forward a reminder to their faculty to complete the research instrument if they had not already done so (see Appendix E). Due to the low response rate at this point (19%), the decision was made to send individual email reminders to nursing faculty members at the participant schools. An amendment explaining the change in methodology was submitted to both IRBs and subsequently approved (see Appendix B). Three schools did not have faculty email addresses posted on their websites. All other schools' faculty email addresses were identified online and the second reminder was sent to those individual faculty members (see Appendix F). The questionnaire was open for data collection for five weeks. Because the data collection software was not configured to identify individual respondents, it was not possible to identify non-responders. The response rates are illustrated in Table 1.

Table 1

Response Waves

Date	Responses	Reminders
Wave 1	47	1 st reminder email sent to deans/department heads
Wave 2	77	2 nd reminder email sent to individual faculty members
Wave 3	144	Web link closed to data collection

Instrumentation

The instrument used in this study is a researcher-developed questionnaire. The Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ) consists of three sections. The participant was instructed to think of a course they taught face-to-face (an exemplar course). The first section contains two screening questions that ask if the participant teaches face-to-face and in what type of program the course is taught. If the participant answered that they did not teach face-to-face or that they taught the course in a graduate curriculum, that questionnaire was excluded from the data analysis. The first section also contains four background questions about the participant's exemplar course. These questions ask about the placement of the course in their curriculum, the content of the course, number of times they have taught the course, and if the course has a clinical component.

The next section of the instrument is divided into subsections for the four components of LCT that were supported in the existing literature: the process of guiding

students, interactive practice, critical thinking, and reflection. The instrument has 21 items that were developed to provide information about nurse educators' use of these four components.

Four additional questions pertained to previous exposure to LCT, the nurse educators' perception of their learner-centeredness in teaching, and beliefs about LCT. There were six demographic variables to determine age, gender, ethnic heritage, years teaching in nursing education, highest degree completed, and academic rank.

The ELCTNEQ was reviewed for content validity by a panel of experts with knowledge and experience in learner-centered teaching. A pilot study was conducted with 10 nurse educators not included in the sample to determine face validity. Pilot studies can reveal instrument design problems and provide evidence for the feasibility of using the instrument (Lancaster, Dodd, & Williamson, 2004). These participants were recruited through personal contact from the primary investigator, were asked to fill out the ELCTNEQ, and were asked to provide feedback evaluating the clarity of the questions, usefulness of the answer scale, and completion time. Positive feedback included that the length was appropriate and not too long, instructions were clear, and the instrument was engaging and visually appealing. Revisions were made based on feedback: some minor rewording for clarity, adding some more instructions, and adding an option to the choice of type of degree program to include "baccalaureate second-degree."

A 4-point Likert type, forced-choice, frequency rating scale was used for the 21 questions pertaining to the four components of LCT to yield a total numerical score as well as sub-scores for the components. Quantifying behaviors using whole numbers can

be an arbitrary exercise when asking participants to remember over time. The process is subject to recall bias, which is a measurement error in which the participant has trouble remembering precisely or remembers in a more positive light than is actual reality (Burns & Grove, 1997). Recall bias is often unintentional but can be a threat to the integrity of the data (Hassan, 2006). Some bias is always present in research but the goal is to minimize the effect. Because of these considerations, percentages were chosen to represent the number of times the behavior was performed during the course.

Percentages encouraged a more accurate description since the actual number of times might be difficult for the participant to count and would encourage recall bias or outright guessing. The answer choices were as follows: *Rarely* (0-25% of the time), *Sometimes* (26-50% of the time), *Frequently* (51-75% of the time) and *Most of the time* (76-100% of the time). The use of a horizontal, visual analog scale with the answer choices given below the questions assisted the participant in understanding the distance between the choices on a continuum. A forced choice scale was chosen to encourage participants to choose a response with the assumption that participants were aware if they used particular strategies or not. Eliminating the mid-point of a scale reduced the tendency to choose a neutral answer rather than giving more thought to the actual behavior (Brace, 2008). The option of “don’t know” was not given as a choice for the same reason--to encourage thoughtful answers resulting in meaningful data (Martin, 2006).

The 21 Likert scale questions were scored as interval data. To be treated as interval data, the scores must represent equal distances on a continuum (Polit & Beck, 2008). The percentages were equidistant so the results were treated as interval data. The participant selected a label of *Rarely*, *Sometimes*, *Frequently*, or *Most of the time* to

answer the question. The percentages assigned to each answer choice were repeated on each page of the questionnaire to remind the participant of the meaning of the label. To facilitate statistical analysis, each label was given a numerical equivalent: *Rarely* = 1, *Sometimes* = 2, *Frequently* = 3, and *Most of the Time* = 4. Since the definitions for the labels specified equidistant percentages, the scoring used equal intervals. The interpretation scale intervals used for scoring the instrument were as follows:

Rarely = 1-1.75 or Teacher-Centered

Sometimes = 1.76-2.50 or Somewhat Teacher-Centered

Frequently = 2.51-3.25 or Somewhat Learner-Centered

Most of the time = 3.26-4.00 or Learner-Centered

This interpretation scale allowed an overall composite score to be calculated for the participant, the calculation of subscales, and meaningful comparisons.

Data Analysis

The data analysis was organized by the research questions. The statistical software program Statistical Package for the Social Sciences (SPSS®-version 20.0) was used for data analysis. The Internet survey software used in this study, Survey Monkey®, collected the responses and created a downloadable file in several different formats: PDF (portable document format), Excel, .sav, or .csv (comma-separated values) file. A downloadable .sav file was created to download the data directly into SPSS. Participants who were disqualified from answering the survey by the screening questions were filtered from the total responses in the Survey Monkey® software to result in the total number of finished questionnaires. Missing data were minimal so all the questionnaires were usable.

All categorical variables were dummy-coded in order to enter them into the regression analysis. Dummy-coding assigns numerical labels to each variable, e.g., Male = 0, Female = 1. The numbers assigned have no intrinsic meaning but this coding allows appropriate calculation and interpretation of statistics (Glass & Hopkins, 1996). Correlation demonstrated any relationships between the independent and dependent variables and the direction of the relationship. Because it was hypothesized that there was more than one influence on the dependent variable (LCT score), analysis of variance (ANOVA) and multiple regression were used to calculate the effects of multiple variables, giving a more complete picture of the factors involved in the use of LCT (Glass & Hopkins, 1996). Regression analysis also provided an opportunity to identify possible predictive variables of LCT.

Q1 What is the relationship between nurse educators' characteristics and their use of LCT in the classroom as measured by nurse educators' LCT scores on the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ)?

Measures of central tendency and variability were appropriate to answer this question because the goal was to illustrate patterns in the data. The independent variables for this research question were the demographic variables: age, gender, ethnic heritage, years of experience teaching in nursing education, highest degree completed, type of degree program (diploma, associate or baccalaureate), and academic rank. Descriptive statistics illustrated the frequency and percentages of these variables.

The dependent variable in this study was the LCT score on the researcher-developed instrument--the ELCTNEQ. The composite LCT score represented the sum of scoring the answers to the 21 questions about behaviors illustrating the four components of LCT: guiding, interactive practice, critical thinking, and reflection. These questions

measured the frequency of participants' behaviors consistent with those four components. The composite LCT score, means, and standard deviations were calculated for each participant. The component means and standard deviations were also calculated and summarized. These statistics organized the data in an orderly, understandable description of current learner centered teaching practice in nursing education (Glass & Hopkins, 1996).

A one-way analysis of variance (ANOVA) was used to determine if the differences between the means of the LCT scores of the different groups (the five categorical independent variables) differed significantly. One-way analysis of variance is used to compare three or more means to determine if the differences are statistically significant. It can also demonstrate whether combinations of the independent variables (interaction) produce different effects on the dependent variable than produced by the variables separately (Glass & Hopkins, 1996). Homogeneity of variance tests the assumption that all variances are equal and is an assumption of ANOVA. Thus, it was verified with the Levene's test; the result should be greater than the level of significance in order to demonstrate homogeneity of variance (Glass & Hopkins, 1996)..

Stepwise multiple regression assisted in explaining the variance in the composite LCT scores that was due to the independent variables. Regression was used to determine which variables were most predictive of the dependent variable, LCT score, and which combinations of variables explained most of the variance in the dependent variable. Regression analysis is the appropriate statistical test when the variables are categorical in nature (Glass & Hopkins, 1996). In stepwise multiple regression, correlation coefficients of multiple variables are entered into the regression equation and tested individually

against each other to see which variable contributes the most explanation of the variance of the dependent variable (Polit & Beck, 2008).

Q2 What is the relationship between nurse educators' previous exposure to LCT and their use of LCT in the classroom as measured by their LCT scores?

H1 Previous exposure to LCT is positively correlated to higher LCT scores.

H2 There is a statistically significant difference in LCT scores between nurse educators with previous exposure to LCT and nurse educators without previous exposure.

Nurse educators' previous exposure to LCT was defined for this study as previous learning or information about LCT gained through formal education courses, workshops, conferences, webinars, faculty development, continuing education, self-study, or other means. Previous exposure was measured by asking the participant to select all the avenues of previous exposure to LCT he or she had experienced from a list of possible choices. If "Other" was selected, the participant was asked to explain his/her answer. A choice of "No exposure" was available for those without any previous exposure. For analysis purposes, this variable was defined as a yes-no categorical variable. Choosing any of the given choices for previous exposure constituted a "yes" answer. Choosing "No exposure" constituted a "no" answer. If a participant answered "Other" and gave an explanation of what that meant, the researcher determined whether the answer constituted previous exposure and assigned it to the yes or no category.

Frequencies were calculated for each of the answer choices indicating previous exposure, the "No exposure" category, and was illustrated with a frequency table. The answers were then grouped into two categories: previous exposure or no previous exposure. A Spearman's rank correlation coefficient (Spearman's r_s) determined the

strength of the relationship between the LCT scores and the two groups. Spearman's r_s is appropriate when one variable is ordinal (previous exposure: yes/no) and one variable is interval (LCT scores) or ratio (Polit & Beck, 2008). An independent t -test compared the means of the LCT scores of the two groups (previous exposure and no previous exposure) to determine if a significant statistical difference existed. The t -test is a hypothesis test that uses the t -distribution to compare the means of two groups (Glass & Hopkins, 1996).

- Q3 What is the relationship between educators' self-perception of their learner-centeredness (teacher-centered, somewhat teacher-centered, somewhat learner-centered, learner-centered) and their use of LCT in the classroom as measured by their LCT score?
- H1 Self-perception as more learner-centered is positively correlated with higher LCT scores.
- H2 There is a statistically significant difference between those who identify themselves with each choice: teacher-centered, somewhat teacher-centered, somewhat learner-centered, and learner-centered.

Nurse educators' perceptions of their learner-centeredness in teaching were defined as their mental image of themselves or awareness of their orientation toward teaching: more teacher-centered or more learner-centered. Definitions of each choice were given on the questionnaire. Self-perception was measured by asking the participant to select a label to describe their current teaching practice: Teacher-centered, Somewhat teacher-centered, Somewhat learner-centered, or Learner-centered. The answer choices were offered in a horizontal format to visually emphasize a continuum.

Frequencies were calculated for the number of educators identifying with each group: Teacher-centered, Somewhat teacher-centered, Somewhat learner-centered, or Learner-centered. A Spearman's rank correlation coefficient was calculated to determine the strength of the relationships between the means of each of the four groups and the

LCT scores. Spearman's r_s expresses relationships between variables as a number from -1 to 1 and demonstrates the direction (positive or negative) of the relationship (Polit & Beck, 2008). A one-way analysis of variance (ANOVA) of the LCT scores of nurse educators from the four levels of self-perception determined if the means of the groups differed significantly.

- Q4 What is the relationship between nurse educators' beliefs about LCT and their use of LCT in the classroom as measured by their LCT scores?
- H1 Beliefs that LCT enhances deeper understanding of nursing concepts and the ability to apply classroom learning to practice has a positive correlation with higher LCT scores.
- H2 There is a statistically significant difference between the scores of those who identify with each choice: Strongly Agree, Agree, Disagree and Strongly Disagree.

Nurse educators' beliefs about LCT were measured by asking the participants to choose a level of agreement (*Strongly Agree, Agree, Disagree, Strongly Disagree*) to two questions. The first item asked if they believed LCT enhanced deeper understanding of nursing concepts more than teacher-centered teaching. The second item asked if they believed LCT enhanced the ability to apply classroom learning to clinical practice.

A Pearson's product-moment correlation coefficient (Pearson's r) was calculated to determine the strength of the relationships between the means of each of the four groups and the LCT scores. Pearson's r is appropriate when correlating interval level data (Polit & Beck, 2008). Like Spearman's r , Pearson's r expresses relationships as a number between -1 and 1. An ANOVA of the LCT scores of nurse educators with the four levels of agreement with LCT beliefs determined if the means of the groups differed significantly.

Summary

This chapter presented the research design and introduced the research instrument used in this descriptive, correlational study. The data analysis plan was detailed for each of the four research questions. The next chapter presents the results of the data analysis.

