INTERPROFESSIONAL EDUCATION IN THE CLINICAL SETTING: AN EXPLORATION OF THE ATTITUDES, KNOWLEDGE, AND SKILLS OF PHYSICAL THERAPIST STUDENTS AND PHYSICAL THERAPIST CLINICAL INSTRUCTORS

by

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ABSTRACT

**Background:** Interprofessional collaborative practice and teamwork has become an important practice standard across healthcare professions. In order for students to enter the workplace prepared to effectively contribute to the interprofessional team, they must have didactic and clinical education experiences that help develop their knowledge and competence. Valuable clinical education experiences require licensed clinicians trained in interprofessional competencies and effective teaching methods. This study explored the knowledge, attitudes and skills of both students and clinical instructors (CI) related to interprofessional education and practice. **Methods and Procedures:** Using the Interprofessional Education Collaborative (IPEC) Competency Survey Instrument, development of self-perceived competence of students was measured following an 8-week clinical rotation. The self-perceived competence of their clinical instructors was measured as well. After students completed their clinical rotation, interviews were conducted with both students and clinical instructors, and document review was performed on the Interprofessional Practice and Collaboration skill of the students’ Physical Therapy Manual for the Assessment of Clinical Skills. **Results:** Independent sample t-tests showed significant improvement in self-perceived competence on all IPEC Competency domains after the conclusion of an 8-week clinical rotation. No significant difference existed between the post-rotation student ratings and the ratings of experienced clinical instructors on the IPEC Competency Survey. Interviews revealed limited opportunities for students to be actively involved in interprofessional tasks, as both students and CIs described the student role as more observational. Additionally, the background and preparation of CIs in the area of interprofessional practice and teaching methodology appeared to be lacking. **Conclusions:** Physical therapy clinical education leads to increases in students’ self-assessed IPEC
competencies. For the domains and competencies with lower scores, educational and clinical education programs may consider integration of additional targeted experiences to enhance student development. While students appear to be gaining needed experience and confidence in interprofessional competencies, additional continuing professional education related to interprofessional practice and teaching methodology may be beneficial for clinical instructor development. Improved clinical instruction may assist students in further developing their competence and allow them to enter clinical practice prepared to effectively engage in collaborative, patient-centered care.
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CHAPTER 1: INTRODUCTION TO THE STUDY

Introduction

Interprofessional education (IPE) and collaborative practice is currently a significant focus in healthcare environments and in educational programs that are preparing students to become healthcare practitioners. Multiple health practitioners are involved, including but not limited to physical therapists, pharmacists, physician assistants, physicians, nurses, dentists, and public health practitioners. In distinct settings, different professions may take the leadership role, but each profession is considered a valuable part of the team and an appreciation of the contribution of each profession is essential. In interprofessional practice environments, team members partake in shared goal setting and shared decision making in conjunction with input from the patient in order to obtain the best outcomes. This study focused primarily on physical therapist education and the way in which physical therapy students are trained to become successful, contributing members of the healthcare team in a collaborative practice environment.

To develop skills in teamwork and collaborative practice, students must be exposed to interprofessional education during the didactic component of their education. The earlier students are exposed, the less likely they are to develop negative bias towards other health professions (Oandasan & Reeves, 2005). However, exposure during the academic classroom environment is not sufficient. Modeling of the desirable behaviors must be present during the clinical component of an educational program as well, as clinical education is an integral piece of preparing students to become competent practitioners (Ingram et al., 2013; Jarsi, Kulig, & Olson, 1990). Through shared learning between different professions, students are able to develop knowledge, skills, and attitudes reflective of teamwork and collaboration. While
interprofessional education is not a new concept in healthcare, recently a renewed interest and focus on collaboration has occurred. In 2014, the American Physical Therapy Association (APTA) released a white paper endorsing the Interprofessional Education Collaborative (IPEC) core competencies for interprofessional collaborative practice (American Physical Therapy Association [APTA], 2014). The IPEC core competencies include: Values/Ethics for Interprofessional Practice, Roles/Responsibilities, Interprofessional Communication, and Teams and Teamwork (Interprofessional Education Collaborative [IPEC], 2011). Shared interprofessional competencies across health professions are valuable in developing consistency and focus for interprofessional education and initiatives.

**Background to the Study**

Collaboration among practitioners is essential in today’s healthcare landscape. The United States (U.S.) health care system is the most costly in the world, but it continues to underperform when compared to other countries (Davis, Stremikis, Schoen & Squires, 2014). The well-known 1999 report *To Err is Human* reported that between 44,000 and 98,000 deaths occur each year in U.S. hospitals as a result of medical error (Institute of Medicine [IOM], 2000). A more recent study reported that 210,000 deaths are associated with preventable errors that take place in hospitals (James, 2013). Many factors have been identified that contribute to high costs, low performance, and medical errors. Among other items, suggestions for improvement include increased participation by patients in their healthcare decisions and increased communication and collaboration between health professionals (James, 2013; Yeager, 2005). With well-coordinated care comes improved health, less duplication of services, and cost savings (Cuff, 2013). The rise of and focus on interprofessional education and interprofessional collaborative
practice is reflective of studies showing these benefits for patients and the healthcare system as a whole.

Interprofessional education (IPE) is defined as “when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes” (World Health Organization [WHO], 2010). The focus on interprofessionalism began many decades ago. In the Institute of Medicine’s 1972 report, multiple recommendations were made that are related to interprofessional education and patient care (Institute of Medicine [IOM], 1972). Since that time, the focus on interprofessional education and practice has waxed and waned, but significant interest in IPE continues because of the increasing complexity of healthcare delivery and organization in the U.S. and abroad. However, a lack of translation from classroom-based IPE to clinical practice exists. This shortcoming stems from the isolation and disconnect between the educational environment and the practice of health care in clinical and community settings (Interprofessional Education Collaborative Expert Panel, 2011). The IOM (2013) has called for strengthening the link between the classroom content, which is defined as interprofessional education; and the clinical application of that content, which is defined as interprofessional practice. Within the space between classroom-based learning and professional practice by licensed professionals, pre-licensure clinical education occurs. Successful efforts to strengthen the focus on interprofessional education during this clinical education phase of academic programs will assist in bridging theory to the application of interprofessional collaboration.

For providers to practice in a collaborative manner, educational programs must offer opportunities for students to learn about and engage in interprofessional collaboration and teamwork, in both the didactic and clinical segments of the curriculum. Interprofessional
collaboration and teamwork is a complex professional competency, and practice of the required skills for success cannot be delayed until students have completed their education (McPherson, Headrick, & Moss, 2001). The importance of quality clinical education experiences for physical therapy students has been established (Recker–Hughes, Wetherbee, Buccieri, Timmerberg, & Stolfi, 2014). However, the quality of clinical education experiences varies, as does the expertise of the clinical instructors.

Physical therapy clinical education differs from the clinical training in many other health professions in that the clinical instructors are not employed by the academic institution and are not generally paid any additional salary or stipend for mentoring a student for a clinical rotation. Certification programs for clinical instructors exist, though neither those certifications nor any additional specific training is required for a clinician to act as a clinical instructor. The minimum qualifications for becoming a clinical instructor generally only require that a clinician be licensed in the state where they are practicing, be in good standing with their employer, demonstrate competence as a clinician, and have one year of experience practicing (Recker-Hughes et al., 2014). Physical therapy students must be supervised by a physical therapist and cannot be supervised by any other healthcare practitioner.

Additionally, physical therapy education has made some significant changes over the last 35 years. During that time, physical therapy has moved from a Bachelor’s to a Master’s to a Doctoral degree (Plack & Wong, 2002). With this change has come increased responsibility and training, more autonomous practice, and (in many states) patients who have direct access to services without a physician referral. However, many licensed physical therapists in practice still hold a bachelor’s or master’s level degree. Some clinicians who originally obtained a bachelor’s or master’s degree have gone back to complete a transitional doctoral degree, but that
additional education is not required for licensure. While experience in practice cannot be undervalued, some physical therapists trained at the bachelor’s and master’s level are lacking some of the curricular components that have been added into physical therapy programs since the time of their education, and interprofessional education is likely to be one of these components.

The educational process and focus within physical therapy curricula have changed over time in order to meet the needs and demands of the diverse society and healthcare systems. The Commission on Accreditation in Physical Therapy Education (CAPTE) develops and revises a set of Essential Standards for all entry-level physical therapy programs (Plack & Wong, 2002). In 2012, CAPTE proposed an added element related to interprofessional education and interprofessional collaboration to the PT standards for accreditation (CAPTE, 2012). The CAPTE standard states that “the didactic and clinical curriculum includes interprofessional education; learning activities are directed toward the development of interprofessional competencies including, but not limited to, values/ethics, communication, professional roles and responsibilities, and teamwork” (CAPTE, 2015, p. 20). This criterion is set to become effective January 1, 2018 (CAPTE, 2015), which means that all physical therapy programs will have increased accountability for ensuring that interprofessional education is a component of their curriculum.

Many U.S. physical therapy programs have already begun incorporating IPE into their curriculum, though the way in which IPE has been added varies greatly and multiple challenges exist. Without the incorporation of IPE activities into core curricular objectives and graded coursework, students will be unlikely to view the content as being as relevant or important as other profession specific topics (Brashers, Owen, Blackhall, Erickson, & Peterson, 2012). Reeves (2000) discusses the lack of motivation for student participation in IPE experiences when
they are not assessed in a way that gives them equal weight when compared to other coursework. Ho et al. (2008) notes that IPE must be integrated throughout all phases of the educational environment in order to move from the periphery to a central aspect of student learning. Because the clinical phase of learning is such a large part of healthcare practitioner curriculum, IPE must also be integrated into student internships.

During physical therapy internships/clinical rotations the importance of IPP has been discussed, although IPE/IPP had not been explicitly added as a skill to be evaluated despite the addition of the expectation of IPE in clinical settings by CAPTE. However, the most recent version of the Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS) has included the addition of Skill 18, which is “Management of Care Delivery: Inter-Professional Practice and Collaboration” (Dillon et al., 2015). The objectives listed that contribute to successful completion of this skill are as follows:

Collaborates with those who receive care, those who provide care, and others who contribute or support the delivery of health services; communicates one’s roles and responsibilities clearly to patients, caregivers, and other professionals; organizes and communicates information with patients, caregivers, and healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible; listens actively and encourages ideas and opinions of other team members; engages other health professionals, appropriate to the care situation, in shared patient-centered problems-solving; effectively manages conflict. (Dillon et al., 2015, p.67).

The move towards evaluation of IPP as an essential skill for clinical internships is a step towards reinforcing the importance of IPE in physical therapist education.
An additional challenge for incorporating IPE into clinical rotations is that most practicing PT’s who are clinical instructors were trained prior to the implementation of IPE into DPT curricula and certainly prior to the addition of those CAPTE standards. Therefore, the clinical instructors were not specifically trained in interprofessional collaboration and they may not be practicing in a way congruent with current standards and best practices. Physical therapists are required to take 30 hours of continuing competency units (CCUs) every two years, but available courses that are related to IPE are costly and infrequently available. Some clinicians may have participated in continuing competency courses related to IPE; however, Hean, Craddock, & Hammick (2012) note that continuing professional development in IPE is not always well received. Additionally, a gap in the frequency and effectiveness of collaborative practice is present between educational and clinical practice settings. Solid examples of effective interprofessional collaborative care are not universally present in healthcare environments (Hall & Zierler, 2015). Therefore, a disconnect is present between what students are taught and what they experience while working with licensed physical therapists in a clinical setting. Students are introduced to theories and ideal models, but in practice they observe a lack of collaborative relationships and therefore the importance of IPP/C is not reinforced.

**Statement of the Problem**

The current body of literature in physical therapy education focuses primarily on classroom and institution-based IPE in the didactic portion of the curriculum. Various case-based and simulation teaching techniques have also been utilized in an attempt to create realistic interprofessional clinical settings and scenarios (Bolest & Chmil, 2014; Figueroa, Sepanski, Goldberg & Shah, 2013). Dubouloz, Savard, Burnett, and Giutard (2009) describe the development of an IPE model in a university-affiliated primary health care clinic. However, the
implementation and evaluation of interprofessional education in the clinical education component of physical therapy curriculum is less explored in the research despite the importance of introducing all students to IPE in a variety of practice settings. Brault, Therriault, St-Denis, and Label (2015) note that the implementation of IPE by universities has been primarily through coursework or simulation, but that few attempts have been made to pursue IPE in healthcare clinical settings. This study focused on interprofessional education in the clinical education setting and explored the potential challenges created at the intersection of increased emphasis on and expectation of incorporating IPE into physical therapy curricula with the lack of formal clinical instructor training in the area of interprofessional education and practice.

**Purpose of the Study**

The purpose of this study was to explore the knowledge level, attitudes, and skills of physical therapist students and clinical instructors related to interprofessional education in the clinical education setting.

**Research Questions**

The following research questions were addressed by this study:

- How do student perceptions of readiness for interprofessional education and practice change over the course of the clinical rotation?
- How do students and CIs describe the opportunities available for them to engage in interprofessional practice during the clinical rotation?
- What is the perception of clinical instructors related to interprofessional education and practice and to their own preparedness for teaching and practice of related skills?
- How do clinical instructors evaluate the skill of doctor of physical therapy (DPT) students when they are placed in interprofessional practice situations?
Design Overview

The research questions were addressed through a mixed-methods study that integrated both qualitative and quantitative data. A convergent parallel design, as described by Creswell (2014), was utilized. Through the convergent design, different but complementary data were obtained that were related to interprofessional education during PT student clinical internships.

Data collection occurred through an existing self-report assessment tool, interviews, and document review. The assessment survey utilized was the IPEC Competency Survey (Dow, DiazGranados, Mazmanian, & Retchin, et al., 2014), which was issued to both students and clinical instructors to assess their self-perceived competence. For students, the results of the IPEC Competency Survey were compared pre- and post-clinical rotation to identify any changes in competency. The results of the students’ IPEC Competency Survey were analyzed in a series of independent sample t-tests for each domain subscale. Document analysis consisted of review of skill #18, Management of Care: Interprofessional Practice and Collaboration from the Physical Therapy Manual for the Assessment of Clinical Skills. Interviews were conducted with both students and clinical instructors.

Theoretical Framework

A theoretical framework in interprofessional education has been discussed in the literature as a necessity for forward progress in the instructional practice domain and for facilitating research in the field (Clark, 2006). Barr (2013) notes that a theoretical base for IPE is dependent upon the same honest and humble comparison and combination of perspectives that is required for collaborative clinical practice. In developing a theoretical framework for this study, consideration was given to the relationship of interprofessional education to both student learning and to the way practitioners are expected to help students develop practical skills in a
clinical setting. Additionally, the interprofessional learning continuum (IPLC) model was consulted.

**Learning Theories**

Theory related to cooperative, collaborative and social learning has frequently been applied to IPE, as the very definition of IPE states that students must learn with, from, and about one another (Clark, 2006; D’Eon, 2005). Experiential learning theory is also relevant in the education of healthcare practitioners both pre- and post-licensure. Students have been socialized into their own professions and bring a particular frame of reference and professional culture with them to IPE activities (Hall, 2005). Professional silos are frequently addressed as a barrier to effective interprofessional practice and collaboration. Hall (2005) discusses the idea that each profession may attract individuals with a particular set of cognitive learning styles and that the educational theory and learning methods best suited to those students will be utilized to teach them, which actually reinforces the professional silos. Conflict that ensues from working together contributes to the development of new insights, increased understanding, and acquisition of skills (Kolb, 1984). The application of experiential learning to IPE sets the foundation for the importance of students having the opportunity to experience collaboration and teamwork in real clinical settings or, at a minimum, realistic case studies or simulations (Clark, 2006). Barr (2013) and Clark (2006) also highlight the necessity of individual and group reflection in making IPE truly transformative.

Adult learning theory postulates conditions needed by adult learners, including the idea that the environment for learning must be one of mutual trust and respect, mutual helpfulness, freedom of expression, and acceptance of differences (Alford, 2013). Additionally, learners must accept roles and responsibilities within the learning experience and participate actively in
the process (Alford, 2013). These components are necessary for graduate students and practitioners to learn about and from one another in order to appreciate and respect the essential roles and contributions of each profession.

The clinical education learning environment adds layers of complexity to the student learning experience. Patton, Higgs, & Smith (2012) note that the application of learning theories to clinical education has been sparse, and they explore the application of workplace learning to physical therapy clinical education experiences. Workplace learning presents an interesting lens for viewing the development of interprofessional collaboration and teamwork skills for both physical therapy students on clinical rotations as well as for licensed practitioners practicing in healthcare environments. Learning in the workplace involves a complex negotiation of knowledge, roles, and processes (Billett, 2004) as does interprofessional collaboration and teamwork.

Pedagogical content knowledge is a way “of representing and formulating the subject that makes it comprehensible for others” (Shulman, 1986, p.9). Teachers must be able to relate their knowledge of teaching to their specific content knowledge within the context of a particular learning environment (Cochrane, Kind, & DeRuiter, 1991). Within the realm of physical therapy clinical education, clinical instructors are practitioners who are asked to volunteer to accept and teach students in the content area of physical therapy. Practitioners possess the specific content knowledge required to be successful clinicians in their particular area of practice. However, most physical therapists receive limited, if any, training on pedagogy. Without this knowledge of the method and practice of teaching, clinical instructors may struggle to relate their own content knowledge in a way that is digestible to a physical therapy student. Additionally, the fast-paced, productivity-driven environment present in many clinical settings is
a perceived barrier to optimal productivity (Christner et al., 2016), though some studies report increased productivity for physical therapy clinical instructors when paired with a student (Pivko, Abburzzese, Duttaroy, Hansen, & Ryans, 2016).

While learning theories have been applied to academic learning and to interprofessional learning, Patton et al. (2013) describe a paucity of information related to application of learning theories to clinical education practices and proceeds to describe the relevance of workplace learning literature to the topic of clinical education. Billett (2014) describes the complexity of workplace learning in relation to the interactions between individuals and the workplace that involve power differences, acceptance into communities of practice, and the use of knowledge, roles, affordances and engagement in the workplace. In this way, workplace learning mirrors the complex relationships to be navigated during interprofessional and collaborative practice environments.

In addition to all of the basic knowledge and applications of physical therapy skills that have been a standing part of clinical education, academic programs are adding interprofessional practice and collaboration as a required element of the curriculum. As of January 1, 2018, the Commission on Accreditation in Physical Therapy Education (CAPTE) will require interprofessional content. For this content area, clinical instructors may not only be lacking the pedagogical knowledge, but may also be lacking the specific content knowledge surrounding interprofessional practice and collaboration. Yet, they are being asked to provide instruction and opportunities for physical therapy students to practice collaboratively and to promote interprofessional education. Shulman (1986) distinguishes three categories of content knowledge: subject matter content knowledge, pedagogical content knowledge, and curricular knowledge. In the area of curricular knowledge, clinical instructors are also at a disadvantage.
Because the clinical instructors are not employed by the educational institution, they are also often missing the big picture that is the DPT curriculum. Educational programs frequently send a curriculum overview to the clinical instructors, though limited information can be gathered that is related to what the curriculum contains and how the components interact and build on one another without diving into a significantly greater quantity of information. Learning in the clinic involves a process of mutual inquiry by the student and clinical instructor in conjunction with the provision of patient care, and, contrary to the belief of many clinical instructors, this learning does not occur naturally (Jensen & Mostrom, 2013). Jensen and Mostrom (2013) note that effective clinical learning “requires the student to make meaning of knowledge in a clinical sense and then to enact that meaning when providing physical therapy services.”

Miller (1990) suggested a framework for the assessment of clinical skills in medical education that includes a pyramid of skills of increasing difficulty. The base level is “knows” followed by “knows how,” “shows how,” and “does” (Miller, 1990). The “knows” level assesses basic knowledge acquisition, as would take place in a classroom setting. At the “knows how” level, a student would be able to demonstrate the skills or competencies under controlled assessment methods, as would take place in a classroom-based practical examination. At the “shows how” level, the skills and competencies would be performed in a clinical setting under supervision. Finally, at the “does” level, the skills and competencies would be performed regularly in independent practice. A modification of the Miller model adds a fifth level of “does and teaches,” indicating that performance of the competencies has been mastered and the practitioner is able to teach those skills to others (SimBase, n.d.).

