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Investigating the Efficacy of Pre-Licensure Clinical Interprofessional Education

Brenda Kay Wheeler
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Investigating the Efficacy of Pre-Licensure Clinical Interprofessional Education

Presented in Partial Fulfillment of the
Requirements for the Degree of Doctor of
Philosophy in Nursing Education

Nova Southeastern University

Brenda Kay Wheeler
2016

**NOVA SOUTHEASTERN UNIVERSITY
HEALTH PROFESSIONS DIVISION
COLLEGE OF NURSING**

This dissertation, written by Brenda Kay Wheeler under direction of her Dissertation Committee, and approved by all of its members, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF PHILOSOPHY IN NURSING EDUCATION

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Abstract

Nurses are expected to work collaboratively with other health professionals after graduation; however, most have not been taught to work in teams and are ill-prepared to work in collaborative relationships. Interprofessional Education (IPE) may better prepare nursing students for teamwork. The purpose of this study was to investigate the efficacy of pre-licensure clinical IPE for nursing students. It was hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by higher scores on the Attitudes Toward Health Care Teams Scale (ATHCTS), Quality of Care/Process subscale and by lower scores on the ATHCTS, Physician Centrality subscale. The theoretical framework for this study was Pettigrew's intergroup contact theory. A quasi-experimental, nonequivalent control group, after-only design was used for this study. Archived data (ATHCTS) for nursing students who had participated in clinical IPE was used for the intervention group. The ATHCTS was administered to nursing students in control group universities. An independent *t* test was used to compare group mean scores. There was no significant difference in Quality of Care/Process subscales between groups. Students participating in clinical IPE had lower scores on the Physician Centrality subscale than the control group. Nursing students participating in clinical IPE favored shared leadership while non-IPE participants supported physician authority. Clinical IPE did not improve student attitudes toward quality of care given by teams. However, all participants had relatively high attitudes toward quality of care provided by teams.

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Chapter One

The Problem and Domain of Inquiry

Interprofessional education may be imperative to provide the interprofessional collaborative practice demanded by the increasingly complex health care needs of today. The United States (US) is faced with providing health care to an aging population. By 2020, it is projected that almost 20% of the U.S. population will be 65 years and older (U.S. Census Bureau, 2012a). In 2000, the average life expectancy for both sexes and all races was 76.86 years (Arias, Curtin, Wei, & Anderson, 2008). By 2010, the life expectancy had risen to 78.7 years (Hoyt & Xu, 2012). The U.S. Census Bureau (2012b) projects a life expectancy of 80.2 years by 2020.

While an increase in life expectancy seems positive, the incidence of chronic illnesses also increases. Data from the 2009-2010 National Health Interview Survey (Freid, Bernstein, & Bush, 2012) indicated 45% of adults 65 years and older had two or more chronic conditions. The Surgeon General alluded to the complexity of health care when noting that most health care professionals felt ill-prepared to care for patients with multiple chronic conditions (Benjamin, 2010). With the aging population and prevalence of multiple chronic conditions, health care needs of today require the expertise of multiple disciplines. It is unlikely that any single discipline with its distinct focus has the capability to meet complex patient needs.

Effective communication and collaboration between various disciplines in the health care team is essential to address the complexity of health care needs and to

produce positive patient outcomes. The Institute of Medicine (IOM, 2000) estimated that between 44,000 and 98,000 deaths per year in the US were attributed to medical error. These figures were extrapolated from findings of studies of adverse events in hospitals in New York (Brennan et al., 1991) and Colorado and Utah (Thomas et al., 2000). In addition, HealthGrades (2004) conducted a study of Medicare patients from 2000 to 2002 and attributed more than 195,000 deaths to preventable errors. While some authors claim the reported number of deaths due to preventable errors was exaggerated (Hayward & Hofer, 2001; McDonald, Weiner, & Hui, 2000), preventing medical errors is a problem that must be addressed.

Among other causes, the IOM (2011) identified a lack of communication among health care professionals as a contributing factor in medical errors. In a qualitative study by Sutcliffe, Lewton, and Rosenthal (2004), medical residents identified communication failures as a contributor to medical errors. The Joint Commission (2007) cited ineffective communication among health care providers as the root cause of two thirds of the 3,548 sentinel events in accredited hospitals during a 10-year period. Health professionals must communicate effectively and engage in collaboration to reduce medical errors and improve patient outcomes (Nair, Fitzpatrick, McNulty, Click, & Glembocki, 2012).

Interprofessional collaboration is an interpersonal process, which professionals use to accomplish a common task or reach a common goal (Bronstein, 2003). In addition, Bronstein (2003) purported that effective collaboration requires interdependence, flexibility, and collective ownership of goals by participants. The adjustment from working in parallel relationship with other disciplines in health care to a true collaborative relationship is not without challenges. Stereotypes of physicians and

nurses (Carpenter, 1995a), role ambiguity and cultural differences (Hall, 2005; Jeffries, McNelis, & Wheeler, 2008), disruptive behaviors of physicians and nurses (Rosenstein & O'Daniel, 2005), hierarchical nature of relationships (Weinberg, Cooney-Miner, Perloff, Babington, & Avgar, 2011), general lack of awareness of other disciplines, and turfism and territorialism (Lindeke & Sieckert, 2005) all contribute to ineffective collaboration. Higgins and MacIntosh (2010) suggested that interprofessional education (IPE) might facilitate interprofessional respect, communication, and collaboration.

The Centre for the Advancement of Interprofessional Education (CAIPE) offered the most commonly cited definition for IPE. "Interprofessional Education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care" (CAIPE, 2002, Defining IPE, para. 1). Derived from CAIPE's definition, the World Health Organization (WHO) solidified the definition of IPE in its action plan for interprofessional education and collaborative practice. "Interprofessional education occurs when two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (WHO, 2010, p. 7).

It is important to note the difference between interprofessional and multidisciplinary. While both profession and discipline refer to the various specialties in health care and are used interchangeably, the term profession is most commonly used when referring to IPE (Metzelthin et al., 2013; Slack & McEwen, 2013; Wakely, Brown, & Burrows, 2013). However multidisciplinary and interprofessional do not denote the same meaning. Multidisciplinary refers to various disciplines working in parallel within their own scopes of practice, doing their own work (Paul & Peterson, 2001; Sheehan, Robertson, & Ormond, 2007). Multidisciplinary teams share patient findings after having

completed work within disciplinary boundaries. Conversely, interprofessional refers to professions or disciplines working alongside each other, sharing an integrated plan of patient care. Activities are coordinated and interactions are ongoing as patient needs are being addressed (Paul & Peterson, 2001).

The IOM suggested IPE as a method for preparing health professionals for working in interprofessional teams (IOM, 2000, 2001). The American Association of Colleges of Nursing (AACN, 1995, 2008) emphasized the importance of IPE to effective collaboration. By gaining an understanding of the roles of other professions, respect for the contribution of other disciplines follows, which in turn emboldens collaboration.

Problem Statement

Nurses are expected to work collaboratively with other health care team members soon after graduation, yet most have not been taught to work in teams. Just as other health professionals have, traditionally, nurses have received training within isolation of their own respective disciplines, rendering them ill-prepared to work in collaborative relationships (IOM, 2000, 2001). Poor attitudes toward teamwork and other health professionals are barriers to effective collaboration. A lack of understanding of the roles of other professions and their contribution to the health care team may contribute to this problem. Interprofessional education could help nursing students learn to respect and appreciate the contribution of physicians and other professionals to the health care team.

Purpose of the Study

The purpose of this dissertation study was to investigate the efficacy of a pre-licensure, clinical IPE for nursing students. The study compared attitudes toward health care teams of nursing students who participated in clinical IPE with nursing students who

did not participate in clinical IPE. While the ultimate goal of IPE would be to engender true collaboration among health care professionals and improve patient outcomes, it is unlikely it would occur devoid of improved attitudes toward health care teams.

Demonstrating that clinical IPE improves nursing students' attitudes toward health care teams would give evidence for the inclusion of clinical IPE in undergraduate nursing curricula.

Research Question and Hypotheses

Research Question

The research question for this study was as follows: Do nursing students who participate in pre-licensure, clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in pre-licensure, clinical IPE?

Research Hypotheses

Hypothesis one. It is hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by higher scores on the Attitudes Toward Health Care Teams Scale (ATHCTS), Quality of Care/Process subscale.

Hypothesis two. It is hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by lower scores on the ATHCTS, Physician Centrality subscale.

Significance of the Study

Nursing Education

Zorek and Raehl (2013) noted the importance of accrediting bodies including standards to promote IPE. The authors found that the AACN (2008) holds baccalaureate nursing programs accountable for preparing students to work in interprofessional teams. The extent to which Bachelor of Science in Nursing (BSN) programs prepare graduates to “use inter . . . professional communication and collaborative skills . . .” (AACN, 2008, p. 22) and “demonstrate appropriate teambuilding and collaborative strategies when working with interprofessional teams” (AACN, 2008, p. 23) is unknown. The literature is replete with studies assessing the benefit of IPE for medical students (Anderson, Smith, & Thorpe, 2010; Corfield & Kelly, 2009). However, there is a lack of evidence to validate the use of and benefit of IPE for nursing students. This dissertation study validates the benefit of clinical IPE for nursing students. It provides evidence to support the inclusion of clinical IPE in nursing curricula to promote interprofessional collaboration.

Nursing Research

Humphris and Hean (2004) assert the importance of building evidence about interprofessional learning. The need for evidence-based nursing practice has been widely recognized (American Nurses Association, 2010; IOM, 2011). However, evidence-based practice for nursing education lags far behind (Gresley, 2009). Many scholars have identified the burgeoning need for evidence for improved nursing and interprofessional education (Horder, 2004; Humphris & Hean, 2004; Stevens, 2013).

This dissertation study regarding the influence of clinical IPE on nursing students' attitudes toward teamwork was anticipated to be the first in a series of studies on the efficacy of clinical IPE. If student attitudes toward health care teams are improved by clinical IPE, more research into whether the improvement is sustained over time is needed. In addition, research into the benefit of clinical IPE and improved communication and collaboration of nurses with other health care team members is warranted.

Additionally, it is essential to note the importance of completing the entire research process, including presentation of results. Tornquist (1986) aptly noted that research is for naught unless results are disseminated. In order to build the science of nursing education, it will be important to make results available to others at the culmination of this study.

Nursing Practice

In several reports, the IOM (2000, 2001, 2011) called for interprofessional collaboration as a means to improve health care delivery and produce more positive patient outcomes. When professionals are educated separately within their own disciplines, teamwork and collaboration do not always ensue. Horder (2004) stated, "Working together must be grounded in learning together" (p. 244).

It was hypothesized that clinical IPE will improve attitudes toward health care teams. Better attitudes toward health care teams would likely lead to improved communication and collaboration with other health care professionals. Findings from this study showed that nursing students who participated in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate,

and nurses may be better prepared to work in interprofessional teams. The enhanced communication and collaboration among team members have great potential to positively affect patient outcomes (Barnwell, Arnold, & Berry, 2013).

Public Policy

The WHO (2010) called for policymakers to consider inclusion of IPE for health professions students. While the WHO was not prescriptive in the type of IPE, they did assert the importance of IPE in preparing health care professionals for interprofessional collaboration. Recognizing the importance of IPE, the United Kingdom (UK) recently released a quality assurance framework, which called for inclusion of IPE as a requirement for approved nursing education institutions (Nursing & Midwifery Council, 2013).

Public policy issues have the potential to be widespread, encompassing both accrediting and regulatory agencies. The findings from this dissertation study provide evidence to call for inclusion of clinical IPE in undergraduate nursing curricula. One policy initiative could be lobbying lawmakers at state levels to require clinical IPE as a requirement for approved nursing education institutions. In addition, requesting funding for continued research in IPE would provide further evidence of the requisite nature of IPE in improving both communication and collaboration among health care professionals.

Philosophical Underpinnings

The post-positivist paradigm was the basis for this dissertation study. The ontological view of the post-positivist paradigm is a modified realist view of phenomenon, avowing that the researcher cannot be absolutely sure about claims to

knowledge (Creswell, 2009; Duffy & Chenail, 2008). The epistemological stance of the post-positivist is that the researcher strives to remain as objective as possible. While the post-positivist asserts the impossibility of pure objectivity, the researcher attempts to remain detached from subjects to reduce bias (Duffy & Chenail, 2008; Lodico, Spaulding, & Voegtler, 2010). Quantitative methodology using the scientific method was utilized for hypothesis testing to answer the dissertation study's research question.

Theoretical Framework

Much of IPE research is devoid of a theoretical basis. Clark (2006) described the nature of IPE literature as being “descriptive, anecdotal, and atheoretical” (p. 577). Hean and Dickinson (2005) also noted the lack of a theoretical basis for IPE research. Theories are essential for building the science of nursing education. Fain (2013) stated that theories are needed to help explain relationships between variables. Polit and Beck (2012) further explained that a theory provides a framework for nursing research and is useful in predicting outcomes.

The theoretical framework for this dissertation study was intergroup contact theory (ICT). Intergroup contact theory has its origin in social psychology (Pettigrew & Tropp, 2011). Dovidio, Gaertner, and Kawakami (2003) asserted that the ICT is one of the most effective strategies in diminishing prejudice and improving intergroup relations. Pettigrew (1986) described the ICT as a middle range theory, useful to help explain “changes in intergroup attitudes as a function of intergroup contact under varying conditions” (p. 171).

Historical Development

There is no distinct beginning of the ICT. Many factors shaped social psychologists' initial thoughts of the influence of contact on reducing prejudice. These thoughts gave way for Allport's contact hypothesis, which was eventually developed into a guiding theory.

While Gordon Allport is credited with the development of the contact hypothesis, Allport (1958) recognized the work of many social psychologists in providing a basis for his hypothesis. The earliest research on intergroup contact centered on racial prejudice. Prejudices, stereotypes, and racism have been of concern to social psychologists for decades. In the 1930s and 1940s, many Americans were troubled by the anti-Semitism promoted by the Nazis (Pettigrew, 1986).

Proponents of the human relations movement believed intergroup conflict was the result of prejudice. In addition, members of the movement assumed that prejudice and stereotyping were products of ignorance about the outgroup. Efforts were made to educate groups about one another through informational pamphlets and to bring groups together through Brotherhood dinners. While Hewstone and Brown (1986) acknowledged that knowledge about similarities and differences between groups was important, the lack of improved attitudes toward the outgroup following the human relations movement initiatives suggested that education and contact alone were not enough to reduce prejudice.

While initial attempts at improving intergroup relationships through contact did not bring about the desired results, interest among social psychologists in contact research was ignited. One of the first recorded studies, conducted at the University of

Alabama, indirectly investigated the effect of contact. Sims and Patrick (1936) compared attitudes toward Blacks of three groups of White college students: Northern students attending a Northern university, Northern students attending a Southern segregated university, and Southern college students. While Southern college students had frequent contact with Blacks, Northern college students rarely had contact with Blacks until going to the Southern university. Sims and Patrick found Northern White students attending a Southern segregated university had increasing anti-Black attitudes with each year of attendance. Typically, the only contact these students had with Blacks was with those in lower status positions. In addition, anti-Black sentiment permeated the community as well as the university. Although the Whites were used to seeing Blacks in the South, prejudice and extreme racism was rampant. Contact alone did not produce more positive attitudes toward Blacks.

Social psychologist Robert Williams, Jr.'s work about intergroup relations most directly guided Allport's development of the contact hypothesis. Williams (1947) was summoned by the Social Science Research Council to review research on intergroup relations. Numerous variables influencing intergroup contact's result on prejudice were noted by Williams. In addition, Williams offered 102 propositions on intergroup relations. Included in these propositions were suggested approaches to reduce prejudice and hostility between groups. As noted by Pettigrew and Tropp (2011), a few of these propositions were rudiments of Allport's contact hypothesis. In order to maximize the positive effects of contact, members of the two groups need to share a common focus or have a shared objective (Williams, 1947). Group members should have similar interests and near equal status, both economically and socially. To reduce prejudice, group

members should not possess the negative stereotypic conceptions associated with the group. Also, contact must be more than casual; it must be personal and intensive in nature.

Using findings from previous works of social psychologists on intergroup contact, Allport offered the most influential conclusion in his legendary work *The Nature of Prejudice*, first published in 1954. Noting that some situations exacerbated prejudice while others seemed to abate it, Allport (1958) offered the following conclusion:

Prejudice (unless deeply rooted in the character structure of the individual) may be reduced by equal status contact between majority and minority groups in the pursuit of common goals. The effect is greatly enhanced if this contact is sanctioned by institutional supports (i.e., by law, custom or local atmosphere), and if it is of a sort that leads to the perception of common interests and common humanity between members of the two groups. (p. 167)

Consistent with Williams's (1947) initial conclusions, Allport's formulation of contact hypothesis spelled out four critical attributes needed for improved intergroup relations. For intergroup contact to be effective in improving attitudes toward other groups, the four key conditions must be present: equal status within the group situation, common goals, intergroup cooperation, and the support of authorities (Pettigrew, 1998).

The initial development of ICT began with Allport's (1958) foundational contact hypothesis. Since that time, the contact hypothesis has been repeatedly tested and yielded strong empirical evidence of its usefulness as a theoretical basis for research (Pettigrew & Tropp, 2011). The contact hypothesis offered critical conditions for contact, predicting when and under which conditions contact brings positive changes. Pettigrew (1998) identified four problems with the contact hypothesis: causal sequence, independent variable specification, unspecified process of change, and generalization of effects. There was no explanation as to how or why contact evokes positive changes

(Eller & Abrams, 2003). Without identifying the process by which attitudes were changed through contact, the contact hypothesis remained just a hypothesis.

Thomas Pettigrew reformulated the contact hypothesis into the ICT, which explains the process by which contact brings about positive relationship changes. T. F. Pettigrew (personal communication, October 5, 2013) acknowledged the influence of social identity theory in expanding the contact hypothesis. The social identity theory explains how an individual identifies self in respect to social membership within a group (Tajfel & Turner, 1979, 1986). This process involves social categorization, identification, and comparison between groups. While individuals develop a sense of social identity within a group, the knowledge of not belonging to another group also emerges. The use of “us” and “them” to denote ingroup and outgroup members becomes evident. Tajfel and Turner (1979) noted how this social categorization could lead to intergroup conflict, prejudice, and bias. Understanding the necessity of deemphasizing the intergroup differences, Pettigrew (1998) borrowed the concepts of decategorization, salient categorization, and recategorization from previous works of Brewer and Miller (1984) and Hewstone and Brown (1986) to formulate the ICT.

Description of the Theory

Intergroup contact theory explains that under certain conditions contact between outgroups and ingroups can reduce prejudice and improve attitudes toward the outgroup. To grasp the usefulness of the theory, readers must understand the essential conditions for intergroup contact and the process of change through intergroup contact. While changes in attitude toward the outgroup take place within the given context, there is a process by which these changes in attitude may be generalized to outgroup members as a whole.

Essential conditions for intergroup contact. The essential conditions for successful intergroup contact include equal status within the situation, common goals, intergroup cooperation, support of authority, and the potential for intergroup friendship (Allport, 1958; Pettigrew, 1998). While it may not be possible for groups to have equal status coming into the situation, it is important that groups feel equal within a given situation (Cohen, 1982; Patchen, 1982; Riordan & Ruggiero, 1980; Robinson & Preston, 1976). Effective contact requires groups to share a common goal or focus (Chu & Griffey, 1985; Patchen, 1982). Mutual goals allow for cooperation rather than promote competition between groups. Intergroup cooperation is essential for groups to accomplish the intended purpose (Sherif, Harvey, White, Hood, & Sherif, 1988). In addition, intergroup contact must have the support of authority. Authority-sanctioned intergroup contact is more widely accepted by participating groups (Parker, 1968). Support from authority establishes norms of acceptance (Pettigrew, 1998). The final critical condition is the potential for friendship. Pettigrew (1998) posited that time for groups to learn about each other and develop cross-group friendship is essential for optimal outcomes.

In the longitudinal model of his reformulated ICT, Pettigrew (1998) denoted these conditions as essential and facilitating situational factors (see Figure 1). It should be noted that each participant brings his or her own personal past experiences and characteristics that may influence outcomes of intergroup contact. In addition, prior experiences and attitudes will likely determine whether individuals seek or agree to contact with an outgroup (Pettigrew, 1998). Williams (1947) and Rothbart and John (1985) cautioned that group members should not possess the negative stereotypic

characteristics associated with said group, which may only affirm preconceived judgments and result in increased prejudice.

Schema (Model) of Intergroup Contact Theory

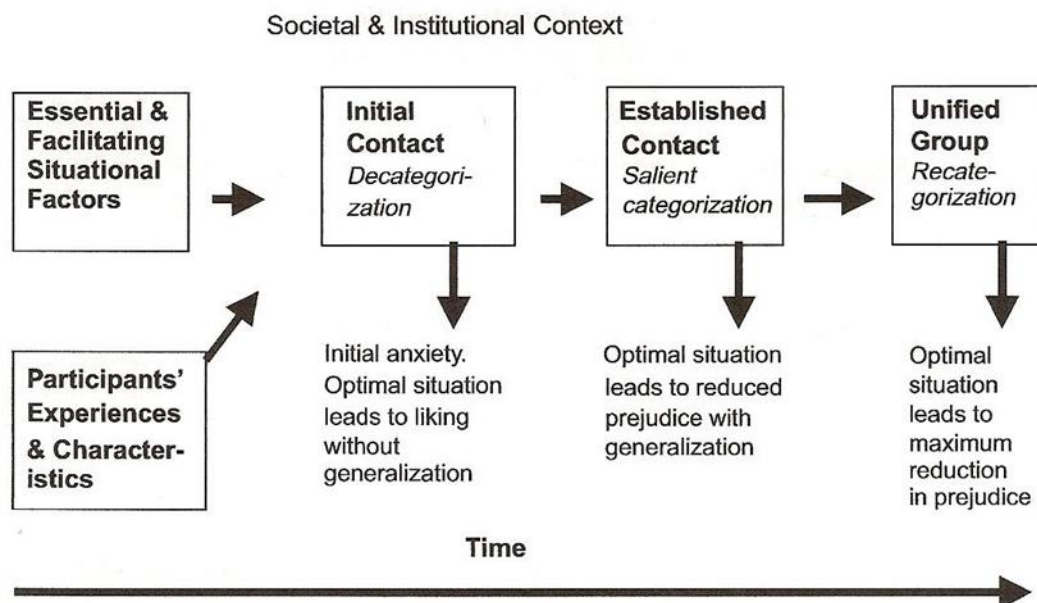


Figure 1. The longitudinal model of Pettigrew's intergroup contact theory depicts the process by which intergroup contact brings intergroup attitude change. From "Intergroup Contact Theory," by T. F. Pettigrew, 1998, *Annual Review of Psychology*, 49, p. 77. Copyright 1998 by Annual Reviews. Reprinted with permission.

Processes of change through intergroup contact. Pettigrew (1998) described four interrelated processes responsible for change in behavior resulting from intergroup contact. The first process is *learning about the group*. Stephan and Stephan (1984) asserted that ignorance propagates prejudice. Understanding similarities and dissimilarities between groups is essential for effective contact. Rothbart and John (1985) concluded that in order to disconfirm the stereotype, outgroup members must be representative of the outgroup and must have characteristics distinctly different from the stereotypic views held by the ingroup. Stephan and Stephan found that when White

students learned more about the culture of Mexican-Americans, they had less prejudice and more positive attitudes toward their Mexican-American classmates. In addition, intergroup contact must be of sufficient length to allow groups to learn about each other.

Changing behavior is another process of intergroup contact. Pettigrew (1998) noted that along with the new situation of intergroup contact come certain expectations, one of which is acceptance of the outgroup. The process of behavioral change is best facilitated by repeated contact with the outgroup. When given an assignment requiring expertise from an outgroup member, White students reached out to Mexican-American classmates. This behavioral change resulted in more positive attitudes toward Mexican-American classmates (Aronson & Gonzalez, 1988).

Positive emotions encountered during intergroup contact are instrumental for *generating affective ties*. Pettigrew (1998) noted that contact has an affective component as well as a cognitive component. When ingroup members form an emotional tie to an outgroup member, more positive attitudes toward the outgroup are observed. Batson et al. (1997) found that empathy toward a member of a stigmatized group resulted in more positive attitudes toward the entire group.

The final process of intergroup contact is *ingroup reappraisal*. Pettigrew (1998) explained that when intergroup contact occurs, the ingroup may gain a new perspective on itself. Verkuyten, Thijs, and Bekhuis (2010) described a reduction in ethnocentric thinking and less perceived outgroup threat by the ingroup, following optimal intergroup contact.

Ingroup process of generalization to whole outgroup. Pettigrew (1998) completed the longitudinal nature of the model of his reformulated ICT by describing the

process by which ingroup attitude changes are generalized to the outgroup as a whole. The social identity theory along with works of Brewer and Miller (1984) and Hewstone and Brown (1986) influenced Pettigrew's use of the concept of social categorization to offer an explanation for this process.

The first step is the *initial contact*, which likely is accompanied by some degree of initial anxiety (Pettigrew, 1998). Within the situation, group members decategorize and deemphasize group differences. Group members are seen as individuals, allowing members to become acquainted on a personal level (Dovidio et al., 2003). Building friendships with outgroup members has been known to reduce prejudice and improve attitudes toward outgroups (Levin, van Laar, & Sidanius, 2003).

During the next step, *established contact* occurs following initiation of intergroup contact. Once intergroup contact has been established, salient group categorization is required if positive effects are to be generalized to the outgroup as a whole (Pettigrew, 1998). An emphasis is put on distinct characteristics common to all members of the outgroup. Because relationships between groups have formed and a better understanding of the outgroup has formed, the salient attributes delineating the group will be associated with more positive attitudes toward the outgroup.