CHAPTER IV

RESULTS

The purpose of this study was (a) to describe the application of learner-centered teaching (LCT) in undergraduate nursing education and (b) to explore the relationships between nurse educators' characteristics and their application of LCT in the classroom. Analyses were conducted to investigate relationships between nurse educators' demographic characteristics, previous exposure to LCT, self-perception of learner-centeredness, and their beliefs about LCT. This chapter describes the properties of the instrument and the results for each research question.

Data Analysis

The data was analyzed using SPSS® version 20.0. Prior to analysis, the data were inspected for errors and decisions were made to recode some written answers into numbers for ease of analysis. For example, the free text box for years teaching in nursing education included answers such as "40+ years." This was recoded as "40." Some participants filled in the free text box for "Other" previous exposure with an answer that fit into one of the predefined categories so these answers were recoded into the correct categories.

Monitoring of questionnaire responses on Survey Monkey® during data collection identified a trend of consistent missing data for two questionnaire items: "Where is this face-to-face course placed in your curriculum?" and "What is the content

of this course?” It was discovered that upon initial opening of the research web link, those two questions were not visible to the participants. Because of this, half the participants who completed the questionnaire (60 of 122) did not have the opportunity to answer those questions. The problem was identified and corrected after the first reminder and the remainder of the participants answered those questions.

Sample

The sample consisted of nurse educators recruited from all undergraduate programs of nursing in a southern state. The state has one diploma program, 12 associate degree programs, and 13 baccalaureate degree programs, with ~400 nurse educators teaching in these programs. The inclusion criterion was teaching a face-to-face course in an undergraduate nursing program. The exclusion criterion was teaching online or in a face-to-face course in a graduate program. Some nurse educators taught undergraduate face-to-face courses as well as online or courses in a graduate curriculum. These participants were directed to use their face-to-face undergraduate course to answer the questionnaire.

The total number of attempted questionnaires was 143. Of these 143 responses, 18 were excluded by the first questionnaire item: “Do you teach a face-to-face undergraduate nursing course?” If the answer was “no,” the participant was directed to a page that thanked them for their time but explained that the questionnaire only concerned face-to-face undergraduate courses. If the participant continued the questionnaire anyway, the second item asked: “In what type of degree program do you teach this face-to-face course?” If the participant answered “master’s” or “doctoral,” they were again directed to a page that thanked them for their time and explained that the questionnaire

only concerned face-to-face undergraduate courses. Some of these participants continued the questionnaire anyway but their answers were excluded from analysis. This resulted in 125 responses. Of these 125, three participants did not complete the questionnaire beyond the first few items; thus, those questionnaires were excluded from final analysis. Because the survey was designed not to track IP addresses in order to protect participant confidentiality, there was no method of tracking the non-completers to compare them with those who completed the questionnaire.

The a priori power analysis estimated that the average number of participants needed to establish meaningful results was 108, utilizing an alpha level of .05 and power of .80 for all statistical tests, and assuming a medium effect size. The final number of completed questionnaires was 122 of a possible ~400 for a return rate of 30%. Each statistical test had a particular sample size necessary to achieve a particular effect and power (Polit & Beck, 2008). The final number of 122 completed questionnaires was sufficient to detect a medium effect size using multiple regression and bivariate correlation but was only sufficient to detect a large effect size using a one-way analysis of variance (ANOVA).

The results for type of program were collapsed from three categories (traditional, second degree program, and RN-BSN program) into one baccalaureate program category. This was done because of the forced choice format of the questionnaire item. The item asked participants to choose which type of program they taught in from the choices of diploma, associate, baccalaureate traditional, baccalaureate second degree, RN-BSN, master's, and doctoral. This wording might not have captured the reality that many programs mix second degree and RN-BSN students in classes with traditional

baccalaureate students. To compare baccalaureate students with the other types of programs, it was reasonable to include all baccalaureate students in one category.

The sample characteristics are presented in Table 2. Statistical analysis of these characteristics is presented with the results of Research Question 1.

Table 2

Sample Characteristics

Characteristics	<i>N</i>	Response Options	Frequency	Percent %
Gender	122	Female	114	93.4
		Male	8	6.6
Ethnic Heritage	121 ^a	American Indian	0	0
		Asian	0	0
		Black	17	14
		Hispanic	3	2.5
		White	98	81
		Mixed	3	2.5
Highest Degree Completed	121 ^a	Baccalaureate ^b	1	0.8
		Master's	85	70.2
		PhD	16	13.2
		DNP	4	3.3
		DNS/DSN/ND/DNSc	7	5.7
		Doctorate in field other than nursing	8	6.6
Academic Rank	121 ^a	Instructor/Lecturer	39	32.2
		Assistant Professor	60	49.6
		Associate Professor	15	12.4
		Professor	7	5.8
Type of Degree Program	122	Diploma	1	0.7
		Associate	29	24
		Baccalaureate	92	75.3

^a One participant did not respond to this question. ^b One participant held a baccalaureate degree, which is permissible by the State Board of Nursing if an exception is granted by the board (Louisiana State Board of Nursing, 2012). Usually this exception is requested by a school of nursing due to difficulty recruiting educators with the necessary graduate degree.

Age

The ages ranged from 26 to 81 years ($n = 122$), with a mean of 50.6 years of age and standard deviation of 9.79 years. The median was 52 years and the mode was 55 years of age.

Years Teaching in Nursing Education

Years of teaching in nursing education ranged from 1.5 to 45 years ($n = 122$), a mean of 12.25 years, a standard deviation of 9.83, a mode of 2 years, and a median of 8.5 years. Figure 2 illustrates the distribution, which was skewed to the right, visually demonstrating that the largest proportion of participants had taught 10 years or less.

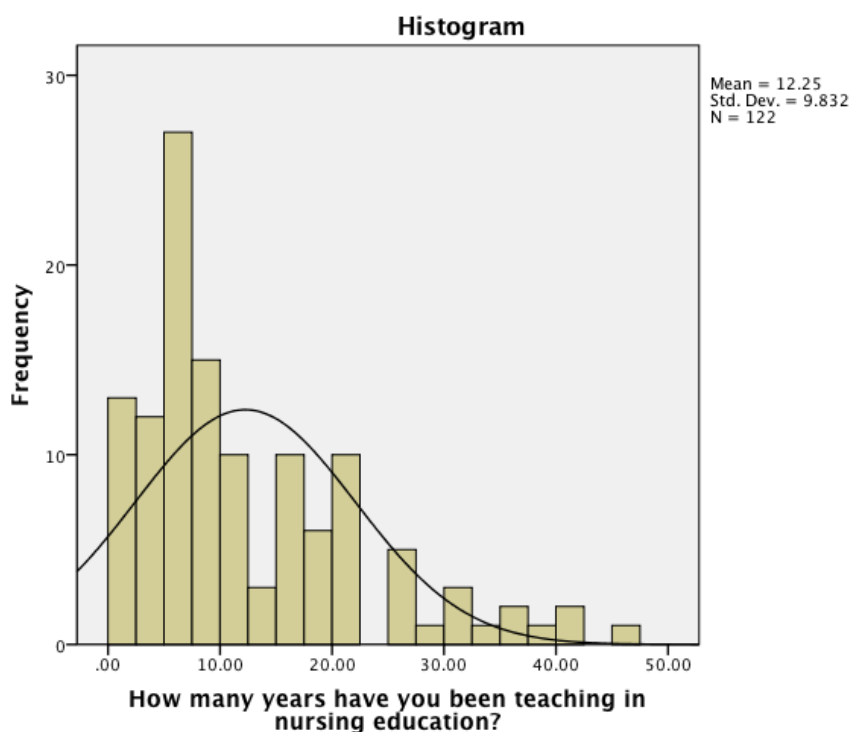


Figure 2. Years teaching in nursing education.

Four additional questions were presented pertaining to the participant's face-to-face course: placement of the course in the curriculum (beginning, middle or graduating semesters), content of the course, number of times the participant had taught the course, and if the course had a clinical component. Because of the initial implementation problem affecting the ability of the participants to view the items concerning placement and content of the course, only 62 participants were able to answer these two items. Due to the low number of responses to these items, statistical procedures were not appropriate. Only frequencies were tabulated for these items. Of the 62 responses to the question of course placement, 19 courses were placed in the beginning semesters, 28 in the middle semesters, and 15 in the graduating semester. The subject matter of the courses was diverse: the majority identified teaching maternal/child health (30%, $n = 18$) and medical-surgical nursing (23%, $n = 14$). Other courses taught included psychiatric/mental health, leadership/management, fundamentals, research, community health, pathophysiology/pharmacology, gerontology and assessment, as well as specialty courses. Number of times the participant had taught the course varied from "this the first time" to 60 times. The majority of courses (84%, $n = 102$) had an associated clinical course. Table 3 displays these characteristics.

Table 3

Additional Characteristics of the Face-to-Face Courses

Question	N	Response Options	Frequency	Percentage %
Placement of the course in the curriculum	62 ^a	Beginning (first or second) semester	19	30.6
		Middle semester(s)	28	45.2
		Graduating semester	15	24.2
Content of the course	60 ^a	Maternal/Child	18	30
		Medical-Surgical	14	23
		Psychiatric	7	11.6
		Leadership/Management	7	11.6
		Fundamentals	6	10
		Community	3	5
		Research	3	5
		Pathophysiology/Pharmacology	3	5
		Gerontology	2	3
		Assessment	2	3
		Other: Genetics, Health Promotion, Nutrition, Introduction to Nursing	5	8
Associated clinical component	122	Yes	102	83.6
		No	20	16.4

^aAll 122 participants did not have the opportunity to answer these questions.

Instrument

Learner-Centered Teaching Scores

As described in Chapter III, the instrument used in this study is a researcher-developed questionnaire--the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ). The first section contains screening and background questions. The second section contains 21 items reflecting the theoretical basis for LCT and is divided into four components: guiding, interactive practice, critical thinking, and

reflection. The third section of the instrument contains the demographic questions. This section of the chapter analyzes the 21 items that address the LCT components.

Questions 11-31 comprise the second section of the questionnaire and resulted in the LCT score. A 4-point Likert-type, forced-choice, frequency rating scale was used for these 21 items to yield a total numerical score as well as sub-scores for the components. The composite score for the 21 items was calculated for each participant by totaling the participants' scores for all items and dividing by 21. The item answer choices and interpretations are shown in Table 4. The mean composite LCT score for the total 122 participants was 2.59 with a standard deviation of 0.62 (see Table 5). Figure 3 illustrates the bimodal distribution of the scores.

Table 4

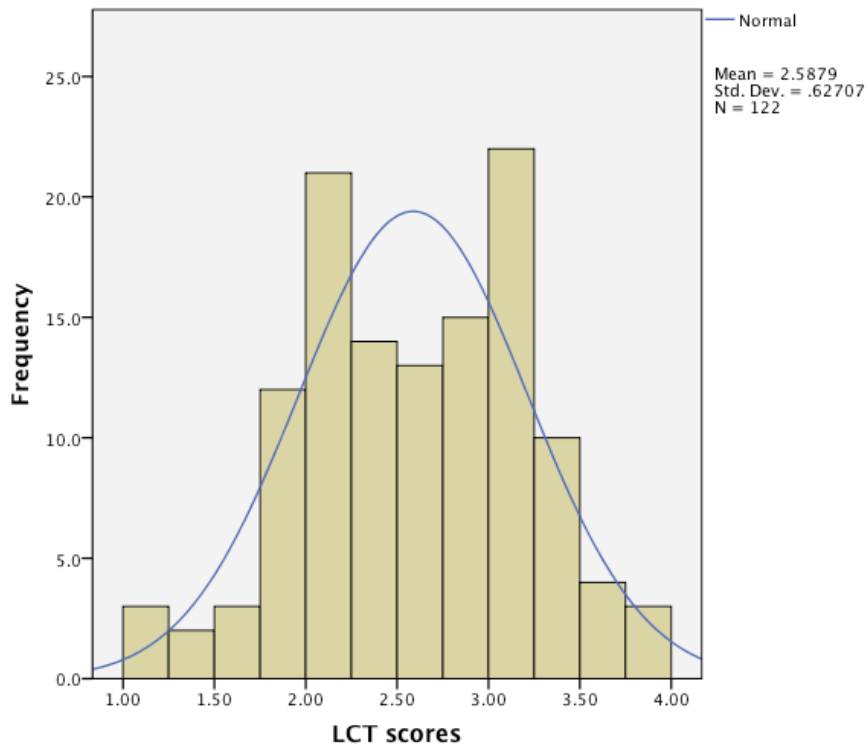
Ellis Learner-Centered Teaching in Nursing Education Questionnaire Answer Choices and Interpretation

Answer Choices	Numerical Equivalent	Interpretation Scale Intervals	Interpretation
Rarely (0-25% of the time)	1	1-1.75	Teacher-Centered
Sometimes (26-50% of the time)	2	1.76-2.50	Somewhat Teacher-Centered
Frequently (51-75% of the time)	3	2.51-3.25	Somewhat Learner-Centered
Most of the time (76-100% of the time)	4	3.26-4.00	Learner-Centered

Table 5

Composite Learner-Centered Teaching Scores (n=122)

	Minimum	Maximum	Mean	SD
Composite score	1.05	3.95	2.59	0.62

Note. $n = 122$.*Figure 3.* Distribution of learner-centered teaching scores.