Miller’s Pyramid of Clinical Competence forms a framework for pursuing ongoing improvement in interprofessional skills as students progress from beginning pre-licensure
education to clinical education to post-license practice and lifelong learning. During the didactic component of physical therapy education, a student acquires basic knowledge related to interprofessional practice and collaboration through classroom exposure, then moves into the “knows how” stage by working together with other professions on clinical cases and simulation environments. During the clinical component of a DPT student’s education, students have the opportunity to “show how” they can perform the IPP skills under supervision from their clinical instructor. Ideally, the clinical instructor regularly applies their own skills in the area of interprofessional collaboration in independent practice and is able to function at the “does and teaches” level in order to assist the student in acquisition and development of those skills. This project focused on the processes and outcome measurements that occur during the clinical education experiences, which provide the students opportunities to progress to the “shows how” level of competency with the guidance of a clinical instructor that is theoretically at the “does and teaches” level of competency. However, without the basic content knowledge in IPE/P and without any knowledge of pedagogy, creation of a successful learning environment for a student is challenging at best.

**Significance of the Study**

As DPT programs across the U.S. continue to develop interprofessional education curricula within their institutions, the clinical component cannot be overlooked. This study informs directors of clinical education and other academic and clinical faculty related to the implementation of an interprofessional education curriculum at the clinical sites utilized by their institutions. The study assists in determining what opportunities currently exist within the structure of clinical sites as well as assessing the education, training, and comfort level of clinical instructors related to interprofessional collaboration and practice.
The information gathered provides a baseline for identifying the need for development of continuing education courses for practicing clinicians. With improved awareness of and training in IPE, clinical instructors will be better prepared to provide a student experience reflective of current practice standards related to interprofessional collaborative practice.

**Definition of Terms**

Doctor of Physical Therapy (DPT) – The entry-level graduate degree for physical therapists.

Director of Clinical Education (DCE) – The faculty member within the physical therapy program responsible for the management and administration of the clinical education component of the curriculum.

Interprofessional education (IPE) – The education that occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (WHO, 2010).

Interprofessional collaborative practice (IPP) – The practice that occurs when multiple health workers from different professional backgrounds work together with patients, families, and communities to deliver the highest quality of care (WHO, 2010).

Interprofessional Education Collaborative (IPEC) – A collaborative designed to promote and encourage constituent efforts that would advance substantive interprofessional learning experiences to help prepare future health professionals for enhanced team-based care of patients and improved population health outcomes (IPEC, 2015).
Physical Therapist (PT) – Health care professionals who diagnose and treat individuals of all ages who have medical problems or other health-related conditions that limit their abilities to move and perform functional activities in their daily lives (APTA, 2015).

Physical Therapy Manual for the Assessment of Clinical Skills (PT MACS) - An assessment tool designed as a method for evaluating knowledge, skills, and attitudes, and for determining a student’s readiness for clinical practice.

Pre-licensure education – Education that occurs while a student is in their formal years of learning, before receiving a license to practice independently (Oandasan & Reeves, 2005).

Post-licensure education – Education that occurs once a health professional is practicing independently, often in the form of professional development (Oandasan & Reeves, 2005). Often called continuing education or continuing competency training.

**Summary**

This chapter reviewed the necessity of effective integration of IPE in the clinical education component of DPT program curricula. The call for IPE and collaborative practice has become a theme across multiple healthcare professions and educational institutions in the U.S. and abroad. Recent changes in the accreditation requirements for doctor of physical therapy programs will soon require IPE/IPP experiences as part of the curriculum. In order to fully realize the benefits of IPP/C students must be well-trained in the IPEC core competencies and have the opportunity to apply their knowledge and competencies in a clinical practice setting. Additionally, clinical instructors must be competent in their own skills related to IPP/C as well as their ability to evaluate these skills and effectively teach them to students in the clinic.
CHAPTER 2: LITERATURE REVIEW

Each year in the U.S., a large number of deaths occur as a result of preventable medical errors. The Institute of Medicine’s 1999 report *To Err is Human* first brought this subject to the forefront with an estimate of between 44,000 and 98,000 deaths each year (IOM, 2000), while a more recent study reports an estimate of greater than 200,000 deaths (James, 2013). Strong interprofessional collaboration is thought to be a fundamental component in laying the foundation for improving patient safety and patient outcomes (Cuff, 2013; James, 2013; Yeager, 2005), and improvements in healthcare performance are likely based on better communication, coordination, and inclusion as opposed to enhanced clinical expertise (Manser, 2009). For this reason, many stakeholders have devoted significant resources to the development and improvement of initiatives related to interprofessional education (IPE) and interprofessional practice and collaboration (IPP/C). Interprofessional education and IPP/C are widely researched topics that have come to be considered essential elements of both academic and clinical practice environments in healthcare.

Interprofessional Education and Collaborative Practice

Interprofessional collaborative practice is described as occurring “when multiple health workers from different professional backgrounds work together with patients, families, careers, and communities to deliver the highest quality of care” (WHO, 2010). In describing interprofessional collaborative practice and teamwork, an important distinction is made between multiprofessionalism and interprofessionalism. Korner, Wirtz, Bengel, and Gortz (2015) discuss the differences between multiprofessional and interprofessional teams. Multiprofessional teams consist of the various disciplines working separately, each with its own treatment goals, and generally utilizing one-way communication between professionals. Each profession may be
working towards solving the same problem, but is approaching the solution through its profession-specific paradigm (Oandasan & Reeves, 2005). For example, students may come together to study management of patients with spinal cord injuries, but unless they are specifically learning how to work together in the management of spinal cord injuries they are working in parallel and not in collaboration with one another (Oandasan & Reeves, 2005).

In contrast, interprofessional teamwork is interactive, with professionals from multiple disciplines agreeing on a common treatment goal and communicating multilaterally (Korner et al., 2015). The approaches differ in organization, communication, leadership, and decision-making (Korner, 2010). While many settings claim to work interprofessionally and promote interprofessional practice, the lack of a cohesive culture would place many teams more in line with the definition of a multiprofessional team. Therein is one of the challenges of effective interprofessional practice and collaboration; many individuals and teams are under the impression they are practicing interprofessionally when in fact they are practicing multiprofessionally and the essential components of an interprofessional team are lacking.

In order to develop healthcare practitioners and environments conducive to interprofessional collaborative practice, interprofessional education during the academic programs of healthcare students is necessary. Interprofessional education is described as occurring “when students from two or more professions learn about, from, and with each other to enable effective collaboration and to improve health outcomes” (WHO, 2010). The Interprofessional Education Collaborative (IPEC) began with six different health professions, including medical doctors, doctors of osteopathy, nursing, pharmacy, dentistry, and public health (IPEC, 2015). However, many additional professions have now adopted the IPEC standards and moved to the inclusion of some components of interprofessionalism in their educational and
practice environments. The majority of interprofessional education takes place at the graduate level, but some undergraduate programs, such as nursing, are included as well.

In an effort towards standardization of expectations and measurement in interprofessional research, the Interprofessional Education Collaborative developed a set of competency domains including: Values/Ethics for Interprofessional Practice, Roles/Responsibilities, Interprofessional Communication, and Teams and Teamwork (IPEC Expert Panel, 2011). The Values/Ethics Competency states that professionals will, “work with individuals of other professions to maintain a climate of mutual respect and shared values” (IPEC Expert Panel, 2011, p.19). The Roles/Responsibilities Competency states that professionals will “use the knowledge of one’s own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served” (IPEC Expert Panel, 2011, p.21). The Interprofessional Communication Competency states that professionals will “communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease” (IPEC Expert Panel, 2011, p.23). The Team and Teamwork Competency states that professionals will “apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective, and equitable” (IPEC Expert Panel, 2011, p.25).

The impetus behind development of the competencies is that students can continuously develop in these areas so that they are prepared to enter the workforce and practice effective teamwork and team-based care (IPEC, 2011). Currently, a lack of fluidity and carryover exists between interprofessional education and interprofessional collaborative practice, and the Institute
of Medicine has identified a need for stronger linkages between the classroom content and the clinical application of that content (IOM, 2013).

**Importance of IPE and IPP/C**

Interprofessional practice and collaboration is important for multiple reasons. Several reports have outlined the frequency of preventable medical errors both in the United States and abroad (James, 2013; Francis, 2013; IOM, 2000). Efforts to improve patient safety have been closely tied to interprofessional practice with increased collaboration and communication between health care professionals as a central focus (James, 2013; Yeager, 2005). The United Kingdom Centre for the Advancement of Interprofessional Education (CAIPE) has stated that, “the quality of service delivery in health and social care, plus patient, client and service user safety, depends upon an effective workforce practicing collaboratively,” and that “interprofessional education can bring about the changes needed” (CAIPE, as quoted in Hean et al., 2012, p.79).

In addition to improving patient safety and outcomes, interprofessional practice and collaboration can have a positive impact on the patient experience. Quaschnig, Korner, and Wirtz (2013) demonstrated that patient satisfaction is influenced by the patient’s evaluation of the healthcare team, and suggest that team interactions be considered as an important component of patient outcomes. A culture of trust and the freedom for patients to speak up about matters of concern is essential for patient safety and satisfaction (Jackson, Peters, Andrew, Edenborough, & Halcomb 2010). Reeves and Freeth (2002) describe patients’ high levels of satisfaction with their care when they were treated in an interprofessional facility focused on collaboration and teamwork.
Interprofessional practice and collaboration also benefits healthcare practitioners. Research on employee engagement shows that in healthcare 13% of individuals are actively disengaged, 48% are not engaged and 38% are engaged (Flaherty, 2015). Factors contributing to employee engagement include having someone at work who encourages their development, feeling like they have friends at work, believing that the mission of the institution is important, and being able to utilize their skills (Flaherty, 2015). Effective teamwork and collaboration, as well as having others appreciate an individual or professional role on the healthcare team, can contribute to the above listed items and can improve healthcare practitioner engagement at work.

Additionally, hospitals with high teamwork ratings experience greater nurse retention and lower hospital costs (O’Leary, Sehgal, Terrell, & Williams, 2011). Effective professional relationships can result in increased job satisfaction and decreased turnover, while ineffective relationships can result in psychological conflict (Vertino, 2014). Interprofessional learning has been reported to result in positive outcomes for practitioners in the clinical setting, including development of mutual respect and a non-hierarchical culture (Anderson et al., 2011). Students who have received education on interprofessional teamwork demonstrate increased collaborative behavior that leads to higher satisfaction and productivity in the workplace (Howell, 2009; Ekmekci, 2013).

Veerapen and Purkis (2014) explored the early workplace experiences of medical and nursing students, which were found to be intensely formative in nature. The workplace environment in which the students trained laid the foundation for their professional identities and attitudes toward interprofessional collaboration and teamwork. For this reason, factors that discourage collaborative practice and teamwork must be identified and mitigated so that the
transition from student to practitioner occurs in a way conducive to developing productive interprofessional relationships (Veerapen & Purkis, 2014).

**Assessment of IPE and IPP/C**

The development and acceptance of the IPEC core competencies in 2011 was a big step forward for IPE in the United States (Blue et al., 2015). However, the lack of development in the area of assessment of those competencies continues to create challenges for educators (Blue, Chesluk, Conforti, & Holmboe, 2015). Many studies conducting assessment have focused on learner attitudes as opposed to learner knowledge or skill (Blue et al., 2015; Kenaszchuk, 2013), and several of those are lacking the psychometric information currently considered standard (Kenaszchuk, 2013). As noted by Blue et al. (2015), very few studies conduct an assessment of learner interprofessional collaborative behaviors. The Readiness for Interprofessional Learning Scale (RIPLS) and the Interdisciplinary Education Perception Scale (IEPS) have been widely utilized, though many assessment instruments have also been locally developed to meet specific institutional needs (Blue et al., 2015). Blue et al. (2015) found that very few programs reported systematic processes for assessing individual student’s skills and behaviors related to interprofessional collaboration, and state that “for the field to advance and to align with the demands of changing clinical care systems, robust assessment and evaluation methods, standardized use of common tools, and longitudinal assessment from diverse data streams are needed for IPE.” (p.73)

Despite the enthusiasm and importance of interprofessional education and collaborative practice, the 40-year history of research in this area has produced little evidence from which educators and practitioners can develop, implement, and evaluate interprofessional interventions (Cerra, 2015). However, because of the importance of interprofessional collaborative practice,
continued research, continuing competency training for licensed practitioners, and education for students on developing competency in interprofessional teamwork are essential.

**Training Students in IPP/C Competencies in the clinical setting**

The majority of the IPE experiences offered to students are directed at the didactic, pre-clinical phase of their education, with the implementation of IPE experiences during the clinical phase of education lagging behind the other institutional initiatives (Hall & Zierler, 2015). A study by Anderson et al. (2011) evaluated multiple constructs for students who were involved in only classroom-based IP learning compared to students involved in both classroom and clinic-based learning experiences. Those students participating in both classroom and clinic based intervention had improved scores for many factors related to knowledge, perceptions, skills, and attitudes towards interprofessional collaborative practice (Anderson et al., 2011). Improved student knowledge of other professions, more positive attitudes towards IPE, and increased satisfaction were noted after clinical experiences in interprofessional environments (Reeves & Freeth, 2002; Pozner et al., 2004). Brashers et al. (2012) state that, “interprofessional education competencies should be learned in their clinical context,” as incorporation of IPE into all components of students’ education is necessary to move IPE from the periphery to the central focus of healthcare education. In order for this education to be successful, educators must consider the teaching and learning theories that underpin the acquisition of new knowledge and skills in adult learners (p.242).

**Essential Teaching and Learning Strategies**

Various teaching and learning strategies have been applied to clinical education as well as to interprofessional education. The teaching strategies and learning processes utilized in IPE cannot be overlooked, as they are essential determinants of success in priming students to be
prepared for IPP in a post-licensure clinical setting. Some of the teaching and learning strategies described in conjunction with IPE and clinical education are reflection, modeling, mentoring, coaching, and scaffolding.

**Reflection**

Reflection is a component of many educational theories that incorporate reflection on practice (Schon, 1987) and experiential learning theory (Kolb, 1984), which has been defined as a higher-order mental process in which we examine “the assumptions by which we have been justifying our convictions” (Mezirow, 1990, p.5). Reflection as an essential component of IPE has also been discussed (Clark, 2009; Oandasan & Reeves, 2005). Experiential learning is a process involving conflict (Kolb, 1984), as are IPE activities. Students present with different personalities, learning styles, backgrounds and professional biases; and they must work through complicated issues related to traditional hierarchies, blurring of professional roles, leadership, communication and decision-making (Clark, 2009; Oandasan & Reeves, 2005). Reflection can be a valuable strategy in working through these encounters and challenging the assumptions and perceptions they may hold coming into the interprofessional activities.

Schon (1987) relates the value of both “reflection-in-action” and “reflection-on-action” for a student to carefully examine what they are doing, both while they are doing it and afterwards, to gain a greater understanding of how actions contributed to outcomes. Within the realm of physical therapy clinical education, Page and Ross (2004) describe reflection as a learning experience in which the clinical instructor encourages the student to compare their current level of skill with previous skills or the skill level of expert practitioners or other students, and then to analyze those experiences relative to the current standard of practice.
Modeling

Modeling involves student observation of a clinical instructor in order to develop an understanding of elements required to complete a process or task (Page & Ross, 2004), and has been identified as one of the most powerful learning tools for students in a clinical setting (Davies, 1993). The attitudes and behaviors of clinical instructors are impactful and act as lessons for students on what to emulate in their own professional practice. Because clinical instructors act as role models for students, a high standard of professionalism, technical skill and affective domain traits should be upheld (Jarski et al., 1990).

Coaching

Coaching is a broad term with many definitions, but a common thread is the emphasis on improving future performance (Bartlett, 2007). Relationship is also an essential component of a successful coaching, including the elements of mutual trust, respect, and freedom of expression (Bartlett, 2007). O’Neil and Hopkins (2002) describe coaching in the university classroom as “working with students to increase their self-awareness and capacity for self-discovery, while motivating them to begin a process of continuous learning and development” (p.402). In medical education literature, coaching has been described as the “conveyance of students through academic journeys. . . as they learn to lead the improvement of clinical care” (Homa et al., 2008).

Coaching in clinical practice has been utilized to improve health care professionals’ ability to manage, change and lead others (Ekmekci et al., 2013). According to Page & Ross (2004), coaching for physical therapy skills in clinical education involves the CI observing while the student performs a task and offering specific verbal or physical assistance to help the student develop a higher level of expertise. Specifically related to interprofessional teaching, research has demonstrated that employing executive coaching strategies and interprofessional teamwork
can help students handle many of the challenges they face in the workplace, to facilitate critical thinking, and to increase awareness of the role of the team in delivering optimal patient care (Ekmekci et al., 2013).

**Mentoring**

Plack (2008) relates a lack of consensus in the literature on a definition of mentoring, but adopts the description from Daloz (2012) that includes support, challenge, and vision as the functions of a mentor. Mentoring is a significant dimension of professional life in relation to preparing students to become licensed professionals (Gopee, 2015). Through the mentorship of a clinical instructor, students also learn to negotiate the political and social structures of a particular workplace community (Plack, 2008). Gopee (2015) uses the terms mentoring and clinical education somewhat interchangeably, which highlights the inextricable nature of the two processes. Spouse (2001) suggests that an effective mentoring relationship should allow students to move beyond one-on-one mentorship in order to engage with others in the community of practice, which is also in alignment with the objective of developing interprofessional relationships during the course of a clinical experience. Where permissible, reciprocal mentoring between different healthcare professions has been occurring (Gopee, 2015). In these arrangements, a physician may mentor a physical therapy student, and a physical therapist may mentor a medical student.

**Scaffolding**

The concept of scaffolding was originally developed by Wood, Bruner and Ross (1976) and was related to the offering of guidance to pre-school age children. However, the teaching strategy has since been applied to multiple healthcare professions (Spouse, 1998). Related to this concept is Vygotsky’s (1978) idea of the ‘zone of proximal development,’ which claims that
with support, students are able to grasp concepts that they cannot understand through working independently. This type of development utilizes scaffolding (Hean, 2012). With scaffolding, the clinical instructor must assess a student’s level of understanding and ability to learn and alter the instruction offered in response to that assessment (Spouse, 1998). However, the ability of facilitators and instructors to guide as opposed to direct students in interprofessional education has been questioned (Hean, 2012; Rees & Johnson, 2007).

Hean (2012) states that “planning and delivering interprofessional education with theoretical sophistication is an intellectually challenging and time consuming exercise,” (p.98) that requires preparation and support of the personnel involved. Without the time and resources necessary to train the facilitators and instructors involved, the facilitators and instructors may not possess the required skills to avoid inadvertently undermining the process.