The final step in the process of generalization is *unified group*. This step involves recategorization. Intergroup contact brings about a more inclusive group. Similarities between groups are acknowledged and unique differences between groups are embraced. Gaertner, Dovidio, and Houlette (2010) noted the shift from us versus them to the more inclusive we. This idea of recategorization is consistent with Allport (1958) who noted that for maximum effectiveness with intergroup contact, members of different groups will

perceive themselves as part of a team. It is at this point that ingroup members take new attitudes toward the outgroup gained through the intergroup contact situation and apply them to outgroup members as a whole.

One final thought regarding optimal conditions for intergroup contact is offered. “The effects of contact were more strongly generalized from individual outgroup members to the outgroup as a whole when social categorizations were salient during contact” (Dovidio, Eller, & Hewstone, 2011, p. 150).

Previous Uses of Intergroup Contact Theory

Much research using the ICT can be found in the disciplines of psychology, sociology, and social psychology. The theory has been shown effective in reducing stereotyping and prejudice between groups by encouraging contact under certain conditions (Pettigrew & Tropp, 2011). Pettigrew (1997) investigated the influence of intergroup friendship on prejudice toward minorities in four Western European countries. Intergroup contact theory was used by Vezzali and Capozza (2011) to determine the effect of intergroup contact on attitudes toward disabled colleagues in the workplace. Studies related to race (Patchen, 1982), ethnicity (Amir & Ben-Ari, 1985), culture (Noels & Clément, 1996), age (Aday, Sims, & Evans, 1991), sexuality (Pagtolun-An & Clair, 1986), and disability (Leyser & Price, 1985) have been used to demonstrate the theory’s usefulness in explaining and deterring prejudice among social groups.

The social sciences have extensively used the ICT as a basis for research; however, few health-related disciplines, including nursing, have applied the theory of intergroup contact. Several authors (Ateah et al., 2011; Carpenter, 1995b; Mandy, Milton, & Mandy, 2004; Stead, O’Halloran, Bernier, Zimetbaum, & Irish, 2012) have

identified stereotyping as a barrier to effective collaboration and have affirmed the need for measures to improve attitudes among health professions. Bridges and Tomkowiak (2010) and Hean and Dickinson (2005) have proposed the ICT as a theoretical basis for interprofessional education. Hewstone, Carpenter, Franklyn-Stokes, and Routh (1994) demonstrated that interprofessional or intergroup contact improved attitudes between doctors and social workers. Intergroup contact theory was the basis for a study by Ateah et al. (2011) who examined differences in perceptions of students toward other health professions before and after an IPE experience. Students were from seven different health professions, including nursing. In addition, Mohaupt et al. (2012) investigated attitude change toward interprofessional collaboration following simulation-based IPE of students in nursing and three other health care professions.

Application of Theory to Current Study

The ICT provides an ideal framework for designing and evaluating clinical IPE. The ICT has been shown useful in reducing prejudice between ingroups and outgroups (Pettigrew & Tropp, 2006) if the intergroup contact occurs under certain conditions. While prejudice may not be the term typically used to describe poor attitudes toward other professions, it is nonetheless the underlying cause of negative mindsets. Prejudice and stereotyping may be reduced by utilizing the ICT.

Clinical IPE offers the ideal situation for implementing the ICT. The essential conditions for intergroup contact are present in the dissertation study. The clinical IPE groups (interprofessional teams) consist of students from medicine, nursing, health science, and communication disorders. Although medical students were graduate students and all others were undergraduate level, students were considered of equal status

because all were at the pre-licensure, student level. Each interprofessional team was assigned an older community-dwelling adult as a patient for whom the team must have conducted three home visits. Each visit centered on common objectives that the team must have accomplished. Conducting the home visits and completing the objectives required cooperation from all group members. The clinical IPE program was fully supported by faculty from each represented discipline. In addition, faculty modeled interprofessionalism before the students throughout the program by demonstrating positive attitudes toward other professions. Students also had an opportunity for intergroup friendship. There was extended contact with other groups throughout the clinical IPE program. Students had seven scheduled meetings over a four-month time period. In addition, some students chose to meet briefly before or after a scheduled home visit to make preparations or complete required documentation.

The initial contact was an organized orientation and informational session. For the purpose of this dissertation study, the nursing students were considered the ingroup while other disciplines were members of outgroups. At the orientation, nursing students first met the outgroup members. While there was likely initial anxiety, nursing students soon realized that students in other disciplines were equal in status. Soon students were working together and preparing for the first team visit. As the IPE program progressed, students began to more fully understand the roles and responsibilities of each profession, which brought about the salient categorization, a characteristic noted after contact has been established. Consistent with the suggestion by Hewstone and Brown (1986), clinical IPE was designed so that each professional discipline retained some distinct roles to be used in accomplishing common goals.

At the culmination of the clinical IPE, student teams were a unified group. They realized the unique strengths of other professions and referred to their team as we instead of distinguishing between professional disciplines.

While the above description depicted an optimal intergroup contact situation and accurately described the clinical IPE program for this dissertation study, it was unknown whether this process produced more positive attitudes toward the outgroup.

Constructs and Relationships

Exploring the outcome constructs, antecedent constructs, and the relationship between constructs is essential for understanding ICT. The outcome constructs for this theory are reduced prejudice and improved attitudes. There are five antecedent constructs for ICT. These have been introduced previously as the five essential conditions for intergroup contact. It is crucial that antecedents, equal status within the situation, common goals, intergroup cooperation, support of authority, and the potential for intergroup friendship be present for intergroup contact to produce the desired outcome: improved attitudes (Allport, 1958; Pettigrew, 1998).

The ICT provides five antecedent constructs that are necessary for effective intergroup contact. Given that all essential antecedent conditions are present, and there is sufficient duration of contact between the ingroup and outgroup, a reduction of prejudice and improved attitudes toward the outgroup can be expected.

Theoretical Assumptions

The ICT is based on the following assumptions (Allport, 1958; Dovidio et al., 2011; Pettigrew, 1998; Tausch & Hewstone, 2010):

- There will be equal status for groups within the given situation.

- There will be common goals for all groups within the situation.
- There will be intergroup cooperation, not intergroup competition, within the contact situation.
- There will be support of authority, establishing a norm of acceptance.
- The contact situation will provide the potential for friendship, which requires a sufficient time component for friendship to occur.
- For the theory of intergroup contact to result in improved intergroup relations, the antecedent conditions will be met.

Definition of Terms

Definitions of the constructs of interest, attitude, and interprofessional education are offered in both theoretical and operational or conceptual terms. In addition, other select terms are defined to aid in understanding their use within the dissertation study.

Construct Definition of Attitude

Attitude is the outcome variable and outcome construct of interest in this study.

Theoretical definition. Attitude is a favorable or unfavorable evaluation of an attitude object. The object can be a physical or psychological object, such as a concept or behavior (Ajzen & Fishbein, 2000). Fishbein (1963) asserted that “an individual’s attitude toward any object is a function of his beliefs about the object . . . and the evaluative aspect of those beliefs” (p. 233).

Operational definition. Attitude was measured by a composite score on each of the two subscales of the Attitudes Toward Health Care Teams Scale (ATHCTS). The ATHCTS has two subscales: The Quality of Care/Process subscale and the Physician Centrality subscale (Heinemann, Schmitt, Farrell, & Brallier, 1999). The Quality of

Care/Process subscale score ranges from 0 to 70 with higher scores indicating a more positive attitude about quality of care from teams and quality process in teams. The Physician Centrality subscale score ranges from 0 to 30 with a higher score indicating more acceptance of physician authority in the team; therefore, lower scores on this subscale would indicate more positive attitudes toward the health care team.

Construct Definition of Interprofessional Education

The construct interprofessional education is the independent variable in the study.

Theoretical definition. “Interprofessional education occurs when two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes” (WHO, 2010, p. 7).

Conceptual definition. For this study, interprofessional education is defined as participation in Interprofessional Health Partners program. Student teams, consisting of a student from medicine, nursing, and health science or communication disorders, conducted three home visits for an assigned older community-dwelling adult volunteer (patient) to complete required assessments, screenings, and teaching (Health Partners, n.d.).

Additional Definitions

Many concepts or terms can be misunderstood because of the various meanings associated with those words. The following definitions are offered to explain the use of each term within the dissertation study.

Discipline. A discipline is a branch of instruction and body of knowledge with a distinct way of thinking about a phenomenon (Donaldson & Crowley, 1978). A discipline has a systematic way of developing and categorizing new knowledge (Chinn &

Jacobs, 1983). The distinct way a discipline looks at phenomenon “defines the limits and nature of its inquiry” (Moore, 1990, p. 825).

Profession. “Profession is a self-regulating group of people who have a common body of knowledge, entitled by law to call themselves a specific professional name . . .” (Hammick, Olckers, & Campio-Smith, 2009, p. 3). Parse (1999) further explained that members of a profession are “educated in the discipline according to nationally regulated, defined, and monitored standard” (p. 275).

Multiprofessional education. Multiprofessional education occurs when students in two or more professions learns alongside each other in parallel, not interactively (Hammick et al., 2009).

Health care team. For the purpose of this paper, the health care team referred to all health care professions involved in a patient’s care, which included but was not limited to professionals from medicine, nursing, physical therapy (PT), occupational therapy (OT), speech language pathology (SLP), pharmacy, health education, and dietary. The number of professions represented on the team is dependent on the needs of the patient.

Ingroup. An ingroup consists of members of a social group. These members share a common identity (Tajfel, 1982). Allport (1958) defined ingroups as “any cluster of people who can use the term ‘we’ with the same significance” (p. 35).

Outgroup. The term outgroup is used in contrast when using the term ingroup. When comparing to ingroup, an outgroup is a social group outside the common identity of the ingroup (Tajfel, 1982).

Chapter Summary

The need for improving communication and collaboration between nurses and other members of the health care team has been established. The health care needs of today are complex and require the expertise of multiple health professions to ensure positive patient outcomes. Traditional education, strictly within disciplinary boundaries, leaves nurses ill-prepared to work effectively in health care teams. Interprofessional education has been suggested as a method for improving communication and collaboration among health care professionals. The purpose of this study was to ascertain the efficacy of clinical IPE in improving attitudes of nursing students toward health care teams.

The ICT offers a theoretical basis for explaining how intergroup contact changes attitudes of participants and predicting the outcomes of intergroup contact. Clinical IPE aligns well with the ICT as the five critical conditions for the contact situation were present. Improved attitudes toward the outgroup is an expected outcome of intergroup contact. It was hypothesized that attitudes toward health care teams of nursing students participating in clinical IPE are more positive than nursing students not participating in clinical IPE.

Chapter Two

Literature Review

The review was undertaken to explore the literature and determine the information that is known about the use of the ICT and IPE. Previous pertinent uses of the ICT were explored. Studies of IPE were examined to determine previous participants of IPE. In addition, information regarding optimal timing of IPE and placement in program curriculum were sought. Various participant roles in IPE were determined. Outcomes of IPE were also explored. After perusing studies similar to the dissertation study, gaps in the literature were identified.

A review of the literature was performed to obtain relevant literature centering on two main themes: intergroup contact theory and interprofessional education. In order to procure topics of interest, search engines targeting health professions, social sciences, and education were used: Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, PsychINFO, Applied Social Sciences Index and Abstracts (ASSIA), Social Sciences, Education Resources Information Center (ERIC), and Education Source. The search terms used were intergroup contact theory, contact hypothesis, interprofessional education, and interdisciplinary education. In addition, the above search words were combined to find literature addressing ICT and IPE. The search was limited to articles in English language. In the interest of finding research regarding the topics of interest, the search was further limited to peer-reviewed, research articles.

Intergroup Contact Theory as a Framework for IPE

The ICT has been used extensively in social psychology to explain the role of contact in reducing stereotypes and prejudices and improving attitudes between different groups (Ellison & Powers, 1994; Gaertner & Dovidio, 2005; Patchen, 1982; Pettigrew & Tropp, 2005). Most use of ICT has been within social psychology. Social psychologists have repeatedly demonstrated the effect of contact on attitudes. While some researchers found that contact did not improve attitudes (Ogedengbe, 1993), the majority of findings support the use of ICT in studies trying to either explain the effect of contact on attitudes or trying to change attitudes of participants as a result of some contact intervention (Hannon & Gueldner, 2008; Leyser & Price, 1985). While the most common issues studied were those centering on race/ethnicity, disability, age, sexuality, and mental illness, Allport's ICT has been suggested as an appropriate framework for affecting student attitudes in IPE (Bridges & Tomkowiak, 2010; Hean & Dickinson, 2005). Few studies employing ICT as a foundation were found in the literature. It may also be noteworthy that all IPE research using ICT was conducted in either the United Kingdom (UK) or Canada.

Hewstone et al. (1994) and Carpenter and Hewstone (1996) found that medical students ($n = 44$) and social work (SW) students ($n = 44$) generally had more positive outgroup attitudes following contact through a shared learning program ($F = 10.97, p < .005$). Students in SW showed improved attitudes toward doctors from a mean of 4.02 to a mean of 4.59 while mean attitude scores of medical students toward SW went from 4.46 to 5.37 following IPE. Hewstone et al. (1994) also reported on another study of IPE between students in SW ($n = 23$) and medicine ($n = 33$). Medical students' attitudes

toward SW showed improvement from a mean of 4.48 to 4.76, and SW students' attitudes toward doctors improved from a mean of 3.65 to 4.17.

Carpenter (1995a, 1995b) reported on an IPE contact between nursing and medical students using a paired approach to address a case study. Attitudes toward outgroups of both nursing ($n = 16$) and medical ($n = 23$) students were improved following contact. Mean attitude scores of nurses toward doctors improved from 4.5 to 5.5, and improved attitudes toward nurses was seen in medical students (pretest $M = 5.1$, posttest $M = 5.6$; Carpenter, 1995b). The improved attitudes following contact was significant $F(1, 34) = 10.48, p < .05$ (Carpenter, 1995b). Contrary to the positive results found by Carpenter (1995a, 1995b), Barnes et al. (2000) found no change in professional stereotypes following contact. Licensed professionals (cohort one, $n = 25$; cohort two, $n = 46$) consisting of nurses, OT, SW, psychologists, and psychiatrists participated in a community health IPE program. Barnes, Carpenter, and Dickinson (2000) noted that “participants identified strongly with their teams” (p. 573); however, there remained “very strong evidence for the existence of interprofessional stereotypes” (p. 574). Study findings did not support ICT as there were no significant changes in stereotypes of professionals following contact.

Later studies using ICT as a framework for IPE demonstrated that contact does result in more positive attitudes toward outgroups (Ateah et al., 2011; Lindqvist, Duncan, Shepstone, Watts, & Pearce, 2005; Mohaupt et al., 2012). Students in nursing, medicine, OT, PT, and midwifery were randomly selected for an intervention ($n = 46$) or a control group ($n = 50$; Lindqvist et al., 2005). Students in the intervention group had interprofessional contact with other students as they worked through case studies.

Students in the intervention group viewed other professions (outgroups) as more caring following the intervention.

Ateah et al. (2011) found the ICT as a useful framework for IPE among health professions students in Canada. Students in dentistry, medicine, nursing, pharmacy, medical rehabilitation, and dental hygiene were randomly assigned to a control group, an education-only intervention group, or an interprofessional immersion experience intervention group. When comparing students' stereotype ratings of other professions at baseline and post-immersion IPE, researchers found significant improvement in scores of six of nine stereotype traits among all professions.

Additionally, Mohaupt et al. (2012) found that contact through an IPE simulation program resulted in more positive attitudes toward interprofessional collaboration. Overall, students in nursing, OT/PT, paramedic, and pharmacy technician reported higher scores for perceived collaboration and autonomy, need for collaboration, and actual collaboration following the contact experience.

Research findings by Mandy et al. (2004) yielded mixed support for the ICT. Researchers found that attitudes of PT students toward podiatrists became significantly more negative following an IPE module (pre-IPE, $M = 2.75$; post-IPE, $M = 3.0$). No significant change was found in pre-IPE to post-IPE attitude scores of podiatry students toward PT.

The majority of researchers employing ICT as a framework for IPE demonstrated that contact resulted in more positive attitudes toward outgroups (Ateah et al., 2011; Lindqvist et al., 2005; Mohaupt et al., 2012). While some researchers found either mixed or negative results with contact (Barnes et al., 2000; Mandy et al., 2004), it is important

to examine the studies to see if all antecedent contact conditions were present (Allport, 1958; Pettigrew, 1998).

Overall there was strong evidence that ICT is an appropriate foundation for a study of IPE. Interprofessional education brings individuals from various health care professions together, having potential for an ideal contact situation between ingroup and outgroups. Ingroup attitudes toward outgroups can be improved as a result of contact. It is predicted that the improved attitudes would bring about improved teamwork among health care professionals.

Interprofessional Education Research

Interprofessional education was brought to the forefront with the IOM's (2000) landmark report, *To Err is Human: Building a Safer Health System*. In this and subsequent IOM reports (IOM, 2000, 2001, 2003) academic institutions were challenged to actively teach health professionals to work together in order to prevent medical errors and improve patient outcomes. Since that time, IPE has become more common; however, as noted by Baker and Durham (2013), there is a lack of evidence as to the best practices for IPE. Baker and Durham also noted the complexity of IPE research, which is only complicated by many confounding variables. This review of IPE research will focus on participants in IPE, the role of participants, placement of IPE in academic curricula for health professions students, and outcomes of IPE in order to determine the known and unknown about IPE. Representation of various health professions was found among IPE research. While some research was conducted at the professional level, most was conducted at the student or pre-professional level. In either instance, there were at least two professions represented to be considered interprofessional in nature.

Participants of Interprofessional Education

Licensed professionals as participants of IPE. Participants in IPE at the professional level were varied and typically volunteers. A few studies included academic faculty from medicine, nursing, pharmacy, SW, OT, or PT (Curran, Deacon, & Fleet, 2005; Curran, Sharpe, & Forristall, 2007). These studies typically aimed to ascertain faculty attitudes toward IPE.

The majority of IPE research among professionals was conducted in a practice setting. Most studies included physicians, nurses, and various other health professionals from PT, OT, pharmacy, SW, SLP, anesthesia, and dietary (Carr, Brockbank, & Barrett, 2003; Curran, Sargeant, & Hollett, 2007; Doran et al., 2002; Mann, Sargeant, & Hill, 2009; Messmer, 2008; Morey et al., 2002; Strasser et al., 2008). The typical study involved licensed professionals and looked at the influence of IPE on collaborative teamwork or a clinical improvement in a given area (Carr et al., 2003; Slater, Lawton, Armitage, Bibby, & Wright, 2012).

Pre-professional students as participants in IPE. The diversity and number of professions involved in IPE at the pre-professional or student level was greatly varied. It was apparent that the availability of professional programs as well as scheduling issues was a factor in selecting IPE participants (Bradley, Cooper, & Duncan, 2009; Cameron et al., 2009; Hope et al., 2005; Kenaszchuk, Rykhoff, Collins, McPhail, & van Soeren, 2012; Ruebling et al., 2014).

Typical professions included in IPE research were some combination of medicine, nursing, OT, pharmacy, PT, or physician assistant (PA). Researchers expanded participation to include professions of paramedics (Riesen, Morley, Clendinneng,

Ogilvie, & Murray, 2012), dentistry, SLP, and medical radiation (Cameron et al., 2009), technicians/assistants in OT, and pharmacy (Kenaszchuk et al., 2012), athletic training, clinical laboratory sciences, cytotechnology, health information management, investigative medical sciences, nuclear medicine, nutrition/dietetics, and radiation technology (Ruebling et al., 2014). Occasionally, professions outside of health care were included in IPE. Riesen et al. (2012) included police along with nursing, paramedics, and SW. Kenaszchuk et al. (2012) brought together numerous traditional professions plus funeral services to work on a collaborative case study.

One important factor to remember when selecting participants or planning IPE is to ensure the IPE is relevant to all professions participating. Kenaszchuk et al. (2012) cautioned designers and researchers that the composition of the group must mimic reality in practice. Smithburger, Kane-Gill, Kloet, Lohr, and Seybert (2013) added that the IPE must incorporate aspects important to all participants involved. The collaborative case study described by Kenaszchuk et al. (2012) followed the health trajectory of an elderly patient injured in a fall. The inclusion of funeral services was appropriate as this case followed a trajectory through end of life. The IPE intervention in the Riesen et al. (2012) study focused on domestic violence, which would include aspects relevant to all professions involved, including police.

One concern regarding IPE is whether participation is mandatory or voluntary. In some studies, participation was voluntary (Chan, Chi, Ching, & Lam, 2010) while in others participation was mandatory (Kururi et al., 2014; Smith, 2014). In other studies, participation was either mandatory or voluntary, depending upon the professional program of the students (Brock et al., 2013; Shrader, Kern, Zoller, & Blue, 2013). It is

possible that voluntary participation may lead to inflated outcomes if attitudes or perceptions are being measured. McNair, Stone, Sims, and Curtis (2005) cautioned that voluntary participation may limit the generalizability of study results.

While it is important to ensure the IPE is relevant to all participating professions, the IPE can also be more meaningful if relevant professions are represented. Participants in studies by Carpenter, Ericksen, Purves, and Hill (2004) and Derbyshire and Machin (2011) noted a lack of medical student participation. One student responded “. . . it would be good to get a better mix of professionals involved in IPE . . . they [doctors] do have a lot of clout and have overall responsibility for the patients . . .” (Derbyshire & Machin, 2011, p. 241). Earland, Gilchrist, McFarland, and Harrison (2011) conducted a study involving 11 professions in an IPE intervention; however, data was collected from only dietetics students. Students noted the lack of involvement of some professions. One student commented “I think there should have been social workers to get a wider view . . .” (Earland et al., 2011, p. 138). Another student noted “not having the medics, future doctors, made a big impact on the balance of opinions” (Earland et al., 2011, p. 138). If at all possible, all relevant professions should be included in IPE, so student participants can have a more realistic view of the collaborative team process.

Though it is well-documented that IPE may include participants from any health profession, it may be of interest to note that participant demographics may influence outcomes. One example is the influence of profession. Typically, medical students and PT students had less positive attitudes toward IPE and interprofessional (IP) collaboration than other professions. Delunas and Rouse (2014) found that medical students scored physician-nurse collaboration significantly lower than nursing students. Mean pre-IPE

scores for medical students was 51.12 compared with nursing, ($M = 56.70$) significant difference $F(2, 53) = 6.803, p = .002$. Although both were less positive, post-IPE scores indicated a significant difference between medical and nursing students: $F(3, 70) = 14.076, p = .000$ (medical students $M = 46.58$, nursing students $M = 54.86$). Similarly, Williams et al. (2011) found that compared with other professions, PT students agreed less strongly that patients would benefit if health care students worked together ($M = 3.85, SD = 0.82$ for PT; $M = 4.33, SD = 0.68, p < .001$) across professions. In addition, Buckley et al. (2012) found that following IPE, medical students responded significantly less positively to questions about confidence in interacting with other professions than nursing students.

Placement of IPE in Curriculum

The IOM (2003, 2011) and the AACN (1995) called for the inclusion of IPE in the educational pathway of health professionals; however, the optimal timing of IPE within curricula is debatable. Some believe IPE should begin very early within the first year of professional programs, so students can learn to communicate and collaborate with other professions from the outset (Cameron et al., 2009; Klocko, Krumwiede, Olivares-Urueta, & Williamson, 2012). Others posited that students should begin to develop their own professional identity and be more comfortable with their own roles before being introduced to interprofessional learning (Stewart, Kennedy, & Cuene-Grandidier, 2010). Mazur, Beeston, and Yerxa (1979) agreed that students needed basic skills of their own professions and suggested that IPE be conducted during the clinical phase of health professions education.

Early placement of IPE. Researchers have demonstrated that IPE is conducted at various times throughout curricula. Hoffman and Harnish (2007) reported the earliest IPE that targeted first-year health sciences students before matriculation into health professions programs. Students were introduced to roles and responsibilities of various health professions, participated in exercises related to stereotyping health professions, and examined a patient case study in interprofessional groups. On a pre-post attitudes survey, Hoffman and Harnish (2007) found students had a significant self-reported increase in knowledge of roles and responsibilities of each health profession following the IPE: $F(1,1071) = 152.46, p < .001$. In addition, students had more positive attitudes toward IPE and collaborative practice post-IPE.

Cameron et al. (2009), Ruebling et al. (2014), Klocko et al. (2012), Giordano, Umland, and Lyons (2012), and Reeves (2000) presented findings of research in which IPE was placed in the first year of students' professional program. While IPE was situated within a clinical setting for two studies, all others were pre-clinical IPE. Cameron et al. (2009) described an introductory IPE module in which first-year health professions students learned about other health professions during a one-day IPE module, using small IP group activities and case studies. Pre-post interprofessional attitudes survey results showed a significant improvement in scores following IPE: $F(1, 388) = 113.03, MSE = 1.15, p < .01$. Consistent with Cameron et al. (2009), Ruebling et al. (2014) noted significantly more positive attitudes toward readiness for interprofessional learning and collaborative practice following an IP learning experience for first-year health profession students. In addition, students participating in IPE had more positive attitudes than students in a control group. Mean scores for the Readiness for

Interprofessional Learning Scale (RIPLS) for the intervention group were 36.13, $SD = 8.55$ pre-IPE and $M = 34.88$, $SD = 8.33$ post-IPE, in which the control group mean score was 38.77, $SD = 8.77$ (lower scores indicate more positive attitudes). First-year students participated in required IPE modules consisting of PowerPoint slides and small IP group activities (Klocko et al., 2012). Students demonstrated a 13.6% increase in self-reported teamwork skills following IPE from pretest $M = 1.64$, $SD = 0.20$ to posttest $M = 1.9$, $SD = 0.27$ (significant change at $p = .00018$). Giordano et al. (2012) also studied IP teams of first-year medical, nursing, OT, PT, or pharmacy students. Teams were paired with a community-dwelling volunteer who had at least one chronic illness. Over a two-year period of time, teams completed four required IPE modules. At the completion of the program, students' overall attitude toward IPE was generally high: $M = 3.94$ on a 4.0 scale.