The ELCTNEQ also measured subscales of the LCT score corresponding to the four components of LCT that had support in the existing literature: the process of guiding students, interactive practice, critical thinking, and reflection. The sub-scores for each of

the four components were calculated by totaling the scores for all items in that component and dividing by the number of items. The means of the four components demonstrated that the components of guiding (2.96) and critical thinking (2.74) were used the most by the participants. Reflection (2.32) and interactive practice (2.27) were used to a lesser degree. Table 6 illustrates the results of the four subscales.

Table 6

Subscale Learner-Centered Teaching Scores

Subscale	Minimum	Maximum	Mean	<i>SD</i>
Guiding	1	4	2.96	0.71
Critical Thinking	1	4	2.74	0.69
Reflection	1	4	2.32	0.81
Interactive Practice	1	3.8	2.27	0.64

Note. $n = 122$.

The means and standard deviations were calculated for the 21 items. The item with the highest mean (3.40) was “My written course examinations incorporate critical thinking questions if it is appropriate for the course.” The item with the lowest mean (1.63) was “I use games (Jeopardy, Bingo, etc.) in class.” The mean scores and standard deviations for the 21 items are illustrated in Table 7.

Table 7

Mean Scores of Ellis Learner-Centered Teaching in Nursing Education Questionnaire Items

Item	<i>N</i>	Mean	<i>SD</i>
I encourage discussion of the material between students in class.	120 ^b	2.89	0.89
I use class time to help students to work with the content in various ways to increase understanding.	120 ^b	2.82	0.93
I ask students challenging questions to expand their answers such as “What if we used another intervention first?” and “How does this relate to the nursing care?”	122	3.07	0.82
I ask students to explain their thinking when they answer a question.	119 ^c	2.99	0.90
I give students feedback about their thoughts and understanding verbally during class.	121 ^a	3.18	0.79
I ask the other students in the class to help answer student questions.	121 ^a	2.76	0.98
I design activities to use during class time where students interact with each other.	122	2.62	0.92
I use group activities during class time.	121 ^a	2.41	1.00
I use group activities outside of class time.	122	2.07	0.89
I use games (Jeopardy©, Bingo, etc.) in class.	120 ^b	1.63	0.70
I use group case studies in class.	121 ^a	2.60	0.94
I design activities to help my students solve common (frequent, prevalent, etc.) nursing problems.	121 ^a	2.58	0.88
I spend time in class helping students to analyze their thinking about the content by asking questions such as “What made you do that first?” and “What knowledge did you need to understand that behavior?”	120 ^b	2.38	1.00
I ask students during class to think of ways for nurses to apply the content we are discussing.	119 ^c	2.71	0.99

Table 7 Continued

Item	N	Mean	SD
My written course examinations incorporate critical thinking questions if it is appropriate for the course.	119 ^c	3.40	0.73
I incorporate reflection into my classroom teaching by asking students to identify key decision-making points of hypothetical or actual clinical situations.	121 ^a	2.52	0.96
I encourage students to reflect on their personal or clinical experiences and share them during class time.	121 ^a	2.71	0.93
I ask for written reflections of class activities.	122	1.98	1.12
I incorporate reflection into group activities used in class.	121 ^a	2.03	0.97
I ask students to discuss ways to apply their knowledge gained by reflection to future clinical situations.	119 ^c	2.38	1.00

^a One participant did not answer this question. ^bTwo participants did not answer this question. ^cThree participants did not answer this question.

Validity

Face validity. Face validity was established through a pilot study with 10 nurse educators who were not included in the sample. Revisions were made based on their feedback: I added more instructions, clarified some item wording, and added an option to the choice of type of degree program to include “baccalaureate second-degree.”

Content validity. Content validity was established through the literature review. Learner-centered teaching and similar concepts have been explored in various fields but existing instruments were not suitable for the purpose of this study. There are published instruments that measure similar concepts but they rely on teacher self-assessment of learner-centeredness rather than evaluating the process of LCT itself. One of the purposes of this study was to measure implementation of LCT in the nursing education

classroom so the literature was examined for common dimensions that had the potential for objective measurement. Common nurse educator behaviors in learner-centered environments representing the four subscales (guiding, critical thinking, reflection and interactive practice) emerged through this investigation.

Construct validity. Construct validity of the research instrument was evaluated using exploratory factor analysis. This method clarified and validated each dimension or factor as distinct. Exploratory factor analysis was appropriate in investigating a new measure such as the ELCTNEQ to attempt to validate the conceptual subscales (Waltz, Strickland, & Lenz, 2010). Researchers might develop a priori hypotheses about the relationships of clusters of items on an instrument as possible separate dimensions or subscales of the construct. Exploratory factor analysis confirmed that each subscale measured and explained only one dimension of the latent construct and clarified which items were interrelated (Burton & Mazerolle, 2011; Gall et al., 2007; Polit & Beck, 2008). By clarifying the dimensions of the construct, factor analysis could also be utilized to reduce the number of variables or items on research instruments. The literature suggested that factor analysis required a minimum of 5-10 participants for each question analyzed, with larger samples yielding more accurate results (Costello & Osborne, 2005). Using this criterion, a minimum sample for this study would include 105 (5 x 21) participants. The final sample included 122 participants so exploratory factor analyses were performed.

The correlation matrix for the 21 items illustrated that all items were positively correlated and the majority of the items correlated at .40 and above. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy tests

examined the strength of the correlation of the variables to determine if the data were suitable for factor analysis. Bartlett's test demonstrated that the items were related (1420.44, $df = 210$, $p < 0.01$) and therefore suitable for analysis. The KMO measure of sampling adequacy indicated suitability for analysis as well (0.91).

Factor analysis was completed using principal components analysis and Varimax with Kaiser normalization (orthogonal) rotation. In determining the factors to be considered, the analysis examined Eigenvalues, the scree plot, and the percentage of total variance extracted by the factor. Eigenvalues > 1.00 were found for four factors. Examination of the scree plot in Figure 4 illustrates the four factors that contributed to the variance.

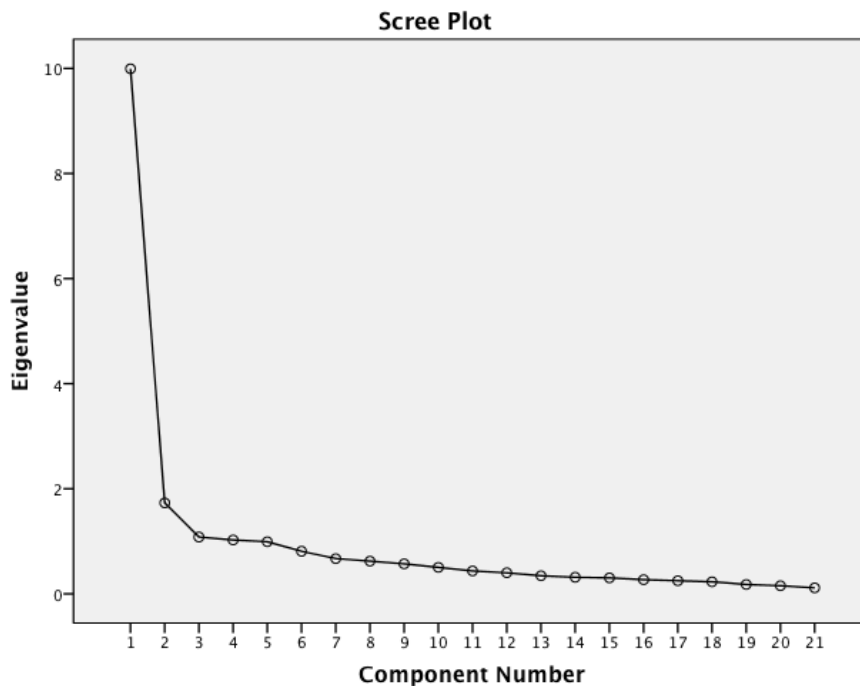


Figure 4. Scree plot for four factors.

These four factors explained 65.9% of the variance. After rotation, the first factor explained 24.5% of the total variance, the second factor explained 22.6%, the third factor explained 11.3%, and the fourth factor explained 7.4%. Factor loadings $< .30$ were not considered for analysis because these would indicate weak correlation (Costello & Osborne, 2005; Waltz et al., 2010).

Of the 21 items, five items cross-loaded on three factors. Cross-loading items load on two or more factors at $.32$ or higher (Costello & Osborne, 2005). These five items' loadings on each factor were very close (between $.30$ and $.50$) with the pattern of $.3$ on one factor, $.4$ on a second factor, and $.5$ on a third factor. When these five items were removed and examined, it was clear that three of the five reflected the theoretical construct of interactive practice. The other two items reflected guiding and critical thinking. Two more items cross-loaded closely on two factors with a difference in loading of $< .10$. After removing all seven cross-loaded items, the third factor had only two items and the fourth factor had three. The third factor was rejected because it contained only two items after removing cross-loading items; two were not enough items to consider as a pattern in the data. The decision was made to disregard the fourth factor because its contribution to the explanation of variance was minimal (7.4%), and the loadings were all below $.36$ except one, indicating a weak factor (Costello & Osborne, 2005).

This resulted in 12 items being retained and explained by two factors that represented the most robust and interpretable factors: Guiding Critical Thinking and Reflection. Factor 1: Guiding Critical Thinking was comprised of seven items with factor loadings of $.61$ to $.80$, included items from two of the four theoretical components

of LCT (guiding and critical thinking) and explained 24.5% of the variance. Factor 2: Reflection included all five items from the theoretical component of reflection with factor loadings of .48 to .84 and explained 22.6% of the variance. These two factors together explained 47.1% of the variance. The items in each factor are displayed in Table 8 with the factor loadings in bold. The items that were not significant to the two-factor solution are displayed in Table 9.

The mean LCT score for Factor 1: Guiding Critical Thinking was 2.8 with a standard deviation of 0.73. The mean LCT score for Factor 2: Reflection was 2.3 with a standard deviation of 0.81. The ranges on the interpretation scale for the ELCTNEQ were *Rarely* = 1-1.75 or Teacher-Centered, *Sometimes* = 1.76-2.50 or Somewhat Teacher-Centered, *Frequently* = 2.51-3.25 or Somewhat Learner-Centered, and *Most of the time* = 3.26-4.00 or Learner-Centered. This placed the scores for Factor 1: Guiding Critical Thinking in the Somewhat Learner-Centered category and scores for Factor 2: Reflection in the Somewhat Teacher-Centered category.

Pearson's product-moment correlation coefficient (Pearson's r) is appropriate for determining relationships between interval level data (Glass & Hopkins, 1996). The Pearson's r between the two factors was statistically significant ($r = .663, p < 0.01$), indicating a strong correlation.

Table 8

Factor Loading for Items in the Rotated Two-Factor Solution

Item	Factor 1: Guiding Critical Thinking	Factor 2: Reflection
I give students feedback about their thoughts and understanding verbally during class.	.80	
I ask students to explain their thinking when they answer a question.	.79	
I ask the other students in the class to help answer student questions.	.72	
I ask students challenging questions to expand their answers such as “What if we used another intervention first?” and “How does this relate to the nursing care?”	.70	
I spend time in class helping students to analyze their thinking about the content by asking questions such as “What made you do that first?” and “What knowledge did you need to understand that behavior?”	.66	.45
I ask students to discuss clinical decision-making in my classroom teaching.	.62	.46
I ask students during class to think of ways for nurses to apply the content we are discussing.	.61	.47
I ask for written reflections of class activities.		.84
I incorporate reflection into group activities used in class.		.81
I ask students to discuss ways to apply their knowledge gained by reflection to future clinical situations.		.74
I incorporate reflection into my classroom teaching by asking students to identify key decision-making points of hypothetical or actual clinical situations.	.44	.66
I encourage students to reflect on their personal or clinical experiences and share them during class time.	.37	.65

Note. Cross-loadings < .30 are not listed.

Table 9

Items Removed by Factor Analysis

Item	Theoretical Component
I encourage discussion of the material between students in class. ^a	Guiding
I use class time to help students to work with the content in various ways to increase understanding. ^a	Guiding
I design activities to use during class time where students interact with each other. ^a	Interactive Practice
I use group activities during class time. ^a	Interactive Practice
I use group case studies in class. ^a	Interactive Practice
I use games (Jeopardy, Bingo, etc.) in class. ^a	Interactive Practice
I design activities to help my students solve common (frequent, prevalent, etc.) nursing problems. ^a	Critical Thinking
My written course examinations incorporate critical thinking questions if it is appropriate for the course.	Critical Thinking
I use group activities outside of class time.	Interactive Practice

^a Items that cross-loaded onto more than one factor.

Reliability

Cronbach's alpha coefficient was used to determine internal consistency and reliability of the data before factoring. Internal consistency demonstrates whether the items on the instrument are measuring the same construct (Polit & Beck, 2008).