**Challenges with Utilization of Teaching and Learning Strategies**

Despite the utility of these and other teaching and learning strategies, they are often overlooked and underutilized. Clinical instructors are inconsistent in their use of effective teaching strategies (Recker-Hughes et al., 2014). Clark (2009) discusses the tendency of educators to focus on the acquisition of knowledge and skills to meet outcomes as opposed to focusing on designing solid educational processes that can be implemented to ensure that students are equipped to work together in a collaborative environment. A study by Page and Ross (2004) revealed that the educational strategy most frequently used by PT clinical instructors was exploration, which involves allowing the student to perform independently of the instructors’ input. Other strategies frequently used were modeling, coaching and scaffolding. Reflection, which is one of the strategies most directly pertaining to clinical reasoning skills, was one of the least frequently utilized instructional strategies (Page & Ross, 2004).
Clinical Instruction in PT Education

The clinical instructor (CI) plays an important and critical role in the professional development of physical therapy students (Jensen & Mostrom, 2013; Plack, 2008, Jarski et al., 1990). While all professions handle and name their internships differently, most have practical, supervised, clinical experience prior to student graduation and licensure. In physical therapy education the space between classroom education and post-licensure clinical practice is where clinical education occurs. Clinical education comprises between 32-45% of the overall contact hours in a typical Doctor of Physical Therapy curriculum (Recker-Hughes, Pivko, Mowder-Tinney & Brooks, 2008). For these clinical experiences, physical therapy students are assigned to a CI who is tasked with providing orientation and professional socialization, as well as with assisting the student in connecting theoretical and practical knowledge (Plack, 2008). Clinical instructors must help students learn about the contextual subtleties of practice, which include intricate details such as “who does what and how, and with whom to engage and when” (Plack, 2008, p.8). Although Plack was not specifically discussing interprofessional practice and education, the constructs of her arguments are applicable to the general workplace and single-profession units as well as to interprofessional collaborative environments. Jensen and Mostrom (2013) discuss the idea that physical therapists seem to quickly forget many components of their academic coursework, but will remember specifics of their clinical education experiences and clinical instructors.

The clinical education component of physical therapy education is designed with multiple objectives in mind. Those objectives include producing independent physical therapists who possess the attitude and skill to effectively evaluate and treat patients, are capable of self-evaluation and reflection, are prepared for participation in life-long learning and are engaged in
professional practice (Jensen & Mostrom, 2013; Patton et al., 2013). Because clinical education occurs in the authentic environment and is focused on real problems in the context of professional practice, students are motivated by the relevance of the experiences (Spencer, 2003). Students learn theories and facts in the academic setting, but clinical education experiences allow students opportunities to apply and refine their skills under the supervision of a licensed practitioner (Casares, Bradley, Jaffe, & Lee, 2003). Additionally, students can develop and demonstrate achievement and competence in a variety of skills and contexts (Webb, et al., 2009) encompassing both the affective and psychomotor domains.

The importance of clinical education and its necessity in preparing physical therapy students has been examined in the literature and described by Jarski et al. (1990) as the “most crucial phase of a student’s education” (p.173). Jarski et al. (1990) go on to say that “because students in clinical education programs learn behaviors that influence their lifetime professional performance, improvement of physical therapy professional services depends to a great degree on maintaining a high quality of clinical education” (p. 173). While Jarski et al. (1990) wrote this article prior to the widespread implementation and expectation of interprofessional education as a component of physical therapy education, the general premise of the authors’ statement is specifically applicable to interprofessional practice. Clinical education experiences in interprofessional practice will set the precedent for how students translate their attitudes, skills and behaviors related to collaboration and teamwork into their everyday work as licensed practitioners. Improvement of interprofessional practice and collaboration in professional healthcare settings depends upon maintaining high-quality and interprofessional clinical education experiences.
The desirable characteristics, attributes, professional behaviors, and teaching and clinical skills of physical therapy clinical instructors have been suggested in a variety of studies (Kelly, 2007; Emery, 1984, Jarski et al., 1990). Emery (1984) identified communication, interpersonal skills, professional skills, and teaching skills as the four essential characteristics of an effective clinical instructor. Recker- Hughes et al. (2014) categorize the essential characteristics into four areas that encompass and expand on those defined by Emery (1984): interpersonal and communication skills, professional behaviors, instructional/teaching skills, and evaluation and performance skills. While studies have defined these desirable characteristics, baseline qualifications of clinical instructors are minimal, which is a reflection of the academy’s attempt to “balance visionary pursuit of excellence with the reality of constraints” (Recker-Hughes et al., 2014, p.49).

When describing outstanding clinical instructors, students highlighted three primary themes, which included a team approach, teaching through “asking” as opposed to “telling,” and acting as a guide and facilitator (Jensen & Mostrom, 2013). Within these teaching philosophies, beneficial strategies included mutual goal setting and planning, use of guided reflection and questioning, and graded supervision, assessment, and feedback (Jensen & Mostrom, 2013). These desired teaching strategies and the strategies identified as useful in development of interprofessional collaborative and teamwork skills are in stark contrast to the strategies most commonly utilized by clinical instructors, which leaves a gap between what students need to be successful and what most clinical instructors are currently providing.

In addition to the lack of consistent implementation of the relevant teaching and learning strategies previously discussed, clinical instructors may not have the specific content knowledge related to the skills currently taught in physical therapy academic settings. A study by Recker-
Hughes et al. (2008) explored the self-perceptions of clinical instructors’ competence in the core content areas of a DPT curriculum. The study reported discrepancies between what “is and what should be” in several areas of current practice expectations for physical therapists and suggested the need for professional development activities to address CI needs. A substantial number of CIs reported “less than adequate” knowledge in several core curricular content areas (Recker-Hughes et al., 2008). The content knowledge related to the addition of interprofessional education as an expected component of physical therapy education is likely no exception. Another study by Recker-Hughes et al. (2010) indicated that CIs had a desire for increased availability of professional development activities specifically related to their role in teaching DPT students.

**Interprofessional Education in the Clinical Setting**

One of the limiting factors in implementing IPE objectives and experiences in the clinical education setting is the lack of clinical instructors who are prepared to guide and teach students in the area of interprofessional collaborative practice (Headrick et al., 2012; Hall & Zierler, 2015). Without clinical instructors and healthcare systems that can act as examples of effective interprofessional practice, forward progress will be hindered. The benefits and challenges of clinical education in physical therapy related to any topic or content area, including interprofessional education, are plentiful. The added challenge for addressing IPE in the clinical setting is seated in the fact that the majority of clinical instructors had little or no formal training related to IPE during their education. Faculty report being apprehensive about teaching and facilitating IPE, as many of them did not receive training in IPE during their academic education, nor have they had any formal continuing professional education related to IPE (Cuff, 2013; Hall & Zierler, 2015).
Additionally, the majority of clinical instructors in physical therapy have not received any formal preparation in education or theories of teaching and learning (Jarksi et al., 1990), which can create an additional level of complexity. Physical therapy clinical instructors are being asked to act as teachers, a role they have not been explicitly trained to perform, and they are also being asked to promote and facilitate content that they may not have adequate knowledge of themselves. The CIs are being asked to do all of this amidst a busy, productivity driven clinical environment. The comfort level of physical therapy clinical instructors related to teaching and facilitating IPP in the clinical setting is currently unknown. Additionally, because the clinical instructor is not employed by the academic institution and is not likely to be given release time by their employer for taking on a student, the time and resources these instructors have available to devote to learning about interprofessional education or about teaching and learning strategies to implement with their students is essentially non-existent. In reality, clinical instructors may have no preparation related to acting as a clinical instructor, and the baseline qualifications do not lend to clinical education experiences that are consistently of a high quality (Recker-Hughes et al., 2014). Kitto, Goldman, Schmitt, and Olson (2014) call for attention to interprofessional education and learning with emphasis on educational strategies beyond traditional didactic approaches.

Attitudes of academic and clinical faculty

Another role that is assumed by both academic and clinical faculty, whether consciously or unconsciously, is that of corroborating the value of IPE and IPP. The status of an interprofessional initiative, in both the academic and the clinical setting, can be negatively impacted if faculty are not viewed as supporting the initiative. In a study by Steinert (2005), attitudinal barriers and inadequate knowledge of roles between professions were identified as
obstacles to faculty support of IPE. If faculty work in an environment that does not support an interprofessional working culture, promoting and delivering interprofessional education could be challenging and potentially ineffective (Oandasan & Reeves, 2005).

Professional cultures play a significant role in attitudes reflected in interprofessional experiences. Culture is multifaceted and can be defined as, “a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (Schein, 2010). Professions within the healthcare arena possess their own unique culture. According to Greenwood (1957), a profession is an organized group that performs social functions and possesses systematic theory, authority, community sanctions, ethical codes, and (most importantly) a culture. Hall (2005) discusses the idea that each different profession within the healthcare sector has an individual set of values, beliefs, attitudes, customs, and behaviors that make up the professional culture. Additionally, within a specific healthcare profession or area of specialization, communication is facilitated by a common vocabulary, similar approaches to problem solving, and a common understanding and approach to addressing issues (Hall & Weaver, 2001).

Pecukonis, Doyle, and Bliss (2008) discuss this “profession-centrism” as a constructed view of the world held by a particular professional group that can hinder interprofessional education and training. Strong professional socialization and professional identities are present within many healthcare professions, which can create a particular challenge when trying to merge multiple professions to create a unified culture of teamwork and collaboration surrounding patient care. Cerra et al. (2015) conducted a mixed-methods study suggesting that attitudinal
limitations of participants is a continued barrier to IPE and IPP/C that is likely to still be present in any healthcare practice or academic setting. The organizational culture of a healthcare entity must work to foster a habitat in which members of each profession respect the roles, expertise, and experience of other individuals and professions. Practitioners must value other individuals as learning assets and foster a culture that is innovative, proactive, and capable of a continuous process of reframing information in order to learn and improve (Barr, 2013).

While clinical instructors in physical therapy education are not considered academic faculty, they play an integral role in student education and are frequently considered to be clinical faculty despite the fact that they are not employed by the academic institution. Both faculty and clinical instructors must emulate the knowledge, skills, and attitudes towards IPP that academic programs desire to instill in their students. Hean (2012) notes that clinical staff are frequently uncomfortable participating in interprofessional learning and highlights the necessity of encouraging them to participate in reflection upon and examination of their own discomfort in this area.

This process of professional socialization through role modeling should be carefully considered by health educators, as discussions related to negative opinions about other professions and professionals is frequently overheard by students (Oandasan & Reeves, 2005). Ingram et al. (2013) specifically discuss the prevalence of badmouthing experienced by physical therapy students in academic and clinical settings. In these instances, students reported that the badmouthing negatively affected their opinions of the targeted profession and only 40% of the students considered the badmouthing appropriate (Ingram et al., 2013). In addition to being counterproductive to intra- and interprofessional relationships, badmouthing is in direct contrast to the APTA Core Values and Code of Ethics, which dictate that “physical therapists shall
respect the inherent dignity and rights of all individuals,” and that they should engage in “collaborative relationships with other health practitioners” (APTA, 2010; APTA, 2004). Kamien, Bassiri, and Kamien (1999) reported that badmouthing impacted student career choices and caused medical students to alter the specialty they were pursuing. Ingram et al. (2013) relay the necessity for faculty to model appropriate behavior and push for early exposure to other professions in order to promote successful IPE and allow students to form their own opinions about other professions and professionals. Academic faculty can set the stage for positive behaviors, but the role of the clinical instructor in modeling professional behaviors cannot be discounted.

Because of the importance of the role they play and their potential to impact the attitudes of students towards interprofessional initiatives, clinical instructors should be provided the same training and preparation as academic faculty in order to be an additional positive influence and role model in promoting interprofessionalism. Hean (2012) also addresses the importance of training sessions to “reinforce the philosophy behind” and promote the culture of interprofessional education. In Canada, development of both clinical and educational faculty related to interprofessional practice and collaboration has been set as a formalized priority (Cuff, 2013).

**Healthcare Teams in Practice**

In addition to the healthcare practitioner, Kelly (2007) adds that an environment facilitating clinical education is also of importance. A supportive environment would include the backing of leadership, including clinical instruction as a step on the career ladder, and allowing clinicians time and productivity standards reflective of their efforts in teaching (Kelly, 2007). Many environments do not provide an example of well-functioning and effective
interprofessional team-based care (Hall & Zierler, 2015), creating additional challenges for clinical education. The Institute of Medicine (IOM) presented a set of core principles and team processes utilized by highly-functioning teams (Mitchell et al., 2012). From that IOM document, the Michigan Health Council Survey of Nurses (2015) put together a list of interprofessional practice standards that included: discussing the roles and responsibilities of each team member; working collaboratively to develop trust; conducting patient rounds, huddles, and meetings with the team and input from the patient and family; effectively communicating with team members, and evaluating team processes and reflecting on performance. The 2013 Survey of Michigan Nurses, found that despite 68% of RN’s reporting that they were part of an interprofessional care team, only 14% reported participating in all core activities of an interprofessional team (Michigan Health Council Survey of Nurses, 2015)

Many of those challenges stem from the difference in the locus of control for academic as compared to clinical teaching and learning. Control of academic teaching is within the educational system while control of clinical teaching is within the healthcare system (Jensen & Mostrom, 2013; Taylor, 1999). The primary players within a clinical education experience include the student, clinical instructor, and patient; however, the healthcare environment provides a complex learning environment with many additional factors to be considered, including the political climate, reimbursement, interprofessional roles, productivity demands, family dynamics, and patient demographics (Jensen & Mostrom, 2013). Different clinical facilities, clinical types, clinical instructors, and patient populations can all complicate any attempt by the academic institution to standardize clinical education experiences and educational objectives. Additionally, no “gold standard model” of clinical education exists within the realm of physical therapy, and individual universities are presented with the task of providing
leadership to ensure the quality of clinical education experiences for their students (Lekkas et al., 2007; Patton et al., 2012). The focus of this study will be on physical therapy, though similar challenges exist regarding the recruitment and retention of instructors to provide high-quality educational experiences in other professions as well (Christner et al., 2016).

A discussion of workplace learning theory helps to shed light on the complexities involved in providing IPE within clinical education. The workplace, which in this case is the clinical education site, is not just a physical location, but is also an arena that encompasses shared meanings, ideas, behaviors, and attitudes (Matthews, 2009, as cited in Kitto et al., 2014). In the midst of the workplace the concept of organizational cultures must be considered, as each healthcare facility will have its own organizational culture. Schein (2010) notes that occupations each have their own culture that transcends organizations, but that their “main impact is through their operation as subcultures within organizations” (p.2). Thus, the subcultures of the professions interacting in the larger organizational culture of the facility create a layer of complexity to be navigated in the workplace by students and practitioners alike.

Practitioners learn in the workplace through refining what they already know, do, and value in their work activities, as well as through engaging in experiences that expose them to new concepts and practices (Billett, 2014). Because the practical application of IPE is relatively new to students and licensed practitioners, both are engaged in the education and learning process related to interprofessional practice and teamwork in the clinical setting. However, bad habits and ill-informed practices can also be learned in the workplace (Billett, 2014), again highlighting the importance of intra and interprofessional work relationships and models that empower and extend positive practice habits for students.
Clark (2006) states that “the implications of experiential learning theory for IPE relate to the fact that learning is a continuous process grounded in experience” (p.581). Students are most receptive and have more positive attitudes towards IPE when they can identify activities and educational processes as directly relevant and applicable to their future practice (Gilligan, Outram, & Levett-Jones, 2014). Additionally, studies have shown that students frequently believe their profession-specific competencies and skills are of greater importance than interprofessional learning (Oandasan & Reeves, 2005; Fallsberg & Wijma, 1999).

Implementation of IPE into clinical internships is a “real world” way to allow the students to practice their skills in a controlled environment and to set the stage for buying into the value of IPP.

**Linking Interprofessional Education to Interprofessional Practice and Collaboration**

Despite the stated benefits and necessity of clinical education, several challenges to delivery of optimal learning exist. The capacity and ability of academic and clinical entities to continue to provide quality clinical education and patient care is uncertain (Patton et al., 2012). Limited clinical site availability, staff reductions, productivity standards, staff attitudes, reimbursement policies and an increasing number of physical therapy programs competing for clinical rotations have all been cited as obstacles (Patton et al., 2012).

Additionally, inherent challenges are present in the implementation of interprofessional practice and collaboration into the clinical education experiences. However, academic institutions are charged with improving the interprofessional education received by students during their training to become healthcare professionals and work to strengthen the carryover from the classroom to the clinical environment. The incorporation of IPE into physical therapy clinical education experiences cannot be delayed, particularly in light of the related CAPTE
standard forthcoming in 2018. Partnerships between academic entities and health systems will be essential to advancing interprofessional education initiatives in the clinical setting (Hall & Zierler, 2015).

The interprofessional learning continuum (IPLC) model provides a visual outline of the interplay between educational processes and both learning and health systems outcomes with consideration of the factors that support and interfere with effective IPE and IPP (IOM, 2015). See figure 2-1. The model highlights the need for IPE to occur not just with pre-licensure students in the classroom and the clinic, but for the educational process to continue with post-licensure professionals through continuing professional development. The term “graduate education” encompasses “supervised health professions training taking place between completion of foundational education and entry into unsupervised practice,” which would include terminal PT clinical education experiences (IOM, 2015).
Figure 2.1 Interprofessional Learning Continuum (IPLC) Model (IOM, 2015)

Shifting the culture in academic settings as well as in the healthcare sites where clinical education is occurring is not a simple task. Brashers et al. (2012) described a study that included general interprofessional classroom knowledge, simulated IPE experiences, as well as integration of IPE into the clinical/clerkship year of nursing and medical students. The authors were trying to establish funds to offer incentives for clinician teams to include interprofessional groups of students in clinical activities (Brashers et al., 2012). Recruitment of clinical “faculty champions” as well as attaining the support of academic and healthcare system leadership were also identified as necessary measures for building relationships between academic and clinical entities and for disseminating interprofessional programs in healthcare practice settings (Hall and Zierler, 2015). Limited research on and expansion of IPE initiatives to practicing clinical interprofessional healthcare teams has been noted as a rate-limiting step in building collaborative interprofessional quality improvement programs (Hall and Zierler, 2015).

Summary

The literature supports the importance of and increasing focus on IPE in order to prepare students across the disciplines to function as interprofessional collaborative teams post-licensure. To become effective practitioners, students must have the opportunity to apply their didactic IPE knowledge in a clinical setting under the guidance of a trained clinician. Existing studies have shown that the current level of competence of clinical instructors in the area of IPP/C as well as in the area of teaching theory and strategy is lacking, and that opportunities for development are needed and desired. This study adds to the existing body of literature and fills in gaps by specifically examining the self-perceived competence of PT CIs related to the IPEC
competencies, as well as by examining the student development of IP skills and competency during a clinical experience.
CHAPTER THREE: METHODS AND PROCEDURES

Introduction

The purpose of this chapter is to describe the research design and methodology for the study of the knowledge level, attitudes, and skills of physical therapy (PT) students and physical therapy clinical instructors (CIs) related to interprofessional education (IPE) in the clinical education setting.

The roots of interprofessional education (IPE) began in 1972. However, more recently, in 2014, the American Physical Therapy Association (APTA) endorsed the Interprofessional Education Collaborative (IPEC) core competencies and began to more strongly encourage team-based interprofessional education (American Physical Therapy Association [APTA], 2014). The original set of Core Competencies for Interprofessional Collaborative Practice were published by the IPEC in 2011 and updated in 2016 to reaffirm the value and impact of the competencies and sub-competencies (IPEC, 2016). Effective January, 2018, the accrediting body for physical therapy education programs will require IPE as an essential component of PT education, so academic programs in physical therapy are devoting significant time and effort to creating didactic learning environments to train students in interprofessional practice and collaboration.

Development of these collaborative skills and time to practice those skills are essential components of physical therapy education. Clinical education offers the opportunity for students to develop and perform skills in a realistic, supervised setting. In order to meet the new minimum accreditation standards and expectations for an entry-level physical therapist, incorporation of interprofessional collaborative and teamwork skills into the clinical setting is necessary.
Research Design

The primary objective of this study was to explore the knowledge, attitudes and skills related to IPE during PT clinical rotations from the perspective of both the student and the clinical instructor. A convergent mixed-methods design was utilized. Both qualitative and quantitative data were collected at the same time and the information gathered from the various sources and methods was integrated and interpreted (Creswell, 2014; Creswell & Plano-Clark, 2011). Grounded theory, as described by Strauss and Corbin (1998), was applied to develop a set of integrated concepts to provide a theoretical explanation of the development of interprofessional knowledge and competency development in clinical education. Grounded theory utilizes data and analysis to construct a theoretical explanation related to a particular phenomenon. According to Merriam (2009), grounded theory is useful for addressing questions about how something changes over time. Kennedy and Lingard (2006) add that grounded theory is an appropriate methodological approach for explaining research questions related to social experiences. Thus, the use of grounded theory to explain the experience of interprofessional socialization over the course of an eight-week clinical experience was appropriate. Additionally, part of the purpose of this study was to evaluate how student perceptions of and skills related to interprofessional practice changed during the course of their clinical rotation experience, which further supports grounded theory as an appropriate approach for this study.