In contrast, Reeves (2000) described a community-based IPE intervention in London in which second semester, first-year students in medicine, nursing, and dentistry visited local community-based agencies in an observational role. This IPE continued into the second year in which IP groups under the direction of a general practitioner interviewed both health care consumers and providers to better understand the health system. Through this qualitative study, Reeves found that students come to their respective schools with preconceived stereotypes of each profession. While Reeves concluded that IPE had little effect on the preconceived notions, he posited that continued IPE could help diminish traditional stereotypes. In spite of some negative findings, Reeves did note that for the most part, students reported working together in teams without dominance of any one professional group.

Hope et al. (2005) and Mészáros, Lopes, Goldsmith, and Knapp (2011) discussed IPE interventions early in professional programs before clinical placement. A student-led initiative in New York provided IPE for a group of 65 student volunteers from seven professional programs (Hope et al., 2005). After team-building exercises, group members worked together to select and implement an interprofessional community health action project. As a result of the IPE, participants reported a 44% improvement in teamwork skills ($p < .001$). There was also 36% improvement in understanding of professional function and a 52% increase in understanding of professional training of other professions.

Similar positive outcomes were found in another pre-clinical IPE intervention with students from medicine, pharmacy, and PA programs (Mészáros et al., 2011). Students worked in teams to discover medical errors in case scenarios. The majority of students reported being glad they participated in the IPE (100%), enjoying working with other professional students (61.6%), and learning something new (100%). In addition, 100% of the students agreed that IPE was useful and necessary. In a six-month follow-up survey, 91.7% of students reported that all members of the team had been actively involved during the IPE, and 50% of students reported working together to reach a consensus.

Lie, Walsh, Segal-Gidan, Banzali, and Lohenry (2013) provided more insight regarding early IPE within the first 2 years of education. Lie et al. (2013) compared student responses regarding IPE of second-year PA students who participated in a formal geriatric IPE experience with students who did not have a formal IPE experience.

Students from both groups reported that IPE should be required of all students and should commence within the first semester of study.

Most research of early IPE suggests the timing is efficacious in promoting IP working among students; however, it is unknown whether these positive results are stable over time. Perhaps it is important to note both Coster et al. (2008) and Pollard and Meirs (2008) found that overall students' attitudes toward IPE tend to worsen over time. Some positive results may be attributed to exuberance of students beginning a new profession (Smith, 2014).

Later placement of IPE. Mandy et al. (2004) contended that students must first begin to develop a sense of professional identity before commencing IPE. Negative stereotypes may be reinforced if IPE begins too early in the educational process. Students may be insecure in their own abilities and reluctant to share with other professions. McFadyen, Webster, and MacLaren (2006) added that students may not understand or appreciate the role and responsibilities of other professions before clinical exposure.

Ekmekci et al. (2013), Morison, Boohan, Jenkins, and Moutray (2003), McNair et al. (2005), and Stewart et al. (2010) discussed IPE activities occurring later in curricula. Teams consisting of students in medicine (fourth year), nursing (second year), PA (second year), and PT (third year) participated in coaching and simulation IPE workshops (Ekmekci et al., 2013). Students had significantly more positive perceptions of team performance after IPE. Likewise, Stewart et al. (2010) found positive results when teams of medical students (fourth year) and nursing students (third year) participated in pediatric simulations. While researchers used a posttest-only design, students had high

perceptions of knowledge and skill acquisition, communication and team working, professional identity and role awareness, and attitudes toward shared learning following IPE. Mean scores on a 100-point scale in the four domains were between 73.1 and 79.9 for medical students and 76.4 and 84.8 for nursing students.

In a study by Morison et al. (2003), students were at the same level as participants in Stewart et al. (2010). In regard to IPE timing, Morison et al. (2003) noted that students “. . . in their third or fourth year of study . . . felt confident in their own role . . .” (p. 101). Medical students ($n = 113$) and nursing students ($n = 17$) completed a two-week classroom IPE consisting of lectures, problem-based learning (PBL), and other small group activities. In addition, all of the nursing students and 35 medical students participated in a shared clinical placement. Students had mixed opinions of the classroom learning but were mostly positive about the shared clinical placement. There were no negative student comments regarding timing of IPE. In general, students believed IPE was important for learning about other professions’ roles and for communication between professions.

In a study by McNair et al. (2005), students were in varying stages of their programs of study. Nursing, medical, pharmacy, and PT students who had all completed some clinical participated in a rural IPE program. Interprofessional teams of students were placed for 2 weeks in a rural community health setting where they observed IP teams, participated in discussions, and completed a team project. Students demonstrated some positive and some negative changes in self-reported competencies for IP practice following the clinical IPE. On a scale of 1 to 5 in which 1 is *strongly agree*, after completing IPE, students indicated they felt more strongly that IPE should be part of all

health professions' pre-licensure training (pretest $M = 1.66$, posttest $M = 1.42$, $p = .011$).

At the same time, students answered more negatively when responding to feeling high levels of respect for other professions, pretest $M = 1.52$, posttest $M = 1.67$, $p = .043$.

A few studies were conducted very late in the students' education with mixed results (Brock et al., 2013; Leaviss, 2000; Smithburger et al., 2013). Leaviss (2000) interviewed 15 professionals after 1 year of employment to examine the effect of a multiprofessional course taken during their last year of study. Only two previous students reported more positive attitudes because of the course, and one respondent reported more negative attitudes. While overall, participants believed the course helped them gain knowledge about other professions' roles, most felt their undergraduate education resulted in more negative attitudes toward other professions, especially toward medical students.

In contrast to Leaviss (2000), Brock et al. (2013) and Smithburger et al. (2013) both found more positive results associated with late IPE. Brock et al. (2013) described a successful mandatory IP team capstone held just before graduation for students in medicine, nursing, pharmacy, and PA programs. Student teams completed three simulated exercises using human patient simulators or standardized patients. Pretest-posttest scores were compared for two selected instruments to measure attitudes, motivation, utility, situational awareness, leadership, mutual support, and communication. Results showed significantly improved scores for all subscales except leadership. Authors did not indicate any previous IPE among participants. This culminating IPE capstone afforded students an opportunity for interprofessional collaboration as students addressed complex clinical scenarios. Positive results were also

seen in a small study conducted by Smithburger et al. (2013) to test the feasibility of IPE using high fidelity human patient simulators. All students were in the last year of education and represented five professions. As IP student teams completed four simulation scenarios, researchers evaluated the team's communication and team skills. Overall, team scores improved significantly from scenario one to scenario four.

Interprofessional education across the curriculum. Earland et al. (2011) and Rogers (2010) looked at the impact of IPE across the curriculum for health professions students. Earland et al. (2011) asked opinions of dietetics students who had participated in three virtual learning, patient care scenarios over their four-year program of study. Overall students were dissatisfied with the timing of IPE. Students believed they should have had clinical experience before delving into the interprofessional role. The third scenario was well-accepted because it was after clinical placement of students.

Rogers (2010) also encountered mixed feelings from midwifery students in the UK. Though not specified by Rogers as to the type of modules, midwifery students participated in IP modules throughout their three-year educational experience. While there was a general consensus that early IPE was beneficial, Rogers found that a number of students favored later introduction of IPE. One student remarked the following comment:

I think they should do the midwife-specific ones in the first year and do more of the interprofessionals later . . . it's difficult at the beginning you are thinking I've come here to be a midwife . . . it takes time to realize you're interprofessional." (Rogers, 2010, p. 460)

While the IPE was not specifically across the curriculum, Cooper, MacMillan, Beck, and Paterson (2009) described a student-led IPE on global health issues that had participants from first to their last year of education. This study was qualitative and no

attempt was made by researchers to compare data based upon year of study. When questioned about challenging professional stereotypes, one student responded:

I think if you expect students to wait until they are graduating, it's too late. They have already formed their opinions or misconceptions of what another profession is responsible for doing. It doesn't help to build trust, respect or communication. It just reinforces negative stereotypes. (Cooper et al., 2009, p. 216)

Summary regarding placement of IPE. There seems to be no solid evidence to support ideal timing within curricula. Only one study indicated some comparison of IPE timing. Rogers (2010) found that students preferred to have some clinical experience before IPE. Researchers may have noted the student level of participants in studies; however, they failed to test timing as a variable. For example, Williams et al. (2011) evaluated readiness for interprofessional learning among numerous professions and across all years of study. While outcomes of various professions were compared, no comparison was made for year of study.

Some researchers have suggested having medical students at a lower level and other professions at a higher level for IPE (McNair et al., 2005), which may reduce the feelings of hierarchical status frequently attributed to the medical profession. This difference in timing for IPE based on profession was employed by Delunas and Rouse (2014) in a study of first-year medical students and junior nursing students. Student teams followed an adult in long-term care for three semesters. Medical students completed a pathophysiology paper while nursing students completed a reminiscence paper. Results showed that medical and nursing students had less positive attitudes toward physician-nurse collaboration following IPE. It should be noted that this educational endeavor was more multi-professional in nature rather than interprofessional as each profession worked alongside each other to complete profession-specific tasks.

It is challenging to reach a decision as to the optimal timing for IPE based upon available literature. Comparison of the aforementioned studies regarding timing of IPE is cautioned. Each study comes with many variables, making comparison difficult. These variables include but are not necessarily limited to the type of IPE and role of participants, the outcomes being measured, participant demographics, and timing of IPE. While quantitative data regarding ideal placement of IPE in the curriculum is lacking, qualitative data of student comments does yield some consistency. Students believe that IPE should begin at some time before professional licensure (Clark, 2011). It also seems that even though students believed IPE should begin early (Lie et al., 2013) most believed it is beneficial to have some clinical experience before IPE, enabling students to be more comfortable in their own profession before learning to work with other professionals (Earland et al., 2011).

Roles of Participants in Interprofessional Education

The role of participants in IPE is varied and dependent upon the learning and teaching method employed. Participants include both faculty and students. Though some student roles may be passive, most IPE offerings include active activities. Student roles in IPE may be classified as either non-patient contact or patient contact activities.

Faculty roles in IPE. Faculty may take on one of several roles in IPE. First, IPE is typically designed by faculty members from two or more professions (Becker & Godwin, 2005; Chan et al., 2010; Juntunen & Heikkinen, 2004). Faculty also is responsible for orienting students to the IPE coursework (Becker & Godwin, 2005). If the IPE involves lecture or some didactic component, faculty is responsible for delivering the content (Carpenter et al., 2004; Tunstall-Pedoe, Rink, & Hilton, 2003). When IPE

involves PBL, case studies, or group discussions, faculty members from participating professions serve as facilitators and content experts to guide students (Chan et al., 2010; O'Neill & Wyness, 2005). In clinical type settings, faculty members may provide direct oversight of students giving patient care (Jakobsen, Larsen, & Hansen, 2010), or they may be support for agency staff who oversee students (Hallin, Kiessling, Waldner, & Henriksson, 2009). In most instances faculty retain responsibility for assigning grades if applicable (Ponzer et al., 2004; Tunstall-Pedoe et al., 2003).

Students in first-year OT, PT, and respiratory care participated in a mandatory six-week online IPE module (Becker & Godwin, 2005). Interprofessional student teams were presented with a case study and completed weekly discussions and other assignments. The experimental group received online orientation and feedback from volunteer faculty mentors in an effort to promote teamwork skills. Student perception of interprofessional teamwork was compared pre-IPE and post-IPE as well as an experimental to control group comparison. The control group completed the WebCT IPE modules but without orientation and ongoing faculty feedback. Students in the experimental group were found to have more positive perception of IPE teamwork following IPE than before IPE, pretest $M = 69.9$, posttest $M = 72.4$ in comparison with the control group, which had more negative responses post-IPE, pretest $M = 70.7$, posttest $M = 68.2$. The differences between control and experimental groups was significant at $p = .006$ for posttest scores. These findings indicated the importance of faculty feedback to promote IPE.

No matter which roles faculty may have, it is important for faculty members to be comfortable with their roles in IPE and with the content for which they are responsible

(Kent, Drysdale, Martin, & Keating, 2014). In one study, students commented about the lack of knowledge or training for IPE among faculty (Lie et al., 2013). One student reported, “. . . they (faculty) were not clear about our specific roles, and what we were supposed to do . . . The faculty should really know what the (health professions) roles are” (Lie et al., 2013, p. 39).

Student roles in IPE. With a few exceptions, the role of students in IPE seems to follow guidelines of experts for teaching and learning. The most effective learning will incorporate some active learning process for the student (Benner, Sutphen, Leonard, & Day, 2010; Merriam, Cafferella, & Baumgartner, 2007; Young & Paterson, 2007). Even with some active methodology, most IPE opportunities included some lecture or didactic component to introduce concepts of IPE and interprofessional working and explain roles of each profession (Shrader & Griggs, 2014). It should be noted that the exact nature of IPE in some studies was vague, and student roles were not clearly described.

Non-patient contact roles of students. Many non-patient contact IPE activities were described in the literature and were categorized as college or university courses (Brown et al., 2008; Carpenter et al., 2004; Faresjö, Wilhelmsson, Pelling, Dahlgren, & Hammar, 2007; Hansson, Foldevi, & Mattsson, 2010; Kururi et al., 2014; Whelan et al., 2005); electronic learning modules (Davies et al., 2011; Johnson, 2005; Juntunen & Heikkinen, 2004; Morey et al., 2002); or some type of program, seminar, or workshop (Catangui & Slark, 2012; Chan et al., 2010; Curran et al., 2012; Margalit et al., 2009; Owen et al., 2014; Ragucci, Steyer, Wager, West, & Zoller, 2009; Tunstall-Pedoe et al., 2003; Williams et al., 2011). Student roles varied within each category of non-patient contact IPE activities.

Student role in courses. A great number of the non-patient contact IPE activities were within courses for health professional students. Some were designated as IPE courses (Kururi et al., 2014) while many were IPE courses designated by a particular common subject matter, such as culture (Brown et al., 2008), diabetes (Pittenger, Westberg, Rowan, & Schweiss, 2013), or ethics (Carpenter et al., 2004; Faresjö et al., 2007; Hansson et al., 2010; Whelan et al., 2005). Courses are mandatory or elective and student roles are highly varied. First-year students in nursing laboratory science, PT, and OT participated in mandatory lecture-style, joint classes on holistic medicine/teamwork studies and interprofessional work overview (Kururi et al., 2014). As the author noted, this first-year course was really more multiprofessional rather than interprofessional in nature. Pretest-posttest results of a survey of attitudes toward health care team indicated a decline in student scores following the lecture-style IPE. For example, scores of one item related to quality of care delivery decreased significantly after the lecture-style course: pretest score $M = 4.36$, $SD = 0.68$; posttest score $M = 4.03$, $SD = 0.69$, $p = .001$.

Brown et al. (2008) described an elective IPE course as primarily didactic with a cultural component. In addition to guest speakers and topic discussions, students were assigned to small interprofessional groups and assigned to address a weekly cultural topic imbedded in a medical case study. Results of a pretest-posttest survey related to IPE showed that students had more positive attitudes toward working in interprofessional teams following IPE. Eight of the 11 IPE survey items were significantly more positive post-IPE. Student roles were somewhat different for participants in an elective course on diabetes management (Pittenger et al., 2013). Interprofessional groups of pharmacy and nursing students were responsible for collaborating to plan care for an imagined patient

with diabetes. Because students were on remote campuses, interactive television enabled students to meet in interprofessional groups for the initial contact. In addition, students communicated using asynchronous online Web format to complete required diabetes care projects. While scores of two interprofessional surveys showed no significant differences from pretest to posttest, general comments of students did indicate some positive influence of the course. The majority of students (79%) commented about better understanding roles of other professions following the IPE. Most complaints came from the delivery method of the course and from a lack of real collaboration between professions.

Carpenter et al. (2004) described a joint ethics course for health professions students at the University of British Columbia. Students from 14 health professions participated in the elective course. Ethical topics were presented in either lecture or panel presentation format. Course faculty members tutored small groups as students discussed ethical case studies. After entering their respective professions, former students were surveyed to determine the extent to which the course aided in participants' ability for interprofessional collaboration on ethical issues. Students rated the overall global value of the course as good to excellent. Researchers found a significant correlation between the global value of the course and participants' ability to identify ethical issues ($r = 0.644, p < .01$) and work as an interprofessional team ($r = 0.435, p < .01$).

In another study, first-year students in medicine, nursing, PT, OT, and medical biology at Linköping University in Sweden participated in a mandatory common course titled Health, Ethics, and Learning (Faresjö et al., 2007; Hansson et al., 2010). In this course, interprofessional groups of students worked toward achieving interprofessional

competence as they used PBL to address ethical issues. Student attitudes toward physician-nurse collaboration was compared pre-IPE and post-IPE as well as to a non-IPE intervention group at a different university (Hansson et al., 2010). No significant difference was found in attitudes of students participating in the first-year course and the control group.

Whelan et al. (2005) assessed student opinions of a first-year IPE course on clinical communication and ethics for students from nine health professions. This IPE was described as 4 hours of lecture and over 6 hours of interactive workshops. Only dietetics students ($n = 26$) were surveyed asking about the interest value of the learning experience and value for clinical practice for each of the seven sessions. While all but one session received significantly positive results, little information was gained in regard to IP teamwork or other professions

Student roles in electronic learning modules. Many IPE opportunities described as modules used some sort of electronic learning (Davies et al., 2011; Johnson, 2005; Juntunen & Heikkinen, 2004). Davies et al. (2011) described the role of students from 13 professions in IPE as interprofessional learning modules delivered using WebCT platform. The modules were run annually throughout the students' educational program. Students participated in online discussions following a patient case study. Researchers sought input from only physiotherapy students in their final year of study. The majority of students rated the IPE as relevant to clinical practice (58%) and significant during their clinical placements (69%) as compared to other university learning. In addition, 74% of students reported a more positive awareness of other professional roles. However, less

than half of the students (45%) felt the IPE would affect their ability to work with other professions.

Johnson (2005) described an IPE module for students in nursing, radiology, midwifery, PT, and SW. Following a video clip of a patient scenario, interprofessional groups of 12 students discussed care for the patient. Outside of the six weekly sessions, students were responsible for researching topics pertinent to the case as well as participating in online discussions. Qualitative comments indicated that students felt the learning experience allowed students to work together and share knowledge (61/67 participants). The biggest negative finding was the lack of relevance to some participants. Students noted that the case was dominated by mental health nurses and social workers with no real relevance for those in radiology. Because the design of the module did not require interprofessional collaboration while researching information for the case studies, students tended to work in groups within their own profession instead of working with students from other professions.

An electronic learning IP module on elderly care was discussed by Juntunen and Heikkinen (2004). One hundred and twelve students completed the module. Video lecture via WebCT platform was used to present central concepts of the module. Students completed required online discussions and assignments within assigned interprofessional groups. In addition, each student interviewed an older adult, then discussed findings as a group within the context of the central concepts of elderly care. Qualitative data regarding the IPE module indicated that students appreciated the occasion to improve knowledge about working with elderly from different professional perspectives. However, students also reported that the required work was rarely

collaborative and did not result in much discussion. In addition, students cited numerous technological problems with the electronic learning platform.

Student roles in programs, seminars, or workshops. Many of the IPE activities were designated as some type of program, seminar, or workshop and included some type of case study (Chan et al., 2010; Curran et al., 2012; Hanyok, Walton-Moss, Tanner, Stewart, & Becker, 2013; Williams et al., 2011). Medical residents and adult health nurse practitioner (NP) students completed an IPE intervention (Hanyok et al., 2013). Following an initial introduction and discussion of professional backgrounds and stereotypes, IP dyads collaborated to plan care for a patient in a case study. Participants completed a survey regarding interprofessional attitudes and practices before and after IPE. Significant changes in attitudes were seen for nine of 21 survey items. Following the IPE case study work, participants reported improved attitudes toward IPE and teamwork as well as more respect for other professionals.

Curran et al. (2012) described an interprofessional collaboration workshop in which nursing, allied health, and psychiatric postgraduate residents learned about collaboration using a combination of lecture, videos, group discussion, and case studies. Ninety percent of participants felt their understanding of IP collaboration was improved following the workshop. While there was no significant change in attitudes toward IPE and health care teams, a post-workshop follow-up indicated changes in team meetings and understanding of professional roles in patient referrals following IPE.

Williams et al. (2011) also reported on an interprofessional workshop for undergraduate students in six health-related professions at Monash University in Australia. Case studies of patients with various health conditions were presented to

students using a DVD video. Students from each profession incorporated their own knowledge and roles as a joint collaborative plan of patient care was developed. Attitudes toward IPE were measured pre-IPE and post-IPE and again 6 months following IPE. Most of the 19 items on the survey demonstrated improved attitudes; however, only four items showed significant changes. Two facts regarding the results are noteworthy. First, students had relatively high attitudes on the pre-IPE survey with most mean scores 3.84 or greater on a five-point scale. Another fact important to note is that survey scores did not significantly decrease by the six-month follow-up. In other words, students' positive attitudes toward IPE did not diminish over time.

Chan et al. (2010) also employed a case study in a PBL IPE for senior nursing and SW students. Students were given a case study about elder abuse, an article on ethical decision making, and a set of questions to guide preparation for two IPE seminars. Both small and large group discussions were used to address the ethical case study in seminars. As a result of this IPE activity, students reported greater awareness of the different emphases and roles between professions. Students also completed a 14-question survey to ascertain effectiveness of the IPE methodology. A scale of 1 to 5 indicated effectiveness with 1 being most effective. A mean score of 1.93 indicated that students felt the interprofessional group discussion was an effective methodology to facilitate learning. Also, students reported the IPE approach was effective in enhancing knowledge of other professions: $M = 1.77$. These research studies demonstrated that case studies are somewhat effective in helping students understand roles of other health professionals. There was mixed evidence of the impact of IPE using case studies to change attitudes toward other professions.

Ragucci et al. (2009) described a competitive extracurricular IPE program for students of six health professions colleges at the medical University of South Carolina. For this program, students completed a day-long retreat plus evening sessions throughout the year-long program. Each evening students had presentations and group discussions on topics such as health care systems, team behavior, and ethical concerns. In addition, interprofessional student teams completed a team research project focusing on a health disparity. All activities were interactive and were intended to increase understanding of IP roles while reducing professional stereotypes. Students understanding of interprofessional collaboration was significantly improved following the IPE program as demonstrated by mean scores on an IP collaboration survey: pre-IPE $M = 3.57$, post-IPE $M = 3.90$ on a five-point scale, $p < .05$. In addition, posttest mean scores were higher for the IPE group ($M = 3.90$) than for the control group ($M = 3.58$).

Margalit et al. (2009) described a one-day IPE program for students in six academic health programs at the University of Nebraska medical center. Students completed four Web-based interactive modules prior to the IPE day to learn about IP teamwork, hospital-acquired infections, and communication errors. The IPE day consisted of a large panel presentation in which a transplant team demonstrated effective IP collaboration. Following the presentation, students met in small IP groups in which they completed team-building exercises and addressed case studies based on quality care issues of hospital-acquired infections and communication errors. Students were asked to evaluate the various components of the IPE program. Only 39% of students found the online modules to be excellent or good. The online discussions were rated even less favorable with only 23% indicating excellent or good. In contrast, 85% of students found

the transplant team presentation to be excellent or good. The most favored learning methodologies were the group interactions (91% excellent/good) and facilitator leadership (96% excellent/good). In addition, mean scores on a survey demonstrated students had more positive attitudes toward shared learning. Following the IPE program, posttest score means were between 0.22 and 0.42 points higher for six of 19 survey items.

Student roles in simulation. Simulated patient contact was utilized by many researchers as a delivery method for IPE (Baker et al., 2008; Lewitt, Ehrenborg, Scheja, & Brauner, 2010; Mellor, Cottrell, & Moran, 2013; Shrader & Griggs, 2014; Titzer, Swenty, & Hoehn, 2012). Baker et al. (2008) described two piloted simulated events for medical and nursing students. One pilot simulation focused on cardiac resuscitation. Each student in a team of five had opportunity to act as team leader for the resuscitation. Students gained skills in resuscitation, team leadership, and team communication. The second pilot simulation was merely a shared competency module in which medical and nursing students simulated intravenous access. The intravenous access simulation was simply professions working side by side and not interprofessional in nature. Researchers found the resuscitation simulation to be effective in helping students understand team roles. All students felt the intravenous access simulation was valuable but reported a lack of interaction between medical and nursing students during the exercise.

Students in nursing, radiologic technology, OT, and respiratory therapy participated in a patient care scenario using a high-fidelity manikin (Titzer et al., 2012). Prior to this simulation, students viewed a presentation on roles and responsibilities of professions involved in the simulation. Because of the great number of students, only 28 students in teams of seven were involved in the simulation. The remaining 103 students

completed an observer checklist while watching the simulation. For the simulation, students completed tasks specific to their profession for a patient with a paralytic ileus and history of chronic lung disease. The various professions collaborated to prioritize care and problem solve during the simulation. Five items on a survey were used to assess students' perception of the use of simulation to address collaboration and problem solving. For each item, 87% to 95% of students scored greater than or equal to 4 on a five-point scale, indicating agreement or importance. In addition, students' perception of each profession's roles and responsibilities in the simulation was assessed. Student responses indicated an understanding of professional roles following the simulation.