Cronbach's alpha is presented as a number ranging from 0 to 1, where higher values

reflect higher internal consistency (Polit & Beck, 2008). Reliability for the overall instrument was established as a Cronbach's alpha of .94, indicating excellent reliability. Reliability coefficients were computed for the four theoretical components of LCT: guiding (.89), interactive practice (.76), critical thinking (.84), and reflection (.87). These four Cronbach's alpha coefficients indicated good reliability for the theoretical components. Cronbach's alpha was also computed for the two factor solution. Factor 1: Guiding Critical Thinking produced an alpha of .91. Factor 2: Reflection resulted in an alpha of .87. Both alpha coefficients demonstrated high reliability.

Because factor analysis resulted in two factors that explained 47.1% of the variance in scores, those two factors were used for analysis of the research questions instead of the overall LCT score. Each question was analyzed using both factors. This is referred to as the Two-Factor LCT score for efficiency. The factors were not combined because analysis revealed that each factor often had distinct effects or lack thereof in the research questions.

Research Questions

Research Question 1

- Q1 What is the relationship between nurse educators' characteristics and their use of LCT in the classroom as measured by nurse educators' LCT scores on the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ)?

Levene's test verified homogeneity of variance for each independent variable (age, gender, years teaching in nursing education, highest degree completed, academic rank, and type of degree program) except ethnic heritage. A Welch test was computed on the variable ethnic heritage to control for unequal variances. The Welch's test statistic

was not statistically significant for either factor (Factor 1 = .569, Factor 2 = .374) so analysis proceeded.

One-way analyses of variance (ANOVA) were calculated to discover any statistically significant differences in the dependent variable of LCT scores (as represented by the Two-Factor LCT scores: Guiding Critical Thinking and Reflection) that could be associated with the demographic characteristics of the participants. The categorical independent variables examined were gender, ethnic heritage, highest degree completed, academic rank, and type of degree program. The results indicated no statistically significant difference on Factor 1: Guiding Critical Thinking scores from the independent variables of gender, ethnic heritage, highest degree completed, academic rank, and type of degree program. Results did indicate a statistically significant effect from the variable type of degree program on Factor 2: Reflection ($F = 4.89, p = 0.009$), but no effect from the other independent variables on that factor. The results are illustrated in Table 10.

Stepwise multiple regression analysis was used to determine the relative contribution of the independent variables to the variance in the Two-Factor LCT scores. Regression illustrates the effect of two or more independent variables in predicting a dependent variable (Polit & Beck, 2008). Stepwise regression was chosen as the regression method because it could identify combinations of predictor variables that explained the variance in the dependent variable. Demographic variables do not normally occur in isolation so it was reasonable to assume that if an effect on the variance was present, it might be due to more than one variable.

Table 10

One-way Analysis of Variance Results of Demographic Variables

Variable	Factor	<i>df</i>	<i>F</i> ^a	<i>p</i> ^b
Gender	Factor 1	1	.26	.11
	Factor 2	1	.00	.99
Ethnic Heritage	Factor 1	3	.99	.40
	Factor 2	3	.95	.42
Highest Degree Completed	Factor 1	5	1.24	.29
	Factor 2	5	1.32	.26
Academic Rank	Factor 1	3	.08	.97
	Factor 2	3	.33	.80
Type of Degree Program	Factor 1		1.51	.21
	Factor 2	4	4.89	.009

Note. Significant results in bold.

^aOne-way analysis of variance ^b.05 alpha level for 2-tailed test of significance

Prior to analysis, the independent variables were examined for normality. Skew and kurtosis are visual clues to the normality of a distribution (Glass & Hopkins, 1996). Visual examination of the distributions via histograms demonstrated that the variables of age, gender, ethnic heritage, and type of program were negatively skewed. The variables years of experience teaching in nursing, highest degree completed, and academic rank were positively skewed. A one-sample Kolmogorov-Smirnov test was run for each independent variable. Results indicated that the skewness of all the variables--age ($p = .009$), gender ($p < .001$), ethnic heritage ($p < .001$), type of program ($p < .001$), academic rank ($p < .001$), years of experience teaching in nursing ($p < .001$), and highest degree completed ($p < .001$)--was statistically significant. Visual inspection of the histograms revealed that of the seven variables, gender was the most highly skewed and also the

most leptokurtic. Violation of normality of the independent variables can lead to underestimation of the strength of the prediction value of the independent variables on the dependent variable; however, the standardized residuals for Factor 2: Reflection approximated the normal curve so this was not significant.

The variables of gender, ethnic heritage, highest degree completed, academic rank, and type of degree program were dummy-coded into binary variables (0, 1) and entered into the regression analysis. Gender was coded into two categories: female and male. Since no participants identified with American Indian or Asian, ethnic heritage was coded into four categories of Black, White, Hispanic, and mixed. The remaining variables were coded in the same manner. Highest degree was coded into six categories: baccalaureate, master's, Ph.D., DNP, DNS/DSN/ND/DNSc., and doctorate in field other than nursing. Academic rank was coded into four categories: instructor/lecturer, assistant professor, associate professor, and professor. The final categorical variable of type of degree program was coded into three categories: diploma, associate, and baccalaureate (see Table 11 for an example of how this coding was accomplished). The continuous variables of age and years teaching in nursing education were entered into the regression analysis without transformation.

Table 11

Dummy Coding of Ethnic Heritage

Ethnic Heritage	Code
Black	Black =1 All others=0
White	White=1 All others=0
Hispanic	Hispanic=1 All others=0
Mixed	Mixed=1 All others=0

In stepwise multiple regression, variables are entered into the regression equation in steps. The partial correlation coefficients of the independent variables with the dependent variables are examined and the variable with the highest statistically significant partial correlation coefficient is entered first. The remaining variables are tested individually with the first variable and in combination with each other. When adding a variable results in decreasing the fit of the model, that variable is then removed. Variables are added and removed in this manner until no more of the variance can be significantly explained (Polit & Beck, 2008). None of the independent variables entered into the regression equation for Factor 1: Guiding Critical Thinking because the partial correlation coefficients were not significant. This indicated that the independent variables did not explain any of the variance in scores for Factor 1: Guiding Critical Thinking.

Stepwise multiple regression did yield a regression equation for Factor 2: Reflection. Standardized residuals for Factor 2: Reflection approximated a normal curve

as illustrated in the histogram in Figure 5 so assumption of normality was maintained. Examination of the scatter plot revealed a linear relationship.

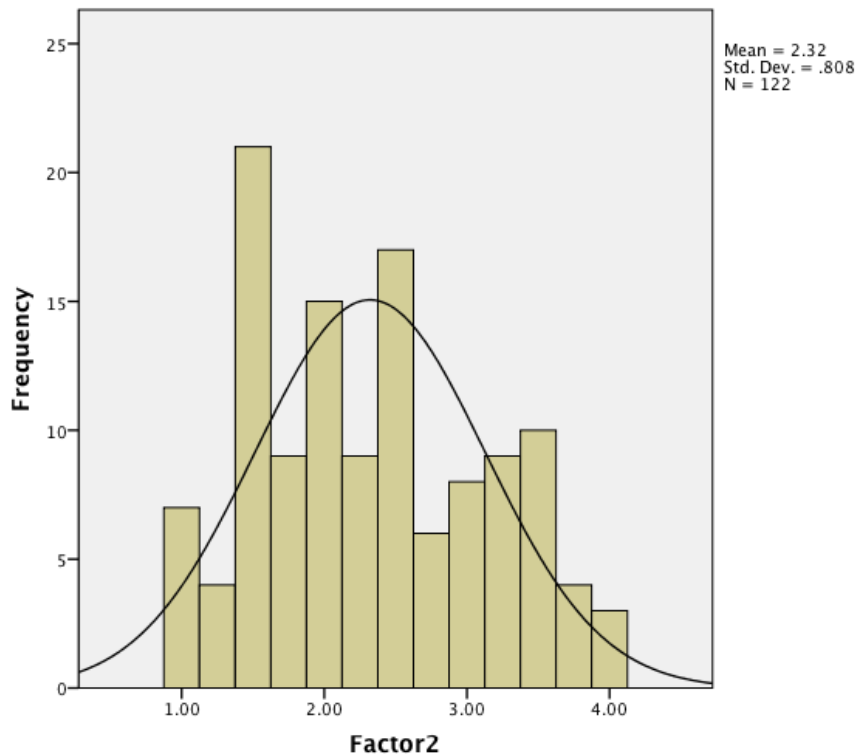


Figure 5. Standardized residuals for factor 2.

All but one of the independent variables were excluded by the analysis for Factor 2: Reflection because the partial correlation coefficients were not statistically significant. This indicated that these excluded variables did not explain a significant portion of the variance in LCT scores for Factor 2: Reflection. No collinearity issues were identified through examination of tolerance and variance inflation factor (VIF) values.

One of the three types of program variables (associate degree) entered into the regression analysis for Factor 2: Reflection, resulting in an explanatory model. The

ANOVA results for the overall regression analysis for the model ($F = 8.246, p = 0.005$) demonstrated statistical significance. The model contained one predictor (associate degree program) and explained 7% of the variance in the Factor 2: Reflection scores. The model summary is shown in Table 12. The regression equation coefficients are illustrated in Table 13. The ANOVA results are illustrated in Table 14. The characteristics of the excluded variables are presented in Table 15.

Table 12

Model Summary of Factor 2: Reflection Regression Analysis

Model	R	R Square	Adjusted R Square	SEE ^b
1	.259 ^a	.067	.059	.777

^aPredictors: (Constant), associate degree program. ^bStandard error of the estimate

Table 13

Regression Equation Coefficients for Factor 2: Reflection

Model	Unstandardized Coefficient	SE	Beta	<i>t</i>	<i>p</i>
Constant	2.43	.08		29.73	<.001
Associate degree	-.49	.17	-.26	-2.87	.005

Note. Significant results in bold.

Table 14

One-way Analysis of Variance Results for Factor 2: Reflection

Model	df	SS	MS	F^a	P
Model 1 Regression	1	4.98	4.98	8.25	.005^b
Residual	115	69.39	0.60		
Total	116	74.36			

Note. Significant results in bold.

^aOne-way ANOVA, ^bPredictors: (Constant), Associate degree program

Table 15

Excluded Variables

	Beta In	t	p	Partial Correlation	Tolerance	VIF
Age	.04	.42	.68	.04	.999	1.001
Gender	.02	.18	.86	.02	.995	1.005
Years Teaching	.06	.62	.54	.06	.999	1.001
Black	-.11	-1.23	.22	-.11	.981	1.019
Hispanic	-.08	-.83	.41	-.08	.992	1.008
White	.15	1.61	.11	.15	.990	1.010
Mixed	-.04	-.46	.65	-.04	.998	1.002
Baccalaureate	.07	.73	.47	.07	.997	1.003
Master's	-.12	-1.37	.17	-.13	.981	1.019
PhD	.08	.87	.39	.08	.994	1.006
DNP	.07	.75	.45	.07	1.000	1.000
DNS/DSN/ND/DNSc	-.12	-1.28	.20	-.12	.997	1.003
Doctorate in field other than nursing	.14	1.50	.14	.14	.978	1.023
Instructor	.02	.20	.84	.02	.995	1.005
Assistant Professor	-.02	-.25	.80	-.02	1.000	1.000
Associate Professor	-.04	-.39	.70	-.04	.999	1.001
Professor	.06	.67	.50	.06	.999	1.001
Diploma program	.07	.73	.47	.07	.997	1.003
Baccalaureate program	-.31	-.73	.47	-.67	.046	21.538

Research Question 2

- Q2 What is the relationship between nurse educators' previous exposure to LCT and their use of LCT in the classroom as measured by their LCT scores?
- H1 Previous exposure to LCT is positively correlated to higher LCT scores.
- H2 There is a statistically significant difference in LCT scores between nurse educators with previous exposure to LCT and nurse educators without previous exposure.

Participants were asked to check all avenues of exposure to LCT they had experienced from a list of nine choices including "Other" and "No exposure." The three answers submitted for the choice of other were "course development," "mentored with expert faculty," and "it is how we conduct our courses; we integrate these activities into lecture." Fifteen percent ($n = 19$) of the participants indicated no previous exposure to LCT. Table 16 illustrates the avenues of previous exposure to LCT in order of the most common choice. The mean Factor 1: Guiding Critical Thinking score for those with previous exposure was 2.84 ($SD = .73$) and the mean for Factor 2: Reflection was 2.36 ($SD = .82$). The mean Factor 1: Guiding Critical Thinking score for those with no previous exposure was 2.67 ($SD = .79$) and the mean for Factor 2: Reflection was 2.11 ($SD = .73$).

Table 16

Exposure to Learner-Centered Teaching

Response Options	Frequency	Percentage
Faculty Development	68	55%
Workshops	54	44%
Formal education	48	39%
Self-Study	45	36%
Conferences	39	31%
Continuing Education	35	28%
Webinar	20	16%
Other	3	2%
No Exposure	19	15%

Note. Total does not equal 100% due to multiple choices allowed as responses. $n = 122$.

For the analysis, the categorical variables of previous exposure versus no previous exposure were dummy-coded. Previous exposure of any kind was designated by value of “1” and no exposure received a designation of “0.” Most participants (85%, $n = 103$) indicated some sort of previous exposure.