Data collection occurred through interviews of both students and clinical instructors. Additionally, both students and clinical instructors were asked to complete the IPEC Core Competency Survey. The Survey consists of a 42-item questionnaire designed to assess outcomes related to collaborative practice at the degree program level. The items are divided into four domains that correspond to the IPEC core competencies (Dow, DiazGranados,
Mazmaniam, & Retchin, 2014). The tool as a whole and each domain within the tool demonstrate high reliability coefficients (Dow et al., 2014). In the study by Dow et al. (2014) the division of items within each domain was slightly different than the finalized tool. See table 3-1.

Table 3-1. Overall Alpha for Each Domain of IPEC Competency Survey as found by Dow et al., 2014

<table>
<thead>
<tr>
<th>Domain</th>
<th>Number of Items</th>
<th>Overall Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles and Responsibilities</td>
<td>7</td>
<td>α = .926</td>
</tr>
<tr>
<td>Interprofessional</td>
<td>10</td>
<td>α = .966</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Values and Ethics</td>
<td>10</td>
<td>α = .976</td>
</tr>
<tr>
<td>Teams and Teamwork</td>
<td>15</td>
<td>α = .976</td>
</tr>
</tbody>
</table>

Within each of the IPEC competencies, students self-assessed items on a 5-point scale ranging from strongly disagree to strongly agree. The items are rated by the students based on their classroom and clinical experience. As with any self-assessment report, respondents may perceive themselves differently than they would be rated by other objective measures of performance. Students were asked to complete the IPEC Core Competency Survey Instrument both prior to and after the completion of their Clinical Practicum II, which was the student’s third clinical rotation. The Clinical Practicum II took place after the completion of all the didactic coursework, which included the institutional and programmatic IPE curriculum. Clinical instructors for the students during the Clinical Practicum II were asked to complete the
same IPEC Competency Survey Instrument, rating their own self-perceived competence. Clinical instructors completed the IPEC survey only once.

Additionally, student performance on interprofessional practice and collaboration skills was assessed by the CI through utilization of the skill sheet in the student’s Physical Therapy Manual for the Assessment of Clinical Skills (PT MACS), which is the assessment tool currently used for the majority of the student clinical rotations. The PT MACS is considered to have good content validity in describing behaviors needed for success in a PT clinical education experience (Stickley, 2005). The CI conducted the evaluation and completion of the PT MACS skill assessment, though the student provided a self-rating as well.

**Population and Participants**

**Population**

The population from which the sample was extrapolated for this study consisted of students enrolled in accredited entry-level doctor of physical therapy (DPT) programs in the United States (U.S.). Currently the Commission on Accreditation of Physical Therapy Education (CAPTE) accredits 230 physical therapy programs (Commission on Accreditation of Physical Therapy Education [CAPTE], 2015). Thirteen of these programs are located in the state of Texas (APTA, 2015). Program size and class sizes vary year to year, but approximately 650 students are included in the programs in the state of Texas. The sample for this study was comprised of students from a single academic program.

**Sample**

Purposeful sampling was utilized to select students for this study. Patton (2002) describes purposeful sampling as a method in selecting cases from which the researcher can learn
a great deal about the issues of central importance to a study. The researcher is the Director of Clinical Education for the university health science center Department of Physical Therapy and is the Interprofessional Curriculum Committee liaison for the Department of Physical Therapy. The university health science center has a robust IPE curriculum housed at the institutional level and organized by the Department of Interprofessional Education and Practice, with input from each academic department involved. Because the purpose of this study was specifically to evaluate the knowledge, attitudes, and skills of students in interprofessional practice, selection of students who have had ample preparation in this area was necessary for this investigation. The researcher was familiar with the background preparation of students in this study.

In order to be included in the survey portion of the study, students had to meet the following selection criteria:

1. Be in good standing with the DPT program and university
2. Have successfully completed the didactic component of the IPE program at the university health science center and attended all IPE sessions

In order to be included in the survey and questionnaire portions of the study CIs needed only to meet the criteria typical for being qualified to act as a CI. These criteria included:

1. Acting as the clinical instructor for a university health science center student on the Clinical Practicum II rotation
2. Have at least one year of clinical experience
3. Be in good standing with their place of employment

In order to be invited for interview, both students and CIs needed to be working in an inpatient hospital setting, skilled nursing facility, or pediatric clinic.
Forty students were enrolled in the university health science center DPT Class of 2017. This cohort completed its Clinical Practicum II over 8 weeks from August 1 – September 23, 2016. Twenty-eight of 40 students that completed the CPII in this cohort agreed to participate in this study. Results of the IPEC Competency Survey were analyzed for the 28 students who granted consent. Of those students, 19 were placed in an inpatient hospital, skilled nursing, or pediatric clinical setting. Twenty-six of 40 clinical instructors agreed to participate in the study. The results of the IPEC Competency Survey, as well as the results of a CI questionnaire, were utilized for all 26 CIs granting consent. Of those CIs, 17 worked in an inpatient hospital, skilled nursing, or pediatric clinical setting. Invitations for interview were only extended when both the student and their supervising CI agreed to participate in the study. If the student and not the CI or the CI and not the student agreed to participate, then those pairs were omitted for interview. Of the students and CIs that consented, 12 matched pairs existed and both the CI and student were invited for interview. Either the CI or student were unable to complete an interview in five of the matched pairs, leaving a total of eight matched pairs that completed the interview component of the study. Only those students who completed the interview were asked to provide their skill sheet from the PT MACS for analysis.

**Data Collection**

Data for this study were collected through a variety of methods, including a self-assessment survey, interviews, and document analysis. Information was gathered from both students and clinical instructors. Gathering data in various forms and from multiple sources allowed for triangulation of the data.
Survey Protocol

**Student survey.** Prior to beginning their Clinical Practicum II, students were given the IPEC Competency Survey Instrument. The students were asked to respond to the survey based on the experience they had during their Preliminary Clinical Practicum and Clinical Practicum I, which occurred approximately one year prior to the Clinical Practicum II. Students took the IPEC Competency Survey again upon completion of their Clinical Practicum II.

**Clinical instructor survey.** Clinical instructors for students during the CPII were asked to respond to the IPEC Competency Survey. Additionally, the CIs completed a brief questionnaire to obtain background information on the instructors’ experience with interprofessional practice and collaboration. The questionnaire was comprised of the following questions:

- Did your physical therapy education program have content related to IPE?
- What year did you become a licensed PT?
- Have you received any on the job training in IPP/C? If so, please describe.
- Have you taken any IPP/C continuing education courses? If so, please describe.
- What does the term “Interprofessional Practice and Collaboration” mean to you?

Interview Protocol

Additional data was collected through interviews conducted by the researcher, who is trained in qualitative methods. Interviews were conducted in person when possible, and over the phone when face-to-face interviewing was not possible. In-person interviews were conducted in a private space that was determined by the interviewee. The interviews were voice recorded and transcribed. Interviews lasted between 11 – 25 minutes.
**Student interviews.** The structure for the interview consisted of a set of leading questions and probes that were prepared by the researcher. See Appendix A for a listing of the interview questions and probes for the student interviews.

**Clinical instructor interviews.** The objective of the study was explained to the subjects, and they were assured of the confidentiality of their responses. See Appendix B for a list of primary interview questions and probes that were used as a guide for conducting the clinical instructor interviews.

**Document Review**

Data was collected from one clinical skill of the student’s Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS) binder. The PT MACS is a clinical skills assessment document developed by clinical and academic faculty that is designed as a method for evaluating clinical performance and as a tool to promote clinical teaching and learning. Content validity has been established at a statistically significant level for 50 of the 53 skills of the PT MACS (Stickley, 2005). However, the “Management of Care: Interprofessional Practice and Collaboration” skill was added after the completion of the study by Stickley (2005), thus no psychometric properties have been established for this particular skill. No studies have been completed related to the reliability or validity of the PT MACS since the addition of the skill related to interprofessional practice and collaboration. Each student uses a PT MACS during their clinical rotations throughout the physical therapy program.

Skill number 18 in the PT MACS is titled, “Management of Care: Inter-Professional Practice and Collaboration.” A list of objectives applicable to this skill is present on the evaluation page and provides guidance to both the student and CI. This information helps to determine whether the student meets the necessary objectives or skill level to be considered
entry-level at that particular setting. During each of the student’s clinical practicums, they are rated by their CI on this skill, and the student also provides a self-rating. A space for CI comments is available on the rating sheet, though comments are not required unless the rating for the student on that particular skill is “not independent” or “unacceptable.” The possible ratings for each skill are listed below in Table 3-2.

Table 3-2: PT MACS Rating Scale

<table>
<thead>
<tr>
<th>Rate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Above entry-level. Surpasses entry-level standards for this setting by meeting all applicable objectives; practices the skill safely, effectively, consistently and efficiently.</td>
</tr>
<tr>
<td>√</td>
<td>Entry-level. Meets entry-level standards for this setting by meeting all applicable objectives; practices the skill safely and effectively.</td>
</tr>
<tr>
<td>NI</td>
<td>Not Independent. Below entry-level standards for this setting does not meet all applicable objectives; practices the skill with supervision or assistance from the CI requiring guidance and/or correction.</td>
</tr>
<tr>
<td>U</td>
<td>Unacceptable. Well below entry-level standards for this setting, does not meet applicable objectives even with repeated assistance from CI to correct deficits; practices the skill in an unsafe and/or ineffective manner even with repeated guidance from CI.</td>
</tr>
<tr>
<td>Blank</td>
<td>Student has had no opportunity to practice the skill in this setting</td>
</tr>
</tbody>
</table>

Student subjects were asked to provide a copy of the skill #18 sheet. Skill sheet #18 was the only skill sheet of the PT MACS booklet analyzed. A blank copy of the skill sheet can be found in Appendix C. Any names present on the skill sheets were covered and not included on the copy. Each of the skill sheet copies was coded with a number. A master list of the student and corresponding number was kept by the researcher. Storage of the master list and the numbered skill sheets was in separate locations in order to decrease the likelihood of a violation of confidentiality. All data was kept in locked drawers in the office of the researcher or on a password-protected drive.
Document analysis of the PT MACS skill sheets occurred in two parts. Part one consisted of a comparison between the student self-rating and the CI rating for the IPE skill. Ratings were coded into one of three categories: CI rating higher, ratings match, and student rating higher. The second part of the document analysis consisted of reviewing clinical instructor comments. Objective ratings and comments were compared for alignment and consistency.

**Data Analysis**

**Survey Analysis**

For students, the results of the IPEC Competency Survey were compared both pre and post CPII. The results of the IPEC Competency Survey were analyzed in a series of independent sample t-tests that were conducted on each of the four domain subscales: Values and Ethics, Roles and Responsibilities, Interprofessional Communication, and Teams and Collaboration. To determine the magnitude of any significant differences, Cohen’s d effect sizes were computed for each of the subscales. Dow et al. (2014) note that students had higher ratings in the “Values and Ethics” domain as compared to the “Teams and Teamwork” domain and that following the changes in domain scores could potentially assist educational programs in improving experiences in certain competencies.

To determine whether significant differences existed between clinical instructors with varied years of experience (i.e., 5 years and less; 6-10 years; 11 years and up) a one-way analysis of variance (ANOVA) test was conducted. Bonferroni post-hoc analyses were also used due to the inclusion of multiple groups. To examine the magnitude of differences, the $F$-ratios were used and converted to effect sizes represented by $r$ as recommended by Field (2009). Means and
standard deviations were calculated for the 42 individual items for each years-of-experience grouping.

To examine differences between student and clinical instructor confidence levels on competencies post clinical rotation, t-test were conducted on each of the four domain subscales.

**Interview Analysis**

All recordings made during interviews were transcribed. After transcription, the interview recordings were deleted in order to maintain confidentiality. Data from subject responses were constructed into categories through open coding as described by Merriam (2009). Open coding was utilized for the initial review of the data, as qualitative studies related to interprofessional education in the clinical education setting are few, and data may have been missed by arbitrary creation of predetermined codes. Kennedy and Lingard (2006) have identified the application of predetermined themes, as opposed to seeking emergent ones, as one of the three major pitfalls present in the use of grounded theory in qualitative medical education research. After interpretation and reflection on the meaning of the open codes, analytical coding, as described by Richards (2005), was used to further categorize the data into themes and sub-themes. Dedoose software was used to code and analyze the documents in this study.

**Document Review Analysis**

Comparison of student and CI ratings of PT MACS Interprofessional Practice and Collaboration skill was conducted in order to determine what percentage of ratings matched, what percentage of students rated themselves higher than their clinical instructor, and what percentage of students rated themselves lower than their clinical instructor. Analysis of this data
helped to determine a sense of the student’s self-awareness of their skills and abilities as they related to interprofessional practice in the clinical practice setting.

The limited number of CI comments on the PT MACS Interprofessional Practice and Collaboration skill prohibited the necessity of coding into categories and sub-categories. Initially, the researcher planned to review the rating of the level of student performance on the skill against the comment section to determine whether consistency was present between the two data points; however, the scarcity of comments limited the value of this analysis.

Validity

Yin (2011) provides a vignette offering seven strategies for combating threats to validity in qualitative research. Several of those strategies were applicable to and appropriate for this research project. One of the listed strategies is intensive long-term field involvement of the researcher. The researcher for this project has been a Director of Clinical Education (DCE) for over five years. Additionally, the researcher is the PT department IPE liaison to the university health science center IPE curriculum committee. The experience of the researcher assisted the effort to produce a more complete and in-depth understanding of IPE in PT clinical education.

Triangulation is another strategy offered by both Merriam (2009) and Yin (2011). In this study, data were collected from both students and their clinical instructors in the form of a self-assessment tool, interview, and through document analysis. By collecting data on the current climate of IPP/C through a variety of methods, validity of the results was increased.

Limitations

This study had several limitations due to its design and collection instruments. Because the sampling was representative of only one academic institution, differences may exist that
make the sample unlike the broader population. The academic institution included is a public health science center in the state of Texas. Physical Therapy programs nationwide are comprised of public and private institutions at both health science centers and liberal arts colleges and universities. Additionally, academic institutions across the U.S. vary greatly in their stage of development and in the application of IPE in their programs. Differences in the process of IPE and clinical education and the resources put into IPE may differ significantly between institutions.

The perceptions of the physical therapy students from a particular program at a particular point in their education may be a limitation in generalizability because schedules and sequencing of courses, IPE curriculum, and clinical rotations differ across programs. Some academic programs have the entirety of their clinical education experiences at the end of the curriculum, so that the first time the student steps into the clinic is after all of their academic courses have been successfully completed. Other programs have clinical courses integrated throughout the curriculum.

Additionally, not all DPT programs use the PT MACS as their assessment tool. Many of the academic programs use the Clinical Performance Instrument (CPI), which also assesses professional behavior, though the categorization of these skills is different. Thus the data gathered from the PT MACS document analysis portion of this research project may not translate to academic programs using an alternate instrument.

While the results of this study may not be generalizable, they can inform practices related to IPE in the clinical education environment. Findings may be extrapolated and applied to other
academic institutions and clinical practices seeking to enhance their interprofessional education and collaboration efforts.

**Ethical Considerations**

Because the researcher is the DCE and the Department of Physical Therapy liaison to the Interprofessional Curriculum Committee, students may have felt pressure to participate in the study. Additionally, the grade for the Clinical Practicum II was assigned by the researcher. Students were assured that they were not required to participate in the study and that opting in or out of the study would not impact their grade or programmatic standing in any way. Additionally, a third party introduced the research project to the students to avoid possible increased pressure to participate that may have been present with the DCE presenting the project and requesting consent.

Clinical instructors were informed that they were not required to participate in this study and that their decision to opt in or out of the study would not be shared with their employer, nor would it impact their ability to obtain continuing competency units for acting as a CI.

Both CIs and students were notified that the study was approved by the IRB at both the university health science center and the educational institution of the researcher. All information was kept confidential and is not identifiable by individual respondent. Prior to each interview, a cover letter explaining the research project and obtaining informed consent for participation was given to each subject. Subjects signed a consent form that clearly outlined the fact that participation was voluntary and that they were able to withdraw at any time without penalty. Verbal and written consent was obtained for audio-recording of the interview using a digital voice recorder.
Summary

This chapter described the design of this mixed-methods study, which explored the self-perceived knowledge, attitudes, and skills of physical therapy students and physical therapy clinical instructors related to interprofessional education in the clinical education setting. Students completed the IPEC Competency Survey both pre and post clinical rotation, and CIs completed the survey once during the clinical rotation of the student. The survey provided information on the basis of self-described competence for both students and CIs.

Additionally, this chapter described the methodology for interviewing students and CIs, the methodology for document analysis of the student’s PT MACS, and the methodology for analysis of the IPEC Competency Survey. Interviews allowed for richer information from both students and CIs. Through triangulation of data from multiple sources, a greater understanding of the current state of IPE in physical therapy clinical education was developed.
CHAPTER 4: DATA ANALYSIS AND FINDINGS

Introduction

The current body of literature related to interprofessional education (IPE) within physical therapist (PT) education is sparse, particularly in the clinical setting. The aim of this study was to investigate the self-perceived knowledge, attitudes, and skills of PT students and clinical instructors (CIs) related to IPE in the clinical education setting. This chapter will present the research findings and data analyses by describing the subjects and presenting an analysis of both the quantitative and the qualitative data collected. Data gathered included student and CI self-assessment related to interprofessional competencies, assessment of the student through a clinical skills tool, as well as information on the student clinical rotation experience through interviews.

Subjects

Participants in this study included Doctor of Physical Therapy (DPT) students from a university health science center in the southern United States (U.S.) that were enrolled in the eight-week Clinical Practicum II (CPII) course. At this point in their curriculum, the forty students enrolled in the course had completed all didactic content. All students were invited to participate in the Interprofessional Education Collaborative (IPEC) Competency Survey component of the study, while only students completing their CPII at a hospital inpatient, skilled nursing, or pediatric setting were invited to participate in the interview and document analysis components of the study. Document analysis consisted of review of the “Management of Care Delivery: Inter-Professional Practice and Collaboration” skill sheet from the Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS) analysis. All CIs supervising the DPT students on their CPII were invited to participate in the IPEC Competency component of the study. Only those CIs supervising students in the hospital inpatient, skilled nursing, or pediatric
settings were invited to participate in the interview component of the study. Participant numbers for each component of the study are discussed in Chapter 3.

**IPEC Competency Survey Instrument**

The IPEC Competency Survey Instrument (Dow, DiazGrandos, Mazmania, & Retchin, 2014) is designed to assess outcomes related to collaborative practice at the degree program level for graduating health profession students. The survey contains 42 items that are rated on a 5-point Likert scale with 1= strongly disagree to 5 = strongly agree. There are four domain subscales (Values and Ethics- 10 items; Roles and Responsibility- 9 items; Interprofessional Communication- 11 items; Teams and Teamwork- 12 items). Items within each domain are summed with higher scores indicating higher levels of competency. The IPEC Competency Survey has demonstrated adequate psychometric properties (Dow et al., 2014). See table 3-3.

Five steps were implemented to enter and analyze data and to identify patterns or responses across participant groups. First, IBM SPSS Statistical Software was used to enter and clean data. Second, Cronbach’s Alpha scores were calculated to determine the internal reliability of the domain subscales for both students and clinical instructors. Third, descriptive statistics were calculated for all participants. Fourth, the individual items from each domain were rank ordered by perceived level of competency based on educational experience. Finally, specific statistical analyses were conducted to address each of the following questions.