Though the exact nature of the IPE was not well defined, Mellor et al. (2013) reported on an IPE program in which students in medicine, PT, OT, pharmacy, and nursing worked in small IPE groups for four, 3.5-hour sessions. The group activities included case studies, simulations, and simulated ward rounds. Qualitative results demonstrated the effectiveness of these IPE methods. Communication and teamwork skills improved as a result of IPE. One student remarked ". . . it enforced you to think more about caring for the patient as a team as opposed to 'This is my job and that is what I am going to do'" (Mellor et al., 2013, p. 294). In addition, students reported a greater understanding of others' professional roles. As one student stated

. . . being able to get in that environment where you can practice scenarios and you can actually get to know some of the other team members and what their role is, . . . [you will have] a better working environment and work ethic, and professionalism when we are actually out in the workforce . . . (Mellor et al., 2013, p. 295)

Shrader and Griggs (2014) told of a clinical assessment course for pharmacy students in which nine IPE activities were embedded. Eight of the nine activities

involved simulated IPE activities. As a team, students from pharmacy, medicine, nursing, and PA programs completed a simulated code blue situation and a simulated acute unstable patient scenario. A standardized patient was used to simulate discharge planning. In addition, pharmacy students had several opportunities to simulate communication with physicians in making pharmacologic recommendations for patient care. Researchers assessed pharmacy students for changes in perceptions of IP collaboration following IPE. Pharmacy students had improved perception of IP collaboration in 16 of 18 items ($p < .05$) following IPE. Simulation has been found effective in improving students' knowledge of roles and responsibilities of other professions as well as improving perception of IP collaboration (Mellor et al., 2013; Shrader & Griggs, 2014; Titzer et al., 2012). Students have the opportunity to work with other professions in a controlled safe environment when simulation is used for IPE. Unlike the clinical setting, simulation allows for similar experiences for all students.

Patient contact roles of students. Many IPE activities included patient contact roles for student participants. Even within patient contact settings, student roles varied. For some, students visited a clinical setting to observe teamwork (O'Neill & Wyness, 2005; Tunstall-Pedoe et al., 2003). Some patient contact IPE opportunities included patient visitation with interviews or some patient assessment (Shrader & Griggs, 2014). In other clinical IPE, students worked together under preceptors to provide patient care within clinics (Kent et al., 2014; Sicat, Huynh, Willett, Polich, & Mayer, 2014). In Sweden (Hallin et al., 2009; Lidskog, Löfmark, & Ahlström, 2008, 2009; Ponzer et al., 2004), Denmark (Jacobsen & Lindqvist, 2009; Jakobsen et al., 2010), and the UK

(Reeves & Freeth, 2002), much of the IPE in clinical settings was conducted in clinical education wards or IP training units.

Students in nursing, SW, medicine, and pharmacy took part in an IPE component as part of an elective course (O'Neill & Wyness, 2005). While the IPE activities included classroom with PBL, there was also a patient contact component. Student teams were mainly observers in the clinical setting as IP teams worked to provide care for patients with HIV/AIDS. This clinical experience allowed students to better understand the IP team. One student remarked ". . . being able to observe different professions working together as a team motivated me to want to do the same in my professional career . . ." (O'Neill & Wyness, 2005, p. 436).

Similar to O'Neill and Wyness (2005), Tunstall-Pedoe et al. (2003) described a course in which, among other IPE activities, students in medicine, diagnostic and therapeutic radiology, PT, and nursing were paired to observe primary health care teams as they functioned within a hospital setting. While the majority of students believed the IPE would enhance IP working and lead to better patient care, most students had a lower attitude toward other professions following IPE. Whether observation of other IPE teams in action is effective remains unknown as mixed results were seen in these studies. It is important to note that observation was not the sole variable in either study.

Although the study by Shrader and Griggs (2014) was discussed earlier when considering simulation as an IPE method, this IPE also included a home visit to a geriatric patient. Students in pharmacy and medicine conducted a patient interview and medication assessment of an older adult. Just as the results of observation IPE were

confounded by other IPE methodologies, the positive results noted in this study may be attributed to simulation IPE.

Sicat et al. (2014) described a patient contact IPE for medical and pharmacy students in an internal medicine and primary care clinic. Students interviewed patients and served as primary care providers under the direction of preceptors. In addition, students had resources available to learn about roles and responsibilities of each profession. These included written descriptions, online modules, and facilitated group discussions. Students indicated that working with other students and preceptors in the IPE clinics was the most beneficial aspect of their learning. In spite of the positive feelings toward the clinical IPE, no significant difference was found between pretest and posttest scores for attitudes toward IP teamwork or other team members.

Kent et al. (2014) also described a clinic setting for IPE. The clinic was developed for the purpose of providing IP learning experiences for health professions' students in Melbourne, Australia. Students were from 10 professional programs and were supervised by a general practitioner and health professions' educators. Patients seen in the clinic were older adults recently discharged from acute care. Student teams interviewed patients and completed screenings to assess the need for referrals or follow-up services. The student-led IPE clinic was effective in helping students understand the roles and responsibilities of other professions as well as understand the benefit of the IP team perspective on patient care. Students "reported a new awareness of the potential weakness in approaching patient care from the limited perspective of one discipline" (Kent et al., 2014, p. 53). One student elaborated by stating, "it's interesting to see how much we miss when we are just focusing on our own profession and our own goals . . ."

(Kent et al., 2014, p. 54). Another student spoke specifically about teamwork saying, "it was great to see how we could actually work so well together to actually improve the people . . . who came to see us . . ." (Kent et al., 2014, p. 54).

Several examples of IPE within acute care clinical education units were found in the literature. These education units were commonly found in Western European countries. Lidskog et al. (2008, 2009) described clinical IPE on a training ward in a nursing home in Sweden in which students in nursing, OT, and SW cared for older adults during their time of recovery or rehabilitation. Student teams were engaged in total care for the patients along with permanent professional staff of the facility. In addition, permanent health care assistants were employed to assure continuity of basic patient care needs. Students spent a total of 3 weeks on the training ward. Researchers assessed student attitudes using both quantitative (Lidskog et al., 2008) and qualitative (Lidskog et al., 2009) methods. Following IPE, students in each profession reported a better understanding of other professions. There was improved understanding of nurses by 65% of students in OT and SW, but 81% and 80% of students reported greater understanding of OTs and SWs, respectively (Lidskog et al., 2008). There was no significant change in appreciation of other professions following IPE; however, students had reported a relatively high regard for other professions before IPE. Students voiced concern when asked if the experience helped develop their own professional role. Students felt they were assigned basic patient care, a task usually completed by health care assistants (Lidskog et al., 2009). One student noted "there's no real teamwork when students from different professions work together in doing the health care assistants job. They don't have the opportunity to train their own role in the team, nor do they see others in their

real roles" (Lidskog et al., 2009, p. 492). Students felt they needed more responsibility and independence to perform the roles of their respective professions.

Ponzer et al. (2004) and Hallin et al. (2009) also described IPE conducted in a clinical education ward in a university hospital in Sweden. Teams consisting of students from medicine, nursing, PT, and OT provided care for patients in an orthopedic ward under the supervision of tutors who were professional staff at the hospital. Students were to perform activities according to their respective professional roles. Over the two-week time period, rotating student teams provided patient care throughout the day and evening hours. Ponzer et al. (2004) first reported on an evaluation of IPE in the clinical education ward from 2000 to 2001. The majority of students (64%) perceived a greater clarity of their own professional role after IPE. Following the clinical experience, students perceived a significant improvement in knowledge regarding other professions. In addition, students indicated a significant increase in and understanding of the importance of good communication among team members. In later studies from 2002 to 2005, Hallin et al. (2009) found similar results. Students in all four professions reported an increase in knowledge about the other professions following IPE. All student groups believed the IPE aided in gaining a clearer understanding of the importance of collaboration and patient care. Contrary to findings by Lidskog et al. (2008), Hallin et al. (2009) found that students gained clarity of their own professional role and professional competence following IPE. When students performed roles similar to their professional role, more positive attitudes resulted.

An orthopedic and rheumatology ward in London was the setting for IPE for students in nursing, medicine, OT, and PT (Reeves & Freeth, 2002). Supervised teams of

students planned and delivered care to patients during a two-week time period. Similar to the role of students in studies by Ponzer et al. (2004) and Hallin et al. (2009), students worked within their profession-specific roles as well as team duties of basic patient care activities. Qualitative data revealed mixed feelings of students regarding their experience. Overall students believed the IPE experience on the training ward to be effective in enhancing teamwork skills by offering more opportunities for IP communication and collaboration. However, there were concerns regarding team duties. Medical students' involvement in team duties was limited as they were occupied preparing for morning rounds. Medical students felt their purpose on the ward was to serve as house officer, not participate with other team members in general patient care. The other three professions worked together to complete general care and had the understanding that all professions would work together.

Jacobsen and Lindqvist (2009) and Jakobsen et al. (2010) offered another example of an IP training unit on an orthopedic ward at a hospital in Denmark. Student teams from nursing, OT, PT, and medicine performed similar roles as students in the studies by Ponzer et al. (2004) and Hallin et al. (2009). Jacobsen and Lindqvist (2009) and Jakobsen et al. (2010) noted the influence of the clinical IPE in Sweden in designing the IPE teaching unit in Denmark. At a morning IPE meeting, students planned patient care, after which students began performing their jobs. Even though in Denmark nurses and physicians traditionally complete patient rounds, only medical students attended rounds for IPE. Jacobsen and Lindqvist (2009) noted improvement in attitudes toward other professions following IPE. Before IPE, physicians were seen as the least caring of all professions and nursing as the most caring. Also nurses were viewed as most

subservient and physicians least subservient. Following IPE, all professions were seen as more caring than before IPE. Physicians were seen as somewhat more subservient and the other three professions as less subservient following IPE. Jakobsen et al. (2010) surveyed medical students who participated in the IPE on the IP training unit. Among other purposes, researchers wanted to examine the contribution of the IPE on students' IP collaboration. The majority of students, more than 90%, responded that as a result of IPE, they learned more about the role of the other professions and IP collaboration. One medical student commented that "the stay in the ITU [interprofessional training unit] has given a good insight into the other professions way of working and how we could collaborate and learn from and about each other" (Jakobsen et al., 2010, p. e395).

Faculty and student roles in IPE are varied although there is more variance in student roles. Most roles include some type of active learning opportunity. The efficacy of each role as evidenced by positive outcomes is not necessarily dependent upon the role alone. As noted in the discussion above, similar participant roles produced different results. Because of multiple variables, it may not be possible to determine the best student role for IPE.

Outcomes of Interprofessional Education

The efficacy of IPE is dependent upon the outcome by which the IPE is evaluated. Similar IPE programs may demonstrate varying degrees of efficacy depending upon the outcome variable. The new world Kirkpatrick model (Kirkpatrick & Kirkpatrick, 2015) offers a useful framework for evaluating IPE outcomes. The four levels by which outcomes are classified include reaction, learning, behavior, and results. The lowest level of outcomes, reaction, focuses on learners' satisfaction with, engagement in, or perceived

relevance of the learning event. The second level, learning, seeks to ascertain whether participants gained knowledge, skills, attitudes, confidence, or commitment because of the learning event. Level three outcomes, behavior, center on whether participants applied learning. The last level of outcomes is the most important as it focuses on the results of learning. Several researchers utilized Kirkpatrick's model of evaluation when discussing IPE outcomes (Carpenter, Barnes, Dickinson, & Wooff, 2006; Mann et al., 2009; Slater et al., 2012; Weaver et al., 2010). Kirkpatrick's model was utilized to classify IPE outcomes in this literature review.

Reaction to IPE. The lowest level outcome to assess for IPE is participant reaction to IPE. Many researchers include participants' satisfaction with IPE as an outcome of interest (Carpenter et al., 2006; Carr et al., 2003; Curran et al., 2007; Mann et al., 2009; Weaver et al., 2010); however, few used reaction to IPE as a sole variable of interest (Achike et al., 2014; Mészáros et al., 2011). While it may be important to know whether or not participants enjoy IPE or believe it to be relevant, this outcome does little to demonstrate effectiveness of IPE. Only level one outcome was assessed by Achike et al. (2011) and Mészáros et al. (2011) who surveyed students to learn their opinions after IPE. In general, both found that students liked the IPE and found it helpful. Achike et al. conducted a pilot study of IPE in which students in medicine and nursing worked through clinical scenarios to address safe drug use. While the majority of students agreed the objectives were clear (94%) and the class was useful (84%), students were somewhat critical of the organization of the class. Only 59% of participants felt the class was organized. Mészáros et al. also focused the IPE on promoting safety by having IP teams of students in medicine, pharmacy, and PA programs identify medical errors in scenarios.

Similar results were found by Mészáros et al. All students identified that the IPE was useful. However, only 61.6% of students found the IPE format to be good.

Many other researchers assessed level one outcomes in addition to other, higher level outcomes. IPE offerings varied from workshops (Mann et al., 2009), online modules and working in IP community health teams (Carpenter et al., 2006), simulation (Buckley et al., 2012; Kilminster et al., 2004; Kowitlawakul, 2014), workshops with case studies (Carr et al., 2003), and team training for professionals (Bajnok, Puddester, MacDonald, Archibald, & Kuhl, 2012; Curran et al., 2007; Slater et al., 2012; Weaver et al., 2010). In all instances, overall satisfaction of the IPE was good. In addition to general satisfaction, many indicated that the IPE was relevant. Participants in the Slater et al. (2012) study reported the IPE to be relevant ($M = 4.0$ on a five-point scale). Weaver et al. (2010) found the IPE was relevant for 81% of participants. Qualitative remarks also substantiated the positive reaction. Kilminster et al. (2004) reported all but one of 28 participants offered positive comments about IPE. Focus group data from Bajnok et al. (2012) offered positive reactions to IPE when participants indicated they liked the speakers. Some participants had mixed reactions to IPE. Carpenter et al. (2006) found students to be very positive about the IPE event, reporting the IPE to be relevant and engaging. However, the course requirements were reported to be very stressful, resulting in 25% of students dropping out of the program. Buckley et al. (2012) found that students responded favorably regarding the availability of video feedback following simulation; however, participants did not believe they would access it following the course. In some cases, the degree of satisfaction varied by participants. Buckley et al. (2012) and Mann et al. (2009) found that participants in medicine were significantly less

positive toward IPE than participants in nursing. Mann et al. (2009) reported that only 39% of physicians found interacting with other professionals in IPE to be a good use of time. Despite generally positive reactions to IPE, not all participants would recommend the IPE to others. While participants in the Weaver et al. (2010) study found the IPE to be organized (94%) and relevant (81%), only 71% of participants indicated they would recommend the IPE to others.

Learning from IPE. Level two outcomes focused on the degree to which the intended knowledge, skills, attitudes, confidence, and commitment was acquired by participants in IPE (Kirkpartick & Kirkpartick, 2015). The greatest number of IPE studies measured some attribute of learning. Many of the learning outcomes were measured by using a pretest/posttest assessment (DeSilets, 2009). Each assessment instrument sought to measure specific outcomes of interest to IPE. These instruments were primarily designed to measure modification of attitudes or perceptions or acquisition of knowledge/skills (Reeves, Boet, Zierler, & Kitto, 2015). It was not unusual to find researchers using more than one instrument to measure variables of interest (Brock et al., 2013; Delunas & Rouse, 2014; Pittenger et al., 2013; Smith, 2014). For example, although not all data was shared in the article, Carpenter et al. (2006) used multiple instruments across a two-year period of time to measure various attributes of competence and expertise.

Some researcher sought to measure participants' attitudes of professional attributes or stereotypes of other professions. Jacobsen and Lindqvist (2009) used the Attitudes to Health Professionals Questionnaire to ascertain how students viewed other professionals on dimensions of caring and subservience. Among students in medicine,

nursing, OT, and physiotherapy, doctors were seen as the least caring and subservient while nurses were seen as most caring and most subservient. Following IPE, all professions were seen as more caring and doctors were seen as somewhat more subservient while all other professions were viewed as less subservient.

Mandy et al. (2004) and Ateah et al. (2011) sought to find the impact of IPE on professional stereotyping. Mandy et al. used the Health Team Stereotype Scale (HTSS) to measure stereotypes of students in physiotherapy and podiatry. Scale range is from 1 to 7 in which higher scores indicate more negative stereotype. For physiotherapy student's stereotype of podiatrists, Mandy et al. found the pre-intervention HTSS median score to be 2.75, with the interquartile range from 2.0 to 4.0. After IPE, the median score was 3.0 with a narrower interquartile range of 2.5 to 3.5. Podiatry students' perception of physiotherapists was similarly more negative following IPE. Pre-IPE, median score was 3.25 with interquartile range of 2.5 to 4.0 and post-IPE median score of 3.75 and interquartile range of 3.0 to 4.125. While scores for both student groups were more negative following IPE, only change in physiotherapists' stereotype of podiatrists was found to be significant.

Unlike Mandy et al. (2004), Ateah et al. (2011) found that IPE reduced negative stereotypes of students toward other professions. The Student Stereotypes Rating Questionnaire (SSRQ) was used to assess student's perception of other professions. The SSRQ measures student perceptions of nine traits on a five-point scale. The higher score indicated a more positive perception of others. Three student groups were compared with assessing the influence of IPE on student perceptions. There was a control group that did not participate in IPE, a group that participated in education only, and an immersion

group in which students observed IP interaction in collaborative patient care settings. Ateah et al. (2011) found a significant increase in SSRQ scores for both the education and immersion groups following IPE. IPE was determined to be effective in producing more positive attitudes toward other professions. There was no evidence to support immersion over education only because no significant difference was found between changes in scores for the education and immersion groups.

Carpenter et al. (2006) also assessed professional stereotypes during a two-year postgraduate program for nurses, SW, OT, and other professionals. Carpenter et al. noted that students began the program with evidence of professional stereotyping and there was little change in stereotypes following IPE.

Many researchers assessed participants' attitudes toward health care teams or working in health care teams. Various instruments were used to evaluate the impact of IPE on the attitudes toward health care teams or teamwork. Several researchers used the Readiness for Interprofessional Learning Scale (RIPLS; Bradley et al., 2009; Dubouloz, Savard, Burnett, & Guitard, 2010; Kowitlawakul et al., 2014; Pittinger et al., 2013; Ruebling et al., 2014). This instrument provides information about student attitudes toward teamwork and collaboration, professional identity, and roles and responsibilities (Hertweck et al., 2012). Some inconsistencies in reporting results were found between authors, and inadequate description of the use of the instrument in the studies leaves readers unable to adequately compare study results. Coupling the author's comments regarding improvement in attitudes with data shown, it appeared that in some instances, higher RIPLS scores indicated improved attitudes (Bradley et al., 2009) while lower scores in the Ruebling et al. (2014) study appeared to be more favorable. Other authors

provided limited or no data (Kowitlawakul et al., 2014; Pittenger et al., 2013) leaving readers no way to validate stated findings. Ruebling et al. compared RIPLS results of a control group and pretest/posttest of the intervention group. There was a significant improvement in RIPLS scores after IPE ($M = 34.88$, $SD = 8.33$) compared with pretest scores ($M = 36.13$, $SD = 8.55$). Post IPE scores were found to be significantly better than the control group scores ($M = 38.77$, $SD = 8.77$). The lower, more positive scores demonstrated by the intervention group supported the use of IPE to change participant attitudes toward health care teams.

Bradley et al. (2009) found similar results for pretest/posttest scores of the RIPLS. Improved scores were seen for two subscales of the RIPLS following IPE. However, at a three- to four-month follow-up, improvement was not sustained. Scores for teamwork and collaboration were pre-IPE $M = 39.5$, $SD = 4.1$; post-IPE $M = 41.4$, $SD = 4.1$; and follow-up $M = 39.9$, $SD = 4.0$. Similar results were found for professional identity, pre-IPE $M = 30.1$, $SD = 3.8$; post-IPE $M = 32.1$, $SD = 3.9$; follow-up $M = 30.6$, $SD = 3.7$. Subscale scores for roles and responsibilities did not change significantly over time.

Dubouloz et al. (2010), Kowitlawakul et al. (2014), and Pittenger et al. (2013) also evaluated pre- and post-IPE attitudes using RIPLS; however, results were less positive. Dubouloz et al. assessed scores of PT students in a collaborative clinical placement. They noted high scores on RIPLS before clinical placement. No significant change in overall score was demonstrated following clinical placement. Only three items were found to have significant change after IPE. Qualitative data did provide some evidence of the efficacy of IPE in spite of test results. Students reported learning more about other professions' roles as a result of IPE. Kowitlawakul et al. also found

relatively high baseline scores for teamwork and collaboration. The only significant change attributed to IPE was improved scores for medical residents in teamwork and collaboration. IPE did not seem to influence any other outcome. Similarly, Pittenger et al. attributed a lack of change in RIPLS scores to high scores before IPE.

The Interdisciplinary Education Perception Scale (IEPS) was used by several researchers to assess student perceptions of interprofessional collaboration but with mixed results. The IEPS has four subscales: competence and autonomy, perception of need for cooperation, actual cooperation (which could be viewed as a level three outcome), and understanding of others' roles or value (Shrader & Griggs, 2014). Cameron et al. (2009) and Shrader and Griggs (2014) demonstrated the efficacy of IPE to improve perceptions of interprofessional collaboration. Shrader and Griggs surveyed pharmacy students before and after participating in a clinical assessment course in which IPE activities were integrated. Following the course, students scored significantly higher on 16 of 18 items on the IEPS. Cameron et al. (2009) found similar results following a first-year introductory IPE module. Improved scores were seen on 15 of 18 items of the IEPS. While Cameron et al. and Shrader and Griggs noted positive changes in IEPS scores, other researchers found no difference in scores of IEPS following IPE (Pittenger et al., 2013; Salvatori, Berry, & Eva, 2007). Pittenger et al. (2013) found no significant difference in IEPS scores following an interprofessional diabetes course. Likewise, Salvatori et al. (2007) found no significant change in student IEPS scores following clinical placement with weekly tutorials. While mean IEPS scores of pretest and posttest showed no significant difference, it was noted that medical students had significantly lower IEPS scores than OT and PT students for both pretest and posttest.

Pinto et al. (2012) observed significant difference in IEPS scores from baseline to follow-up between control and intervention groups. Students were placed in either traditional clinical placement or a structured IPE placement with weekly tutorials and case studies. Students in the control group had higher scores than the intervention group, indicating more positive perceptions of interprofessional collaboration. Students also gave comments following IPE. They reported the IPE experience helped them gain IP skills and knowledge as well as learn how to collaborate; however, the IEPS results did not support student claims.

The ATHCTS was used by Smith (2014), Giordano et al. (2013), and Bonifas and Gray (2013) to assess attitudes toward teamwork with varying results. In studies by Smith and Giordano et al., student teams visited a community-dwelling individual with at least one chronic illness and completed required assessments and wellness plans. Smith found no significant difference in overall ATHCTS scores pre- and post-IPE. The mean for pretest scores was 3.71, $SD = 0.48$ and posttest scores $M = 3.82$, $SD = 0.61$. While there was no significant difference in overall scores, six of 14 items indicated significant improvement. Giordano et al. (2013) did find significantly improved scores following IPE. Overall ATHCTS pre-IPE mean was 3.27, $SD = 0.45$, with posttest score mean of 3.75, $SD = 0.58$. While only Giordano et al. demonstrated significantly positive results following IPE, scores in Smith's study also improved following IPE, just not significantly. One explanation may be the relatively high baseline scores of students before IPE (Smith, 2014).

Bonifas and Gray (2013) used only 10 items from the ATHCTS to assess participants' change in attitudes following IPE. Attitude change in two groups was

compared before and after education. One group was a uniprofessional group of SW students who had lessons on IP collaboration. The other group was interprofessional in which multiple learning methods were employed to teach about IP collaboration. The interprofessional group demonstrated significant improvement in seven of the 10 items on the ATHCTS while the uniprofessional group demonstrated improvement in only one item.

Several other less commonly used instruments were utilized by researchers to assess attitudes of students. Cameron et al. (2009) used the Interprofessional Attitudes Questionnaire to assess student opinions of usefulness of IPE. A significant main effect for time was demonstrated by the findings. Twelve of the 14 items were found to be significantly improved following IPE. The two items not demonstrating significant change already were rated very positive by students at baseline. Another instrument to measure attitudinal outcomes of participants was the Interprofessional Attitudes Survey (IPAS) adapted from the RIPLS for use with graduate-level students (Hanyok et al., 2013). Before the didactic and clinical IPE for adult nurse practitioner students and medical residents, IPAS scores were relatively high for three of the five subscales. No data was provided regarding overall scores for IPAS; however, nine of the 21 items were reported to have significantly improved scores following IPE. In particular, there was a significant change in participants' perception of respect among health professionals.

Brock et al. (2013) used Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) Teamwork Attitudes Questionnaire (TAQ) to assess participants' attitudes toward team communication and teamwork. Students in medicine, nursing, pharmacy, and PA programs participated in simulations prior to graduation.

Results of TAQ demonstrated significant improvement in attitudes following simulation, pre-IPE $M = 4.02$, 95% CI [3.97-4.07]; post-IPE $M = 4.16$, CI [4.09-4.23], $p = .000$.

Some instruments were used to assess an aspect of collaboration. The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration was used by Delunas and Rouse (2014), Hansson et al. (2010), and Dillon, Noble, and Kaplan (2009) to assess nursing and medical students' attitudes concerning authority, autonomy, and responsibility. In each study, participants' scores of Jefferson Scale were compared before and after IPE. In Delunas and Rouse (2014), teams followed a patient in long-term care and completed required, discipline-specific tasks. Pretest scores for medical students ($M = 51.12$) were significantly lower than nursing students ($M = 56.7$). Following IPE, both nursing and medical students demonstrated significantly lower mean scores ($M = 54.86$, $M = 46.58$, respectively). From these results, attitudes of students regarding collaboration and communication between physicians and nurses did not improve with IPE.