Spearman’s rank correlation coefficient (Spearman’s r_s) was calculated to determine any correlation between the Two-Factor LCT scores of participants with previous exposure versus those without previous exposure. Spearman’s r_s is appropriate when the data is ordinal in nature such as Yes-No questions (Polit & Beck, 2008). The Spearman’s r_s value for Factor 1: Guiding Critical Thinking was .082 and .106 for Factor

2: Reflection, indicating little to no correlation between previous exposure and the two factors.

The first hypothesis for Research Question 2 stated that previous exposure was positively correlated to higher LCT scores. Little to no correlation was detected in this study; therefore, this hypothesis was not supported.

Levene's test statistics were .064 and .940, indicating homogeneity of variance between the two groups. A one-way ANOVA determined the significance of the difference between the two groups' Two-Factor LCT scores. The results for Factor 1: Guiding Critical Thinking, $F = .870$, $df = 120$, $p = .353$ and Factor 2: Reflection, $F = 1.391$, $df = 120$, $p = .241$ were not statistically significant at the 0.05 level. Table 17 displays the ANOVA results.

Table 17

Analysis of Variance Results for Differences in Two-Factor Learner-Centered Teaching Scores for Previous Exposure

Source		<i>df</i>	SS	MS	F^a	P^b
Factor 1	Between Groups	1	.47	.47	.87	.35
	Within Groups	120	64.79	.54		
	Total	121	65.26			
Factor 2	Between Groups	1	.91	.91	1.39	.24
	Within Groups	120	78.06	.65		
	Total	121	78.97			

^aOne-way analysis of variance ^b.05 alpha level for 2-tailed test of significance

These results demonstrated that the probability that the difference in the means was due to chance was high. The ANOVA achieved an effect size of .30 (medium-large) and a power of .90 using the sample of 122. This meant there was a 90% chance of detecting a medium to large difference between the means of the two groups that was not due to chance alone. Cohen's *d* standardized effect size estimate confirmed that the difference between the means was within one standard deviation of the typical group mean (Factor 1: Guiding Critical Thinking, $d = -.23$; Factor 2: Reflection, $d = -.31$). Cohen's *d* was calculated as the difference in the means divided by the root mean square of the two standard deviations (Polit & Beck, 2008). Although the sample size was sufficient to detect a statistically significant and meaningful result, none was found.

The second hypothesis for Research Question Two stated that there was a statistically significant difference in LCT scores between nurse educators with previous experience and those without. Since no statistically significant differences were found, the second hypothesis was not supported by this study.

Research Question 3

- Q3 What is the relationship between educators' self-perception of their use of learner-centered teaching (teacher-centered, somewhat teacher-centered, somewhat learner-centered, learner-centered) and their use of LCT in the classroom as measured by their LCT score?
- H1 Self-perception as more learner-centered is positively correlated with higher LCT scores.
- H2 There is a statistically significant difference between those who identify themselves with each choice: teacher-centered, somewhat teacher-centered, somewhat learner-centered, and learner-centered.

Participants were asked to indicate what label they would choose for themselves from the Likert-type scale choices of 1 = Teacher-Centered, 2 = Somewhat Teacher-

Centered, 3= Somewhat Learner-Centered, and 4 = Learner-Centered. The largest group of participants selected Somewhat Learner-Centered (52.9%, $n = 64$) or Somewhat Teacher-Centered (25.6%, $n = 31$). Twenty (16.5%) participants selected Learner-Centered and six (5%) selected Teacher-Centered. These results are displayed in Table 18.

Table 18

Self-Perception of Learner-Centeredness

Response Options	Frequency	Percentage %
Teacher-Centered	6	5
Somewhat Teacher-Centered	31	25.6
Somewhat Learner-Centered	64	52.9
Learner-Centered	20	16.5

Note. $n = 121$.

The participants' self-perception choices were then correlated with their Two-Factor LCT scores using Spearman's rank correlation coefficient. The Spearman's r_s for Factor 1: Guiding Critical Thinking was .360 and it was .361 for Factor 2: Reflection, which were statistically significant at the 0.01 level for a two-tailed test. This indicated a moderately strong positive correlation. The first hypothesis for this research question stated that self-perception as more learner-centered was positively correlated with higher LCT scores. This hypothesis was supported by these results.

Levene's test statistics for each factor and the four groups were .786 and .548, demonstrating homogeneity of variance. A one-way ANOVA was calculated, which resulted in statistically significant differences between the Two-Factor LCT scores of each group: Factor 1: Guiding Critical Thinking, $F = 6.397$, $p < 0.01$, and Factor 2: Reflection, $F = 5.931$, $p < 0.01$. Table 19 displays the ANOVA results.

Table 19

One-way Analysis of Variance Results for Differences in Two Factor Learner-Centered Teaching Scores of the Four Self-Perception Choices

Source		df	SS	MS	F^a	P^b
Factor 1	Between Groups	3	9.13	3.04	6.40	<.001
	Within Groups	117	55.68	.48		
	Total	120	64.81			
Factor 2	Between Groups	3	10.39	3.46	5.93	.001
	Within Groups	117	68.31	.58		
	Total	120	78.70			

Note. Significant results in bold.

^aOne-way analysis of variance. ^b.05 alpha level for 2-tailed test of significance.

The second hypothesis for this research question stated there was a statistically significant difference between those who identified themselves with each choice: Teacher-Centered, Somewhat Teacher-Centered, Somewhat Learner-Centered, and Learner-Centered. This hypothesis was supported by these results.

Tukey's Honestly Significant Difference (HSD) test is a post hoc adjustment to maintain the correct alpha level when multiple comparisons are made (Glass & Hopkins, 1996). When multiple comparisons are made, there is a higher possibility of Type I error or rejection of the null hypothesis when it is actually plausible. Post hoc testing using

Tukey's HSD test revealed statistically significant differences between the means of the answer choice of Learner-Centered and the other three choices on Factor 1: Guiding Critical Thinking: Teacher-Centered ($p = 0.01$), Somewhat Teacher-Centered ($p = 0.01$) and Somewhat Learner-Centered ($p = 0.012$). For Factor 2: Reflection, Tukey's HSD revealed a statistically significant difference between the means of Learner-Centered and the two choices of Teacher-Centered ($p = 0.25$) and Somewhat Teacher-Centered ($p = 0.001$) but not the choice of Somewhat Learner-Centered. The largest differences in both factors were seen between the means of Learner-Centered and Somewhat Teacher-Centered.

Nurse educators whose self-perception was that they were Learner-Centered tended to have a higher score on the Two-Factor LCT scores. The means and Tukey's test results for the four answer choices are illustrated in Table 20.

Table 20

Means and Tukey's Results for Self-Perception of Learner-Centeredness

	Answer Choice	N	Mean	Standard Deviation	Tukey's significant differences
Factor 1	Teacher-Centered	6	1.83	0.74	with LC ^a p=.01
	Somewhat Teacher-Centered	31	2.00	0.79	with LC ^a p=.001
	Somewhat Learner Centered	64	2.36	0.67	with LC ^a p=.01
	Learner-Centered	20	2.85	0.57	
	Total	121 ^b			
Factor 2	Teacher-Centered	6	2.36	0.75	with LC ^a p=.03
	Somewhat Teacher-Centered	31	2.58	0.81	with LC ^a p=.001
	Somewhat Learner-Centered	64	2.81	0.71	
	Learner-Centered	20	3.37	0.85	
	Total	121 ^b			

^aLC = Learner-Centered, ^bOne person did not answer this question.

Research Question 4

- Q4 What is the relationship between nurse educators' beliefs about LCT and their use of LCT in the classroom as measured by their LCT scores?
- H1 Beliefs that LCT enhances deeper understanding of nursing concepts and the ability to apply classroom learning to practice has a positive correlation with higher LCT scores.
- H2 There is a statistically significant difference between the scores of those who identify with each choice: Strongly Agree, Agree, Disagree and Strongly Disagree.

Nurse educators' beliefs about LCT were measured by asking the participant to choose a level of agreement to two questions. Each answer choice was assigned a number: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree and 4 = Strongly Agree. Belief Question 1 asked if the participant believed LCT enhanced deeper understanding of nursing concepts more than teacher-centered teaching. Belief Question 2 asked if the participant believed LCT enhanced the ability to apply classroom learning to clinical

practice. Both questions returned a mean of > 3 , indicating the participants agreed or strongly agreed with both statements. The means and standard deviations are displayed in Table 21.

Table 21

Level of Agreement with Belief Statements

Question	<i>N</i>	Minimum	Maximum	Mean	<i>SD</i>
1) Based on my understanding of Learner-Centered Teaching, I believe it enhances deeper understanding of nursing concepts more than teacher-centered teaching.	122	1	4	3.19	0.71
2) Based on my understanding of Learner-Centered Teaching, I believe it enhances the ability to apply classroom learning to clinical practice more than teacher-centered teaching.	119 ^a	1	4	3.18	0.76

^aThree participants did not answer this question.

Pearson's correlations were completed comparing responses to each of the two questions with the participants' Two-Factor LCT scores. Belief Question 1 (LCT enhances understanding of nursing concepts) demonstrated a weak but positive correlation with Factor 1: Guiding Critical Thinking; the Pearson's r was .22. This was statistically significant at the 0.05 level (two-tailed test). This question was not correlated with Factor 2: Reflection.

Belief Question 2 (LCT enhances ability to apply nursing concepts) also demonstrated a weak but positive correlation with Factor 1: Guiding Critical Thinking; the Pearson's r was .241. This was also statistically significant but at the 0.01 level (two-

tailed test). Belief Question 2 also did not correlate with Factor 2: Reflection. The Pearson's r results for both belief questions demonstrated a weak but positive correlation between participants' beliefs about LCT and Factor 1: Guiding Critical Thinking scores.

Hypothesis 1 for this research question stated that both belief questions were positively correlated with higher LCT scores. This hypothesis was partially supported by the results. Belief Questions 1 and 2 were both positively correlated with higher Factor 1: Guiding Critical Thinking scores but neither question was correlated with Factor 2: Reflection scores.

Levene's test verified homogeneity of variance for Factor 1: Guiding Critical Thinking and Belief Question 1 (LCT enhances deeper understanding of nursing concepts). A one-way ANOVA was completed for Belief Question 1 and the Factor 1: Guiding Critical Thinking scores and a statistically significant difference ($p < 0.05$) was found. This indicated a statistically significant difference between the groups of participants choosing each answer choice and their Factor 1 scores. The results are displayed in Table 22.

Table 22

Analysis of Variance Results for Belief Question 1: Learner-Centered Teaching Enhances Understanding of Nursing Concepts

Source		df	SS	MS	F^a	P^b
Factor 1	Between Groups	3	4.66	1.55	3.02	.033
	Within Groups	118	60.61	.51		
	Total	121	65.26			
Factor 2	Between Groups	3	2.60	.87	1.34	.265
	Within Groups	118	76.37	.65		
	Total	121	78.97			

Note. Significant results in bold.

^aOne-way analysis of variance. ^b.05 alpha level for 2-tailed test of significance.

Levene's test statistic indicated violation of homogeneity of variance for Factor 2: Reflection with Belief Question 1, so a Welch statistic was included in the analysis. The Welch procedure is a modification of the ANOVA procedure that does not assume homogeneity of variance. The Welch yields an adjusted F statistic to account for this lack of homogeneity (Glass & Hopkins, 1996). The Welch statistic ($F = 1.763, p = .21$) confirmed the lack of statistical significance of the ANOVA result for Factor 2: Reflection.

Post hoc Tukey's HSD test for Belief Question 1 (LCT enhances deeper understanding of nursing concepts) and Factor 1: Guiding Critical Thinking comparing the four group (answer choice) means was not statistically significant at the 0.05 level; however, it did approach statistical significance for the differences between the choices of Strongly Agree and Agree ($p = .06$), indicating there might be a difference between those who strongly agreed with Belief Question 1 and those who simply agreed.

Levene's test indicated violation of homogeneity of variance for Belief Question 2 (LCT enhances ability to apply classroom learning) and both Factor 1: Guiding Critical Thinking and Factor 2: Reflection, so a Welch test was included in the analysis. A one-way ANOVA was completed for Belief Question 2 and the Two-Factor LCT scores. Results demonstrated statistical significance (.02) for Belief Question 2 on Factor 1: Guiding Critical Thinking scores. Welch's statistic was significant ($F = 4.674, p = .02$) for Factor 1: Guiding Critical Thinking and approached significance for Factor 2: Reflection, $F = 3.308, p = .06$. Table 23 displays the ANOVA results for Belief Question 2.

Table 23

Analysis of Variance Results for Belief Question 2: Learner-Centered Teaching Enhances Ability to Apply Classroom Learning

Source		df	SS	MS	F^a	P^b
Factor 1	Between Groups	3	5.37	1.79	3.46	.02
	Within Groups	115	59.61	.52		
	Total	118	64.98			
Factor 2	Between Groups	3	4.05	1.35	2.15	.10
	Within Groups	115	72.11	.63		
	Total	118	76.16			

Note. Significant results in bold.

^aOne-way analysis of variance. ^b.05 alpha level for 2-tailed test of significance.