1. **Do students show a significant improvement in their self-perceived competence within each of the 4 domains pre- (time 1) and post- (time 2) clinical rotation.**

To determine whether significant differences exist on students' perceived competency from pre-to post-clinical rotation independent sample t-tests were conducted for each domain subscale. To
determine the magnitude of any differences, Cohen’s $d$ effect sizes were computed for each of the subscales (Rosenthal & Rosnow, 1991). Interpretations of effect sizes are the standard for Cohen’s $d$ with small (0.2), medium (0.5) and large (0.8) representations (Cohen, 1977). See Table 4-1. Finally, means and standard deviations were calculated for individual items within each subscale and change scores were calculated to determine differences for each item.

Table 4-1

<table>
<thead>
<tr>
<th>Domains</th>
<th>Cohen’s $d$</th>
<th>Effect Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values and Ethics</td>
<td>0.991</td>
<td>large</td>
</tr>
<tr>
<td>Roles and Responsibilities</td>
<td>1.006</td>
<td>Large</td>
</tr>
<tr>
<td>Interpersonal Communication</td>
<td>0.535</td>
<td>Medium</td>
</tr>
<tr>
<td>Team and Teamwork</td>
<td>0.676</td>
<td>Medium</td>
</tr>
</tbody>
</table>

2. **Do differences exist on the self-perceived competence levels of how clinical instructors and post-rotation students rate themselves within each of the 4 domains and overall?**

To determine whether significant differences exist between student and clinical instructor self-perceived competence levels on IPEC competencies, a series of independent sample t-tests were conducted on each of the four domain subscales (i.e., Values and Ethics, Roles and Responsibilities, Interprofessional Communication, Teams and Teamwork). To determine the magnitude of any significant differences, Cohen’s $d$ effect sizes were computed for each of the subscales (Rosenthal & Rosnow, 1991). See table 4-1.

3. **Do differences exist on competency ratings based on years of experience for clinical instructors?**

To determine whether significant differences exist between clinical instructors with varied years of experience (i.e., 5 years and less; 6-10 years; 11 years and up) a one-way analysis of variance
(ANOVA) test was conducted. Bonferroni post-hoc analyses were also used due to the inclusion of multiple groups. To examine the magnitude of differences the $F$-ratios were used and converted to effect sizes represented by $r$ as recommended by Field (2009). Means and standard deviations were calculated for the 42 individual items for each years-of-experience group.

The internal reliability of each domain subscale was inspected for both students and clinical instructors. All subscales demonstrated adequate reliability with Cronbach’s Alpha ranging from .72-.93. Table 4-2 displays all Cronbach’s alpha values for CIs and Table 4-3 displays Cronbach’s alpha values for students both pre- and post-clinical rotation.

Table 4-2
Reliability of Domain Subscales for CIs

<table>
<thead>
<tr>
<th>Domains</th>
<th>Clinical Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values and Ethics***</td>
<td>0.81</td>
</tr>
<tr>
<td>Roles and Responsibilities***</td>
<td>0.91</td>
</tr>
<tr>
<td>Interpersonal Communication**</td>
<td>0.9</td>
</tr>
<tr>
<td>Team and Teamwork**</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Note.**$p<.01$, ***$p<.001$

Table 4-3
Reliability of Domain Subscales for Students

<table>
<thead>
<tr>
<th>Domains</th>
<th>Student Pre-Clinical</th>
<th>Student Post-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values and Ethics***</td>
<td>0.72</td>
<td>0.84</td>
</tr>
<tr>
<td>Roles and Responsibilities***</td>
<td>0.86</td>
<td>0.82</td>
</tr>
<tr>
<td>Interpersonal Communication**</td>
<td>0.79</td>
<td>0.82</td>
</tr>
<tr>
<td>Team and Teamwork**</td>
<td>0.87</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Note.**$p<.01$, ***$p<.001$
To examine within group differences from pre- to post-clinical rotation, paired sample t-tests were conducted. All domain subscales revealed significant differences. Specifically, there were significant differences with large effects on the *Values and Ethics* $t(27) = -4.69$, $p = 0.000$, (ES = -0.991) and *Roles and Responsibilities* subscales $t(27) = -4.285$, $p = 0.000$, (ES = -1.006).

Significant differences with medium effects were found for the *Interpersonal Communication* $t(27) = -2.566$, $p = 0.01$, (ES = -0.535) and *Teams and Teamwork* $t(27) = -3.329$, $p = 0.001$, (ES = -0.676) subscales. Table 4-4 displays all information regarding within group differences from pre to post clinical rotation.

### Table 4-4

Differences in Pre/Post Clinical Rotation Domain Scores

<table>
<thead>
<tr>
<th>Domains</th>
<th>Pre-Clinical</th>
<th>Post-Clinical</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M(SD)</td>
<td>M(SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Values and Ethics</strong>*</td>
<td>43.32(3.11)</td>
<td>46.46(3.27)</td>
<td>-4.69</td>
<td>-0.991</td>
</tr>
<tr>
<td><strong>Roles and Responsibilities</strong>*</td>
<td>34.42(4.50)</td>
<td>38.39(3.42)</td>
<td>-4.285</td>
<td>-1.006</td>
</tr>
<tr>
<td><strong>Interpersonal Communication</strong></td>
<td>44.96(3.83)</td>
<td>47.11(3.94)</td>
<td>-2.566</td>
<td>-0.535</td>
</tr>
<tr>
<td><strong>Team and Teamwork</strong>**</td>
<td>46.61(5.38)</td>
<td>50.43(4.81)</td>
<td>-3.329</td>
<td>-0.676</td>
</tr>
</tbody>
</table>

*Note.* **$p<.01$, ***$p<.001$
Each domain was examined to determine which demonstrated the greatest and least amount of change from pre- to post-clinical rotation. The *Roles and Responsibilities* domain exhibited the greatest change and the *Interprofessional Communication* domain exhibited the least change. At the post-rotation assessment, the *Teams and Teamwork* domain ended up with the lowest mean self-perceived competence rating overall, meaning that students were least confident in their abilities within this domain.

When examining individual items at pre- and post-clinical rotation, the item “*act with honesty and integrity in relationships with patients, families, and other team members*” had the highest mean across all students on the *Values and Ethics* subscale at both time points. “*Communicate my roles and responsibilities clearly to patients, families, and other professionals*” was the highest on the *Roles and Responsibility* subscale for pre- and post-clinical rotation. On the *Interpersonal Communication* subscale, the student group as a whole perceived themselves as most competent on the item, “*Listen actively, and encourage ideas and opinions of other team members*” at pre-clinical rotation and “*express my knowledge and opinions to team members involved in patient care with clarity and respect*” at post-clinical rotation. Finally, for the *Teams and Teamwork* subscale, students rated the item, “*reflect on my individual performance for my improvement*” as highest for both pre- and post-clinical rotation. These students felt most competent in their ability to reflect on their performance as compared to the other listed competencies within this domain. Table 4-5 lists the items with the highest and lowest mean ratings across all students.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Item</strong></td>
</tr>
<tr>
<td><strong>Pre</strong></td>
<td><strong>Post</strong></td>
</tr>
<tr>
<td>Values and Ethics</td>
<td>Manage ethical dilemmas specific to interprofessional patient centered care situations.</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lowest</td>
<td>Act with honesty and integrity in relationships with patients, families, and other team members.</td>
</tr>
<tr>
<td>Highest</td>
<td>same</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roles and Responsibility</th>
<th>Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>Engage in continuous professional and interprofessional development to enhance team performance.</td>
</tr>
<tr>
<td>Highest</td>
<td>Communicate my roles and responsibilities clearly to patients, families, and other professionals.</td>
</tr>
<tr>
<td></td>
<td>same</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interpersonal Communication</th>
<th>Give timely, sensitive feedback to others about their performance on the team.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>same</td>
</tr>
<tr>
<td>Highest</td>
<td>Express my knowledge and opinions to team members involved in patient care with clarity and respect.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teams and Teamwork</th>
<th>Describe the process of team development.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest Pre</td>
<td>Use available evidence to inform effective teamwork and team-based practices.</td>
</tr>
<tr>
<td>Highest Pre</td>
<td>Reflect on my individual performance for my improvement.</td>
</tr>
<tr>
<td></td>
<td>same</td>
</tr>
</tbody>
</table>

Items were also examined for the greatest and least amount of change from pre- to post-clinical rotation. On the Values and Ethics subscale the item with the most change was “manage
ethical dilemmas specific to interprofessional patient centered care situations” and the item with the lowest change score was, “act with honesty and integrity in relationships with patients, families, and other team members.” For the Roles and Responsibility subscale the biggest change was on the item, “use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable,” while the least amount of change occurred on the item, “establish interprofessional relationships to improve care and advance learning. On the Interpersonal Communication subscale, students had the biggest change on the item, “recognize how my position in the hierarchy of the healthcare team, contributes to communication, conflict resolution, and interprofessional working relationships” and the least amount of change on the item, “listen actively, and encourage ideas and opinions of other team members.” Lastly, students had the most change for the item, “apply leadership practices that support collaborative practice and team effectiveness” on the Teams and Teamwork subscale and the least amount of change for the item, “use available evidence to inform effective teamwork and team-based practices.” Table 4-6 lists change scores for each item on the IPEC Competency Survey.

<table>
<thead>
<tr>
<th>Table 4-6.</th>
<th>Individual Items Rank Ordered at Pre and Post Clinical Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Values and Ethics</td>
</tr>
<tr>
<td></td>
<td>Place the interests of patients at the center of interprofessional health care delivery.</td>
</tr>
<tr>
<td></td>
<td>Respect the privacy of patients while maintaining confidentiality in the delivery of team-based care.</td>
</tr>
<tr>
<td></td>
<td>Embrace the diversity that characterizes patients and the health care team.</td>
</tr>
</tbody>
</table>
Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions. | 4.43 | 4.76 | 0.33
---|---|---|---
Work in cooperation with those who receive care and those who provide support or care. | 4.21 | 4.65 | 0.44
Develop a trusting relationship with patients, families and other team members. | 4.29 | 4.7 | 0.41
Demonstrate high standards of ethical conduct and quality of care in my contributions to team-based care. | 4.5 | 4.83 | 0.33
Manage ethical dilemmas specific to interprofessional patient centered care situations. | 3.82 | 4.35 | **0.53**
Act with honesty and integrity in relationships with patients, families, and other team members. | 4.71 | 4.87 | **0.16**
Maintain competence in my own profession appropriate to my scope of practice or level or training. | 4.07 | 4.59 | 0.52

**Roles and Responsibility**

Communicate my roles and responsibilities clearly to patients, families, and other professionals. | 4.18 | 4.67 | 0.49
Recognize my limitations in skills, knowledge, and abilities. | 4.11 | 4.54 | 0.43
Engage diverse healthcare professionals with complementary professional expertise to develop strategies to meet specific patient care needs. | 3.57 | 4.22 | 0.65
Explain the roles and responsibilities of other care providers and how the team works together to provide care. | 3.64 | 4.3 | 0.66
Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable. | 3.39 | 4.3 | **0.91**
Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention. | 3.71 | 4.3 | 0.59
<table>
<thead>
<tr>
<th>Establish interprofessional relationships to improve care and advance learning.</th>
<th>4.11</th>
<th>4.26</th>
<th>0.15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage in continuous professional and interprofessional development to enhance team performance.</td>
<td>3.89</td>
<td>4.13</td>
<td>0.24</td>
</tr>
<tr>
<td>Use unique and complementary abilities of all members of the team to optimize patient care.</td>
<td>3.82</td>
<td>4.24</td>
<td>0.42</td>
</tr>
</tbody>
</table>

**Interpersonal Communication**

<table>
<thead>
<tr>
<th>Choose effective communication tools and techniques to facilitate discussions and interactions that enhance team function.</th>
<th>3.86</th>
<th>4.15</th>
<th>0.29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicate information with patients, families, and healthcare team members in a form that is understandable.</td>
<td>4.32</td>
<td>4.52</td>
<td>0.2</td>
</tr>
<tr>
<td>Avoid discipline-specific terminology when possible.</td>
<td>3.86</td>
<td>4.15</td>
<td>0.29</td>
</tr>
<tr>
<td>Express my knowledge and opinions to team members involved in patient care with clarity and respect.</td>
<td>4.18</td>
<td>4.54</td>
<td>0.36</td>
</tr>
<tr>
<td>Listen actively, and encourage ideas and opinions of other team members.</td>
<td>4.46</td>
<td>4.46</td>
<td>0</td>
</tr>
<tr>
<td>Give timely, sensitive feedback to others about their performance on the team.</td>
<td>3.68</td>
<td>3.91</td>
<td>0.23</td>
</tr>
<tr>
<td>Respond respectfully to feedback from others on my healthcare team.</td>
<td>4.29</td>
<td>4.46</td>
<td>0.17</td>
</tr>
<tr>
<td>Use appropriate, respectful language in a given difficult situation such as an interprofessional conflict.</td>
<td>4.36</td>
<td>4.43</td>
<td>0.07</td>
</tr>
<tr>
<td>Recognize how my experience and expertise contributes to communication, conflict resolution, and interprofessional working relationships.</td>
<td>4.07</td>
<td>4.32</td>
<td>0.25</td>
</tr>
<tr>
<td>Recognize how my position in the hierarchy of the healthcare team, contributes to communication, conflict resolution, and interprofessional working relationships.</td>
<td>3.82</td>
<td>4.24</td>
<td>0.42</td>
</tr>
</tbody>
</table>
Consistently communicate the importance of teamwork in patient-centered and community-focused care. | 4.07 | 4.28 | 0.21

**Teams and Teamwork**

Describe the process of team development. | 3.64 | 3.82 | 0.18

Describe the roles and practices of effective healthcare teams. | 3.79 | 4.04 | 0.25

Engage other health professionals in shared problem solving appropriate to the specific care situation. | 3.79 | 4.19 | 0.4

Inform care decisions by integrating the knowledge and experience of other professions appropriate to clinical situation. | 3.82 | 4.13 | 0.31

Apply leadership practices that support collaborative practice and team effectiveness. | 3.75 | 4.07 | **0.32**

Engage others to constructively manage disagreements that arise between healthcare professionals, patients, and families. | 3.71 | 3.94 | 0.23

Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care. | 4.04 | 4.2 | 0.16

Reflect on my individual performance for my improvement. | 4.36 | 4.52 | 0.16

Reflect on my healthcare team's performance for my team's improvement. | 4.11 | 4.2 | 0.09

Use strategies that will improve the effectiveness of interprofessional teamwork and team-based care. | 3.82 | 4.07 | 0.25

Use available evidence to inform effective teamwork and team-based practices. | 3.89 | 3.76 | **-0.13**

Perform effectively on teams and in different team roles in a variety of settings. | 3.89 | 4.35 | 0.46

* Bolded numbers indicate highest change score for each domain; * Red bolded items indicate lowest change score for each domain
### Table 4-8. Individual Items Rank Ordered Clinical Instructor

<table>
<thead>
<tr>
<th></th>
<th>5 years and less (N = 10)</th>
<th>6-10 years (N = 8)</th>
<th>11 years or more (N = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Values and Ethics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place the interests of patients at the center of interprofessional health care delivery.</td>
<td>4.5(.53)</td>
<td>4.63(.52)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Respect the privacy of patients while maintaining confidentiality in the delivery of team-based care.</td>
<td>4.5(.53)</td>
<td>4.65(.46)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Embrace the diversity that characterizes patients and the health care team.</td>
<td>4.6(.52)</td>
<td>4.75(.46)</td>
<td>4.88(.35)</td>
</tr>
<tr>
<td>Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.</td>
<td>4.7(.48)</td>
<td>5.0(.00)</td>
<td>4.88(.35)</td>
</tr>
<tr>
<td>Work in cooperation with those who receive care and those who provide support or care.</td>
<td>4.7(4.8)</td>
<td>4.63(.52)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Develop a trusting relationship with patients, families and other team members.</td>
<td>4.8(.42)</td>
<td>4.75(.46)</td>
<td>4.88(.35)</td>
</tr>
<tr>
<td>Demonstrate high standards of ethical conduct and quality of care in my contributions to team-based care.</td>
<td>4.9(.32)</td>
<td>4.75(.46)</td>
<td>5.0(.00)</td>
</tr>
<tr>
<td>Manage ethical dilemmas specific to interprofessional patient centered care situations.</td>
<td>4.2(.63)</td>
<td>4.38(.52)</td>
<td>4.88(.35)</td>
</tr>
<tr>
<td>Act with honesty and integrity in relationships with patients, families, and other team members.</td>
<td>4.8(.42)</td>
<td>4.75(.46)</td>
<td>5.0(.00)</td>
</tr>
<tr>
<td>Maintain competence in my own profession appropriate to my scope of practice or level or training.</td>
<td>4.6(.52)</td>
<td>4.63(.52)</td>
<td>4.63(.52)</td>
</tr>
<tr>
<td><strong>Roles and Responsibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicate my roles and responsibilities clearly to patients, families, and other professionals.</td>
<td>4.6(.52)</td>
<td>4.75(.46)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Recognize my limitations in skills, knowledge, and abilities.</td>
<td>4.5(.53)</td>
<td>4.63(.52)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Engage diverse healthcare professionals with complementary professional expertise to develop strategies to meet specific patient care needs.</td>
<td>4.2(.63)</td>
<td>4.13(.35)</td>
<td>4.5(.53)</td>
</tr>
<tr>
<td>Explain the roles and responsibilities of other care providers and how the team works together to provide care.</td>
<td>4.2(.63)</td>
<td>4.63(.52)</td>
<td>4.5(.53)</td>
</tr>
<tr>
<td>Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.</td>
<td>4.0(.47)</td>
<td>4.5(.53)</td>
<td>4.75(.46)</td>
</tr>
<tr>
<td>Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.</td>
<td>4.0(4.7)</td>
<td>4.5(.53)</td>
<td>4.63(.52)</td>
</tr>
<tr>
<td>Establish interprofessional relationships to improve care and advance learning.</td>
<td>4.2(.63)</td>
<td>4.38(.74)</td>
<td>4.63(.52)</td>
</tr>
<tr>
<td>Engage in continuous professional and interprofessional development to enhance team performance.</td>
<td>3.8(.63)</td>
<td>4.13(.83)</td>
<td>4.5(.53)</td>
</tr>
<tr>
<td>Use unique and complementary abilities of all members of the team to optimize patient care.</td>
<td>4.1(.87)</td>
<td>4.25(.46)</td>
<td>4.63(.52)</td>
</tr>
</tbody>
</table>

**Interpersonal Communication**
Choose effective communication tools and techniques to facilitate discussions and interactions that enhance team function. 4.2 (.42) 4.0 (.53) 4.5 (.76)
Communicate information with patients, families, and healthcare team members in a form that is understandable. 4.6 (.51) 4.50 (.53) 4.88 (.35)
Avoid discipline-specific terminology when possible. 4.0 (.82) 4.13 (.64) 4.25 (1.03)
Express my knowledge and opinions to team members involved in patient care with clarity and respect. 4.5 (.53) 4.63 (.52) 4.75 (.46)
Listen actively, and encourage ideas and opinions of other team members. 4.5 (.53) 4.38 (.52) 4.63 (.52)
Give timely, sensitive feedback to others about their performance on the team. 3.6 (.97) 3.88 (.99) 4.38 (.92)
Respond respectfully to feedback from others on my healthcare team. 4.2 (.63) 4.38 (.52) 4.5 (.76)
Use appropriate, respectful language in a given difficult situation such as interprofessional conflict. 4.3 (.67) 4.13 (.64) 4.5 (.76)
Recognize how my experience and expertise contributes to communication, conflict resolution, and interprofessional working relationships. 4.2 (.63) 4.5 (.53) 4.63 (.52)
Recognize how my position in the hierarchy of the healthcare team, contributes to communication, conflict resolution, and interprofessional working relationships. 4.0 (.82) 4.5 (.53) 4.75 (.46)
Consistently communicate the importance of teamwork in patient-centered and community-focused care. 4.1 (.58) 4.38 (.52) 4.5 (.76)