Hansson et al. (2010) compared responses on the Jefferson Scale of students at one university who participated in IPE with students at another university who did not participate in IPE. Baseline data was collected during the first year and again during students' final year. There was no significant difference in attitudes toward collaboration before IPE between students the two universities. In addition, no difference was found in posttest scores between groups. There was a slight but significant difference detected in attitudes of students before IPE and after IPE; students were less positive toward nurse-physician collaboration following IPE.

Dillon et al. (2009) found different results for participants in a mock code simulation. Nursing students' pretest scores on the Jefferson Scale ($M = 53, SD = 9.27$) were higher than medical students scores ($M = 49.8, SD = 6.42$), indicating that nursing students had a more positive reflection on nurse-physician collaboration. However, posttest scores indicated that medical students had a more positive outlook on nurses and nurse-physician collaboration following IPE (medical students $M = 55.6, SD = 4.09$; nursing students $M = 54.5, SD = 7.67$). There was a statistically significant positive difference for medical students in two subscales: nurses' autonomy and collaboration. Dillon et al. (2009) supported IPE as an effective means of changing student attitudes toward nurse-physician collaboration.

IPE is at least somewhat effective in changing learning outcomes of knowledge, skills, and attitudes as demonstrated in the literature. However, it is unknown whether these results will affect change in behavior of health care professionals and ultimately improve patient outcomes.

Behavior outcomes for IPE. Evaluation of learning and IPE is important; however, it is also important to determine if the learning has been applied in practice. Researchers have evaluated various outcomes to assess for changes in behavior as a result of IPE. Because students are not yet in a professional practice role, it is more difficult to determine if learning has been applied in practice. Most research in which behavior change outcomes following IPE are assessed involves professional participants. Few studies assessing changing behavior were found at the student level (Baker & Durham, 2013; Ekmekci et al., 2013; Riesen et al, 2012; Smith, 2014). Some behavior changes were assessed through the use of instruments (Baker & Durham, 2013; Ekmekci et al.,

2013; Riesen et al., 2012; Smith, 2014). Others used some self-report (Mann et al., 2009) or interviews/focus groups (Bajnok et al., 2012; Curran, Sargeant, & Hollett, 2007). Observation was yet another method used to elicit change in behavior (Carr et al., 2003; Morey et al., 2002; Shrader et al., 2013; Weaver et al., 2010).

Most research of behavior change in IPE involving students used some sort of self-report to document behavior. Various instruments were used to assess changes in teamwork or collaboration following IPE. Baker and Durham (2013) and Riesen et al. (2012) used the Interprofessional Collaborative Competencies Attainment Survey (ICCAS) to determine changes in participants' perception of their collaborative behaviors and competency attainment following IPE. In Baker and Durham, Undergraduate students in nursing, medicine, and pharmacy completed an IPE course based on TeamSTEPPS (Baker & Durham, 2013). TeamSTEPPS is a program developed by the Agency for Health care Research and Quality (AHRQ) along with the Department of Defense to improve quality care and patient safety by improving communication and teamwork among health care workers (Baker & Durham, 2013; King et al., 2008). The curriculum for TeamSTEPPS focuses on team competencies of “leadership, situation monitoring, mutual support, and communication” (Baker & Durham, 2013, p. 714). Following the IPE, results demonstrated a significant difference in all competencies following IPE: pre-IPE $M = 4.0$, $SD = 1.17$; post-IPE $M = 6.35$, $SD = 0.61$; $t(16) = 9.7373$, $p < .001$. (Scores appear to be a mean for all items, not a total composite score.)

Similar results were found by Riesen et al. (2012), following a workshop for health professions students post-graduation but pre-licensure. The workshop was blended learning that included some simulation. Significant differences were found from

pre-IPE ICCAS scores ($M = 98.75$, $SD = 3.54$) to post-IPE scores ($M = 128.98$, $SD = 10.56$), $t(55) = -9.30$, $p < .001$.

Another instrument used to measure perceived teamwork was the Team Performance Scale (TPS; Smith, 2014). Following an IPE home visiting program, participants' TPS scores were significantly higher than scores before IPE, $M = 5.55$, $SD = 0.59$; $M = 5.27$, $SD = 0.70$, respectively; $t(59) = -2.48$, $p = .016$. The Team Assessment Inventory (TAI) was used by Ekmekci et al. (2013) to measure pretest/posttest perceptions of students' teamwork following three simulation workshops. The difference in overall mean TAI scores was 0.99 ($p = .000$). Each of these studies demonstrated effectiveness of IPE in changing perceived behavior, with significant changes in pretest to posttest scores on various instruments.

In addition to using a survey instrument, Riesen et al. (2012) also used McMaster-Ottawa Team Objective Structured Clinical Encounter (TOSCE), an observer rating form to measure team competency in each of three simulations. Using repeated ANOVA, statistically significant improvement in scores was observed across time.

Shrader et al. (2013) also used an observer rated Teamwork Score and Clinical Outcome score to evaluate effectiveness of team behavior during simulations. Researchers found teamwork scores to be a significant predictor of clinical outcome scores.

Results outcomes of IPE. Few researchers attempted to study the effect of IPE at the highest level: changes in organizational practice or benefits to patients (Barr, Freeth, Hammick, Koppel, & Reeves, 2000). The majority of these studies were at the professional level. Strasser et al. (2008), Carr et al. (2003), and Morey et al. (2002)

found improved patient outcomes following IPE while Nielsen et al. (2007) did not identify improved outcomes following IPE. Though the evidence is minimal, available study results did support the use of IPE for professionals to improve patient outcomes.

While no studies were found examining outcomes at the highest level of results in undergraduate education, one study was found at the graduate level. Carpenter et al. (2006) reported both an impact on the organization and improved client outcomes following IPE. Postgraduate students in an IPE program for mental health service providers were interviewed to ascertain results of the program. Participants reported that a team approach was being used for patient care. More improvement in life skills for clients cared for by student teams than for other clients was also found. The improved client outcome was attributed to changes in client care brought about by the IPE training program.

Similar Studies to the Dissertation Study

A few studies were found with an IPE design similar to the dissertation study (Basran et al., 2012; Giordano et al., 2013; Rose et al., 2009; Smith, 2014). Basran et al. (2012) described a longitudinal elderly-person shadowing program for students in medicine, pharmacy, nursing, nutrition, SW, and PT. Community-dwelling older persons volunteered to serve as senior partners for student teams. Teams of three or four students visited the senior partner and conducted interviews four times in one semester. The IEPS was used to measure student attitudes toward IP teams. No significant change in IEPS scores was seen from baseline to post IPE, indicating no change in student attitudes toward other professionals. Student comments from focus group interviews indicated

that students had a better understanding of the roles of other professions and perceived they had improved teamwork following IPE.

Rose et al. (2009) and Giordano et al. (2013) had very similar designs for their health mentors IPE programs. Student teams consisted of three to five students in medicine, nursing, OT, PT, pharmacy (Giordano only), and couples' and family therapy (Giordano only). The health mentor was a community person with at least one chronic illness. In each study, student teams visited the health mentor four times over 2 years and worked together to complete required assignments, such as a life review, health history, wellness plan, medication list, and home safety check. Giordano et al. used ATHCTS to assess changes in attitudes toward health care teams resulting from IPE. Significant improvements in scores were demonstrated following IPE: pre-IPE $M = 3.27$, $SD = 0.45$; post-IPE $M = 3.75$, $SD = 0.58$; $p = .000$. Rose et al. chose a one-shot study design and compared only posttest results of the IEPS and the RIPLS. While differences between professions were noted for some subscales of each instrument, no data were available to assess overall benefit of IPE.

Smith et al. (2014) had mixed results in a similar study. Student teams consisted of four to five students in medicine, nursing, PT, OT, pharmacy, and couples' and family therapy. Teams visited an assigned community person who had at least one chronic illness. Students conducted two visits and worked together as a team to complete a health history and wellness plan. The ATHCTS and Team Performance Scale Survey (TPSS) were used to assess student outcomes. No difference was seen on overall ATHCTS scores from baseline to post IPE; however, six of 14 items did demonstrate significant

positive change. Significant improvement in TPSS score from visit one to visit two indicated improved perception of team performance among participants.

No studies were found with this same IPE design (student teams visiting a community mentor) in which outcomes of students participating in IPE were compared with outcomes of a control group of students not participating in IPE.

Chapter Summary

A literature review was conducted to learn more about the ICT and IPE. First, research related to the ICT was reviewed. The ICT has been used extensively by social psychology to explain the role of contact in improving attitudes toward outgroups (Cameron, Rutland, Brown, & Douch, 2006; Gaertner & Davidio, 2005; Patchen, 1982; Pettigrew & Tropp, 2005). Most research using the ICT was of an explanatory nature (Bowen & Bourgeois, 2001; Deforges et al., 1991; King, Winter, & Webster, 2009). However, some studies did use the ICT as a basis for an intervention study to predict attitudinal changes as a result of contact (Cameron et al., 2006; Nosse, 1993; Vezzali, Capozza, Giovannini, & Stathi, 2011). The ICT was utilized in some studies as a framework for IPE research. Several researchers demonstrated that contact under the right conditions did improve participants' attitudes toward other professionals (Ateah et al., 2001; Carpenter & Hewstone, 1996; Hewstone et al., 1994; Lindqvist et al., 2005). If all contact conditions were not present, IPE was not always successful in changing attitudes of participants (Barnes et al., 2000).

There was substantial literature for IPE research. Though participants of IPE can be licensed professionals or students, the greatest number of studies involved student

populations. Many different professions were involved in IPE although the most common were medicine, nursing, SW, OT, PT, and pharmacy.

No solid evidence was found to support timing of IPE or placement in curriculum. Some researchers argued for early placement before students developed stereotypes (Cameron et al., 2009). However, some researchers found that students entered programs with stereotypes (Carpenter et al., 2006). Others contended that students should be more knowledgeable and comfortable with their own professional role before learning about and with other professions (Mandy et al., 2004). The only consensus was that IPE should begin at the student level.

The roles of participants in IPE varied greatly and included non-patient contact, simulation, and patient-contact. Students preferred more active, realistic roles in IPE, ones that mimic their expected professional roles. The success of IPE was not necessarily dependent upon the participant role as many other factors may have been involved.

Evaluation of outcomes was accomplished by using the hierarchical Kirkpatrick model as a framework. Outcomes of IPE were categorized as reaction, learning, behavior, and results. While all four levels of evaluation were used as outcomes for IPE, the most commonly measured outcomes were associated with learning. Barr et al. (2000) reminded researchers that as outcome levels progress in Kirkpatrick's model of categorization, it becomes more difficult to say with certainty that changes are attributed solely to the IPE intervention.

There are many gaps in the literature because of the complexity of IPE. There are numerous variables to consider, such as the timing of IPE or placement in curriculum, the

participant role and type of IPE intervention, and the outcome variables being measured. Because of the difficulty in controlling each variable, it is increasingly difficult to compare studies and draw solid conclusions regarding best practices for IPE.

When considering the dissertation study, there were only four similar studies found in the literature. However, none were identical to the dissertation study. Three studies were pretest/posttest design, and one compared only posttest results between various professions. No study used the same design of IPE coupled with comparing results of the intervention group with a control group.

The literature provided some evidence supporting IPE, yet it was found to have gaps as identified above. The dissertation study served to provide more evidence on the efficacy of clinical IPE in changing students' attitudes to other professionals and teamwork. If students have more positive attitudes toward teamwork, future collaborative working may be enhanced resulting in better patient outcomes.

Chapter Three

Methods

To study the efficacy of clinical IPE in promoting better attitudes of nursing students toward health care teams and teamwork, a quasi-experimental study was conducted. The ATHCTS was used to measure student attitudes toward the health care team and teamwork. Attitudes of nursing students participating in clinical IPE were compared with nursing students in a control group. In this chapter, methodology, research assumptions, sampling, the measurement instrument, and analysis of the data were explored.

Research Design

The dissertation study was a quasi-experimental study. A nonequivalent control group, after-only design was used. This design allowed for comparison of attitudes of students participating in clinical IPE to attitudes of students in a control group. However, due to the lack of randomization, equivalency of the two groups cannot be assumed (Polit & Beck, 2012). Because students' participation in clinical IPE was primarily mandated by the school, random assignment of students to experimental or control groups was not possible.

Research Assumptions

There are several research assumptions inherent in this study. The following statements regarding the student participants and the research instrument are assumed to be true.

- The instrument ATHCTS does indeed measure students' attitudes toward health care teams.
- Students' behavior and test scores remain relatively consistent over time.
- Students in both the experimental and control groups have similar understanding of the terms in the instrument and meaning of the survey items.
- Students' responses on the survey accurately reflect their true attitudes.
- Students accurately report their attitudes.

Setting

Students in the dissertation study were in a baccalaureate nursing program in the Midwestern US from a school in the state of Missouri. The student level was at the end of the junior year or beginning of the senior year, having completed the equivalency of one year of clinical during the program of study. Students in the experimental group attended a public university in Northeast Missouri. Data from the experimental group already existed, having been collected as part of Health Partners, the interprofessional clinical education program directed by faculty at a private university in Northeast Missouri. Students in each participating professional program completed various surveys at the conclusion of the Health Partners program. One of the surveys was the ATHCTS. The nursing students who participated in Health Partners were junior level students from the public university in Northeast Missouri. Participants for the control group will be recruited from the baccalaureate programs at a private university in central Eastern Missouri and a public university in central Missouri.

Sampling Plan

Sampling Strategy

A non-probability, convenience sampling strategy was utilized for obtaining participants. The major strength of this sampling strategy is convenience. The dissertation study served as a means to compare attitudes toward health care teams of students who participated in clinical IPE with attitudes of students who did not participate in IPE. In order to secure an adequate number of participants that met the criteria for participation, convenience sampling was appropriate for this study.

While convenience sampling was appropriate for this study, it is identified as a weak form of sampling (Polit & Beck, 2012). Convenience sampling carries a great risk of sampling bias, which increases the chance of a Type I error. The sample is likely to be more homogeneous and may not be representative of the population of interest, students in baccalaureate nursing programs. Because this sample was likely more homogeneous, the results were not generalizable to the population as a whole.

Eligibility Criteria

Inclusion criteria. To participate in the dissertation study, students had to be enrolled in a baccalaureate nursing program seeking the bachelor's degree in nursing. Students also had to be at the junior level in nursing and had completed one semester of clinical course. In addition, students had to be able to read and understand the English language to participate.

Exclusion criteria. Students in the control group who had participated in IPE were not allowed to participate in the dissertation study.

Determination of Sample Size

Power analysis. The number of participants required for the study was determined by completing a statistical power analysis, which was accomplished through the use of G*Power (Heinrich Heine Universitat Dusseldorf, 2014). To help control for a Type I error, a level of significance was set at alpha of .05. Polit and Beck (2012) noted that $\alpha = .05$, commonly used in research, is an acceptable level of significance. A conventional standard for power ($1 - \beta$) of .80 was used to help control for Type II error. A medium effect size was used in determining appropriate sample size. Evidence from some studies demonstrated no change in students' attitudes following IPE (Dubouloz et al., 2010; Kowitlawakul et al., 2014; Pittenger et al., 2013; Smith, 2014). However, several studies demonstrated a significant change in attitudes of students following IPE (Bonifas & Gray, 2013; Cameron et al., 2009; Giordano et al., 2013; Pinto et al., 2012; Ruebling et al., 2014; Shrader & Griggs, 2014). While there may have been sufficient evidence to warrant using a large effect size for IPE on attitude change, because of mixed results, as noted above, a medium effect was used.

A two-tailed *t* test was used to ascertain statistically significant differences of means between two independent groups. An a priori power analysis was computed to determine sample size using $\alpha = .05$, $1 - \beta = .80$, and a medium effect size. It was determined that a total sample size of 128 participants (64 participants in each of the experimental and control groups) was adequate for the dissertation study.

Protection of Human Subjects

Approval from the Institutional Review Board (IRB) at Nova Southeastern University (NSU) was obtained prior to conducting the dissertation study. Once IRB

approval was granted by NSU, approval from each of the other participating schools was obtained (see Appendix A). Data from the experimental group was already collected as part of Health Partners research. While the investigator did have these nursing students as students during their junior year, all data had been de-identified and stored in locked cabinets of Health Partners' faculty mentors. There was no way to determine which students completed the survey or of associating survey results with specific students.

Potential participants at the control group schools were read an informed consent prior to completing the survey. If a student completed and submitted a survey, informed consent was implied. Students were asked to return the completed survey to an envelope with no identifying information. Survey results were anonymous. In addition, the investigator did not know any students in the control group and did not have a list of student names.

Risks and benefits of participation. There were no anticipated risks involved with participation in this research. Any risks were minimal and may have included loss of anonymity or mild anxiety while filling out the survey instrument. There was no direct benefit to the experimental group as the data was already collected and was in storage. Participants in the control group were given a small token (a candy bar or other small snack food) in appreciation for their participation. There were no other direct benefits for participation.

Data storage. All surveys were submitted with no identifiers, and there was no list of participants; therefore, surveys were anonymous. Data will be stored for 3 years in a locked file in the investigator's home. The investigator's home computer and a dedicated USB drive were used for electronic data storage. All files with data were

password protected. All data will be destroyed after 3 years. Paper copies will be shredded and electronic files will be erased. Only the investigator and a research assistant have access to the data.

Procedures

Data for the experimental group had already been collected by IPE Health Partners faculty and de-identified. Surveys for the past two years of the clinical IPE, Health Partners was stored in a locked filing cabinet of an IPE faculty mentor. This data was retrieved for use in the dissertation study. An overview of the Health Partners program can be found in Appendix B.

The procedures at each control group school were slightly different because of school preference. At the university in central Eastern Missouri, the investigator administered the survey to the control group. For the control group at the university in Central Missouri, surveys were sent to a faculty contact for administration. An introduction to the study was written by the investigator and was read by the investigator or faculty contact to potential participants before surveys were distributed. The survey was then distributed to all students present. Students were told that submission of a completed survey implied consent for study participation. Students returned surveys to an envelope provided by the researcher. Upon returning of surveys, students were given the small token for participation. When surveys had been collected, the faculty contact person sealed the envelope and returned it to the investigator for analysis of data. All completed surveys of students meeting the eligibility criteria were included in the research.

Instrumentation

Attitudes Toward Health Care Teams Scale

The ATHCTS was developed by Heinemann, Schmitt, and Farrell in response to a lack of instruments to measure attitudes toward a team approach to health care (Heinemann et al., 1999). The authors noted the

. . . need for a more general attitudes scale that will enable researchers to compare the attitude of team members from different professions and to test hypotheses about the interrelationships between such variables as attitude and participation of team members, team functioning, and results of educational programs designed to improve attitudes and enhance team performance. (Heinemann et al., 1999, p. 126)

The ATHCTS underwent various revisions during its development. It began as a 31-item instrument and was reduced to a 20-item instrument following three study phases (Heinemann et al., 1999). This instrument measures two factors: quality of care/process and physician centrality. The quality of care/process factor relates to the participant's attitudes toward the quality of care given by teams and the quality of team care process. The physician centrality factor relates to the participant's acceptance of the authority of the physician in the team.

Developers of the ATHCTS acknowledged the role of attitudes as a determinant of behavior (Heinemann et al., 1999). Team behavior can be highly influenced by attitudes of team members toward the health care team. Interprofessional education in clinically-based settings with a focus on collaborative teamwork skills can foster positive attitudes toward the health care team and teamwork. In turn, the positive attitudes have the propensity to improve team performance. The ATHCTS is a useful instrument to measure change in attitudes toward health care teams as a result of IPE (Heinemann et al., 1999).

Several variations of the ATHCTS have been used in research, including a 21-item version (Hyer, Fairchild, Abraham, Mezy, & Fulmer, 2000; Robben et al., 2012), the 20-item version (Bain, Kennedy, Archibald, LePage, & Thorne, 2014; Heinemann et al., 1999; Zuccherro, Hooker, Harland, Larkin, & Tunningley, 2011), and a 14-item version (Giordano et al., 2013; Hayashi et al., 2012; Kim & Ko, 2014; Kururi et al., 2014; Makino et al., 2013). Twenty items on the 20- and 21-item versions are the same but different factors were identified. For the 21-item instrument, three factors emerged: quality of care, costs of team care, and physician centrality (Heinemann et al., 1999). The longer survey added an item regarding participant's perception of patient satisfaction with care provided by a health care team (Hyer et al., 2000). Fourteen of the survey items related to team quality or value, and the remaining items related to physician centrality versus shared leadership. The 14-item modified-ATHCTS (m-ATHCTS) omitted all items with the word "physician," such as those related to physician centrality, and focused solely on attitudes toward health care teams (Giordano et al., 2013). It should be noted that not all studies used the same terminology for the various subscales.

For most versions of the ATHCTS, the subscales could stand alone. As an additional note, the original versions of the ATHCTS did not have a total score for the entire scale (Heinemann et al., 1999). With the original versions, higher scores on quality of care/process indicated more positive attitudes toward health care teams; lower scores on physician centrality indicated more positive attitudes.

Instrument Validity

Although the ATHCTS changed some during its three-stage development, primarily in item numbers and subscales, many aspects of validity were determined

during phase two of development (Heinemann et al., 1999). Content validity was established by having four content experts (two nurses, one physician, and one social scientist) examine the items for relevance. Agreement on overall relevance of the survey was determined to be 95%. In addition, the experts identified no missing dimensions in the survey.

To test for reliability and validity, researchers administered the ATHCTS, a semantic differential scale to measure attitudes toward health care teams of participants, and a portion of the Collaborative Practice Scale (CPS; Weiss & Davis, 1985 as cited in Heinemann et al., 1999) to a convenience sample consisting of graduate nursing students, members of health care teams in hospital settings, and past participants of an interprofessional conference ($n = 132$). Several procedures were used to assess construct validity (Heinemann et al., 1999). Following a factor analysis, researchers identified three underlying constructs or factors for the ATHCTS: quality of care, costs of team care, and physician centrality. Participants who believed teamwork fosters improved quality of care had more positive attitudes toward team process and outcomes. Also, those scoring low on physician centrality believed leadership should be shared among team members.

Construct validity was also assessed by correlating nurses' scores on the ATHCTS with scores on the nurse section of the CPS (Heinemann et al., 1999). The CPS measures perceived collaboration between nurses and physicians. A positive correlation between CPS score and the Quality of Care subscale ($r = .21, p < .05$) and a negative correlation between CPS score and the costs of team care ($r = -.21, p < .05$), demonstrated construct validity.

Concurrent validity was assessed by comparing scores on the ATHCTS with a semantic differential measure of attitudes toward health care teams by Clutter and Sachs, 1990 (as cited in Heinemann et al., 1999). There was a correlation between Quality of Care subscale score and semantic differential score ($r = .60, p < .001$) and Costs of Team Care scale and semantic differential score ($r = -.57, p < .001$). These correlations support concurrent validity of the ATHCTS.

During phase three of the development of the ATHCTS, factor analysis was again performed to assess construct validity (Heinemann et al., 1999). It was determined that factors quality of care and costs of team care were measuring the same construct. The subscales became Quality of Care/Process and Physician Centrality. During phase three, participants completed a questionnaire regarding perceptions about team process including respective roles and team functioning. The Quality of Care/Process scale correlated positively with measures of cohesion ($r = .25, p < .001$) and team effectiveness ($r = .39, p < .001$). Low correlation with measures of team process with physician centrality did not support construct validity; however, the correlation of team process with quality of care/process did support construct validity of that subscale.

Construct validity was also demonstrated by Kim and Ko (2014) by comparing m-ATHCTS with the IEPS. Graduate students in law, nursing, medicine, pharmacy, SW, and dentistry were participants in this study. Though correlations in subscales were considered small ($r = .24$ to $.26$), Quality of Care subscales with autonomy, perceived need for cooperation, and perception of actual cooperation (IEPS subscales) correlations were statistically significant.

Instrument Reliability

During phase two of development, the ATHCTS was administered to a group of 27 nurses on two separate occasions, 6 weeks apart to examine test-retest reliability (Heinemann et al., 1999). A Pearson's correlation was conducted to compare scores between the two administration times. The test-retest correlation was 0.71 ($p < .001$) for quality of care subscale. Additionally, weaker, but significant correlations were found for costs of team care ($r = .042, p < .05$) and physician centrality ($r = .36, p < .05$).

Internal consistency of each subscale was also demonstrated during phase two of development (Heinemann et al., 1999). Cronbach's alpha for the subscales were .87 for quality of care, .72 for costs of team care, and .75 for physician centrality.

Phase three of ATHCTS development also demonstrated internal consistency for the two identified factors (Heinemann et al., 1999). Participants in this study were 973 members of geriatric health care teams in Veterans Affairs Medical Centers from across the US, representing multiple professions. Cronbach's alpha for quality of care/process was .83, demonstrating acceptable internal consistency and for physician centrality was .68, showing lower internal consistency.

Other studies using ATHCTS have also demonstrated instrument reliability. Hyer et al. (2000) used the ATHCTS to assess the sufficiency of the Geriatric Team Training Program to change attitudes of participants. Participants were graduate students from eight major academic training centers in the US in nursing, SW, pharmacy, and other allied health programs. Hyer et al. (2000) used the 21-item ATHCTS, renaming the three identified factors. Quality of care became team value, costs of team care became team efficiency, and physician centrality became shared leadership. The instrument had

acceptable Cronbach's alpha of .85 for team value, $\alpha = .76$ for team efficiency, and $\alpha = .75$ for shared leadership. Overall internal consistency was found to be high with $\alpha = .87$.