Because homogeneity of variance could not be assumed, Dunnett's T3 post hoc test was appropriate to differentiate which means were significantly different (Norman & Streiner, 2008). Dunnett's T3 test results for Belief Question 2 (LCT enhances ability to apply classroom learning) and Factor 1: Guiding Critical Thinking were statistically

significant for differences between the choices of Strongly Agree and Agree ($p = 0.04$) as well as Strongly Agree and Disagree ($p = .007$). Dunnett's T3 test revealed a significant difference between Strongly Agree and Disagree for Factor 2: Reflection as well. The means and Dunnett T3 results are illustrated in Table 24.

Table 24

Means and Results for Belief Question 2: Learner-Centered Teaching Enhances Ability to Apply Classroom Learning

	Answer Choice	<i>N</i>	Mean	<i>SD</i>	Dunnett T3 significant differences
Factor 1	Strongly Disagree	4	2.79	.83	
	Disagree	13	2.48	.49	With Strongly Agree, $P = .05$
	Agree	60	2.70	.81	With Strongly Agree, $P = .05$
	Strongly Agree	42	3.08	.62	
	Total	119			
Factor 2	Strongly Disagree	4	2.60	1.5	
	Disagree	13	1.99	.44	With Strongly Agree, $p = .05$
	Agree	60	2.23	.84	
	Strongly Agree	42	2.52	.72	
	Total	119			

Hypothesis 2 for this research question stated that there was a statistically significant difference between the scores of those who identified with each choice: Strongly Agree, Agree, Disagree, and Strongly Disagree. This hypothesis was partially supported by the results. There was a statistically significant difference between Factor 1: Guiding Critical Thinking scores for both questions and respondent choices and approached significance for Factor 2: Reflection with Belief Question 2. There was no significant difference for Belief Question 1 and Factor 2: Reflection.

Nurse educators who strongly agreed or agreed with the statements “Based on my understanding of Learner-Centered Teaching, I believe it enhances deeper understanding of nursing concepts more than teacher-centered teaching” and “Based on my understanding of Learner-Centered Teaching, I believe it enhances the ability to apply classroom learning to clinical practice more than teacher-centered teaching” were more likely to have a higher score on Factor 1: Guiding Critical Thinking.

Summary

The study participants in this research were overwhelmingly White, female, over 45-years-old, had completed a master’s degree, and held the rank of assistant professor. The final number of completed ELCTNEQ instruments was 122 of a possible ~400 for a return rate of 30%. This number was adequate for inferential statistical analysis. Face and content validity were established for the ELCTNEQ. A factor analysis was conducted to determine construct validity and overall reliability was established as a Cronbach’s alpha of .94. A two-factor solution was found to explain 47% of the variance in the scores on the ELCTNEQ. Research Question 1 found a significant relationship between participants who taught in associate degree programs and their Two-Factor LCT scores; this explained 7% of the variance in scores. Research Question 2 found no impact from previous exposure on the Two-Factor LCT scores; the hypotheses were not supported. The hypotheses for Research Question 3 were supported in this study: nurse educators who saw themselves as learner-centered tended to have higher Two-Factor LCT scores. The hypotheses for Research Question 4 were partially supported: nurse educators who believed that LCT enhanced deeper understanding of nursing concepts and the ability to apply classroom learning to practice tended to have somewhat higher scores

on Factor 1: Guiding Critical Thinking but not on the other Reflection factor. This chapter has detailed the characteristics of the sample, validated the instrument, and reported the results of the research questions. The next chapter discusses conclusions from these findings, implications for practice, and gives suggestions for future research.

CHAPTER V

DISCUSSION

This research examined an innovative pedagogy, Learner-Centered Teaching (LCT), in the context of the nursing education classroom. Based on previous research, LCT guides students in constructing understanding using an interactive, social context and assists students to discover content through actively processing it using critical thinking and reflecting on their understanding. The National League for Nursing (NLN; 2003, 2005) and the Institute of Medicine (IOM; 2011) have identified a more learner-centered approach as a means of transforming nursing education. However, the lack of a clear definition and measurement of LCT in nursing education has hindered attempts to investigate its efficacy. This study identified and examined factors that impacted the use of LCT by faculty in the nursing education classroom.

The purpose of this descriptive research study was two-fold: (a) to describe the application of LCT in the undergraduate nursing education classroom using a researcher-developed instrument--the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ), and (b) to explore the relationships between nurse educators' characteristics and their application of LCT in the classroom. The dependent variables measured in this study were the two factors of LCT derived from the factor analysis of the instrument: Factor 1: Guiding Critical Thinking and Factor 2: Reflection. The

independent variables measured were age, gender, ethnic heritage, years teaching in nursing education, highest degree completed, academic rank, type of degree program, previous exposure to LCT, nurse educators' self-perception of themselves as learner-centered or teacher-centered, and their beliefs about learner-centered teaching.

Understanding the current status of the use of LCT in nursing education will assist in testing its efficacy as a teaching framework. The discussion in this chapter is organized by the research questions and connected to the review of literature.

Research Question 1

- Q1 What is the relationship between nurse educators' characteristics and their use of LCT in the classroom as measured by nurse educators' LCT scores on the Ellis Learner-Centered Teaching in Nursing Education Questionnaire (ELCTNEQ)?

Sample Characteristics

The sample characteristics conformed to the most recent reports available from the NLN (2009) describing national nurse educator characteristics. The study participants were overwhelmingly White, female, and over 45-years-old. The majority of the participants held a master's degree and the rank of assistant professor. This study was limited to a sample of faculty involved in undergraduate nursing education so the preponderance of master's degrees and lower ranks of instructor and assistant professor reflected this. The largest number of participants had taught in nursing education 10 years or less. This might have had significance for the study results because younger nurse educators might have been exposed to LCT in their educational programs. They might also be more hesitant to attempt a new pedagogy until they are more comfortable in the role of educator.

A relationship was found between the type of program in which participants taught and their use of the reflection component of LCT in the classroom. The regression analysis yielded an explanatory model that attributed 7% of the variance in the Factor 2: Reflection scores to teaching in an associate degree program. Comparison of the means of age, gender, ethnicity, highest degree completed, rank, and years teaching in nursing for the two types of program categories of associate and baccalaureate degree programs revealed no significant differences between the two groups. No mention of any influence of type of program was found in the literature so this was a new finding and should be explored in future research.

Instrument

The ELCTNEQ was developed to measure LCT behaviors. The premise of the instrument was that the more often these behaviors were utilized, the more learner-centered the nurse educator was in the classroom. The overall LCT composite scores before factoring reflected that most of the sample participants were somewhat learner-centered. The ELCTNEQ demonstrated good reliability and validity. The sample was large enough for statistical purposes; the data were strong with high reliability estimates, high factor loadings, and strong positive correlations between the items. Three of the four theoretical components were incorporated into the final Two-Factor solution: Guiding, Critical Thinking, and Reflection. Factor 1: Guiding Critical Thinking and Factor 2: Reflection together explained 47% of the variance in LCT scores. Experts differ in the amount of variance that should be accounted for by factor analysis, advocating anywhere from 50-90% as desirable (Beavers et al, 2013; Polit & Beck, 2008). The final number of factors retained after factor analysis should represent the

most easily interpretable explanation for the variance and should reflect the theoretical constructs being measured. The results of this factor analysis did not produce an explanation to account for the majority of the variance but the two factors extracted did produce a beginning understanding of the relationships between the theoretical components of the study definition of LCT. This understanding is helpful in considering future research directions.

Factor analysis demonstrated that the a priori structure (the theoretical background) of the instrument was similar to the results of the factor analysis. The components of LCT are examined in the next sections separately as theoretical components and as factors produced by the factor analysis.

Theoretical components. The theoretical component subscales (Guiding, Critical Thinking, Interactive Practice, and Reflection) were scored individually and demonstrated differing utilizations of the components of LCT. Guiding and Critical Thinking were utilized the most. The teacher as guide and critical thinking are very familiar concepts to nurse educators who use guiding behaviors extensively in teaching in clinical settings (Gaberson & Oermann, 2010; Phillips, 2009). As experienced nurses, they guide students to learn the tasks and ways of thinking in nursing. This behavior probably transitions easily to the classroom. Critical thinking has been an important trend for many years in nursing education, especially in testing and evaluation (Ridell, 2007)--so again, a familiar concept and one that nurse educators have been integrating into their teaching for some time. The fact that these two components factored into the strongest factor (Factor 1: Guiding Critical Thinking) added weight to the assertion that nurse educators were utilizing these components of learner-centered teaching.

Reflection was utilized less often than Guiding or Critical Thinking. The items representing Reflection all factored into the second factor, demonstrating that the ELCTNEQ did capture these behaviors in nurse educators. There was, however, some minor cross-loading of the items representing the two components of Critical Thinking and Reflection, which might indicate that participants perceived some overlap between the components. The definitions of critical thinking and reflection are often blurred in the literature, making it difficult to separate the concepts; the lack of a clear definition has been cited as a barrier to teaching those concepts (Blondy, 2007; Duffy, 2007; Duke & Appleton, 2000; Forneris & Peden-McAlpine, 2006). Nurse educators might not perceive much difference between the concepts as applied in the classroom.

Interactive Practice was not as highly utilized as the other three components. The theoretical underpinnings of this component are supported in the literature but the results demonstrated that nurse educators were not implementing this component of learner-centered teaching as much as the other three. Reasons for this might include the limitations of time required to implement interactive practice techniques in the classroom. Nurse educators often feel great pressure to cover content (Greer et al., 2010; Schaefer & Zygmunt, 2003; Shell, 2001). They might rely on lecture to meet this goal efficiently, leaving little time to implement interactive practices. Time pressures might decrease their willingness to try this pedagogy even though they might agree with research showing its usefulness (Kohtz, 2006; Schaefer & Zygmunt, 2003; Schell, 2001, 2006). Implementing interactive practices could also feel like a loss of control to educators and could lead to discomfort with the practice (Schell, 2001; Kohtz, 2006).

The questionnaire items attempted to separate Interactive Practice from the components of Guiding, Critical Thinking, and Reflection but the factor analysis demonstrated that the items pertaining to Interactive Practice cross-loaded onto all the other factors. The items might not have been written distinctly enough to fully capture the data on Interactive Practice specifically. There might also have been overlap in the way nurse educators implement Interactive Practice. For instance, a nurse educator might characterize a behavior as teaching critical thinking but might in fact assist students to practice critical thinking interactively in the classroom.

Factors. Factor scores developed from the factor analysis were similar to the theoretical component subscale results. Factor 1 included the components of Guiding and Critical Thinking. Participants' Factor 1 scores fell in the somewhat learner-centered category in these areas. Factor 2 consisted of items representing the component of Reflection. Participants' scores on this factor were in the somewhat teacher-centered category. These scores indicated that these participants utilized Guiding behaviors and Critical Thinking fairly often, and Reflection less often. Interactive Practice cross-loaded onto both factors; thus, these items clearly were not captured distinctly enough by the ELCTNEQ.

Construct validity determines whether a measure operationalizes the concepts from the study (Gall et al., 2007). Exploratory factor analysis was used in this study to establish that each subscale of the ELCTNEQ measured only one dimension of the theoretical constructs of LCT. The possible overlap in the participants' perceptions of some of the four components of LCT (Guiding, Critical Thinking, Reflection, and Interactive Practice) might reflect limitations of the instrument because it did not clearly

distinguish some of the components. Like Schell's (2006) Delphi study of innovative teaching, this study attempted to decrease participant bias toward the study definitions by only defining the broader concepts of Learner-Centered and Teacher-Centered Teaching. Schell recognized in the conclusions of her study that giving a definition might have somewhat biased or led the respondents toward that definition, but might have been helpful in clarifying what the researcher intended for the respondent to focus on. Presenting clear definitions of the four theoretical components of LCT in this study might have assisted participants in choosing their answers and more clearly defining the dimensions of LCT. To summarize Research Question 1, most participants scored in the somewhat learner-centered category by utilizing the LCT components of Guiding and Critical Thinking the most. The instrument needs revision of the operational definition of LCT to more clearly reflect the theoretical components of LCT because there might be significant overlap in the participants' understanding of the components, especially Reflection and Interactive Practice. The ELCTNEQ identified that teaching in an associate degree program had an impact on the use of reflection in the nursing classroom but the revised instrument should be evaluated with a larger sample to validate this result and increase the generalizability of the findings.

Research Question 2

- Q2 What is the relationship between nurse educators' previous exposure to LCT and their use of LCT in the classroom as measured by their LCT scores?
- H1 Previous exposure to LCT is positively correlated to higher LCT scores.
- H2 There is a statistically significant difference in LCT scores between nurse educators with previous exposure to LCT and nurse educators without previous exposure.

Faculty development and workshops were the most common ways nurse educators learned about LCT. Formal education was chosen 39% of the time.

Considering that the demographic statistics illustrated that the largest number of study participants had taught 10 years or less, many of these participants might have benefitted from exposure to some form of LCT in more recent educational programs. Schell (2001) found that previous education about and exposure to innovative teaching (a similar concept to LCT) facilitated its use.