**Teams and Teamwork**

Describe the process of team development. 3.2 3.63 (.74) 4.0 (1.07)
Describe the roles and practices of effective healthcare teams. 3.5 3.88 (.35) 4.13 (1.13)
Engage other health professionals in shared problem-solving appropriate to the specific care situation. 3.9 4.38 (.52) 4.5 (.53)
Inform care decisions by integrating the knowledge and experience of other professions appropriate to clinical situation. 4 4.25 (.71) 4.13 (.64)
Apply leadership practices that support collaborative practice and team effectiveness. 3.6 4.25 (.46) 4.38 (1.06)
Engage others to constructively manage disagreements that arise between healthcare professionals, patients, and families. 3.6 3.88 (.64) 4.38 (1.06)
Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care. 3.9 3.88 (.64) 4.63 (.52)
Reflect on my individual performance for my improvement. 4.1 4.5 (.53) 4.38 (.74)
Reflect on my healthcare team's performance for my team's improvement. 3.8 4.38 (.52) 4.38 (.74)
Use strategies that will improve the effectiveness of interprofessional teamwork and team-based care. 3.7 4.13 (.64) 4.38 (.74)
Use available evidence to inform effective teamwork and team-based practices. 3 3.38 (1.06) 4.13 (.83)
To examine differences between student and clinical instructor self-perceived confidence levels on competencies post clinical rotation, t-tests were conducted on each of the four domain subscales. There were no significant differences on any of the domain subscales between students and clinical instructors. The top-rated competency domain for both students (M = 50.43; SD = 4.81) and clinical instructors (M = 48.03; SD = 7.27) was Team and Teamwork. The lowest rated domain for both students (M = 38.39; SD = 3.42) and clinical instructors (M = 39.52; SD = 4.12) was Roles and Responsibilities. Table 4-7 displays scores for clinical instructors and post-rotation scores for students. For this comparison, CIs rated their own competence, as opposed to rating the competence of the student.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Student (N=28) M(SD)</th>
<th>Clinical Instructor (N=26) M(SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values and Ethics</td>
<td>46.46(3.27)</td>
<td>47.15(2.75)</td>
<td>-1.114</td>
</tr>
<tr>
<td>Roles and Responsibilities</td>
<td>38.39(3.42)</td>
<td>39.53(4.12)</td>
<td>-0.567</td>
</tr>
<tr>
<td>Interpersonal Communication</td>
<td>47.11(3.94)</td>
<td>47.8(5.09)</td>
<td>1.434</td>
</tr>
<tr>
<td>Team and Teamwork</td>
<td>50.43(4.81)</td>
<td>48.03(7.27)</td>
<td>-0.835</td>
</tr>
</tbody>
</table>

When examining differences by years of experience, no significant differences were reported for any of the subscales. Individuals who had 11 or more years of experience rated themselves as highest for each of the subscales. Those who had 5 or less years of experience had the lowest ratings across all subscales. Table 4-8 displays all individual items rank ordered by clinical instructors based on years of experience.
Physical Therapy Manual for the Assessment of Clinical Skills

The PT MACS assessment allows student self-assessment as well as CI assessment of the student. Ratings of “unacceptable,” “not independent,” “entry-level,” and “above entry-level” are available. At the midterm assessment, after four weeks of clinical rotations, only two of eight students rated themselves as “entry-level” on the PT MACS skill sheet assessment. Five of eight clinical instructors rated the students at entry-level. Three pairs of students and CIs rated the students as “not independent,” two pairs rated the students as “entry-level,” and in three pairs the student rated themselves as “not independent” while the CIs rated the student at “entry-level.” In no assessments did the student give a rating that was higher than the CI rating. At the final assessment, after completing the full eight weeks of the clinical rotation, all pairs had both the student and CI rating of “entry-level” for the student. Comments on the PT MACS skill sheets were sparse. Only three CI’s provided comments at the midterm assessment. Two comments indicated that the student needed more interaction or more experience in order to meet entry level competency, and the other indicated that the student needed to improve their communication with the interdisciplinary team. No comments were provided at the final assessment on any of the skill sheets. The planned qualitative analysis of comments from the skill sheets was omitted due to the scarcity of comments.

Clinical Instructor Questionnaires

For the CI Questionnaire, 40 percent recalled content related to IPE in their PT education program, 36 percent said there was no IPE content, and 24 percent said they could not remember whether there was or was not IPE content. Five PTs were licensed prior to the year 2000, all of whom reported a lack of IPE curriculum. The other 21 PTs were licensed between 2001 and
2014, but no clear pattern related to the presence or absence of IPE content was present in their responses. Therapists licensed as recently as 2013 said there was no IPE in their programs and therapists licensed as far back as 2005 reported recalling IPE content in their program. Interprofessional education content will not become an accreditation requirement for physical therapy programs until January 1, 2018.

Fifty-eight percent of CI respondents said that they had not received any on-the-job training related to interprofessional practice and collaboration, while 42 percent reported that they had such training. Descriptions of the trainings offered comments such as “not formal training” and “yes, but not formal.” The biggest theme described by respondents was participation in various team meetings, though robust descriptions of explicit training were lacking. A few CIs mentioned that trainings at their facility were for managers or leadership teams only. Classes or in-services were mentioned by a few respondents, in comments whose content centered on communication.

Licensed PTs in the state of Texas are required to take 30 continuing competency units (CCUs) every two years. Only one CI responded that they had taken a continuing competency course related to interprofessional practice and collaboration. The course described by that respondent focused on “improving the health of patients through collaboration with nutrition/dieticians, physicians, nurses and ancillary care providers,” which would be considered a true IP focus.

**Interviews**

Themes and content from the interviews will be presented in this chapter, while the implications of that content will be discussed in Chapter 5.
Definition of Interprofessional Practice and Collaboration

The WHO definition of interprofessional collaborative practice is, “When multiple health workers from different professional backgrounds work together with patients, families, carers [sic], and communities to deliver the highest quality of care” (WHO, 2010). Interviewed CI’s highlighted the multidisciplinary component of interprofessional collaborative practice, as well as the aspect of the definition related to working together. Most of the definitions given talked about the patient, but did not specifically include talking with the patient as part of the definition. For example, CIs mentioned talking “about patients” instead of the more inclusive WHO definition which mentions working together “with patients.” Families, caregivers, and communities were absent from the CI definitions. The idea of high-quality care was mentioned only twice. One CI admitted, “until you sent this paperwork, I’ve never even heard that term before.” Students also clearly defined many disciplines as involved in interprofessional collaborative practice, but also did not state that patients, families and other caregivers, and communities are a part of the team as opposed to just the subjects of the team discussion. However, students more frequently highlighted quality care as a component of their definition, utilizing terms such as “optimal patient care,” “quality care,” and “best care.”

Core Tasks of an Interprofessional Team

The Michigan Health Council Survey of Nurses (2015) defined core actives of an interdisciplinary team based on the IOM core principles and description of team processes. These activities include: discussing the roles and responsibilities of each team member, conducting huddles or clinical discussions with the team, conducting patient rounds with other members of the team, holding team meetings with patients and families, developing shared goals reflective of the patients’ priorities and supported by all team members, communicating with
other team members virtually, and continuously evaluating team processes and patient outcomes (MHCSN, 2015). The team interactions of the clinical instructors were explored during both student and CI interviews.

**Team Meetings.** Clinical instructors reported ample opportunities to meet with the healthcare team through rounds, huddles, team conferences, patient care conferences, and interdisciplinary team meetings. The frequency of these team meetings varied from daily to weekly, monthly, quarterly, yearly, and “as needed,” with no consistent repeating theme or apparent standard of practice. While different facilities called the meetings by different names, all had the formalized opportunities for the team to come together to discuss patient care. The participants in the team meetings also varied by facility, type of meeting, and need. Though these meetings were a positive learning experience for some of the students, others made statements that the meetings “happened twice maybe” during their rotation or that they “don’t remember doing that.”

**Discussing Roles and Responsibilities.** When asked about explicitly discussing roles and responsibilities of various disciplines and team members, most CI’s implied that roles and responsibilities were understood and that they did not need to be regularly discussed. Some respondents felt that they had the opportunity to discuss those roles in a meeting should the need arise, and one respondent mentioned discussion about responsibilities only taking place at the directors’ level.

Comments on the understanding of the different roles and responsibilities of the team related more to other professions understanding of what PTs do and what part of their profession is as opposed to the PTs’ having full comprehension of the scope of practice of other professions.
Amidst this discussion, the theme of stability and interpersonal relationships came up as well. In instances where practitioners rotated through the clinical facility or interpersonal relationships were not formed, the perception from the PT was one of poor understanding on the part of the rotating or less-known team member. In instances of team stability and better interpersonal relationships, PTs believed their roles and responsibilities were better understood by other members of the team.

Students reported that they experienced a discussion of roles and responsibilities a few times in the sense that their CIs explained to them what other professions may be doing or focusing on in a particular situation. Other students spent time shadowing and talking with other professions. However, when asked whether they participated in discussions of roles and responsibilities with other practitioners or if they had witnessed the team discussing that topic, students relayed that they did not see those discussions happening with the team. The discussions seemed to occur as an attempt to educate the student and less as an integrated and existing process at the facility.

**Communicating Virtually.** Methods of communication varied greatly between CIs. Some preferred face-to-face communication while others utilized text, email, and phone communication. Access to and ability to review chart notes varied as well depending on the healthcare system and whether other healthcare practitioners seen by the patient were in the same system or a different one. One CI mentioned difficulty in communicating with other professions, which resulted in relaying information through the patient. The CI recognized the shortcomings of this method, stating that many things “got lost in translation.” When asked about communication through text, email, phone or chart review, students reported a background role and limited awareness of the frequency or content of their CI’s communication through those
methods. Student comments consisted of phrases such as, “I personally didn’t communicate that much with other people. If I had to guess, my CIs were probably communicating with other professions daily,” “I think they emailed frequently,” and “I never had to communicate with another team member through email or anything.” Students also mentioned phones or pagers that certain professionals had, but stated that they were not issued that equipment as a student and were therefore not involved in that type of communication.

Developing Shared Goals. CI responses were split as they related to developing shared goals reflective of the patient’s priorities and supported by all team members. Consistently, CIs believed that PT specific goals were in line with patient and family goals, though some CIs stated that they did not share goals with other members of the team as often “as maybe we should.” Other CIs reported meetings in which “everyone comes, except for the physicians,” and “they all get an opportunity,” including the patient and family, “to ask questions about what the goals are for the patient.” Student responses varied in alignment with the responses of their CIs, with some stating it happened daily, some saying “yes and no,” and another replying “I guess that didn’t happen explicitly.”

Evaluating Team Process and Patient Outcomes. Responses related to evaluating team process and patient outcomes were widely varied. Both students and CIs reported relatively consistent monitoring of patient outcomes with the team. However, evaluation of team processes seemed to be an unfamiliar concept to most. Some CIs related that team processes were evaluated by their superiors. For example, one stated, “I think they do that a lot,” referring to a hospital review council, and another said it was “an ongoing process from the corporate level.” Only one CI mentioned specifically discussing, on a monthly basis, the effectiveness of their
team meetings. That CI also mentioned having yearly staff retreats to analyze and address this effectiveness more specifically.

Again, for this core task, overall the students were unable to confidently state if or how frequently practitioners were participating in evaluating team processes, as they gave responses such as, “I don’t think so, not to my knowledge,” “I think I remember just the one,” and “honestly [it] isn’t that often.” One recounted discussions of only PT-specific things, but not team processes. Another recalled a situation in which he felt that a rehab manager used daily patient satisfaction statistics in a competitive way that decreased overall communication and teamwork, as opposed to utilizing that time to encourage and improve team processes. Student interviews revealed that students were not involved in discussions on evaluating team process, but were privy to and involved with discussions related to patient outcomes.

**Formal versus Informal Communication**

Despite the availability of opportunities for interdisciplinary communication through various types of team meetings, informal communication seemed to be more prevalent. CIs indicated that communication was “on the fly” or “nothing formal” in several instances. Students echoed that theme stating that “everything is pretty informal that I saw” and “probably 75-80 percent was informal.” CIs were mostly unfamiliar with structured communication methods such as SBAR, callbacks, or communication and teamwork training such as TeamSTEPPS and had no other formal tools for communication to which they had been introduced. For some interviewees, the informal communication was said to be sufficient, while others believed the communication to be “fair” or “pretty good” and noted that “it doesn’t happen as often as we would like it to.”
Interpersonal Relationships

An emergent theme in the interviews is the dynamics of how interpersonal relationships impact interprofessional relationships. CIs described feeling like they were able to get more accurate and robust information from other practitioners when they were more familiar with one another and had more of a personal relationship. Patient outcomes were also believed to be impacted by improved interpersonal relationships. One CI mentioned that when she knows the other practitioner well, she has fewer instances in which patient equipment is an ill fit or is not appropriate; but when she has to work with practitioners she does not see or communicate with regularly, obtaining the right equipment and right fit for the patient takes longer. Another mentioned that a lack of personal relationships with certain professionals has hindered the ability of PTs in her department to get tasks accomplished on behalf of the patient. Other practitioners echoed the idea that their opinion is valued and their advice is followed more frequently once a personal relationship or familiarity has been established with the other healthcare providers.

Students mirrored this sentiment with comments such as, “I want to try to form those interpersonal relationships because I feel like it makes it easier when you actually have to collaborate professionally,” and “the more connected you are the easier it is for the communication to flow and the collaboration to happen.” Students also discussed good interpersonal skills in the context of decreasing the likelihood of conflict in an interprofessional setting. One student described a situation in which a new and unknown practitioner discounted the information given by another practitioner that was established in that setting and that lack of effective communication between the two professions resulted in a negative change of status for a patient. Students seemed cautious and unsure of how professional interaction would work
within settings in which different disciplines were not located in the same building or hospital campus, but they did believe it would hinder communication and effectiveness.

The theme of familiarity and relationship also impacted whether or not PTs felt their opinions and contributions were valued by the team. While a few CIs said they “definitely” or “absolutely” believed their contributions were valued, others were less sure, stating “I think so” and “I think that is still a work in progress.” Further explanations explored the idea that territorial and boundary issues and pushback were more of an issue when the PT was unfamiliar to another practitioner. Only one student expressed a concern about their opinion or the opinion of their CI or other PTs not being valued. Potentially, students were not engaged or actively involved enough in team communication to pick up on the same nuances that were noticed and expressed by the CIs.

**Challenges**

Various challenges and barriers to teamwork and collaboration became apparent in the interviews. In relation to the idea of building interpersonal relationships to improve interprofessional relationships, the themes of proximity and team stability emerged. When practitioners rotated in and out of a facility or on and off of a floor, building relationships was thought to be more difficult, which in turn made collaborating on patient care more difficult. Clinical instructors mentioned that the process of relaying information and delivering the “right” information took longer in situations in which they did not have familiarity, gained through proximity or stability, with the other practitioners. While not a consistent theme, one of the CIs interviewed mentioned the challenges inherent in mismatched educational levels between practitioners. This CI discussed the importance of some of the certificate-trained members of the healthcare team, such as Certified Nursing Assistants (CNAs), but relayed that perhaps those
practitioners did not always understand the background or importance of the tasks they performed and that communicating with and teaching them in an effective manner was sometimes difficult.

Humility was the most commonly mentioned attribute that students stated was necessary for effective collaboration and teamwork. Communication was listed as the most common skill needed. In relation to these values and skills students discussed the importance of practitioners being willing to accept feedback, knowing when to lead and when to follow, being approachable, and possessing good listening skills.

**Involved Disciplines**

Students reported that they had the opportunity to interact with many professions, including physicians, nurses, respiratory therapists, physician’s assistants, nurse practitioners, speech therapists, occupational therapists, orthotists, mobility specialists, and dyslexia tutors. The nature of those interactions varied from observation to a singular conversation to co-treating or working together daily. Interactions with professions outside of the rehabilitation team, which consists of occupational therapy and speech therapy, were less frequent. While some CIs revealed allowing students to take an active role in team meetings and patient rounds, others described the student role as primarily observational.

Throughout the interviews, “the team” was primarily described by both students and CIs as including the therapies: PT, occupational therapy, and speech therapy. The next most frequently mentioned professions in the context of the team were social work (or case management), respiratory therapy, and nursing. Pharmacists and physicians were infrequently mentioned as members of the team who were regularly present and included in discussions.
While physicians may be part of communication through electronic medical records or phone calls, they were not frequently mentioned as participating in face-to-face conversations. Interviewees mentioned making calls to physicians and receiving return calls from nursing or medical assistants, but rarely speaking with the physician themselves. Orthotists, mobility specialists, and dyslexia tutors were also mentioned during interviews, but in the context of professions the student had the opportunity to observe as opposed to the student seeing explicit evidence of those professions being included in the healthcare team.

**Clinical instructor background and preparation**

When the CIs were asked about what preparation they had to teach interprofessional practice, the most frequent responses were related to their personal experience or the fact that they were comfortable talking with other professions and giving input. A few mentioned the lack of specific training they had received related to IPE in their PT school curriculum and at their workplace. Despite the lack of formal training, CIs generally believed that they were able to adequately teach interprofessional content. One stated, “I think I am fairly good at it. I’m not going to say that I am great, but I think I am comfortable with it,” and another, “I felt like I did an okay job.”

Methods described for teaching interprofessional practice included making introductions to practitioners of other professions, encouraging students to interact with and exchange information with other professions, allowing time for students to observe other professions, and leading by example. Clinical instructors made comments such as, “We encourage the students here to talk with other professions,” and stated that they spend time “encouraging the student to go and ask the questions and use the resources that are available to them.” Another mentioned that he had to “walk the walk and talk the talk” so that students could see what was expected of
them. Though students were told and encouraged to talk with other professions, guidance on how to effectively communicate with other professions was lacking. The students were told the importance of good communication, but not how to communicate or what information would be most pertinent to different practitioners or in different settings. When asked about communication, a CI stated, “as far as with physicians, I try to do the introductions,” but that was as far as they went with the instruction on interaction. Despite all of the encouraging, demonstrating, and introducing, a striking absence in the comments was conversations with specifics on effective communication or on how to structure a handoff to ensure adequate and pertinent information was delivered.

Only one CI described a more planned teaching process that included demonstrating the communication, followed by an explanation of the types of information needed in a team meeting. That same CI also described a particular printed form that contains basic information and models what information is and is not needed for each patient. The student utilized the form and was then guided to take the lead role for the PT in the team meetings towards the end of the clinical rotation. In this case, this guidance created an overall positive experience for the student.

**Transitioning Healthcare Systems**

The interviews revealed a sense that a transition period is beginning to happen in clinical practice. One CI mentioned a trial of a formalized hand-off on another floor in his facility. Another mentioned the hiring of a new physician who has been leading the charge on increasing the formality and impact of huddles as well as the clinician presence at huddles. A different CI mentioned how PT was previously not included in some of the interdisciplinary meetings but that the department had worked to make the collective PT voice heard so that now they are part of the meetings as well.
Summary

The purpose of this research was to explore the knowledge, attitudes, and skills of (PT) students and clinical instructors (CIs) related to IPE in the clinical education setting. That exploration involved both qualitative and quantitative analysis. This chapter described the statistical analysis of the quantitative data gathered through the IPEC Competency Survey as well as the qualitative data gathered through interviews and document analysis. Analysis revealed consistent trends and areas of convergence between the two types of data.

Within group comparison of students pre- and post-clinical rotation revealed a significant increase in the self-rated competence on the IPEC core competencies after the completion of the clinical rotation. Between-group comparisons were performed on the self-rated competence of students after completion of the clinical rotation and the clinical instructors’ self-rated competence of their own abilities on the same competencies. Despite having more experience, licensed clinical instructors did not perceive themselves to be any more competent than students perceived themselves to be on the IPEC Core competencies. Increased tenure as a licensed physical therapist did not equate to improved self-rated competence in the area of interprofessional practice.

Data from interviews revealed themes related to the current state of interprofessional practice in the clinical setting and the way that CIs and students teach and learn competencies related to interprofessional practice. Both students and CIs discussed the importance of interpersonal relationships in ensuring successful interprofessional relationships. Despite working with multiple different professions, purposeful engagement in the core activities of an effective interprofessional team was not consistent. Students were often encouraged to engage in interprofessional practice, but lacked specific instruction on effective methods for
communicating with and participating in interprofessional teams. Many clinical instructors lacked formal instruction on interprofessional knowledge and skills, thus creating difficulty in employing effective teaching and learning theories related to that content during the student clinical rotation. Students were not always able to take an active role in the interprofessional team, but instead learned in an observational capacity.