Zuccherro et al. (2011) used the 20-item version of ATHCTS to assess the impact of a symposium on interdisciplinary care for older adults on student attitudes toward teamwork. Participants ($n = 109$) were composed of undergraduate, masters, and doctoral students in nursing, health care administration, OT, counseling, and psychology. Zucherro et al. (2011) found the symposium to be effective in producing more positive attitudes toward teamwork. Researchers calculated Cronbach's alpha to assess internal consistency of the instrument. Overall internal consistency was low ($\alpha = .66$) or at least questionable (Gliem & Gliem, 2003). The Quality of Care/Process subscale demonstrated good internal consistency with alpha of .82; however, alpha for physician centrality was .52, demonstrating poor internal consistency for this subscale.

Many studies used the m-ATHCTS, which evaluated only items on the Quality of Care/Process subscale. Hayashi et al. (2012) compared pretest-posttest scores of both first- and third-year students in nursing, laboratory sciences, PT, and OT who participated in some IPE program. Cronbach's alpha for the m-ATHCTS was .773, demonstrating adequate internal consistency.

Kim and Ko (2014) assessed the reliability and validity of the m-ATHCTS. Graduate students in law, medicine, nursing, pharmacy, SW, and dentistry participated in the study. Factor analysis validated the use of two subscales quality of care and time constraints. The overall Cronbach's alpha was .82, demonstrating good internal consistency. The Quality of Care subscale indicated a high reliability ($\alpha = .92$), and time constraints had good reliability with alpha of .86.

Kururi et al. (2014) assessed the relationship between IPE and attitudes toward health care teams. Participants were students in nursing, laboratory sciences, PT, and OT in the first and third years of their academic programs. A factor analysis was conducted, which confirmed three factors comprising the items on the m-ATHCTS: quality of care, patient-centered care, and team efficiency. Internal consistencies for the three subscales were Cronbach's alpha of .728, .661, and .552 respectively.

Makino et al. (2013) used the m-ATHCTS to compare attitudes toward health care teams of 501 undergraduate students in nursing, laboratory sciences, PT, and OT with attitudes of alumni ($n = 213$). Researchers found the m-ATHCTS to have good internal consistency with overall Cronbach's alpha of .782.

Bonifas and Gray (2013) chose to use only 10 items from the ATHCTS to measure team attitudes and values in a pretest-posttest study of students in a master's in SW program. Cronbach's alpha was calculated to be .67 demonstrating questionable reliability.

Instrument Scoring

For the dissertation study, the original 14-item Quality of Care/Process subscale and the five-item Physician Centrality subscale from the 20-item ATHCTS (G. D. Heinemann, personal communication, March 15, 2015) was utilized (see Appendix C). The investigator had permission to use the 20-item survey; however, it was discovered that for the intervention group, only the five-item Physician Centrality subscale had been used (Item 8 had been omitted). A six-point Likert-type scale was used for responses. Respondents indicated agreement with a given statement ranking from *strongly disagree* (0) to *strongly agree* (5). Reverse scoring was used for Items 1, 8, 12, 16, and 19. The

19-item version of the ATHCTS used in the dissertation study has two subscales: the Quality of Care/Process (Items 1, 2, 3, 5, 7, 9, 10, 11, 13, 14, 16, 18, 19, and 20) and Physician Centrality (Items 4, 6, 12, 15, and 17). Scores for each subscale were summed following indicated reverse scoring. The Quality of Care/Process subscale ranged in scores from 0 to 70 in which higher scores indicated a more positive attitude about the quality of care provided by a team and quality process in teams. Physician Centrality subscale scores range from 0 to 25. Higher scores indicated acceptance of the physician authority on a team, and lower scores indicated more positive attitude toward shared leadership.

Because the ATHCTS used a Likert-type scale to indicate participant responses, the level of measurement was ordinal (Polit & Beck, 2012). Scores were summed for each subscale, producing data on a continuum.

General Statistical Strategy

Data were in the form of paper copies of the survey instrument ATHCTS for each participant. Student responses to each survey item were entered, and all analyses were conducted using the Statistical Package for Social Sciences (SPSS) Version 22 for Windows.

Data Cleaning

All data were examined for missing item responses. Participant surveys with more than one missing response were laid to the side, and data from that survey were not included in the study. The investigator utilized imputation to address surveys with only one missing item response. A mean substitution was calculated and substituted for the missing value (Polit & Beck, 2012). If more than one response were chosen for one

item, the investigator attempted to determine the intended response for that participant based upon responses of similar items.

Data were hand summed prior to being entered in SPSS. Following entry of data in SPSS, sums were compared to verify accuracy. A frequency distribution and histogram were used to identify errors and true outliers (Polit & Beck, 2012). An outlier was defined as any response greater than two *SD* from the mean. After examining data, the investigator decided to include outliers. The investigator acknowledges that including an outlier may have skewed results and may increase the possibility of committing a Type I or Type II error. The number of participants was slightly increased, which could help reduce the influence of outliers.

Descriptives

Because archived data was used for the experimental group, information regarding participants was limited to general description of the corresponding cohorts. Descriptive statistics was used to describe the control group, including gender and age. In addition, descriptive statistics were employed to report measures of central tendencies of ATHCTS subscale scores for both the experimental and control groups, including the mean, range, and standard deviation.

Reliability Testing

The reliability of the ATHCTS for use in the dissertation study with the experimental and control groups was tested by calculating Cronbach's alpha for total score and for each subscale score. The benchmark for an acceptable Cronbach's alpha was set at greater than or equal to .70, indicating acceptable internal consistency (Gliem & Gliem, 2003). In addition, the corrected inter-item correlation for each item was

inspected. Polit and Beck (2012) suggested that each item within a subscale should have a corrected inter-item correlation of at least .30, demonstrating congruence with the underlying construct. Polit and Beck (2012) suggested that items with a correlation less than .30 may be omitted as they suggest little congruence with the construct of interest. The investigator chose to leave these items and simply acknowledge the possible lack of congruence.

Hypothesis Testing

As previously mentioned, the ATHCTS used a Likert-type scale. Likert-type items are considered to be ordinal data (Sullivan & Artino, 2013). Brown (2011) noted a difference between a Likert-type item and a Likert scale or score. While the Likert item is ordinal data, the Likert score may be treated as interval data, thus permitting the use of parametric tests.

In selecting the correct statistical test to utilize, it was necessary to determine whether the data followed a normal distribution. A frequency histogram was utilized to determine whether the data met the assumption of normal distribution. It was hypothesized that nursing students who participated in clinical IPE have more positive attitudes toward health care teams than nursing students who did not participate in clinical IPE as evidenced by higher scores on the ATHCTS; Quality of Care/Process subscale; and by lower scores on the ATHCTS, Physician Centrality subscale. An independent two-tailed *t* test was performed to test these research hypotheses and ascertain whether students in the experimental group had more positive attitudes toward health care teams and teamwork than those in the control group. The independent *t* test was appropriate for the dissertation study as the mean subscale scores on the ATHCTS of

two independent groups, the experimental and control groups, were compared for differences.

Chapter Summary

It was hypothesized that nursing students who participated in clinical IPE have more positive attitudes toward health care teams than nursing students who did not participate in clinical IPE as evidenced by higher scores on the ATHCTS; Quality of Care/Process subscale; and by lower scores on the ATHCTS, Physician Centrality subscale. A quasi-experimental, nonequivalent control group, after-only design was used to test the research hypotheses. Students in the experimental group had participated in Health Partners, a clinical IPE program. Students in the control group had not participated in IPE. The ATHCTS was used to assess student attitudes toward health care teams and teamwork. Following collection of data, responses were entered and analyzed using SPSS version 23. A two-tailed, independent *t* test was used to test the research hypotheses.

Chapter 4

Results

The purpose of this study was to investigate the efficacy of pre-licensure clinical interprofessional education in changing attitudes of nursing students toward health care teams. The purpose was accomplished through the research question: Do nursing students who participate in pre-licensure clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in pre-licensure clinical IPE? Statistical analysis tested the null hypotheses: There is no difference in attitudes of nursing students toward health care teams of students participating in clinical IPE and students not participating in clinical IPE. The alternative research hypotheses are as follows: It is hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by higher scores on the ATHCTS, Quality of Care/Process subscale and lower scores on the ATHCTS, Physician Centrality subscale.

There were a total of 88 nursing students (46 from the central Eastern Missouri university [Control 1] and 42 from the university in central Missouri [Control 2]) approached to participate as part of the control group who did not participate in IPE. All participants in the control group were junior status and had completed one semester of clinical in a traditional bachelor of science in nursing program. Students in Control 1 were currently in a pediatric nursing course, and students in Control 2 were in a gerontological nursing course. All students in class on the day the survey was

administered were given a copy of the participation letter along with a copy of the ATHCTS (see Appendix D). Following the reading of a brief introduction, students who consented to participate in the study completed the survey and returned the folded survey to a collection envelope. Students who declined to participate were asked to return the blank folded survey. A total of 84 completed surveys were returned along with four blank surveys for greater than 95% response rate. There was no indication why these four chose to decline participation.

Completed, archived surveys from the intervention group who participated in IPE were retrieved from storage files. There were a total of 92 nursing student surveys from the most recent years of archived data. Because the data was de-identified, it is unknown whether all nursing students participating in the Interprofessional Health Partners program completed the survey.

Data Cleaning

Surveys from the control group were examined to assure participants met inclusion criteria and for missing data. The faculty from the two control group schools assured the investigator that students had not participated in previous clinical interprofessional education (IPE). However, 11 participants marked that they had previously participated in clinical IPE. While this may have been either an error in reporting or unclear understanding on the part of the student as to the activity that constituted clinical IPE, it was determined that these surveys would be omitted from inclusion in the control group. In addition, there were three incomplete surveys with a response missing from one item. Because there were adequate remaining valid surveys for inclusion in the study, it was determined that those surveys with missing data would

be excluded from the study results. There were a total of 70 retained surveys for the control group.

When reviewing the surveys for the intervention group, it was discovered that for item responses, an additional option of *no opinion* was added to two years of surveys. Eleven participants had indicated no opinion for one or more item responses. It was decided that these surveys would be excluded from the study. This left a total of 81 completed surveys for use from which 70 completed surveys were randomly selected for inclusion in the intervention group. Statistical analyses were carried out using a total of 140 participants.

Data was entered in to SPSS Version 22. Accuracy of data entry was assured by examining frequency tables for impossible values. Further, responses for the research instrument subscales were both manually summed and computer summed. Subtraction of these two sums, resulting in a zero difference, indicated that the responses to the individual items had been entered correctly. Items 4, 6, 12, 15, and 17 were then reverse scored, according to the instrument scoring instructions.

Characteristics of the Sample

Demographic characteristics for the control group (Group 1) and the intervention group (Group 2) were similar. Participants in Group 1 were 94.3% female ($n = 66$) and 5.7% male ($n = 4$). Participants in Group 2 were 91.4% ($n = 64$) being female and 8.6% ($n = 6$) being male. Age of participants was reported by categorical range in years and presented in Table 1.

Table 1
Age Category of the Participants by Group

Age category in years	Group 1		Group 2	
	<i>n</i>	%	<i>n</i>	%
18 to 20	21	30.0	26	37.1
21 to 22	40	57.1	39	55.7
23 to 24	4	5.7	2	2.9
>24	5	7.1	3	4.3

Note. (*N* = 140)

Exploring the Data

Before analyzing the data measuring the outcome variables for each group (Quality of Care/Process and Physician Centrality), the data were explored to determine the reliability as internal consistency, the frequency distribution of the scores, and the descriptive values of the scores.

Reliability as Internal Consistency

The 14-items on the subscale for Quality of Care/Process and the five items on the subscale for Physician Centrality were subjected to analysis using Cronbach's alpha. The benchmark for acceptable reliability of individual items was a corrected item-total correlation of at least .30 and an alpha value of at least .70 for the entire scale. Summary of results for each group is presented in Table 2.

Table 2
Summary of Reliability as Internal Consistency Testing

Scale	Group 1			Group 2		
	α	Corrected item-total correlation range	95% CI	α	Corrected item-total correlation range	95% CI
Quality of care/ process	.74	[.20, .59]	[.64, .82]	.78	[.18, .67]	[.70, .85]
Physician centrality	.43	[.16, .40]	[.18, .61]	.74	[.33, .59]	[.63, .83]
Entire scale	.71	[.03, .72]	[.60, .80]	.72	[.05, .58]	[.62, .81]

Note. ($N = 140$)

Corrected item-total correlation for some items on each scale and in each group, except Physician Centrality for Group 2, fell below the accepted .30 value. With the exception of the alpha value for Group 1 subscale for Physician Centrality, all alpha values fell within the acceptable range. Alpha values exceeding .70 were accepted as indication that the items were internally reliable and were measuring the one construct of the scale within the sample. However, the subscale for Physician Centrality for Group 1 did not achieve acceptable reliability alpha, so results with these scores must be viewed with caution.

Distribution of Scores

Scores for the subscales were calculated. Measures of central tendency for each group and each subscale are presented in Table 3.

Table 3

Means with Confidence Intervals and Standard Deviations of Group 1 and Group 2 for the Quality of Care/Process and Physician Centrality

Subscale	Group 1			Group 2		
	<i>M</i>	95% CI	<i>SD</i>	<i>M</i>	95% CI	<i>SD</i>
Quality of care/process	54.18	[52.76, 55.61]	5.98	56.20	[54.58, 57.82]	6.79
Physician centrality	13.39	[12.63, 14.14]	3.18	9.64	[8.44, 10.85]	5.05

Note. ($N = 140$)

Distribution of scores was examined. Measures for skewness and kurtosis indicated the extent to which a distribution departs from the normal curve; values that departed from zero indicated that the distribution to some extent was not normal. Table 4 provides the values that describe the distribution of the scores for each group and on each subscale.

Table 4

Measures Describing Histograms and Frequency Distributions

Subscale	Group 1			Group 2		
	<u>Skew (<i>SE</i>)</u>	<u>Kurtosis (<i>SE</i>)</u>	<u><i>KS</i></u>	<u>Skew (<i>SE</i>)</u>	<u>Kurtosis (<i>SE</i>)</u>	<u><i>KS</i></u>
Quality of care/process	-.19 (.29)	.09 (.57)	.10	-.54 (.29)	-.14 (.57)	.10
Physician centrality	-.72 (.29)	1.36 (.57)	.12*	-.04 (.29)	-.45 (.57)	.09

Note. Degrees of freedom for all *KS* statistic = 70. * $p = .01$.

The negative values for skewness indicate that the scores tend to skew slightly to the left. The measures of kurtosis indicate that the scores tend to assume a somewhat pointy curve. While the conservative Kolmogorov-Smirnov (*K-S*) statistic for Group 1, Physician Centrality was significant, indicating that the distribution of the scores was not normal, and the histogram appeared to assume a reasonably normal curve. Histograms for the scores are presented in Figures 2, 3, 4, and 5.

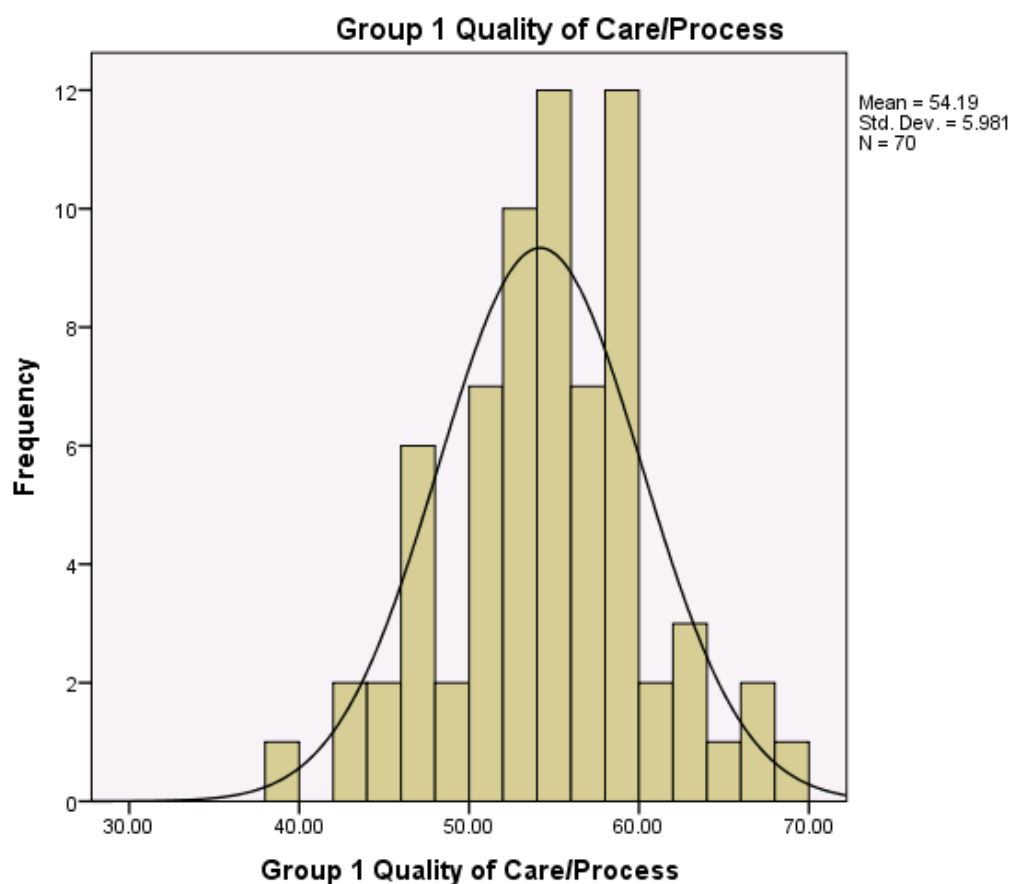


Figure 2. Histogram of scores for Quality of Care/Process for Group 1.

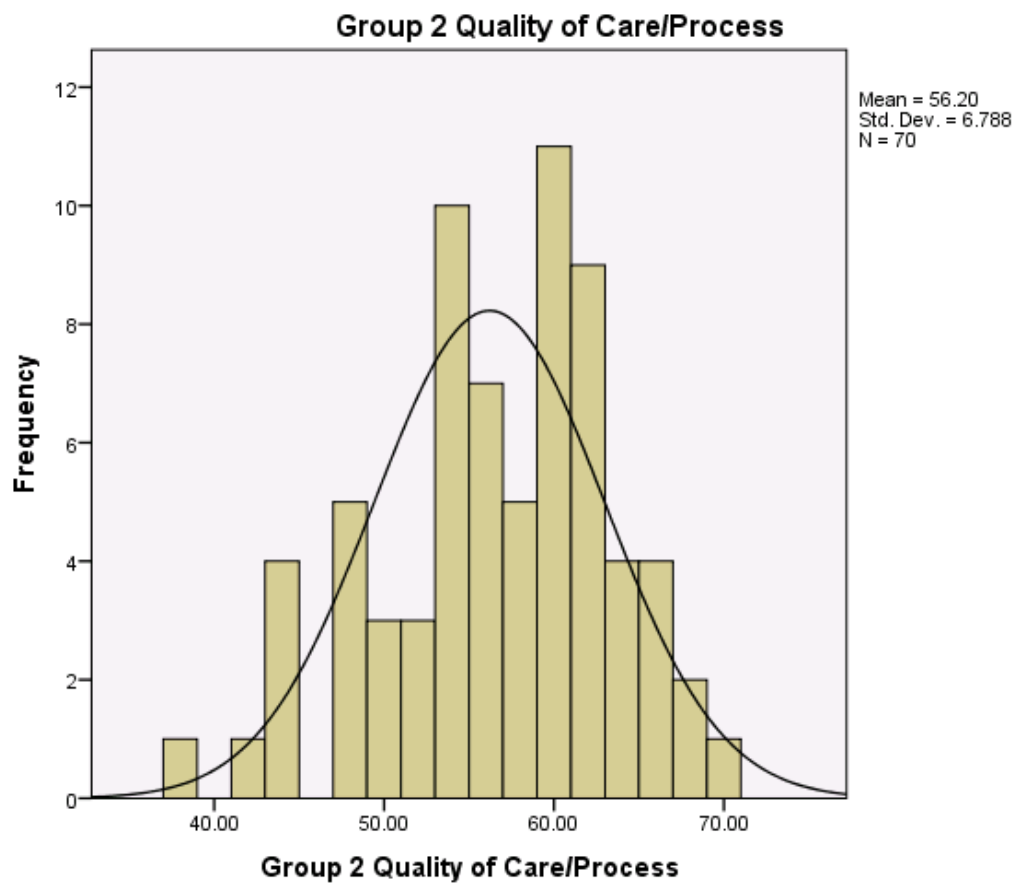


Figure 3. Histogram of scores for Quality of Care/Process for Group 2.

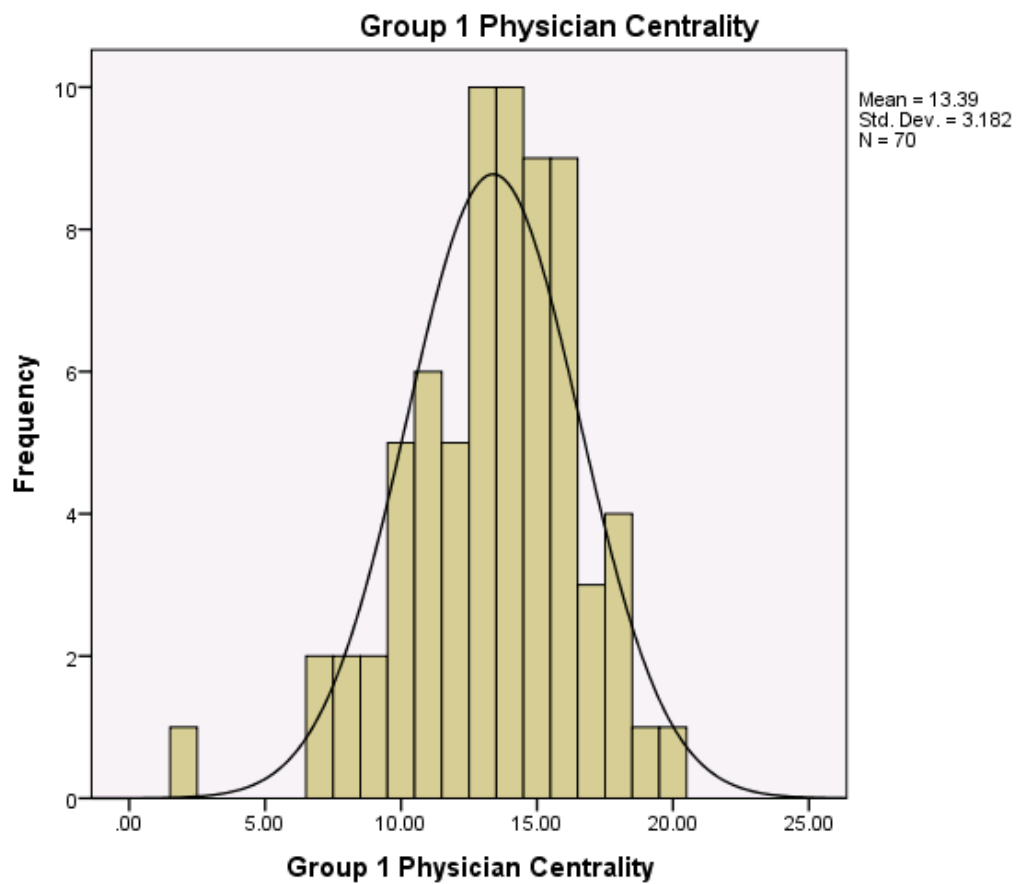


Figure 4. Histogram of scores for Physician Centrality for Group 1.

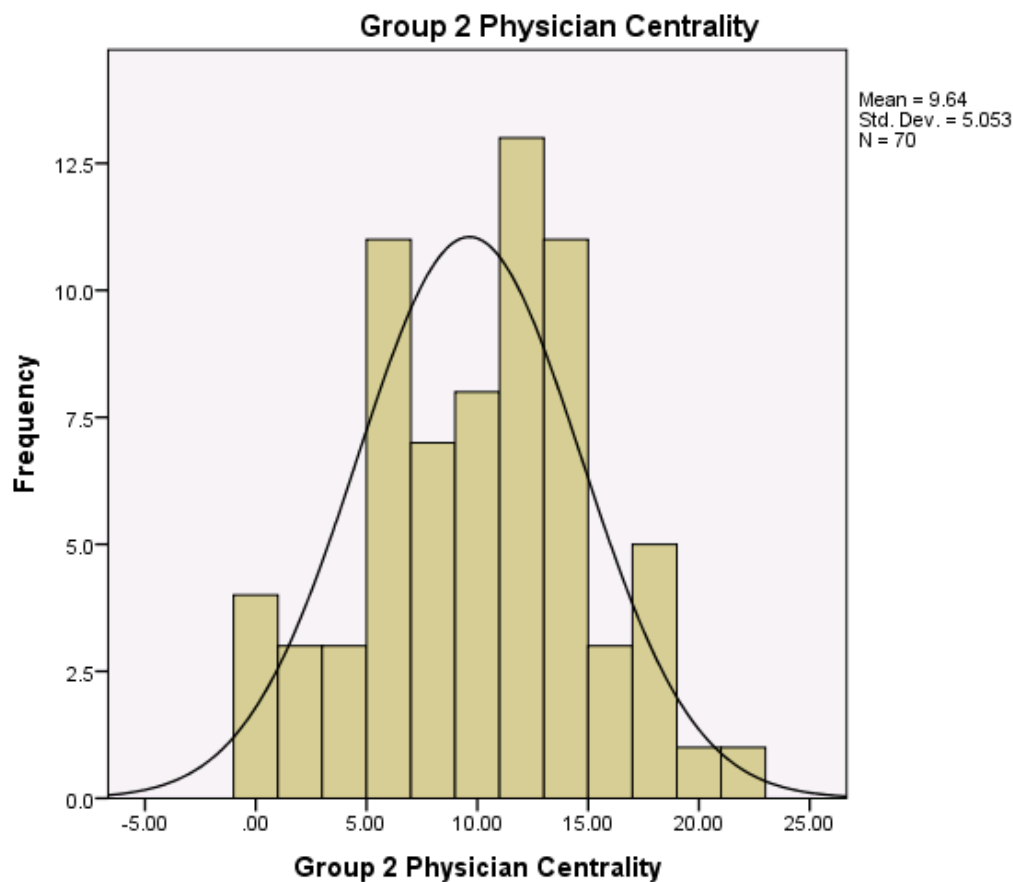


Figure 5. Histogram of scores for Quality of Care/Process for Group 2.