The research hypotheses for this question were not supported. Previous exposure to LCT did not correlate with higher LCT scores and there were no significant differences between those with previous exposure and those without. Based on these findings, previous exposure was not connected to the use of LCT in the classroom. The statistical tests had enough power to detect a medium to large effect size but the results were still not statistically significant, indicating that there was a large possibility the results were due to chance. The question asked the participants to check all the ways of learning about LCT they had experienced. The answers were then combined into two choices: previous exposure or no exposure. Because of the way the data were gathered (allowing multiple choices), it was not possible to determine a relationship between specific types of exposure and utilization of LCT. It is possible there was no relationship between previous exposure and use of LCT but this question needs further exploration. The item needs revision to allow more detailed measurement and exploration of possible relationships between specific types of previous exposure and utilization of LCT.

Research Question 3

- Q3 What is the relationship between educators' self-perception of their learner-centeredness (teacher-centered, somewhat teacher-centered, somewhat learner-centered, learner-centered) and their use of LCT in the classroom as measured by their LCT score?
- H1 Self-perception as more learner-centered is positively correlated with higher LCT scores.
- H2 There is a statistically significant difference between those who identify themselves with each choice: teacher-centered, somewhat teacher-centered, somewhat learner-centered, and learner-centered.

The ELCTNEQ asked participants to place themselves on a continuum from teacher-centered to learner-centered. The use of a continuum was based on previous research using continuums with Likert-type scales to assist participants to self-report the amount of the behaviors they felt they utilized in practice (Blumberg, 2009; Conti, 1990). The majority of the participants (52.9%) labeled themselves as “somewhat learner-centered.” This was consistent with previous research illustrating that educators identified positively with the label of learner-centered (Blumberg, 2009; Greer et al, 2010; Kohtz, 2006; Paris & Combs, 2006; Schaefer & Zygmunt, 2003; Weimer, 2002). The next largest group of participants (25.6%) chose “somewhat teacher-centered.”

The research hypotheses for this question were supported by the results. Self-perception as learner-centered did correlate with higher LCT scores and there was a significant difference between the groups. Results indicated that nurse educators who self-identified as learner-centered in this study were more likely to utilize LCT than those who did not identify with that label. It is interesting that 78% of the participants self-identified in the middle range of somewhat learner-centered to somewhat teacher-

centered. This indicated that nurse educators in this study used teaching methodologies and theories from both perspectives: learner-centered and teacher-centered.

Research Question 4

- Q4 What is the relationship between nurse educators' beliefs about LCT and their use of LCT in the classroom as measured by their LCT scores?
- H1 Beliefs that LCT enhances deeper understanding of nursing concepts and the ability to apply classroom learning to practice has a positive correlation with higher LCT scores.
- H2 There is a statistically significant difference between the scores of those who identify with each choice: Strongly Agree, Agree, Disagree and Strongly Disagree.

The two questionnaire items relating to this research question addressed the participants' beliefs that LCT could enhance deeper understanding of nursing concepts more than teacher-centered teaching and that it could enhance the ability to apply classroom learning to clinical practice more than teacher-centered teaching. Over 85% of participants chose Agree or Strongly Agree to both questions. Again, this was consistent with the literature that spoke to the positive impression of LCT on nurse educators (Blumberg, 2009; Greer et al, 2010; Kohtz, 2006; Paris & Combs, 2006; Schaefer & Zygmunt, 2003; Weimer, 2002).

Initial frequencies of the answers to the belief questions demonstrated that participants agreed or strongly agreed with both questions but the hypotheses for this question were only partially supported by further analysis. Nurse educators in this study believed that LCT enhanced deeper understanding of nursing concepts and enhanced the ability to apply classroom learning to clinical practice but these beliefs had a weak influence on their actual implementation of LCT. Beliefs in LCT seemed to help only in integrating Guiding and Critical Thinking behaviors into practice. These findings

somewhat contradicted Greer et al.'s (2010) previous research noting that teachers' beliefs in LCT facilitated its use but agreed with Kohtz (2006) who found similar ambiguity in her study exploring alternative pedagogies. Both Schell (2006) and Kohtz found that changing teaching practices to become more innovative (as is learner-centered teaching) was challenging for their participants and involved changing their beliefs about learning. Beliefs and values are difficult concepts to measure and do not always correlate with action. It is possible that the questions did not clearly capture the participants' actual implementation behaviors.

Summary

Several overall conclusions can be drawn from this research. The conceptual definition of learner-centered teaching (LTC) utilized in this study was not satisfactorily supported by the results of the ELCTNEQ. Nurse educators are using some components of learner-centered teaching in the nursing education classroom, namely guiding and critical thinking. They are using reflection and interactive practice to a lesser extent. The ELCTNEQ successfully distinguished two factors contributing to 47% of the variance in learner-centered teaching behaviors that incorporated three of the theoretical definitions of LCT: guiding, critical thinking, and reflection, but did not clearly identify interactive practice.

The lack of representation of interactive practice in the LCT scores of the sample participants was an unexpected finding since it had support in the literature. Research about interactive practice has been published in the nursing and non-nursing literature in the past several decades including such methods as active learning, problem-based learning and cooperative learning (Bilimoria & Wheeler, 1995; Candela et al., 2006;

Paulson, 1999; Pugsley & Clayton, 2003; Stage et al., 1998; Weimer, 2002). The lower amount of use of interactive practice by nurse educators in this study compared to the other components of LCT was an important finding since both the NLN (2005) and the IOM (2011) focused on innovative, evidence-based teaching strategies as a means for change and improvement in nursing education. This finding might reveal weaknesses in the design of the instrument (ELCTNEQ). The theoretical components of LCT are based in the literature but translating this into clearly written questionnaire items proved challenging. The ELCTNEQ has promise for measurement of LCT but needs revision to better reflect the theoretical components. The ELCTNEQ should be revised and evaluated with a larger sample to confirm these findings and enhance generalizability.

Other findings demonstrated that nurse educators who saw themselves as learner-centered were more likely to use guiding, critical thinking, and reflection in their classrooms. Nurse educators who strongly believed that learner-centered teaching is beneficial in understanding and applying nursing concepts were also somewhat more likely to use guiding and critical thinking LCT behaviors in the classroom. Two unexpected findings were that previous exposure to LCT had no connection to the use of LCT in the classroom and that nurse educators teaching in an associate degree program were more likely to use reflection in their practice.

Limitations

The study sample was a convenience sample, which limited the generalizability of the results. The participants were White, female and over 45-years of-age, similar to the national characteristics, so the sample could be considered representative even though it was not randomly chosen.

The demographic variables were not normally distributed but the sample did mirror the national population of nurse educators; this skewness was not unexpected. Violation of normality could have increased the chance of Type I and II errors. However, the regression model residuals were normally distributed so those results can be considered valid. Analysis of variance (ANOVA) is robust to violations of normality except when the population is highly skewed (Glass & Hopkins, 1996). Gender was highly skewed but it was not significant in the ANOVA; thus, this was not a concern. Skewness might be unstable in smaller samples so evaluating a larger sample would be helpful in clarifying possible predictor variables.

The study sample's median number of years of experience of 8.5 should be taken into consideration when interpreting the results. Nurse educators who have many years of experience might feel more comfortable experimenting with new pedagogies and might have had opportunities for exposure to LCT over the years. However, the number of years of experience was not necessarily a limitation; educators who are new to teaching nursing might have been exposed to LCT in their educational programs or might be more open to new ideas. This finding needs more exploration with a larger sample to clarify the impact years of experience might have on utilization of LCT.

Self-report instruments have the potential for bias, especially when there is a strong positive connotation as there was in identifying with LCT. The definitions of learner-centered teaching and teacher-centered teaching were given on the research instrument but participants might still have had difficulty deciding between the two choices. The use of Likert-type answer scales and continuums was designed to assist participants' recall since a general category could be assumed to be easier to recall than

specifics when reflecting back over time. This decision hopefully reduced recall bias--a measurement error in which the participant has trouble remembering precisely or remembers in a more positive light than is actual reality (Burns & Grove, 1997).

Research Questions 3 and 4 specifically asked for the participants' self-perception and beliefs so self-report bias was not as problematic for these questions. Waltz et al. (2010) noted that accuracy could be considered less important when the participants' perception was the desired result rather than actual facts.

The research instrument was developed for this research study so it has not been tested in other settings, other disciplines, or with a larger sample, all of which might contribute to improved validity and clarity. Its potential for quantifying LCT practices is important for future research.

Implications for Practice

This research revealed some interesting recommendations for the practice of nursing education.

1. This study did not support previous exposure to LCT as effective in increasing implementation. However, results of the factor analysis did demonstrate that participants were using Guiding, Critical Thinking, and Reflection in the nursing classroom. Thus the finding of no effect of previous exposure might have been related to the analysis of the question (collapsing all previous exposure into one category). The majority of participants stated that they learned about LCT through faculty development opportunities and workshops. Faculty development efforts should utilize the principles of LCT to design learner-centered education to demonstrate the

value of LCT to nurse educators. Nurse educators might have been exposed to the components of LCT but might not have experienced them as the larger construct of LCT.

2. Self-perception as learner-centered and beliefs in the efficacy of LCT are important in increasing the utilization of LCT in the nursing classroom. Ways to strengthen nurse educators' beliefs in their ability to embrace new pedagogies should be explored.

Suggestions for Further Research to Facilitate Learner-Centered Teaching

Future research directions should focus on refining the instrument and further exploration of the results of this study. There is a dearth of empirical research into LCT so all aspects are open for exploration. Suggestions for future research include the following:

- Refinement of the definitions of the four components of LCT should be undertaken, particularly the component of interactive practice. The items on the ELCTNEQ need revision, pilot testing to ensure they reflect the construct appropriately, and evaluation using a larger sample to establish validity and reliability.
- Triangulation of data using more than one measurement (such as another instrument) would be helpful in reducing self-report bias. Learner-centered teaching is a concept that is intuitively positive and vulnerable to social desirability bias in self-reporting. Administering an additional instrument such as the Marlowe-Crowne Social Desirability Scale (MCSDS) is a possibility to assist in detecting social desirability bias. Subjects scoring

highly on the MCSDS (indicating high need for social desirability) could be eliminated from analysis to reduce the influence of social desirability on the outcome (van de Mortel, 2008).

- Teaching in an associate degree program was determined in this study to predict the use of the reflection component of LCT in the nursing education classroom. Further research with a larger sample is needed to validate this result and investigate the reasons for this.
- Does the placement of courses in the nursing curriculum (beginning semesters, middle semesters, graduating semester) affect the use of LCT by nurse educators? This question was inadequately addressed in this study due to implementation problems with these questions in the Internet survey questionnaire. This subject should be addressed again in the next study utilizing the ELCTNEQ.
- The influence (or lack of influence) of previous exposure needs further exploration. It is logical that nurse educators learn about new teaching pedagogies somehow. This question on the ELCTNEQ needs revision to attempt to discriminate between methods of exposure and determine the most effective methods. If previous exposure really does not influence use of LCT in the classroom, then faculty development efforts aimed at encouraging it might not be the best use of limited resources.

Conclusion

This study added to the body of nursing education literature by establishing a baseline measurement of LCT. Results demonstrated that it is possible to measure LCT

using the instrument developed for this purpose, the ELCTNEQ, but the instrument does need some revision. This study included measurement of several areas of interest in LCT (influences, implementation, and beliefs) and created an operational definition.

Learner-centered teaching (LCT) is an innovative pedagogy that can address the challenges of educating nurses in the fast-paced, ever-evolving healthcare environment. Learner-centered teaching guides students in constructing understanding using an interactive, social context and assists students to discover content through actively processing it using critical thinking and reflecting on their understanding. This research demonstrated that LCT is being utilized by nurse educators but not to its fullest potential. However, it has established some influences on the use of LCT in the nursing education classroom. Experts in nursing education have been calling for the transformation of nursing education into a more dynamic, learner-centered model. This study has begun the process of creating an evidence base for LCT to help meet that challenge.

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APPENDIX A

ELLIS LEARNER-CENTERED TEACHING IN NURSING EDUCATION QUESTIONNAIRE

Ellis Learner-Centered Teaching in Nursing Education Questionnaire

The purpose of this questionnaire is to measure how Learner-Centered Teaching is being used in the classroom in nursing education. The survey should take about 15 minutes of your time. The questions concern face-to-face classroom teaching only, not online, laboratory or clinical teaching. Your help is greatly appreciated!

***Think about one course that you teach face-to-face in the classroom. Refer to it in answering the following questions. If you do not teach face-to-face classes, you may stop here. Thank you for your time.**

1) Do you teach a face-to-face undergraduate nursing course?

2) In what type of degree program do you teach this face-to-face course?

Diploma	_____
Associate	_____
Baccalaureate:	
Traditional	_____
Second-degree	_____
RN-BSN	_____
Master's	_____
Doctoral	_____

3) Where is this face-to-face course placed in the nursing curriculum of your program?

Beginning (first or second semester)	_____
Middle semester(s)	_____
Graduating semester	_____

4) What is the content of this course? _____

5) How many times have you taught this course? _____

6) Does this course have a clinical component or an associated clinical course?