The data presented in this chapter will be further discussed and tied to the extant literature in chapter 5.
CHAPTER 5

Overview of Chapter 5

This chapter will discuss the findings of this study and review those findings in relation to the extant literature. The implications of the findings will be discussed, as well as how the study informs the practice of both physical therapist education and clinical practice. Limitations, recommendations for academic and clinical educators, and opportunities for future research will be explored.

Summary of Study

The Doctor of Physical Therapy (DPT) degree offered by education programs in the U.S. has changed and adapted through the years to stay current and meet the needs of a changing healthcare environment. Currently, healthcare organizations and professional education programs across disciplines are pushing for an increased focus on interprofessional education and collaborative practice. Accrediting bodies are requiring that academic programs educate students on interprofessional competencies with the expectation students will transform into licensed clinicians that are able to better work through complex problems by leveraging the power of a collaborative team (Frenk et al., 2010).

While education programs are working to transition the content of the didactic component of their curricula to include interprofessional themes, incorporating interprofessional practice and collaboration objectives into clinical learning proves to be a more challenging task. Many clinical instructors are unprepared to teach in that area, as they had no formal training in their own academic education and have not had continuing professional education related to interprofessional practice (Headrick et al., 2012; Hall & Zierler, 2015; Cuff, 2013). That lack of content knowledge related to interprofessional collaboration and teamwork, in addition to a lack
of preparation or training in effective teaching methods, creates a bleak outlook for the acquisition of those skills by student learners. This dilemma has been described by Shulman (1986) in his work on the theory of pedagogical content knowledge, which discusses the need for educators to deliver specialized content with consideration of effective teaching and learning strategies, within the backdrop of a specific learning environment.

The purpose of this study was to explore the knowledge level, attitudes, and skills of physical therapy students and clinical instructors as they relate to interprofessional education in the clinical education setting. A convergent parallel mixed-methods design was used. Student scores on the IPEC Competency Survey Instrument were compared before and after an eight-week clinical rotation. Clinical instructors completed the same survey, which provided quantitative data on their self-perceived competence on the IPEC Core Competencies. Both students and clinical instructors were interviewed in order to gain a richer understanding of how interprofessional practice is incorporated into physical therapist student clinical rotations. Lastly, document analysis was conducted on the student Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS) in order to determine student and CI perception of student readiness for interprofessional practice.

Discussion of the Findings

Overall, data from this study suggests that several healthcare facilities are currently practicing in a multiprofessional way, but not yet in a collaborative interprofessional way, considering the subtleties between the two as defined by Kroner, et al. (2015). Students and clinical instructors reported working alongside other professions and sharing patients, but generally lack the purposeful and consistent partnerships, shared goals, and shared leadership necessary for effective teamwork and patient-centered collaborative care. Facilities may be
transitioning towards interprofessionalism, but have not yet reached a level at which core activities and competencies are embraced and practiced consistently by all practitioners. Clinical facilities, particularly inpatient facilities, seem to be making concerted efforts to increase teamwork and communication, which is evidenced by team huddles, conferences, and meetings. Some facilities included in this study have certainly experienced more successful interprofessional practice situations than others, but the difference in experience from facility to facility is worth noting.

The interprofessional learning continuum (IPLC) models is valuable in outlining several of the challenges that were present for effective IPE and IPP. Ideally, IPE should continue from didactic education (foundational education) to clinical education (graduate education) through professional practice. Professional and institutional cultures will certainly affect IPE on all levels, and if a particular facility is not practicing in an interprofessional way, students will not experience clinical education in an interprofessional way. The desired learning outcomes for the student experience are shaped by the culture at the particular institutional where the student completes their internship.

Veerapen and Purkis (2014) present the importance of the early formative experiences of students in the workplace. Some student workplace experiences explored in this study failed to corroborate the importance of explicit and purposeful collaborative team-based practice. Additionally, students were frequently kept on the sideline when interprofessional activities were occurring. Workplace learning theory proposes active engagement in the learning process for development, but that component was lacking in the data gathered in this study. While the institutional culture of the academic program is supportive of IPP, learning and professional socialization in the workplace unfortunately did not corroborate the value of IPP. Lack of
consistency and ability to control experiences in varied clinical settings is a constant challenge for academic programs, but, despite those obstacles, a baseline level of clinical competence related to current practice standards is expected to be acquired by students.

No gold standard model of physical therapy clinical education exists (Lekkas et al., 2007; Patton et al., 2012), so the question of precisely what current practice standards are related to interprofessional collaboration and teamwork and how those should be incorporated into clinical education experiences is an additional conundrum to be considered. Wojciechowski (2015) adds, “while health care systems are beginning to deliver team-based health care, physical therapist education generally is not yet structured to provide that range of skills.” Nelson (2013) discusses the need for PT education to have an increased focus on the development of communication skills with a variety of stakeholders including the patient, the caregiver, other health care professionals, and third-party payers,” all of which are in sync with interprofessional practice expectations.

The Michigan Health Council Survey of Nurses proposed a set of core activities that is based on the IOM core principles and description of team processes, which are practiced by highly functioning interprofessional teams (Michigan Health Council Survey of Nurses, 2015). Those core activities, along with the IPEC competencies, may provide a guide as to expected standards for clinical practice as well as what could be expected during the student clinical rotation experience. Based on those documents current practice standards would include discussing the roles and responsibilities of each team member; working collaboratively to develop trust; conducting patient rounds, huddles, and meetings with the team and requesting input from the patient and family; and effectively communicating with team members,
evaluating team processes, and reflecting on performance. It is within this framework that the proposed research questions will be explored.

During the course of the interviews, it became apparent that the clinical sites were not consistently practicing all core activities of an effective interprofessional team. The regularity and membership of team meetings varied greatly, though all sites reported having at least some face time with other professions. Awareness and prioritization of patient outcomes was consistent, though inclusion of the patient as part of the team and part of the decision-making was less apparent. With one exception, the evaluation of team process and function was not practiced. Roles and responsibilities were thought to be apparent and understood, so explicit discussion was labeled unnecessary. Likely, PTs and other healthcare professionals all have an opportunity to play a role and take a lead in facilitating teamwork to advance patient care. This data is consistent with the data on the role of nurses in interprofessional teams and similarly highlights the need to expand the use and quality of healthcare teams (Michigan Health Council, n.d.). The early workplace experiences of students are highly formative and positive examples of interprofessional teamwork and practice will facilitate ongoing progress and improvement.

Research Questions

This study sought to examine the following research questions:

- How do student perceptions of readiness for interprofessional education and practice change over the course of the clinical rotation?
- How do students describe the opportunities available to them to engage in interprofessional practice during the clinical rotation?
• What is the perception of clinical instructors related to interprofessional education and practice and to their own preparedness for teaching and practice of related skills?
• How do clinical instructors evaluate the skill of doctor of physical therapy students when they are placed in interprofessional practice situations?

**Student Perceptions of Readiness**

Student perceptions of readiness for interprofessional education were partially assessed by determining whether students have a significant improvement on their self-perceived competency on the IPEC Competency survey from before they begin their eight-week clinical rotation to after they complete the rotation. A copy of the full survey can be found in Appendix D. Statistical analysis showed a significant increase in PT student self-rated competence across all subscales after completion of their clinical rotation. This finding is in alignment with the article by Anderson et al. (2011) which noted that the addition of a clinic based IP experience improved the knowledge, perception, skill, and attitudes of students towards interprofessional collaborative practice. Reeves and Freeth (2002) and Pozner et al. (2004) provide further support that clinical experiences in interprofessional environments improve student knowledge and attitudes. In the exploration of the IPEC Competency assessment tool, Dow et al. (2014) reported limited change over time; however, at the time of his study, no formal, large-scale IPE programs existed. In this study, students had significant didactic IPE preparation prior to the clinical experience.

Some similarities exist between this study and the study by Dow et al. (2014). Dow et al. (2014) noted the “Values and Ethics” domain had the highest median score across all students. Data collected in this study was consistent, with the “Values and Ethics” domain having the highest median rating by students both pre- and post-rotation. The “Teams and Teamwork”
domain had the lowest median scores in the Dow et al. (2014) study, which was consistent with the post-clinical rotation average for students in this study. However, pre-clinical rotation the “Roles and Responsibilities” domain had the lowest median score. Dow et al. (2014) suggests tracking the changes in domain scores could potentially assist educational programs in improving experiences in certain competencies. The low initial scores on the “Roles and Responsibilities” domain and comments from student interviews related to understanding the roles and scope of practice of other professions suggests an opportunity to improve the didactic preparation of students. Figure 5-1 provides an overview of the domains and lists the items within each domain.

**Values and Ethics Domain**

- Place the interests of patients at the center of interprofessional health care delivery of team-based care
- Respect the privacy of patients while maintaining confidentiality in the delivery of team-based care
- Embrace the diversity that characterizes patients and the health care team.
- Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions
- Work in cooperation with those who receive care and those who provide support or care
- Develop a trusting relationship with patients, families, and other team members.
- Demonstrate high standards of ethical conduct and quality of care in my contribution to team-based care
- Manage ethical dilemmas specific to interprofessional patient centered care situations.
- Act with honesty and integrity in relationship with patients, families, and other team members
- Maintain competence in my own profession appropriate to my scope of practice or level or training

**Roles and Responsibilities Domain**

- Communicate my roles and responsibilities clearly to patients, families, and other professionals
- Recognize my limitations in skills, knowledge, and abilities
- Engage diverse healthcare professionals with complementary professional expertise to develop strategies to meet specific patient care needs
- Explain the roles and responsibilities of other care providers and how the team works together to provide care
- Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.
- Communicate with team members to clarify each member’s responsibility in executing components of a treatment plan or public health intervention
- Establish interprofessional relationship to improve care and advance learning.
- Engage in continuous professional and interprofessional development to enhance team performance
- Use unique and complementary abilities of all members of the team to optimize patient care

### Interprofessional Communication Domain
- Choose effective communication tools and techniques to facilitate discussions and interactions that enhance team function
- Communicate information with patients, families and healthcare team members in a form that is understandable
- Avoid discipline-specific terminology when possible
- Express my knowledge and opinions to team members involved in patient care with clarity and respect
- Listen actively, and encourage ideas and opinions of other team members
- Give timely, sensitive feedback to others about their performance on the team
- Respond respectfully to feedback from others on my healthcare team
- Use appropriate, respectful language in a given difficult situation such as interprofessional conflict
- Recognize how my experience and expertise contributes to communication, conflict resolution, and interprofessional working relationships
- Recognize how my position in the hierarchy of the healthcare team contributes to communication, conflict resolution, and interprofessional working relationships
- Consistently communicate the importance of teamwork in patient-centered and community-focused care

### Teams and Teamwork Domain
- Describe the process of team development
- Describe the roles and practices of effective healthcare teams
- Engage other health professionals in shared problem-solving appropriate to the specific care situation
- Inform care decisions by integrating the knowledge and experience of other professions appropriate to clinical situation
- Apply leadership practices that support collaborative practice and team effectiveness
- Engage others to constructively manage disagreements that arise between healthcare professionals, patients, and families
- Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care
- Reflect on my individual performance for my improvement
- Reflect on my healthcare teams’ performance for my teams’ improvement
- Use strategies that will improve the effectiveness of interprofessional teamwork and team-based care.
- Use available evidence to inform effective teamwork and team-based practices
- Perform effectively on teams and in different team roles in a variety of settings

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**Figure 5-1 Interprofessional Education Collaborative (IPEC) Core Competency Domains and Items within each Domain**
On the Teams and Teamwork subscale, the item with the least amount of change from pre to post rotation was, “use available evidence to inform effective teamwork and team-based practices.” Additionally, this item was the only one on the entire survey that demonstrated a decline in self-rated confidence after the clinical rotation. Interview responses from clinical instructors and students corroborate that formalized training and processes related to effective interprofessional practice in the clinical setting are lacking. Thus, a lack of growth and confidence in this area would be expected. Students may have gone into the rotation thinking they would have the ability to use their background knowledge to inform teamwork, but upon seeing the lack of explicit processes in place in the clinical setting they doubted their ability to be a change agent in promoting this practice.

An item to note from the change scores is the “listen actively, and encourage ideas and opinions of other team members” competency from the “Interprofessional Communication” domain. This competency had the lowest change score across all domains, and showed zero change in self-rated competence after the clinical rotation. When describing their clinical experiences, students mentioned witnessing differences of opinion between professions, but instead of active discussion and problem-solving between all constituents, decisions would be deferred to the profession that saw the patient most or to the most dominant personality in the room. Students observed practitioners avoiding active listening and not hearing all opinions but instead rushing to move forward or trying to avoid conflict. More information is needed as to the reason for the decline on this competency, but this insight does allow both academicians and CIs to consider presenting background content on active listening and conflict resolution and to provide the time and opportunity in the clinical setting for students to problem-solve in situations in which the knowledge and opinions of other professions should considered.
Opportunities for Active Engagement

Workplace learning theory postulates that the workplace involves a complex negotiation of knowledge, roles, and processes (Billett, 2004; Patton, Higgs, & Smith, 2012). For interprofessional learning to occur in the clinical setting, students must possess the necessary background knowledge, but also be able to actively engage in the roles and processes of interprofessional collaboration and teamwork in order to apply that knowledge. Patton et al. (2012) describes the need for students to participate in situated work activities in the workplace in order to develop professional practice capabilities.

In this study, students and CIs overwhelmingly described student opportunities consisting of more observational roles as opposed to active roles in the process pertaining to interprofessional collaboration and teamwork. Experiences included being able to shadow or observe other professions for a day or for an afternoon and to ask any questions students may have had. Some students were able to build up to taking over the PT role in interprofessional meetings, while others reported only being able to observe their CI in team meetings. A few students mentioned being present in the meetings, but with neither their CI nor themselves speaking up to offer the PT perspective. While students believed these opportunities to be valuable in gaining a greater understanding of the roles and responsibilities of other professions, their experiences largely lacked the opportunity to independently navigate the interactions between the different professions and to work through any challenges or conflicts that might have occurred.

The emergent theme of interpersonal relationships and their importance in the clinical setting ties to back to the idea of workplace engagement, satisfaction and productivity in the workplace. The importance of engagement and interpersonal relationships is also mirrored in the
literature. Interprofessional communication contributes to improved patient safety and increased patient satisfaction (Cuff, 2013), and disciplinary expertise is maximized when strong relational skills are routinely employed (Weiss, Rilin, & Morgan, 2018). Both students and CIs reported feeling more comfortable participating in dialogue with other professionals when they were familiar with that individual or had an interpersonal relationship with them. Weiss et al. (2018) go so far as to state that the term “relationship-centered” care is more appropriate than interprofessional care, as it better reflects the importance of the patient and other constituencies in the achievement of good patient outcomes. Patton et al. (2012) explore the influence of people, roles and relationships within the workplace and how belonging, inclusion, and social contribute to the complexity of workplace learning. Both students and clinical instructors in this study recognized the role of workplace relationships in their ability to engage in interprofessional communication and provided examples of when those relationships ultimately had an impact, both positive and negative, on patient care.

Clinical rotations allow experiential learning to take place in a true clinical setting. During the clinical rotations, students reported instances of conflict with other professions, working through challenges with different personalities, and having to overcome their hesitancy to disrupt the traditional paternalistic hierarchy of medical care to communicate with licensed practitioners, both giving and receiving information. However, only one CI-student pair discussed engaging in guided “reflection-on-action” around interprofessional communication that took place during the clinical rotation, though neither explicitly called the process reflection. Ideally, students would have more guided experiences in this area, with feedback from their CIs in addition to reflection on the communication experience. Students would also benefit from
explicit instruction on which information would be pertinent to the other professions and how to best deliver the information in that particular setting.

Students largely described opportunities to consistently engage in informal communication, as opposed to formal communication, with other professions when those professions worked together in close proximity. Students reported uncertainty as to how they would be able to engage in interprofessional communication and practice in settings where they did not work in the same building or at the same facility with other professions. Opportunities to engage with other members of the rehabilitation team – speech therapists and occupational therapists – were most frequently described, nursing was the next most common, and opportunities to engage with physicians and pharmacists were less common. Students reported that, “the physicians were never present,” and “I’m not sure about the physicians” when asked about the role of physicians in interprofessional team meetings and conferences. While not all professions are needed in all cases, a greater degree of interaction with some key professions would have likely been beneficial and appropriate.

Clinical Instructor Perceptions

Self-rating IPEC Core Competency Survey Instrument scores were compared between post-rotation students and CIs in order to assess differences in the confidence levels, with the expectation that CIs would perceive and rate their skills and abilities significantly higher than the post-students would rate themselves. At this point in their education, students have completed all of the classroom-based curriculum, but only 16 of a total of 36 clinical rotation weeks, thus much opportunity for continued growth and development exists. When comparing students’ self-rated competence after the eight-week clinical rotation to the self-rated competence of licensed clinical instructors, no significant difference existed. Students believed they were able
to improve to the level of the licensed practitioner during the eight-week rotation. This belief is supported by the student and CI ratings of all students at entry-level on the Interprofessional Collaboration skill on the PT MACS. This data would support the desired clinical learning outcome, with students progressing from the “knows how” to the “shows how” level on Millers Pyramid of Clinical Competence. However, the validity of this assessment could be questioned due to the reports of observational versus active student roles in the core activities of the interprofessional team. The PT MACS is designed to assess entry-level competence as opposed to the competence of an experienced practitioner, so even with the entry-level ratings for students, the expectation would be for experienced clinicians to have a higher level of competence. However, statistical analysis also revealed no significant differences in the perceived competence levels of novice versus experienced PT practitioners on the IPEC Skills Survey Instrument, so the question of improving skills over time must be raised.

Miller’s Pyramid of Clinical Competence provides a framework for the expected level of development of both students and practitioners, with students expected to move from the “knows” or “knows how” to “shows how” level during the clinical rotation under the guidance of their clinical instructor that would theoretically be at the “does and teaches” level (see Figure 5-2 for the hierarchical levels of Miller’s Pyramid). However, data gathered in this study did not allow for clean categorization of CIs in the existing hierarchical levels on the pyramid. The Pyramid of Clinical Competence sets an expectation of mastery of each level prior to moving to the next, making overall classification of CIs difficult. Two CIs were not at a level where they knew about IPE in a formal sense, which would place them below even the “knows” level, though those same practitioners were at the “does” level in performing some of the core activities of an interprofessional team. The “does” level also indicates that skills and
competencies are performed regularly in independent practice. The data gathered in this study does not support the hypothesis that the core activities of an interprofessional team are performed “regularly” by very many of the clinical facilities in this study. While some of the CIs may perform the core activities, their self-rated scores on the IPEC Competency Survey and comments during interviews would not support they believe they have mastered interprofessional practice nor that they have mastered teaching or more specifically an ability to teach interprofessional content. The top level of Miller’s Pyramid, “does and teaches” aligns with the theory of Pedagogical Content Knowledge in that both address a level of knowledge and competence related to content, as well as the ability to teach effectively. Teaching and learning strategies were not consistently employed, but instead instructors reported relying primarily on role modeling. However, role modeling IPP may not be the most effective strategy considering that CIs reported not regularly engaging in IPP.

Figure 5-2. Millers Pyramid of Clinical Competence. Adapted from Miller (1990).
Students leave the university setting with the theoretical background pertaining to interprofessional practice, and academic programs rely on CIs to assist the student in applying that theory and knowledge to practice as well as to assist in the professional socialization process. Patton et al. (2012) noted the need for clinical educators to remain aware of the way in which students engage with the workplace in order for learning to occur. Consistent with the work of Recker-Huges et al. (2014), clinical educators in this study underutilized effective teaching and learning strategies to help students in knowledge and skill acquisition. Clinical instructors described teaching methods consistent with directing or “telling” the student to work with and talk to other professions and modeling some of those interactions, but did not include essential teaching and learning strategies such as reflection, mentoring, scaffolding or coaching. Hean (2012) states that “planning and delivering interprofessional education with theoretical sophistication is an intellectually challenging and time consuming exercise,” that requires preparation and support of the personnel involved. A lack of time was mentioned as a barrier for interprofessional communication and is likely a barrier for being able to implement teaching strategies as well.