Stem and leaf plots were used to identify extreme scores at the lower end and upper end of the distributions. One extreme score (< 39) was found for Group 1, Quality of Care/Process and for Physician Centrality (< 2). One extreme score (< 38) was found for Group 2, Quality of Care/Process and no extreme scores were found for Group 2, Physician Centrality. As these scores were valid for the participants, they were retained in the analyses.

A further assumption for parametric testing is that the variances in groups are roughly equal. Homogeneity of variance assumes that populations from which samples have been drawn have equal variances. Homoscedasticity assumes that the error has a

constant variance across each of the levels of the independent variable. The opposite of homoscedasticity is heteroscedasticity, which is present when the variance is not constant at the different levels of the independent variable (Vogt & Johnson, 2011). As the variables were measured as continuous level data, these data were compared between two different groups, and this assumption means that the variance of the data should be the same in each of these groups. For the group comparisons, this assumption was tested by a Levene's test for equality of variances; a non-significant value is indication that the assumption has been achieved and that the variances are homogeneous and appropriate for parametric testing.

For comparisons between Group 1 and Group 2 on the Quality of Care/Process scores, Levene's statistic ($F = 1.88, p = .17$) was non-significant; therefore, the comparison between these two groups was made on values wherein equal variances were assumed. For comparisons between Group 1 and Group 2 on the Physician Centrality scores, Levene's statistic ($F = 17.30, p = .00$) was significant; therefore, the comparison between these two groups for these scores was made on values wherein equal variances was not assumed.

Hypothesis Testing

Hypothesis 1. It was hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by higher scores on the ATHCTS, Quality of Care/Process subscale. On average, Group 2 participants who had participated in IPE scored higher on measures of Quality of Care/Process ($M = 56.20, SE = .81$) than did those participants in Group 1 who had not participated in IPE ($M = 54.18, SE =$

.7117). However, this difference was not significant, $t(138) = -1.86$, $p = .06$, and the effect-size was small, $r = .16$.

Hypothesis 2. It was hypothesized that nursing students who participate in clinical IPE have more positive attitudes toward health care teams than nursing students who do not participate in clinical IPE as evidenced by lower scores on the ATHCTS, Physician Centrality subscale. On average, Group 2 participants who had participated in IPE, scored lower on Physician Centrality ($M = 9.64$, $SE = .60$) than did those participants who had not participated in IPE ($M = 13.38$, $SE = .38$). This difference was significant, $t(116.28) = 5.24$, $p = .00$, and the effect-size was medium, $r = .44$.

Post hoc power analysis was conducted using G*Power (Heinrich Heine Universität Dusseldorf, 2014) with input parameters of a two-tailed test, alpha = .05, medium effect, and sample size of 70 in each of the two groups, which indicated the statistical power achieved; .84 was more than adequate (i.e., power $\geq .80$).

Evaluation of Findings

There was not a significant difference between groups in subscale scores for Quality of Care/Process; therefore, the null hypothesis is accepted. Scores for both the intervention and control groups were relatively high, indicating a moderate agreement with the statements. The higher scores on Quality of Care/Process subscale indicated students perceived higher quality of care and process when delivered by a health care team (Zuccherro et al., 2011).

As for the Physician Centrality subscale, there was a significant difference between group scores. The null hypothesis is rejected and the alternative hypothesis is accepted. The lower scores reported by the intervention group demonstrated less

acceptance of physician authority over the team. Students in the intervention group were more positive toward a shared leadership among team members than physician authority over the team.

Chapter Summary

Following data collection and data cleaning, 140 total participant surveys (70 in each intervention and control group) were retained for analysis in order to test the research hypotheses. Cronbach's alpha was used to analyze internal consistency of the two subscales. With the exception of the alpha value for Group 1 Physician Centrality, all alpha values fell within the acceptable range ($\alpha \geq .70$). Because of the low reliability for Group 1 Physician Centrality subscale, these scores will be viewed with caution. Histograms were used to determine distribution of scores. It was determined that in general, scores followed a normal distribution and parametric testing was appropriate.

Hypothesis testing was completed using an independent t test for comparison of group means. For Hypothesis 1, the null hypothesis was accepted as there was not a significant difference in Quality of Care/Process subscale scores between the control and intervention groups. The second research hypothesis was accepted as scores for Physician Centrality were significantly lower for the intervention group than the control group. Based upon the results of this dissertation study, there was mixed evidence as to the efficacy of clinical IPE in improving attitudes of nursing students toward health care teams.

Chapter Five

Discussion and Summary

The purpose of this study was to investigate the efficacy of a pre-licensure clinical IPE for nursing students. A quasi-experimental, nonequivalent control group, after-only design was used for this study. The intergroup contact theory provided a framework for the study. The supposition with this theory is that contact under certain conditions can improve attitudes between nursing students (ingroup) and other team members (outgroup).

Summary of Findings

This study provided mixed results as to the efficacy of IPE in producing more positive attitudes toward health care teams in nursing student participants. When comparing results of nursing student participants of IPE with non-participants, students participating in IPE had higher scores on the Quality of Care/Process subscale. While this difference was not significant, it does indicate a tendency toward more positive attitudes toward the quality of care given by teams and the quality of team care process.

The other measure of student attitudes toward health care teams was the Physician Centrality subscale. Scores for the intervention group were significantly lower than the scores for the control group, indicating less acceptance of physician authority on the team (Heinemann et al., 1999). This finding indicated more positive attitudes toward health care teams as participants are more favorable toward shared leadership within the health care team. In the dissertation study, reliability of Physician Centrality subscale was low

for the control group. Heinemann et al. (1999) also advised researchers that the five-item Physician Centrality subscale was less robust than the six-item subscale. Because the intervention group had used the five-item scale and data was archived, the only option was to omit Item 8 from the 20-item ATHCTS. Given the results of the dissertation study, there was evidence that IPE was at least somewhat effective in producing more positive attitudes of nursing students toward health care teams.

Integration of Findings with Previous Literature

IPE Design

Comparison of previous study results with findings in the dissertation study were challenging due to the multiple variables encountered when conducting studies of IPE. Differences in study design, type of IPE, participants, and measurement of outcomes must be considered when comparing the results. The design of the IPE intervention for the dissertation study was congruent with the general consensus for best practices discerned through the review of literature. First the IPE was relevant to all health professions involved (Carpenter et al., 2004; Derbyshire & Machin, 2011). As outlined in the Health Partners program overview (see Appendix B), student participants were from athletic training, communication disorders, health and exercise science, nursing, and osteopathic medicine. There were components applicable to each of these professions dispersed throughout the Health Partners curriculum.

In addition, IPE was supported by the literature at the student level (Carpenter et al., 2009; Mandy et al., 2004), and some authors suggested that having some clinical experience before IPE is beneficial (Earland et al., 2011; Rogers, 2010). In the dissertation study, all participants in Health Partners were students. While students in

some professional programs had not completed any clinical, all nursing students had completed one semester of clinical before participating in IPE. There was also general agreement among authors that students in IPE should have an active role, one that mimics actual practice (Lidskog et al., 2009; Mellor et al., 2013). All students in Health Partners were active participants as they interviewed, assessed, and educated their assigned patient. These activities mimicked some activities the students might perform as professionals in practice.

Intergroup Contact Theory

The ICT seemed appropriate as a framework for this dissertation study. The antecedent conditions were met for the contact situation or IPE. Participants had equal status in their teams. In order to reduce the hierarchical status commonly associated with medicine, Delunas and Rouse (2014) and McNair et al. (2005) suggested that medical students be at the beginning of their program of study while participants in other professional programs be at a higher level, such as the third or fourth year of undergraduate study. In the dissertation study, medical students were either first- or second-year status while nursing students were in the second semester of their third year (junior status), which seemed to place students at a more equal status, considering medical students were graduate students and all other students, including nursing, were at the undergraduate level. Common goals were established and student teams worked together to complete various assessments in order to meet program objectives. Given the length of the program (4 months) and the number of scheduled meeting times (seven), students had ample time to establish friendships with team members. In addition, professors from all health professional programs served as faculty for the Health Partners

program. These faculty members modeled collaboration and teamwork before the students as they implemented the IPE program. Thus, all antecedent conditions for the contact situation were present, providing the optimal situation for improved attitudes of nursing students toward the health care team (Dovido et al., 2011; Pettigrew, 1998).

Ateah et al. (2011) and Lindqvist et al. (2005) found that contact resulted in more positive attitudes toward outgroups. Each study design included a control and intervention group, similar to the dissertation study design. While the IPE interventions differed from the dissertation study, researchers found that following the interprofessional contact, participants in the intervention group had more positive attitudes toward outgroup members than participants in the control group. The findings in the dissertation study, coupled with those of Ateah et al. and Lindqvist et al., supported the use of the ICT as a framework for IPE.

IPE Studies

Many researchers conducted studies to ascertain if participants had a change in some attitude following IPE. There were mixed results among the various studies. Ateah et al. (2011) found less negative stereotypes of participants toward other professions following IPE. Other researchers also reported improved attitudes following IPE. Ruebling et al. (2014) and Bradley et al. (2009) both looked at changes in attitudes toward teamwork, collaboration, roles, and responsibilities. Ruebling et al. found overall improved attitudes in the intervention group following IPE. Bradley et al. found improved attitudes toward teamwork and collaboration, yet no significant difference in scores for roles and responsibilities following IPE. Though it may be difficult to compare results of different instruments, it appears that Bradley et al. observed opposite

results compared to the dissertation study. In the dissertation study, there was no significant difference in Quality of Care/Process, which would correlate to the teamwork collaboration subscale in Bradley et al. In addition, IPE participants in the dissertation study were more favorable toward shared leadership in which Bradley et al. found no significant difference for IPE participants in attitudes toward roles and responsibilities of team members. Both Cameron et al. (2009) and Shrader and Griggs (2014) found significant improvement in attitudes toward interprofessional collaboration of participants following IPE. Additionally, Brock et al. (2013) found improved attitudes toward team communication and teamwork for participants in a simulation IPE.

Consistent with the dissertation study findings for Quality of Care/Process, many researchers did not find significant differences in attitudes following IPE. The likely reason for this finding is the relatively high comparison score, either baseline score before IPE or non-IPE participant, control group score. In the dissertation study, the Quality of Care/Process subscale score was relatively high for the control group. Dubouloz et al. (2010), Kowitlawakul et al. (2014), Pittinger et al. (2013), Pinto et al. (2012), and Smith (2014) all attributed the lack of evidence in changes in attitude following IPE to higher comparison scores. It seems plausible that health care professions students, including nursing students, see the value of health care teams. It may also be important to note that this finding does not necessarily mean IPE is not important. Findings in Smith and the dissertation study both demonstrated more positive attitudes following IPE; however, the differences just were not significant. In addition, Dubouloz et al. did not find significant differences in attitudes following IPE; however,

qualitative data did provide evidence for the efficacy of IPE in spite of the quantitative findings.

While most researchers found at least some improvement in attitudes following IPE, some researchers found that attitudes were worse following IPE. Dulunas and Rouse (2014) and Hansson et al. (2010) found that following IPE, students were less favorable toward nurse-physician collaboration. These researchers used the Jefferson Scale to assess student attitudes regarding physician authority, nurse autonomy, collaboration, and responsibility. Only Dillon et al. (2009) reported more positive reflection of student participants on nurse-physician collaboration following a simulation IPE. The dissertation findings did not support the findings of Hansson et al. and Dulunas and Rouse. In the dissertation study, IPE participants were more favorable toward shared leadership than those in the control group. Perhaps this finding is because of the difference in study participants. The dissertation study participants were solely nursing students, and the participants in Hansson et al. and Dulunas and Rouse were both nursing and medical students. In comparison with medical students, it is very likely that nursing students would be more amenable to shared leadership in which physician authority is limited and nurse autonomy is espoused.

ATHCTS Instrument

Several researchers documented the efficacy of IPE to improve attitudes of participants toward the health care team as evidenced by higher post-IPE scores on the ATHCTS, Quality of Care/Process subscale (Bain et al., 2014; Fulmer et al., 2005; Giordano et al., 2013; Wellmon, Gilin, Knauss, & Linn, 2012; Zuccherro et al., 2011). In each of these studies, researchers compared participants' Quality of Care/Process

subscale scores before and after participation in some IPE. Bain et al. (2014) compared scores of professionals before and after participating in an IPE program with both classroom and clinical components, which were designed to improve teamwork. Following IPE, participants' Quality of Care/Process scores were significantly higher than pre-IPE scores. Fulmer et al. (2005) also found that IPE was effective in improving participants' attitudes toward health care teams. Following a geriatric interdisciplinary team training (GITT) program, researchers found that participants had significantly higher scores on the Quality of Care/Process subscale than before the IPE. Similar results were found by Wellmon et al. (2012) and Zuccherro et al. (2011), following IPE using case studies. Each of these researchers compared pre- and post-IPE scores of the ATHCTS and found significant improvement in Quality of Care/Process scores post IPE. The IPE in Giordano et al. (2013) was somewhat similar to the IPE in the dissertation study. Interprofessional health care teams met with an assigned patient (health mentor) to complete various assessments. While the IPE in the dissertation study did not significantly improve Quality of Care/Process scores, Giordano et al. found significant improvement in Quality of Care/Process following IPE.

Bonifas and Gray (2013) were the only researchers using the ATHCTS to compare scores of control and intervention groups as was done in the dissertation study. Pretest and posttest results for social workers in a uniprofessional group were compared with scores from social workers in an interprofessional group using a modified 10-item ATHCTS. Seven of the 10 items showed significant improvement in attitudes for the interprofessional group while scores for only two of 10 items for the uniprofessional group were significantly improved.

Some researchers did not see improved scores in Quality of Care/Process following IPE. Smith (2014) determined changes in attitudes toward teams using a pretest-posttest design. While scores did improve, there was no significant difference found between pretest and post-IPE scores for participants; however, Smith did note that participants had relatively high pre-test scores, which left little room for statistical improvement. Even though Smith was comparing pretest and posttest scores for the same group of participants, it is possible that similarly, participants in the control group of the dissertation study simply had quite favorable attitudes toward the quality and process of care delivered by health care teams. While Robben et al. (2012) also failed to find improved scores on the ATHCTS following IPE, results of a different attitudes survey (Interprofessional Attitudes Questionnaire) yielded strong support of the efficacy of IPE.

Many researchers found less acceptance of physician centrality, indicating more positive attitudes toward the concept of shared leadership among team members, which was evident in the dissertation study as well as studies by Bain et al. (2014), Bonifas and Gray (2013), Fulmer et al. (2005), Wellmon et al. (2012), and Zuccherio et al. (2011). Researchers may have used various versions and scoring methods for the Physician Centrality/Shared Leadership subscale; however, all reported significant improvement in this subscale score following IPE. While not all researchers commented on the reliability of the subscales in their studies, Zuccherio et al. used the six-item Physician Centrality and noted that the reliability of the subscale was low ($\alpha = .52$). Just as in the dissertation study, the low reliability of the Physician Centrality subscale must be kept in mind when interpreting results.

Implications of the Findings

Implications for Nursing Education

The lack of evidence to validate the use of and benefit of IPE for nursing students was noted in chapter one. The dissertation study did provide some evidence to support the use of clinical IPE for nursing students. Nursing students who participated in the Health Partners program had more positive attitudes toward shared leadership than non-IPE participants. While the reliability of the Physician Centrality subscale was low for the control group, there was a significant difference in Physician Centrality subscale scores between groups. This finding was supported by results of several other studies (Bain et al., 2014; Bonifas & Gray, 2013; Fulmer et al., 2005; Wellmon et al., 2012; Zuccherino et al., 2011).

The difference of scores on Quality of Care/Process subscale between groups while not significant does not necessarily imply that clinical IPE is ineffective in improving attitudes of nursing students toward health care teams. As noted previously, the Quality of Care/Process subscale score for the control group was relatively high. Several other researchers (Bain et al., 2014; Fulmer et al., 2005; Giordano et al., 2013; Wellmon et al., 2012; Zuccherino et al., 2011) found improved Quality of Care/Process scores following IPE, suggesting that IPE can be influential in improving attitudes toward health care teams.

It is important to consider findings within the confines of the study and not draw conclusions that are not supported by the study results. Based upon the dissertation study findings, there were mixed results to support the efficacy of clinical IPE in improving attitudes of nursing students toward the health care team and teamwork. There was no

evidence to suggest that clinical IPE is detrimental to improving attitudes toward the health care team. Coupling current findings with previous study results, there is at least some evidence to support inclusion of clinical IPE in nursing curricula to support interprofessional collaboration.

Implications for Nursing Research

The dissertation study does add to the body of evidence supporting the use of clinical IPE to improve attitudes of nursing students toward health care teams. The findings in the dissertation study also signal the need for additional IPE research. Future studies could produce more compelling evidence for inclusion of clinical IPE in nursing curricula. The use of the six-item physician centrality subscale with better reliability could result in more robust results (Heinemann et al., 1999). A different study design, such as a pretest-posttest with a control and intervention group, could also demonstrate significant findings. While it is probable that IPE produces a change in attitude, it is possible that one instrument could better measure attitudes than another. Just as noted by Robben et al. (2012), the use of multiple instruments would provide a variety of ways to measure attitude and could help detect a change in attitude following IPE that might not be noticed by using only one instrument. The dissertation study findings along with the proposed future studies will help build the science of nursing education.

Implications for Nursing Practice

The dissertation study findings did not support the hypothesis that nursing students who participated in clinical IPE have more positive attitudes toward the quality of care and the process of providing care by a health care team. While the study results did not show a significant difference in attitudes between IPE participants and

nonparticipants, it should be noted that nursing students seem to already have high regard for the health care team. Because students seem to already have positive attitudes toward health care teams, it may be important to explore other variables that affect communication and collaboration among the health care team.

The findings in the dissertation study support the idea that nursing students are more supportive of a shared leadership role following clinical IPE. This factor could be extremely important for nurses entering the practice arena. Nurses may be called upon to assume more leadership roles on the health care team. The shared leadership will require effective communication among team members. IPE may help nursing students be better prepared for these shared leadership roles.

The IOM (2011) suggested that IPE would better prepare health professionals for working in interprofessional teams. Shared leadership is an essential component for effective teamwork and requires improved communication and collaboration among team members. Following IPE, nursing students demonstrated strong support for shared leadership. Coupling this finding with the already high regard of nursing students for the use of a team approach to patient care, nursing students participating in IPE will be better prepared to work in health care teams following graduation.

Implications for Public Policy

The demand for evidence-based nursing practice must be applied to nursing education. Scholars have identified the need for evidence to improve nursing and interprofessional education (Horder, 2004; Humphris & Hean, 2004; Stevens, 2013); however, there is a lack of funding for nursing education research (Broome, Ironside, & McNelis, 2012). To garner the appropriate attention and needed funds for IPE research,

it must become a matter of public policy. The dissertation study supports the need for further research into the benefit of clinical IPE and improved communication and collaboration of nurses with other health care team members, and lobbying for state and federal research funds could help meet this need.

Another question to consider is whether IPE should be required in undergraduate nursing curricula. The WHO (2010) called for policymakers to consider inclusion of IPE for health professions students. The dissertation study alone does not provide the evidence needed to call for the inclusion of clinical IPE in undergraduate nursing curricula by accrediting agencies. However, the findings do lend support to the growing evidence of the importance of IPE (Bain et al., 2014; Cameron et al., 2009; Fulmer et al., 2005; Giordano et al., 2013; Shrader & Griggs, 2014; Wellmon et al., 2012; Zuccherro et al., 2011). Lobbyists could use these aggregate findings from IPE research to push for lawmakers at state levels to require inclusion of clinical IPE as a condition of approval for nursing education institutions. Requesting funding for continued research in IPE would provide further evidence of the requisite nature of IPE in improving both communication and collaboration among health care professionals.

Limitations

There are some limitations to generalizability of the findings from the dissertation study. Some limitations are inherent because of the study design and sample selection, while others were discovered following data analysis.

Threats to Internal Validity

Selection bias is a threat to internal validity in this study. Because participants were not randomly assigned to groups, it was possible that the experimental and control

groups were not be equal. The control (Group 1) and intervention (Group 2) groups were similar in demographics of gender and age. A greater number of participants were female than male in both groups (females₁ = 66, male₁ = 4; females₂ = 64, males₂ = 6). Most students in both groups were in the traditional age group for college juniors (20-21 years). These ages fell within the first two age ranges of 18 to 20 and 21 to 22 (Group 1 = 63; Group 2 = 65). Because age and gender were the only demographics available with the archived intervention group data, other demographics, such as race, ethnicity, college grade point average (GPA), and income were unknown. In addition, the quasi-experimental, nonequivalent control group, posttest-only design poses a selection threat to internal validity, which limits the extent to which differences in ATHCTS scores can be attributed to the IPE intervention. The inclusion of a pretest could have given valuable information regarding the similarity of the two groups before IPE. Assigning students to an IPE intervention group or a control group would be highly unlikely. In lieu of an experimental design, a quasi-experimental, nonequivalent control group, before-after design would have been a more robust design than the design in the dissertation study (Polit & Beck, 2012). Unfortunately, because archived data from previous students was used for the intervention group, baseline data, or a pretest was not available. Future studies might include a pretest to ascertain equivalency of the two groups at baseline.

Threats to External Validity

Because of the study design, a posttest only, some threats to external validity were reduced. There was no testing threat because there was no pretest. However, there were still some threats to external validity. One threat was the selection-treatment interaction. It is possible that some prior experiences of students, such as previous work in health

care, could interfere with the effect of the IPE intervention. There was some attempt to control this threat with the exclusion criteria for the control group. Potential participants in the control group were asked to indicate whether they had participated in previous IPE. Even though faculty at each control group university indicated the students had not participated in IPE, some students indicated previous IPE participation. Surveys for these students were excluded from the dissertation study. Even though students in the control group had no formal IPE, they may have had some influence because of previous health care work. It is not known whether participants in either group had prior work in health care, other than one semester of clinical.

Another limitation that may have affected both internal and external validity was the two study groups were taken from different schools. While all students in the intervention group had participated in clinical IPE and students who had participated in IPE were excluded from the control group, it was not be known whether there were other confounding factors by which student responses might be attributed. For example, students may have had experiences with other health care professionals during their clinical experiences. It is also possible that the emphasis on communication and teamwork among professionals could have differed between clinical sites. Although it is not possible to determine the degree of exposure to interprofessional working the students in either group might have had during clinical experiences, it may be important to explore the various hospitals used along with the size of the surrounding communities. Students in the intervention group had clinical in one or two hospital facilities. All students had clinical courses at one primary site, a 115-bed, regional medical center/teaching hospital. In addition, many students had one or two clinical days at a regional, 99-bed hospital.

Each of these regional hospitals serves a city with a population of just over 17,500, plus many smaller surrounding rural communities (Advameg, Inc., 2016). About one-half the students in the control group had participated in clinical in various hospitals around the St. Louis, MO area, a metropolitan area with a population of 2.8 million. These hospitals range in size from 75 to 1,150 beds. Excluding the 1,150 bed hospital, the average size was a 265-bed facility. Of these hospitals, two were teaching facilities. The other half of the control group had been assigned to six hospitals within west central Missouri and two hospitals in the Kansas City, MO area (personal communication, K. Krewson, June 24, 2016). The general population of the Kansas City metropolitan area is two million; the smaller outlying hospitals were in cities with populations ranging from 4,600 to 21,500. The hospitals outside of the Kansas City area would be similar to those used by the students in the intervention group as they served the local city plus surrounding rural communities. These hospitals ranged in size from 25 beds to 310 beds with an average size of 142 beds. None of the hospitals used for clinical in west central Missouri were teaching hospitals. While the type of hospital in which the two student groups have had clinical experiences is known, it would not be possible to discover the extent students had been exposed to interprofessional communication and teamwork. Prior exposure to interprofessional teamwork could influence student responses to the survey, which limits the generalizability of these findings.