Yes _____ No _____

Definitions:

Learner-Centered Teaching is defined as intentionally designed learning experiences that guide students in constructing understanding of nursing concepts using an interactive, social context. This assists students to discover content through actively processing it, using critical thinking and reflecting on their understanding. This includes activities such as group work, group discussions, role-playing, etc.

Teacher-Centered Teaching is defined as learning experiences designed to transmit nursing knowledge using a traditional approach. Examples include methods such as lecture, and question and answer sessions designed to elicit memorized knowledge. It does not include group work or interactive activities.

7) Have you had any exposure to Learner-Centered Teaching? Check all that apply.

Formal education courses _____
 Workshops _____
 Conferences _____
 Faculty development _____
 Webinar _____
 Continuing education _____
 Self-study _____
 Other _____ (Please explain _____)
 No exposure _____

8) Based on my understanding of Learner-Centered Teaching, I believe it enhances deeper understanding of nursing concepts more than teacher-centered teaching.

Strongly Agree Agree Disagree Strongly Disagree

9) Based on my understanding of Learner-Centered Teaching, I believe it enhances the ability to apply classroom learning to clinical practice more than teacher-centered teaching.

Strongly Agree Agree Disagree Strongly Disagree

10) Where would you place yourself on a scale from teacher-centered to learner-centered based on the definitions given above? There is no right or wrong answer.

(Teacher-centered)(Somewhat teacher-centered)(Somewhat learner-centered)(Learner-centered)

***Think about one course that you teach face-to-face in the classroom. Refer to it in answering the following questions using the scale:**

Rarely (0-25% of the time)
 Sometimes (26-50% of the time)
 Frequently (51-75% of the time)
 Most of the Time (>76% of the time)

Section 1: Guiding

I encourage discussion of the material between students in class.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I use class time to help students to work with the content in various ways to increase understanding.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I ask students challenging questions to expand their answers such as “What if we used another intervention first?” and “How does this relate to the nursing care?”

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I ask students to explain their thinking when they answer a question.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I give students feedback about their thoughts and understanding verbally during class.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I ask the other students in the class to help answer student questions.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

Section 2: Interactive Social Context

I design activities to use during class time where students interact with each other.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I use group activities during class time.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I use group activities outside of class time.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I use games (Jeopardy, Bingo, etc.) in class.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I use group case studies in class.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

Section 3: Critical Thinking

I design activities to help my students solve common (frequent, prevalent, etc.) nursing problems.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I ask students to discuss clinical decision-making in my classroom teaching.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I spend time in class helping students to analyze their thinking about the content by asking questions such as “What made you do that first?” and “What knowledge did you need to understand that behavior?”

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

I ask students during class to think of ways for nurses to apply the content we are discussing.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

My written course examinations incorporate critical thinking questions if it is appropriate for the course.

Rarely	Sometimes	Frequently	Most of the Time
--------	-----------	------------	------------------

Section 4: Reflection

I incorporate reflection into my classroom teaching by asking students to identify key decision-making points of hypothetical or actual clinical situations.

Rarely Sometimes Frequently Most of the Time

I encourage students to reflect on their personal or clinical experiences and share them during class time.

Rarely Sometimes Frequently Most of the Time

I ask for written reflections of class activities.

Rarely Sometimes Frequently Most of the Time

I incorporate reflection into group activities used in class.

Rarely Sometimes Frequently Most of the Time

I ask students to discuss ways to apply their knowledge gained by reflection to future clinical situations.

Rarely Sometimes Frequently Most of the Time

Demographics

1) What is your age? _____

2) What is your gender?

Female _____

Male _____

3) What is your ethnic heritage?

American Indian _____

Asian _____

Black _____

Hispanic _____

White _____

Mixed _____

4) How many years have you been teaching in nursing education? _____

5) What is the highest degree that you have attained in nursing? _____

Baccalaureate (teaching with State Board exception)

Master's degree in nursing

Doctoral degree in nursing: PhD _____

DNP _____

DNS/DSN/ND/DNSc _____

Doctorate in field other than nursing _____

6) What is your academic rank?

Instructor / Lecturer _____

Assistant Professor _____

Associate Professor _____

Professor _____

Thank you for completing this survey. If you have any questions or would like a copy of the results, please contact me at this email address: elli1356@bears.unco.edu

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVALS

UNIVERSITY of
NORTHERN COLORADO



Institutional Review Board

DATE: January 8, 2013
TO: Donna Ellis
FROM: University of Northern Colorado (UNCO) IRB
PROJECT TITLE: [403404-1] APPLYING LEARNER-CENTERED TEACHING IN THE
NURSING EDUCATION CLASSROOM: FROM THEORY TO PRACTICE
SUBMISSION TYPE: New Project
ACTION: VERIFICATION OF EXEMPT STATUS
DECISION DATE: January 7, 2013

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB verifies that this project is EXEMPT according to federal IRB regulations.

Thank you for such a clear application. Your information on Survey Monkey was very helpful.

Best Wishes, Maria Lahman

(UNCO IRB is now using "verification" instead of "approval" for exempt IRB reviews. You may now commence.)

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

UNIVERSITY of
NORTHERN COLORADO



Institutional Review Board

DATE: February 20, 2013

TO: Donna Ellis
FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [403404-3] APPLYING LEARNER-CENTERED TEACHING IN THE
NURSING EDUCATION CLASSROOM: FROM THEORY TO PRACTICE

SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS

DECISION DATE: February 20, 2013

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

We will retain a copy of this correspondence within our records for a duration of 4 years (Expires 01/07/2017).

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.



Institutional Review Board
Box 11851
Phone: 549-2077

Campus Correspondence
www.selu.edu/irb
Fax: 549-3640

DATE: January 23, 2013

TO: Michele Ellis
 Nursing

FROM: Dr. Michelle Hall, Chair

RE: IRB Action on Proposed Project

This memo is to inform you of the IRB action with regard to your proposal:

Title: Applying Learner-Centered Teaching the the Classroom: From Theory to Practice

This proposal was given: Expedited Review: _____

Full Committee Review: _____

Exempt: X

The result was: Full Approval: X

Denied Approval: _____

If anything other than Full Approval is recommended, it is your responsibility, as investigator, to submit changes/corrections or plans to accommodate conditions listed below to the Institutional Review Board prior to initiating the project. This approval is valid for one year from the date above, if data is to be collected after that time frame, the PI must submit a Continuation of Research Form.

Failure to acquire full approval by IRB before implementation for any project which involves humans means that the PI is not acting in "good faith" with university policy and is not, therefore, guaranteed the protection of the university.

Committee Comments:

IRB Number:2013-0105



Donna Ellis <michele.ellis@selu.edu>


Donna Ellis <mellis@selu.edu>
To: mhall@selu.edu

Tue, Feb 12, 2013 at 5:09 PM

Dear Michelle,

I need to change my sampling method in my approved exempt research study (approved by you 1/23/13). Do I need to file an amendment to the study? I am including the revised narrative document here so you can decide.

Thank you,
Michele Ellis
Graduate student
University of Northern Colorado

 **Ellis SELU exempt_form rev 2.12.13.doc**
61K

Michelle Hall <mhall@selu.edu>
Reply-To: mhall@selu.edu
To: Donna Ellis <Michele.Ellis@selu.edu>

Wed, Feb 13, 2013 at 1:06 PM

Michele,

Just send me an e-mail outlining your revised sampling method and the reason for it. I'll add as an attachment to your original IRB.

Michelle

--

Dr. Michelle Hall, Director Institutional Research & Assessment
Southeastern Louisiana University
SLU 11851
Hammond, LA 70402
e-mail: mhall@selu.edu
phone: [\(985\)549-2077](tel:(985)549-2077)
fax: [\(985\)549-3640](tel:(985)549-3640)
www.selu.edu/ir

Donna Ellis <michele.ellis@selu.edu>
To: mhall@selu.edu

Wed, Feb 13, 2013 at 4:29 PM

Dear Michelle,

Here is the amendment:

Due to a low response rate to the IRB approved method of sampling, a second phase of recruitment will be necessary. The original method was to email the deans/department heads and ask them to forward the email invitation to their faculty. A reminder was sent 2 weeks after the initial invitation, with less than satisfactory results. In order to try and increase the response rate, the PI will email nurse educators the next reminder directly if their email address is available from their department website. About 350 of these educators' addresses are available on websites. The Internet survey software Survey Monkey® is still configured so it will not track individual email addresses. Everything else remains the same as the original plan.

Thank you,
Donna Michele Ellis

APPENDIX C

COVER LETTER/CONSENT FORM



CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

Project Title: Applying Learner-Centered Teaching in the Nursing Education Classroom:
From Theory to Practice

Researcher: Donna Michele Ellis, MSN, RN, School of Nursing

Phone Number: (225) 773-9070 email: elli1356@bears.unco.edu

Research Advisors: Yvonne Yousey, PhD, MSN, CPNP, School of Nursing

Phone Number: (970) 351-1703

Alison Merrill, PhD, RN, School of Nursing

Phone Number: (970) 351-1389

My name is Michele Ellis. I am a doctoral student at the University of Northern Colorado School of Nursing, working on a dissertation in partial fulfillment for a doctoral degree in Nursing Education. The purpose of this research study is to examine the practice of Learner-Centered Teaching in undergraduate nursing education. Technological advances, changes in the way healthcare is delivered and decreasing length of patient stays in the acute care setting offer new challenges for nurses. As a result, undergraduate nursing education must seek innovative methods to prepare students to function in the current healthcare environment. This study will add valuable knowledge to enhance nursing students' learning in the classroom to help meet these challenges.

I am requesting your consent to participate in this research by completing an online questionnaire. The risks to you are no greater than normal reflection about your teaching, but the survey will take approximately 15 minutes of your time to complete. If you agree to participate, please click on the link below. You will be taken to a secure site on the online survey site "Survey Monkey®". You will be asked to think about a particular course that you teach face-to-face. Your consent will be implied when you click "Next" to begin the survey. Clicking "Next" will also indicate that you are over 18 years of age. Data will be collected without identifying names or Internet Protocol (IP) addresses, and will be reported as a group, so your identity will remain confidential. Your status as a nurse educator in the program where you teach will not be affected if you refuse to participate or decide to withdraw from this study. You do not have to answer every question.

Participation is voluntary. You may decide not to participate in this study, and if you begin participation, you may still decide to stop and withdraw at any time. Your decision

will be respected and will not result in loss of benefits to which you are otherwise entitled. If you have any questions about the study, please contact the researcher or the research advisors at the contact information above. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Sponsored Programs, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-2161.

Please click this link to access the survey:

[Http://www.surveymonkey.com](http://www.surveymonkey.com)

Thank you so much for your time,

D. Michele Ellis, MSN, RN

APPENDIX D

EMAIL INVITATION

Subject: Request Participation in Survey of Learner-Centered Teaching

Dear (Department Head or Dean),

My name is Michele Ellis. I am a doctoral student at the University of Northern Colorado School of Nursing, working on a dissertation in partial fulfillment for a doctoral degree in Nursing Education. I am conducting research into the practice of Learner-Centered Teaching in undergraduate nursing education. Technological advances, changes in the way healthcare is delivered and decreasing length of patient stays in the acute care setting offer new challenges for nurses. As a result, undergraduate nursing education must seek innovative methods to prepare students to function in the current healthcare environment. This study will add valuable knowledge to enhance nursing students' learning in the classroom to help meet these challenges. The study uses a survey questionnaire about face-to-face classes.

I am asking for your help in forwarding this email to your undergraduate nursing faculty. A consent form is attached for their information. They can access the survey by clicking the embedded link. I appreciate your time and willingness to participate in my research.

Thank you so much,

Michele Ellis

APPENDIX E

FIRST REMINDER EMAIL

Dear Nurse Educator,

Two weeks ago you received an email invitation for your undergraduate faculty to participate in a survey of Learner-Centered Teaching in Nursing. This research is my doctoral dissertation for completion of my PhD at the University of Northern Colorado. Your and your faculty's participation is very valuable in determining the state of Learner-Centered Teaching in nursing education.

If you have completed the survey, please accept my sincerest thanks.

If you have not had a chance, please do so today by clicking the link below:

<https://www.research.net/s/XKQFC6B>

It should take 15 minutes or less of your time, and your participation is voluntary. Your responses are confidential. If you have any questions, a consent form is attached to this email.

Please forward this email to your faculty. Thank you so much for your help!

Sincerely,

Michele Ellis

PhD candidate, University of Northern Colorado

APPENDIX F
SECOND REMINDER EMAIL

Dear (Individual Faculty Member),

This is a reminder that the survey of Learner-Centered Teaching in Nursing still needs your help! This research is my doctoral dissertation for completion of my PhD at the University of Northern Colorado. Your participation is very valuable in determining the state of Learner-Centered Teaching in nursing education.

If you have completed the survey, please accept my sincerest thanks.
If you have not had a chance, please do so today by clicking the link below:

<https://www.research.net/s/XKQFC6B>

It should take 15 minutes or less of your time; your participation is voluntary, and your responses are confidential. If you have any questions, a consent form is at the end of this email.

Thank you so much for your help!

Sincerely,
Michele Ellis, MSN, RN
PhD candidate, University of Northern Colorado