Recker-Hughes et al. (2008) also reported that CIs lacked knowledge on several core content areas of current practice expectations. Particularly in the “Teams and Teamwork” domain of the IPEC Competency Survey, CIs reported on average that they “neither agree or disagree” that they feel competent with: describing the process of team development; describing the roles and practices of effective healthcare teams; being able to engage others to constructively manage disagreements that arise between healthcare professionals, patients, and families; and being able to use available evidence to inform effective teamwork and team-based
practices. This data is supported by the information gathered through qualitative analysis, as practitioners discussed a lack of any formalized training or processes in many of their facilities. Only one CI had taken a continuing education course related to interprofessional practice and collaboration. Whether this phenomenon is due to lack of availability, awareness or interest is unknown, but an opportunity exists to develop and promote IP related content for licensed practitioners. This finding is consistent with the work of Recker-Hughes et al. (2010), which discussed the importance of educational opportunities for CIs to “promote competence in clinical practice skills and in teaching methods” and indicated that the availability of such opportunities was less than adequate.

Evaluation of DPT Student Interprofessional Skills

The PT MACS skill sheets contribute to answering the question related to student interprofessional skill acquisition during clinical rotations, but do not provide much insight into specific expectations or competency levels. All CIs marked their students as entry-level for the Interprofessional Practice and Collaboration skill despite the fact that some noted in the interviews that the student took a primarily observational role in interprofessional activities and communication. This discrepancy may again point to a lack of mastery of interprofessional knowledge and skills themselves as well as a lack of background in teaching and learning theory and practice.

Studies have shown that a lack of clinical instructors prepared to guide and teach interprofessional collaborative practice is a limiting factor to successful implementation of IPE in the clinical education setting (Headrick et al., 2012; Hall & Zierler, 2015), and this study further supports those conclusions. Additionally, Jarski et al. (1990) discusses CIs lack of preparation in the area of teaching. Shulman’s (1986) discussion of pedagogical content knowledge marries
these two ideas by describing the need for teachers to be competent both in their subject matter and in their ability to formulate and convey that subject matter in a way that others can comprehend. Educational literature supports the idea that teachers teach the way they have been taught (Chicoine, 2004; Pringle, 2006; Hall, Fisher, Marshall 1991). In this study, clinicians asked about training they received instead described activities they perform on the job. While experiential learning does take place on the job, without adequate background knowledge or reflection on action activities may be performed in a less-than-optimal manner. Thus, if clinical instructors are thrown in to do without first being taught, they may inadvertently take this same approach with the students. Interviews revealed that explicit teaching related to IPE was lacking during clinical experiences, but instead students were set free to do or observe. This finding is consistent with the finding that exploration was the most frequently used educational strategy by CIs in PT (Page & Ross, 2004).

If students are placed into a setting without a consistent and effective interprofessional working environment, academicians cannot reasonably expect for students to develop skills in that area or even to maintain the didactic knowledge they have gained. While students did improve significantly in their self-perceived skill on the IPEC core competencies, they seemed to plateau at the confidence level of the clinical instructor. If the instructors do not have skills beyond those of the students, students cannot reasonably be expected to surpass their teachers to obtain the knowledge and skills to meet current practice expectations. Oandasan and Reeves (2005) also discuss the lack of an interprofessional working culture as a challenging and ineffective method of delivering interprofessional education. Protagonists could argue that the role of an academic curriculum is to prepare an entry-level practitioner and that current practice expectations do not include highly rated confidence and competence on all skills of each IPEC
domain. However, with the current healthcare landscape focusing on interprofessional collaboration and practice and patient safety, the physical therapy profession could become a leader in training both students and current practitioners to be on the forefront of promoting and practicing effective interprofessional communication and teamwork.

**Limitations**

This study is not without limitations. While all students completed the IPEC survey and clinical rotation, not all students chose to participate in this study. Thus, the potential for self-selection bias exists, as it is possible that students’ perceptions of their abilities increased because they had a desire to learn about interprofessional collaboration and teamwork while on their clinical rotation and sought out additional opportunities to do so. While the instrument used in this study was validated, it did rely on students’ self-assessments, which are potentially biased. That said, other professions have identified self-assessment as an essential skill for students to develop in order to engage in continuous professional development and life-long learning (Sevin, Hale, Brown, & McAuley, 2016). The same potential for self-selection bias exists for the CIs that chose to participate in the study. Clinical instructor respondents who chose to participate may have felt a sense of professional obligation or pressure to rate their level of competence positively.

The sample utilized in this study consisted of a limited number of CI responses from a geographical region in Texas and a limited number of student responses from one academic institution. The limited number of students (n = 8) and CIs (n = 8) participating in the interview may not be fully representative of what is happening on a broader scale in other geographical locations. Additionally, the interview component of this study examined only clinical settings in which PTs and PT students were likely to physically encounter other professions, but did not
consider outpatient clinics where the likelihood of other professions on the same campus was less. While all students should be completing clinical rotations in a variety of settings prior graduation, further exploration of the teaching and learning of interprofessional practice skills in outpatient settings is needed in order to obtain a more complete idea of how and when students gain competence.

After the inception and partial completion of this study, the IPEC released an update and revision of the core competencies (IPEC, 2016). The update “retains most of the original wording of the general competency statements and related sub-competencies,” but has been revised to integrate concepts from population health. While this change may not create a major limitation, the reader should note the subtle differences and how the integration of strategies to improve population health must also be considered while moving forward with interprofessional education. All changes considered, the 2011 IPEC competencies have been identified by the Health Professions Accreditors Collaborative (HPAC) as “fundamental to educational programs in the health professions” (IPEC, 2016).

**Implications and Recommendations for Practice**

The results of this study have relevance for academic programs, licensed practitioners providing supervision during clinical education, and healthcare facilities in general. Interprofessional, collaborative team-based care is and will continue to be an expectation for healthcare facilities. In order to provide the best possible patient outcomes, facilities must continually refine their processes to reflect current and forthcoming standards of practice and to create environments that support and encourage interprofessional practice. This study indicates that facilities have room for improvement related to the daily activities that contribute to having high-functioning interprofessional teams and for developing an institutional culture that supports
and encourages collaborative teamwork. In addition to providing formalized processes and training on interprofessional competencies, practitioners may benefit from formalized training on teaching and learning theory in order to develop their ability to effectively relay information in a way that allows students to capitalize on their clinical rotation experiences. The Pedagogical Content Knowledge framework lays the foundation for the interactions between the body of knowledge related to IP content and the body of knowledge related to teaching and learning. This knowledge base, both in theory and in practice will produce the desired level of clinical competence at the apex of Miller’s Pyramid.

Additionally, CIs must be trained and encouraged to provide candid feedback to both the student and academic program. Delivering unfavorable feedback could possibly be unpleasant and result in an obligation to give more time and effort in justifying their concerns and recommendations. The results of the IPEC competency survey support the idea that CIs are uncomfortable delivering feedback. As a volunteer, the effort may not be worth the cost. For this reason, CIs may need to be provided with a formal appointment and compensation that holds them accountable and empowers them to have those difficult conversations. Students may also benefit from real-time feedback from other professions outside of their own. This type of 360 degree feedback would assist in increasing the student’s self-awareness of their IP communication and actions as well as promoting dialogue related to how to improve. Additionally, some of the pressure may be taken off the CI, as others less directly tied to the student may be more willing to provide negative feedback.

While essential for clinical instruction, providing additional benefits, education and training for practitioners acting as clinical instructors will not alone be sufficient to improve the current state of interprofessional education. As previously discussed, learning in the workplace
involves a set of complex interactions that provide practitioners with the opportunity to engage in new concepts and practices that will refine their baseline knowledge, values, and actions. As outlined by the IPLC model, professional and institutional cultures can prove to be significant barriers or can assist with enabling this workplace learning in a positive direction. Healthcare facilities must work diligently to progress their workplace cultures to be supportive of and focused on effective collaborative, patient-centered care. Without the backing of the institution and expectation that IPP is woven into the daily functions of all practitioners, institutional and professional cultures will not facilitate an environment in which a well-trained CI can be effective.

The data presented in this study helps to show support for academic programs meeting accreditation requirements for students to partake in interprofessional education in the clinical setting. However, while students are making significant gains in their self-assessment of their abilities on the IPEC competencies, formalized clinical instruction on skills related to interprofessional practice is lacking. Academic programs need to work collaboratively with licensed practitioners and healthcare facilities to improve the interprofessional education process. Both the healthcare facility and academic program must commit to the development of their clinical instructors, which will require time, effort, and funding. Though the needed resources may seem daunting, the benefits would be advantageous for both organizations as well as for practitioners, students, and patients.

**Future Research**

The findings of this study raise many additional questions as to the current state of interprofessional practice in clinical settings: the role of the physical therapy profession, the background knowledge and practice skills of PT CIs related to interprofessional practice, and
how that background and preparation position the CIs to teach and evaluate the skills of a student physical therapist. Students in settings that allow for physical presence of multiple professions in one place are able to obtain increased self-perceived competence in many areas, but this gain in outpatient facilities is unknown. Future studies should obtain input from a larger sample from a wider geographic area and include input from representatives of all practice settings.

Research on training CIs and what methods are most effective, as well as inquiry into the feasibility of allowing other professions to act as instructors for PT students, would be beneficial. While a licensed PT is needed to teach the specific clinical skills of the profession, input from other professions may be beneficial as well, particularly in regards to communication and professionalism.

**Conclusion**

Effective and consistent interprofessional practice has become the standard for healthcare organizations, and health professions students need to be prepared to engage in collaboration and teamwork in order to provide high-quality patient-centered care. Accrediting bodies across the health professions are adopting required competencies in order to help meet the need for highly trained professionals. This study demonstrated a positive change in students’ self-assessment of interprofessional competencies after an eight-week clinical rotation. While significant change was noted in all domains, the least amount of change occurred in the “Interprofessional Communication” domain and the rating on the “Teams and Teamwork” domain remained the lowest at the end of the rotation. Investigation of change made on individual domains can provide academic programs and clinical instructors with a guide to which competencies require additional development during the clinical rotations. Additionally, academic programs may be able to further develop their interprofessional curriculum in order to better prepare students for
application of their knowledge and skills in the clinic. These results demonstrate that students are experiencing opportunities to engage in interprofessional workplace experiences and that students are gaining needed experience and confidence in interprofessional competencies, allowing them to enter clinical practice prepared to effectively engage in collaborative, patient-centered care.

Despite those gains, this study calls into question the current practice standards related to interprofessional teamwork and collaboration and the background preparation in both the IP content and teaching realms. A substantial number of CIs conveyed that current interprofessional practice at their clinical facility was lacking and that their knowledge and confidence with interprofessional competencies was a result of informal and exploratory as opposed to guided and intentional experiences. An understanding of the current status of interprofessional practice in clinical settings as well as the current state of teaching related to interprofessional competencies in clinical education is a necessary step in determining the potential need to bridge gaps between didactic and clinical education. Clinical faculty may benefit from professional development in this emerging content area, as well as in teaching skills, in order to act as clinical instructors in DPT programs.

Interprofessional collaboration and teamwork will be a continued focus and priority for healthcare facilities and the physical therapy profession. Academic institutions must work collaboratively with licensed practitioners to effectively prepare students to engage in team-based, patient-centered care.
REFERENCES


McPherson, K., Headrick, L., & Moss, F. (2001). Working and learning together: Good quality care depends on it, but how can we achieve it? *Quality in Health Care, 10*(S1), ii46-ii53.


Appendix A Student Interview Questions

<table>
<thead>
<tr>
<th>Leading Questions</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What does the term “interprofessional practice and collaboration” mean to you?</strong></td>
<td>Values? Behaviors? Do you think these skills are important for physical therapists?</td>
</tr>
<tr>
<td><strong>What opportunities have you had to participate in IPP/C in this setting?</strong></td>
<td>Describe. Lead role or observation?</td>
</tr>
<tr>
<td><strong>How do the teams in this setting communicate and work together?</strong></td>
<td>How effective are their efforts? Any conflict?</td>
</tr>
<tr>
<td></td>
<td>What communication strategies were used – huddles/call backs/check backs?</td>
</tr>
<tr>
<td><strong>To what extent do you think you have developed the qualities needed for effective interprofessional collaboration?</strong></td>
<td>Great, moderate, not at all? How comfortable are you with your skills? How will you continue to grow in this area?</td>
</tr>
<tr>
<td><strong>In what ways did the IPP/C in this institution improve your knowledge of the roles and responsibilities of other members of the healthcare team?</strong></td>
<td>Which professions? Did your perceptions of these other professions change?</td>
</tr>
<tr>
<td><strong>What obstacles have you observed or experienced in developing an effective, collaborative interprofessional environment</strong></td>
<td>Other PTs? Other professions? Organizational barriers?</td>
</tr>
<tr>
<td><strong>How did your clinical instructor’s perception of your ability to be successful in an interprofessional environment compare to your own?</strong></td>
<td>Better? Worse? In what ways?</td>
</tr>
</tbody>
</table>
Appendix B. Clinical Instructor Interview Questions

<table>
<thead>
<tr>
<th>Leading Questions</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>What opportunities for IPP/C exist in this setting?</td>
<td>How frequently do you participate in IPP/C?</td>
</tr>
<tr>
<td></td>
<td>How effective is the teamwork and communication?</td>
</tr>
<tr>
<td></td>
<td>What communication strategies are in place – TEAM STEPPS? Other?</td>
</tr>
<tr>
<td>In what ways do you believe that physical therapy contributes to the IP team?</td>
<td>What is the value of this contribution? Do you think that IPP/C is an important skill for PTs?</td>
</tr>
<tr>
<td>Describe how you guide/teach/model effective IPP for the student?</td>
<td>How prepared do you feel to do this? What prepared you?</td>
</tr>
<tr>
<td>What opportunities did the student have to engage in IPP/C in this setting?</td>
<td>Describe. How frequently?</td>
</tr>
<tr>
<td>How well was the student able to perform in IPP/C situations in this setting?</td>
<td>How did you perceive their level of comfort? How where they perceived by other professions? Were the students in a position to receive feedback from other professions/providers?</td>
</tr>
</tbody>
</table>
Appendix C. PT MACS Skill Sheet

Skill# 18  Management of Care Delivery: Inter-Professional Practice and Collaboration

<table>
<thead>
<tr>
<th>CLINICAL EXPERIENCE #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mid</td>
<td>Final</td>
<td>Mid</td>
<td>Final</td>
<td>Mid</td>
</tr>
</tbody>
</table>

STUDENT RATING

CL RATING

PRACTICE SETTING: Enter clinical experience # and facility initials for applicable setting(s)

<table>
<thead>
<tr>
<th>Practice Setting</th>
<th>Acute</th>
<th>Rehab (IP/OP)</th>
<th>Pediatric (IP/OP)</th>
<th>OP Ortho</th>
<th>SNF/LTAC</th>
<th>Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Objectives applicable to this skill:

a. Collaborates with those who receive care, those who provide care, and others who contribute to or support the delivery of health services.

b. Communicates one's roles and responsibilities clearly to patients, caregivers, and other professionals.

c. Organizes and communicates information with patients, caregivers, and healthcare team members, in a form that is understandable, avoiding discipline-specific terminology when possible.

d. Listens actively and encourages ideas and opinions of other team members.

e. Engages other health professionals, appropriate to the care situation, in shared patient-centered problem-solving.

f. Effectively manages conflict.

Date  Comments (required with rating of N or U)  CI Initials
Appendix D. IPEC Competency Survey Instrument

**INSTRUCTIONS:** Using the following 5-point scale, please rate the items based on your educational experience in the health care environment. Each item preceded by “I am able to…”

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Values and Ethics Domain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Place the interests of patients at the center of interprofessional health care delivery.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Respect the privacy of patients while maintaining confidentiality in the delivery of team-based care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Embrace the diversity that characterizes patients and the health care team.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Work in cooperation with those who receive care and those who provide support or care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Develop a trusting relationship with patients, families and other team members.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Demonstrate high standards of ethical conduct and quality of care in my contributions to team-based care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Manage ethical dilemmas specific to interprofessional patient centered care situations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Act with honesty and integrity in relationships with patients, families, and other team members.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Maintain competence in my own profession appropriate to my scope of practice or level or training.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Roles and Responsibilities Domain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Communicate my roles and responsibilities clearly to patients, families, and other professionals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Recognize my limitations in skills, knowledge, and abilities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>Engage diverse healthcare professionals with complementary professional expertise to develop strategies to meet specific patient care needs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>Explain the roles and responsibilities of other care providers and how the team works together to provide care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tr>
<tr>
<td>15</td>
<td>Use the full scope of knowledge, skills, and abilities of available health professionals and healthcare workers to provide care that is safe, timely, efficient, effective, and equitable.</td>
<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>16</td>
<td>Communicate with team members to clarify each member's responsibility in executing components of a treatment plan or public health intervention.</td>
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<td>2</td>
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<tr>
<td>17</td>
<td>Establish interprofessional relationships to improve care and advance learning.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>18</td>
<td>Engage in continuous professional and interprofessional development to enhance team performance.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>19</td>
<td>Use unique and complementary abilities of all members of the team to optimize patient care.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>I am able to:</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<tr>
<td><strong>Interprofessional Communication Domain</strong></td>
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<tr>
<td>20 Choose effective communication tools and techniques to facilitate discussions and interactions that enhance team function.</td>
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<tr>
<td>21 Communicate information with patients, families, and healthcare teams members in a form that is understandable.</td>
<td>1</td>
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<tr>
<td>22 Avoid discipline-specific terminology when possible.</td>
<td>1</td>
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<tr>
<td>23 Express my knowledge and opinions to team members involved in patient care with clarity and respect.</td>
<td>1</td>
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<tr>
<td>24 Listen actively, and encourage ideas and opinions of other team members.</td>
<td>1</td>
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<tr>
<td>25 Give timely, sensitive feedback to others about their performance on the team.</td>
<td>1</td>
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<tr>
<td>26 Respond respectfully to feedback from others on my healthcare team.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>27 Use appropriate, respectful language in a given difficult situation such as interprofessional conflict.</td>
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<tr>
<td>28 Recognize how my experience and expertise contributes to communication, conflict resolution, and interprofessional working relationships.</td>
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<tr>
<td>29 Recognize how my position in the hierarchy of the healthcare team, contributes to communication, conflict resolution, and interprofessional working relationships.</td>
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<td>2</td>
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<tr>
<td>30 Consistently communicate the importance of teamwork in patient-centered and community-focused care.</td>
<td>1</td>
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<tr>
<td><strong>Teams and Teamwork Domain</strong></td>
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<td>31 Describe the process of team development.</td>
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<tr>
<td>32 Describe the roles and practices of effective healthcare teams.</td>
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<td>33 Engage other health professionals in shared problem-solving appropriate to the specific care situation.</td>
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<td>34 Inform care decisions by integrating the knowledge and experience of other professions appropriate to clinical situation.</td>
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<td>35 Apply leadership practices that support collaborative practice and team effectiveness.</td>
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<td>36 Engage others to constructively manage disagreements that arise between healthcare professionals, patients, and families.</td>
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<tr>
<td>37 Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.</td>
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<td>38 Reflect on my individual performance for my improvement.</td>
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<tr>
<td>39 Reflect on my healthcare team's performance for my team's improvement.</td>
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<tr>
<td>40 Use strategies that will improve the effectiveness of interprofessional teamwork and team-based care.</td>
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<td></td>
<td>Use available evidence to inform effective teamwork and team-based practices.</td>
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<table>
<thead>
<tr>
<th></th>
<th>Perform effectively on teams and in different team roles in a variety of settings.</th>
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(Dow et al., 2014)