Other Limitations

The low reliability ($\alpha = .426$) of the Physician Centrality subscale when used with the control group has been discussed previously. There may be some explanations for the low reliability of this subscale. First the subscale used had only five items because of the

previous use of a five-item subscale for Physician Centrality with the intervention group. As explained by Heinneman et al. (1999), the six-item Physician Centrality subscale has been found more reliable than the five-item subscale. As noted by Tavakol and Dennick (2011), a small number of test items may underestimate reliability. In future studies, the six-item Physician Centrality should be used to enhance reliability of the instrument. In addition, one item (Item 12) was found to have a lower correlation with the overall subscale score for both the control and intervention group. It was anticipated that participants who were more favorable toward shared leadership and thus favorable toward teamwork would agree with the statement “The physician should not always have the final word in decisions made by health care teams” (Heinemann et al., 1999, p. 137). However, in general, students showed more disagreement with this statement. The item correlation with total score was especially low at .043 for the control group. It is likely that while nursing students support the concept of shared leadership, they understand the nature of physicians having the authority to write orders for patients. While advanced practice nurses may also have prescriptive authority, students may be unaware of this fact. In addition, it is likely that students would think of the role of a staff nurse within a team so that the nurse would not be able to write an order for the patient. Tavakol and Dennick suggested omitting items with low item-total score correlation; however, had this been done, Cronbach’s alpha would still have been low at .495. For future research, it would be judicious to either use the six-item Physician Centrality subscale or select a different instrument with higher reliability to measure this construct.

Chapter Summary

The dissertation study was undertaken to investigate the efficacy of a pre-licensure clinical IPE for nursing students. A quasi-experimental, nonequivalent control group, after-only design was used for this study. It was hypothesized that nursing students who participated in clinical IPE had more positive attitudes toward health care teams than nursing students who did not participate in clinical IPE as evidenced by higher scores on the ATHCTS, Quality of Care/Process subscale. Findings from this dissertation study did not support this research hypothesis. Though the intervention group completing IPE did have higher scores on the Quality of Care/Process subscale than the control group, the difference was not significant. Consistent with findings of numerous researchers, the comparison group mean score (control group score or baseline score) was relatively high, indicating a strong favor for Quality of Care/Process for health care teams.

It was also hypothesized that nursing students who participated in clinical IPE had more positive attitudes toward health care teams than nursing students who did not participate in clinical IPE as evidenced by lower scores on the ATHCTS, Physician Centrality subscale. This hypothesis was supported by dissertation study findings.

This study does provide support of the efficacy of clinical IPE for nursing students and the investigator proposes some implications for nursing education, research, practice, and public policy. The study findings support inclusion of clinical IPE in nursing education curricula. At the same time, the body of evidence supporting the benefit of clinical IPE for nursing students has been expanded. It was determined that continued research as to best practices in IPE and best designs for IPE research were

needed. Nurses who participate in clinical IPE as students may be better equipped for shared leadership opportunities within the health care team. Also, this study lends more support toward the growing evidence of inclusion of clinical IPE in undergraduate nursing curricula by accrediting agencies.

While the study does yield some support for the efficacy of clinical IPE to improve nursing student attitudes toward the health care team, there are several limitations identified as well as suggestions for future research. The use of archived data for the intervention group along with the study design did limit the ability to determine equality of the two groups at baseline. A more robust study design could be beneficial in future research. In addition, the use of the six-item Physician Centrality subscale may have improved the reliability of the subscale in the dissertation study. Future research using the ATHCTS should include the six-item Physician Centrality subscale. In addition, the use of additional instruments to measure attitudes of participants should be considered.

The dissertation study did not produce the expected strong results to fully support the efficacy of clinical IPE in improving attitudes of nursing students toward the health care team. It was beneficial in providing some supporting evidence that clinical IPE is beneficial in improving nursing students' attitudes toward physician centrality or shared leadership among team members. There is compelling evidence of the need for further research into the efficacy of clinical IPE for nursing students.

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Appendix A
IRB Approvals

NOVA SOUTHEASTERN UNIVERSITY
Office of Grants and Contracts
Institutional Review Board



MEMORANDUM

To: Brenda Wheeler
Health Professions Division – College of Nursing

From: Jo Ann Kleier, PhD, EdD, ARNP 
Institutional Review Board
Signature

Date: March 9, 2016

Re: Investigating the Efficacy of Interprofessional Clinical Education

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

- 1) **CONSENT:** If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.
- 2) **ADVERSE EVENTS/REACTIONS:** The principal investigator is required to notify the IRB chair and me (954-262-5369 and 954-262-1978 respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.
- 3) **AMENDMENTS:** Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Protocol File
Office of Grants and Contracts (if study is funded)



MARYVILLE UNIVERSITY
650 Maryville University Drive
St. Louis, Missouri 63141
o 314.529.9300
maryville.edu

Date: March 28, 2016

Memo To: Ms. Brenda Wheeler – Doctoral Candidate, Nursing Education Nova Southeastern U

From: Dr. Robert Bertolino, Chair, Institutional Review Board
Dr. Tammy M. Gocial, Administrator, Institutional Review Board

RE: IRB Review Protocol #15-98
Title: “Investigating the Efficacy of Interprofessional Clinical Education”

CC: Dr. Elizabeth Buck – Assistant Dean for Nursing and MU Sponsor

This is to inform you that your application to conduct research has been reviewed and accepted by the Maryville University Institutional Review Board. You are now authorized to begin the research as outlined in your proposal.

It is understood that this project will be conducted in full accordance with all applicable sections of the IRB guidelines as published by Maryville University. It is also understood that the IRB will be notified immediately of any proposed changes that may affect the status of your research proposal. As the principal investigator(s), you are required to notify the Maryville University IRB of any adverse reactions that may develop as a result of this study. Finally, when your research has concluded (or if you conclude the study sooner than anticipated), please complete the Protocol Closure Form. If informed consent processes were a part of your proposal, an approved, stamped version is attached to this document.

Good luck on your research.



Office of Sponsored Programs and Research Integrity
 Administration 315
 Warrensburg, MO 64093
 Office 660-543-4264
 Grants/Contracts: osp@ucmo.edu
 Compliance: researchreview@ucmo.edu

Exempt Review
 4/11/2016

Researcher: Brenda Wheeler, Doctoral Candidate, Nova Southeastern University

UCM Faculty Sponsor: Dr. Julie Clawson

The research project, 'Investigating the Efficacy of Interprofessional Clinical Education', was approved by the University of Central Missouri Human Subjects Review Committee on 4/8/2016.

If an adverse event (such as harm to a research participant) occurs during your project, you must IMMEDIATELY stop the research unless stopping the research would cause more harm to the participant. If an adverse event occurs during your project, notify the committee IMMEDIATELY at researchreview@ucmo.edu.

The following will help to guide you. Please refer to this letter often during your project.

- If you wish to make changes to your study, submit an "Amendment" through Blackboard under the "Amendment and Renewals" tab. **You may not implement changes to your study without prior approval of the UCM Human Subjects Review Committee.**
- If the nature or status of the risks of participating in this research project change, submit an "Amendment" through Blackboard under the "Amendment and Renewals" tab. **You may not implement changes to your study without prior approval of the UCM Human Subjects Review Committee.**
- **When you have completed your collection of data, please submit the "Final Report" found on Blackboard under the "Final/Renewal Report" tab.**

If you have any questions, please feel free to contact me at researchreview@ucmo.edu.

Sincerely,

Deborah J. Turnbow
 Director, Sponsored Programs & Research Integrity
 University of Central Missouri

cc: clawson@ucmo.edu
 Protocol Number: 484

IRB Review Form
Truman State University

Responsible Investigator: **Brenda Wheeler**

Dept.: **Nursing**

Student Investigators:

Review Date: **4/14/16**

Project Title: **Investigating the Efficacy of Interprofessional Clinical Education**

******* IRB Action *******

The Institutional Review Board has reviewed the project named above.
The results of this review are described here.

A. XX Your IRB application has been fully approved. You may begin your project immediately. This approval is valid for one year. If you make changes to your project you must have them approved by the IRB.

B. _____ Minor revisions or changes to your project are required by the IRB. These changes are described below. You should submit **one copy only** of your revisions to the IRB Office, McClain Hall 203, as soon as possible. In most cases revisions or changes do not have to be reviewed by the full IRB and your changes can be approved within 2 days. You do not need to resubmit the full application. Submit **only one copy** of those materials and documents that show the changes requested. You cannot begin your project until you receive approval of these changes.

C. _____ Significant changes are required by the IRB before your project can be approved. The review of your project has been placed on hold until those changes are submitted and review by the IRB can continue. You may not begin your project until the review is completed and your project is approved. Submit your changes as soon as possible so that review can be completed at the next IRB meeting.

D. _____ Your project has been disapproved by the IRB. Please read the reasons given below carefully. You may revise your project and resubmit it. If you would like to discuss the project further contact the IRB Office in McClain Hall 203.

Reviewers' comments, required changes and/or additional materials to be submitted:

Your project has not been approved. To receive approval, please submit the following changes to your application to the IRB in McClain Hall 203 as soon as possible:

If you have questions about the review information provided above please contact Kris McKim, IRB Administrator, MC 203, 660-785-7245, or irb@truman.edu

Appendix B

Overview of Health Partners Program

Interprofessional Health Partners Program Overview

The Interprofessional Health Partners Program (IHPP) offers students the opportunity to work with community elders and students from other disciplines to gather a health history, assess vital signs, plan and provide condition-specific education to patients in their home. Students will complete an orientation session in preparation for completing 3 patient visits. Visits will occur during the spring semester. The program *patients* will be elder volunteers from the community.

The IHPP is designed to allow students to practice interviewing skills, learn about geriatric health issues and assessment resources, and establish a professional relationship with an elder for the purposes of developing knowledge, skills, and positive attitudes necessary for delivering high quality care to older adult patients. This program also incorporates information and activities that introduce students to interprofessional teamwork and patient safety strategies.

Program Objectives

Through activities and experiences in the IHPP, students will enhance their interprofessional (IP) related attitudes, knowledge and skills as they do the following:

- describe the roles and responsibilities of each involved health care discipline.
- discuss basic concepts of patient safety and interprofessional team theory and practice.
- learn with, from, and about colleagues in other disciplines as part of interactions with assigned elder patient.
- develop an appreciation of the roles and responsibilities of the patient, family, and health professionals on the care team.

- develop skills in establishing and maintaining positive and effective relationships with an elder and members within the assigned team/table group.

Course Details

Teams

Teams will consist of three students selected from the following programs: athletic training, communication disorders, exercise science, health science, nursing, and osteopathic medicine.

Learning Activities

Online, classroom, and experiential learning activities are included in this course. Students will complete an orientation session, three elder home visits, and three review sessions following the elder visits.

Orientation Session: Preparing for Interprofessional Working

Objectives for Orientation

1. Participate in a mutually respectful, non-hierarchical environment for first team meeting.
2. Describe expectations for the IHPP.
3. Describe common goals for all teams/team members.
4. Experience positive IP social interaction including discussion of language demonstrating IP cultural competence.
 - What stereotypes do we have about each other?
 - How are we the same? Our common skills and knowledge?
 - How are we different? Our unique skills and knowledge?
 - When are hierarchies helpful/dangerous?

- What attitudes and behaviors help us work together well? How does language impact working relationships?
 - What are the unique teamwork challenges of clinic based care vs. hospital care?
 - How do we decide who gets respect, how much, and why?
5. Describe core competencies for interprofessional collaborative practice as promulgated by the Interprofessional Education Collaborative Expert Panel (IPEC) (2011), to include the following:
- Values / Ethics
 - Roles / Responsibilities
 - Interprofessional Communication
 - Teams and Teamwork
6. Prepare to complete elder visit one as a team.

Activities for Orientation Session

1. Pick up meal, find a seat, complete Area Health Education Center (AHEC) participant information form, and talk with table members.
2. Introductions and guided discussion
3. IPEC core competencies
 - Values / Ethics
 - Roles / Responsibilities
 - Interprofessional Communication
 - Teams and Teamwork
4. TeamSTEPPS® Tools

Overview of Elder Visits

Visit One: General Assessment of Patient

Objectives for visit one.

1. Demonstrate interprofessional professionalism in interacting with the patient and the team.
2. Re-establish rapport with the team and establish rapport with a patient.
3. Take a health history including chronic diseases and family history.
4. Take patient's vital signs; get list of medications.
5. Identify/describe patient's current wellness strategies (nutrition, exercise, safety practices, etc.).
6. Assess patient's access to needed acute, chronic, and/or preventive care (financial, transportation, language barriers, etc.).
7. Assess patient's level of independence.
8. Prepare patient to complete home safety/fall prevention checklist.
9. Prepare report for visit one review session.
10. Prepare for visit two.

Activities in preparation for visit one and review session one.

1. Review materials and guide; work with team to prepare for visit one.
2. Complete visit one with elder.
3. As a team, prepare a patient presentation for the review session.
4. Locate community resources appropriate to meeting the patient's needs.
5. In preparation for visit two, look up age/gender-specific U. S. Preventive Services Task Force (USPSTF) recommendations for at least one of your patient's health

issues. Be prepared to share what you found with your patient at visit two.

<http://www.uspreventiveservicestaskforce.org/adultrec.htm>

Guide for visit one.

1. Introduce your team, role and purpose.
2. Ask about past medical history.
3. Ask about current medications and the reason they're prescribed.
4. Assess patient's vital signs, heart and lung sounds, distal pulses, etc. Record.
5. Ask patient what they do to stay healthy (nutrition, exercise, safety, etc.). Reinforce healthy behaviors.
6. Ask about patient's use of community resources, including possible resources the patient needs, but has not located.
7. With your patient, assess his/her
 - Nutrition - use nutrition screening tool
 - Level of independence - use activities of daily living (ADL) tool or instrumental activities of daily living (IADL) tool as appropriate
 - Health literacy - ask if the patient
 - understands written medical information;
 - is confident completing medical forms alone; and
 - needs assistance in reading hospital materials
8. Explain home safety/fall prevention checklist. Ask patient to complete in preparation for visit two.
9. Close this visit with overview of next visit.

Tools for visit one.

- Nutrition Screen
- Katz Activities of Daily Living **or** Lawton Brody Independent Activities of Daily Living as appropriate
- Health Literacy - 3 Question Screen
- Home Safety / Fall Prevention Checklist

Visit Two: Functional Status Assessment

Objectives for visit two.

1. Demonstrate interprofessional professionalism in interacting with the patient and the team.
2. Re-establish and maintain rapport with a patient and the team.
3. Update V/S and meds; describe changes evident at visit two.
4. Review last visit with patient; share the community/education resource information the team has gathered.
5. Identify patient's preventive health actions in line with age/gender-specific USPSTF recommendations found on-line.

<http://www.uspreventiveservicestaskforce.org/Page/Name/uspstf-a-and-b-recommendations/>
6. Assess safety and fall risks using checklist.
7. Assess oral health status.
8. Assess and categorize health risk factors/level - available assessments: American Heart Association (AHA) Heart Attack Risk Assessment (HRA), Driving, Snellen or Age-related Macular Degeneration (AMD).

9. As a team, prepare a patient presentation for the review session.

Activities in preparation for visit two and review session two.

1. Review materials and guide; work with team to prepare for visit two.
2. Assemble and prepare to share education resources identified for your patient.
3. Complete visit two with elder.
4. As a team, prepare a patient presentation for the review session.

Guide for visit two.

1. Re-establish rapport with team and patient.
2. Update health history with any changes since last visit; update medication list for discontinued and/or new medications.
3. Assess patient vital signs/physical exam noting any changes.
4. Review last visit; share information about the community resource(s) you identified for your patient.
5. Ask about preventive care: yearly exams or screenings? Share information on age/gender-specific USPSTF recommendations for at least one of your patient's health issues identified in visit one.
6. Assess the following:
 - Safety/Falls: Review Home Safety/Fall Prevention Checklist completed by patient between visits; discuss safety/fall prevention strategies.
 - Get Up and Go
 - Oral health status with Oral Health Assessment Tool (OHAT) and/or Oral Peripheral Exam (OPE)
7. As appropriate/indicated, administer the following optional screening tools:

- AHA Heart Attack Risk Assessment (online)
 - EAT-10
 - Drivers 55+ Self-Rating Form
 - Hearing Screen
 - Snellen and/or AMD
8. Close the visit with an overview of next visit.

Tools for visit two.

- Home Safety / Fall Prevention Checklist
- Get Up and Go
- Oral Health Assessment Tool (or Oral Peripheral Exam/Speech Mechanism -- for teams with a CMDS student)
- AHA Heart Risk Assessments (for diabetes, heart attack, high blood pressure, and/or lifestyle issues)
- EAT-10
- Drivers 55+ Self-Rating Form
- Hearing Screen - Do I have a Hearing Problem?
- Snellen and/or AMD Age-related Macular Degeneration

Visit 3: Social/Cognitive Status and Closure

Objectives for visit three.

1. Demonstrate interprofessional professionalism in interacting with the patient and the team.
2. Establish, re-establish, and maintain rapport with a patient and the team.
3. Update V/S and meds; describe changes at visit three.

4. Assess and categorize health risk factors/level - available assessments:
 - Mini-Cog
 - Two Question Depression Screen
 - Social Support Scale or SRRS
5. Discuss stress/life change with the patient and how that impacts health.
6. Collaborate with patient to identify positive health behaviors, maintenance, and areas for improvement.
7. Create a wellness plan with the patient.
8. Closure.

Activities in preparation for visit 3 and review session 3.

1. Review materials and guide; work with team to prepare for visit three.
2. Assemble and prepare to share any additional education resources identified for your patient.
3. Complete visit three with elder.
4. As a team, prepare a patient presentation for the review session.

Guide for visit three.

1. Re-establish rapport with team and patient.
2. Update health history with any changes since last visit; include current medications and the reason they're prescribed.
3. Assess patient vital signs/physical exam noting any changes.
4. Review last visit.
5. Ask about the impact of stress/difficulties (including perceived discrimination, if appropriate) on health and well-being.

6. With the patient, work through the following assessment tools:
 - Mini-Cog (one or three questions)
 - Two Question Depression Screen
 - Duke Social Support Survey
7. Follow-up assessments, as appropriate
 - St. Louis University Mental Status Examination (SLUMS)
 - Geriatric Depression Scale
 - Holmes-Rahe Social Readjustment Scale (SRRS)
8. Ask patient about goals/plans to maximize his/her health and wellness.
 - Use Brief Motivational Interviewing to identify goals/patient's unique resources/challenges.
 - Collaborate with patient to make an action plan.
 - Review/describe community resources available for changing behaviors.
9. Discuss with patient how team / team members (or health care providers in general) might improve their interactions with patients.
10. Thank your patient for being an integral part of your education.

Tools for visit three.

- Mini-Cog
- Two Question Depression Screen
- Duke Social Support Survey
- SLUMS
- Geriatric Depression Scale
- SRRS

- Action Plan

Overview of Review Sessions

Review Session One

1. Team case presentations of visit one.
 - Team presentations (3-4 minutes per team) of findings in visit one.
 - Describe education issue identified in visit one.
 - Opportunity for questions and suggestions from other teams/participants.
 - Report on findings of any assessment tools used.
2. Facilitated review of materials and team preparation for visit two.
 - Objectives and activities for visit two.
 - Discuss assessment tools to be used for visit two.
 - Team huddle to determine the following:
 - Which team member does what in visit two.
 - Planned educational tool for visit two.
 - Discuss team plans briefly.
3. Teamwork assessment and discussion.
 - Students complete debriefing form.
 - Discuss/identify methods for improving performance in team in small group.
 - Share team strengths/areas for further work in large group.
4. Collect teamwork debrief forms

Review Session Two

1. Team case presentations of visit two.

- Team presentations (3-4 minutes per team) of findings in visit two.
 - Report on findings of any assessment tools used in visit two.
 - Opportunity for questions and suggestions from other teams/participants. (Assign one team to formulate question(s) about presenting team process/findings. Rotate this responsibility for each presentation.)
2. Facilitated review of materials and team preparation for visit three.
 - Objectives and activities for visit three, including review of assessment tools.
 - Team huddle to determine who does what in visit three.
 - Potential community resources?
 - Brief team reports on plans for visit three.
 3. Teamwork assessment and discussion.
 - Students complete debriefing form.
 - Discuss/identify methods for improving performance in team in small group.
 - Share team strengths/areas for further work with large group.
 4. Collect teamwork debrief forms

Review Session Three

1. Team case presentations of visit three.
 - Team presentations (3-4 minutes per team) of findings in visit three.
 - Report on findings of any assessment tools used in visit three.
 - Opportunity for questions and suggestions from other teams/participants. (Assign one team to formulate question(s) about presenting team process/findings. Rotate this responsibility for each presentation.
2. Complete the following forms:

- Program Evaluation
 - Debriefing Forms
 - Documents for ongoing research (ATHCTS).
3. Teamwork assessment and discussion:
- Discuss/identify methods for improving performance in team in small group
 - Share team strengths/areas for further work with large group
4. Conclusion
- Collect teamwork debriefing forms, program evaluations, and research documents (ATHCTS).


Interprofessional Education Collaborative Expert Panel. (2011). Core competencies for interprofessional collaborative practice: Report of an expert panel. Washington, D.C.: Interprofessional Education Collaborative. Retrieved from <http://www.aacn.nche.edu/education-resources/IPECReport.pdf>

Appendix C


ATHCTS Instrument and Permission

Attitudes Toward Health Care Teams Scale

		Strongly disagree	Moderately disagree	Somewhat disagree	Somewhat agree	Moderately agree	Strongly agree
1.	Working on teams unnecessarily complicates things most of the time.	0	1	2	3	4	5
2.	The team approach improves the quality of care to patients.	0	1	2	3	4	5
3.	Team meetings foster communication among team members from different disciplines.	0	1	2	3	4	5
4.	Physicians have the right to alter patient care plans developed by the team.	0	1	2	3	4	5
5.	Patients receiving team care are more likely than other patients to be treated as whole persons.	0	1	2	3	4	5
6.	A team's primary purpose is to assist the physician in achieving treatment goals for patients.	0	1	2	3	4	5
7.	Working on a team keeps most health professionals enthusiastic and interested in their jobs.	0	1	2	3	4	5
8.	Physicians, as a rule, are team players.	0	1	2	3	4	5
9.	Developing a patient care plan with other members avoids errors in delivering care.	0	1	2	3	4	5
10.	Health professionals working on teams are more responsive than others to the emotional and financial needs of patients.	0	1	2	3	4	5
11.	The team approach permits health professionals to meet the needs of family caregivers as well as patients.	0	1	2	3	4	5
12.	The physician should not always have the final word in decisions made by health care teams.	0	1	2	3	4	5
13.	The give and take among team members help them make better patient care decisions.	0	1	2	3	4	5
14.	Hospital patients who receive team care are better prepared for discharge than other patients.	0	1	2	3	4	5
15.	The physician has the ultimate legal responsibility for decisions made by the team.	0	1	2	3	4	5
16.	In most instances, the time required for team meetings could be better spent in other ways.	0	1	2	3	4	5
17.	Physicians are natural team leaders.	0	1	2	3	4	5
18.	The team approach makes the delivery of care more efficient.	0	1	2	3	4	5
19.	Developing an interdisciplinary patient care plan is excessively time consuming.	0	1	2	3	4	5
20.	Having to report observations to the team helps team members better understand the work of other health professionals.	0	1	2	3	4	5

 Attachments can contain viruses that may harm your computer. Attachments may not display correctly.

Wheeler, Brenda

From: gheinemann@verizon.net [gheinemann@verizon.net] **Sent:** Fri 3/15/2013 9:00 PM
To: Wheeler, Brenda
Cc:
Subject: Attitude Scale
Attachments:  [scaleatt.doc\(49KB\)](#)

Dear Brenda,

You have permission to use our Attitudes Scale. We ask that if you publish data from the scale, you footnote us as follows:

Heinemann, G.D., Schmitt, M.H., Farrell, M.P., & Brallier, S.A. (1999). Development of an Attitudes Toward Health Care Teams Scale. *Evaluation & the Health Professions*, 22, 123-142.

I have attached a copy of the scale with scoring instructions. If you have any questions, contact me. Best of luck with your research.

Gloria D. Heinemann, Ph.D.



Confirmation Number: 11138873
Order Date: 11/19/2013

Customer Information

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Appendix D

Participation Letter



Title of Study: Investigating the Efficacy of Interprofessional Clinical Education

Principal investigator
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Description of Study: Brenda K. Wheeler is a doctoral student at Nova Southeastern University engaged in research for the purpose of satisfying a requirement for a Doctor of Philosophy degree. The purpose of this study is to investigate whether nursing students who participate in interprofessional clinical education have more positive attitudes toward health care teams than nursing students who do not participate in interprofessional clinical education.

If you agree to participate, you will be asked to complete a 20 item questionnaire regarding your attitudes toward health care teams. The data gathered from this questionnaire will help the investigator determine to usefulness of interprofessional clinical education. It is anticipated that this survey should take no more than 20 minutes to complete. Once you have completed the survey, you are asked to place it in the collection envelope

Risks/Benefits to the Participant: There may be minimal risk involved in participating in this study. There is a possibility of loss of confidentiality. It is possible that another participant could see your responses. In order to reduce this risk, you are asked to not place any identifying information on the survey. In addition, please fold the survey in half before returning it to the collection envelope so others cannot see your responses.

There are no direct benefits to for agreeing to be in this study. If you have any concerns about the risks/benefits of participating in this study, you can contact the investigators and/or the university's human research oversight board (the Institutional Review Board or IRB) at the numbers listed above.

Cost and Payments to the Participant: There is no cost for participation in this study. Participation is completely voluntary and no payment will be provided.

Confidentiality: You are asked to submit the survey anonymously, so please, do not write any identifying information on the survey form. Information obtained in this study is strictly confidential unless disclosure is required by law. All data will be secured in a locked filing cabinet. Your name will not be used in the reporting of information in publications or conference presentations.

Participant's Right to Withdraw from the Study: You have the right to refuse to participate in this study and the right to withdraw from the study at any time without penalty.

I have read this letter and I fully understand the contents of this document and voluntarily consent to participate. All of my questions concerning this research have been answered. If I have any questions in the future about this study they will be answered by the investigator listed above or her staff.

I understand that the completion of this questionnaire implies my consent to participate in this study.