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Interprofessonal Education: Two Analyses Of Revised Instruments, Comparisons Of Professions, And Effectiveness Of An Interprofessional Health Care Course

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INTERPROFESSONAL EDUCATION: TWO ANALYSES OF REVISED INSTRUMENTS, COMPARISONS OF PROFESSIONS, AND EFFECTIVENESS OF AN INTERPROFESSIONAL HEALTH CARE COURSE

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This dissertation, submitted by Andrew Knight in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

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Andrew Knight
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ABSTRACT

The purposes of study #1 were to assess the reliability of the Readiness for Interprofessional Learning Scale (RIPLS-2010, Parsell & Bligh, 1999) instrument that was used in an Interprofessional Health Care (IPHC) course at University of North Dakota from 2010-2012 and compare students by discipline. The IPHC course curriculum team includes the director of Interprofessional Education, a course coordinator, and one faculty representative from medicine, nursing, physical therapy, occupational therapy, social work, music therapy, communication science and disorders, and nutrition/dietetics. The purposes of study #2 included an analysis of the reliability of a different version of the RIPLS (called RIPLS-2013) and an exploration of the effectiveness of the spring 2013 session 1 IPHC course using a pre and post design with a session of students (N = 66).

In Study #1, a factor analysis of data from 2010-2012 (N = 631) supported a relatively reliable two-factor model with a RIPLS that was revised from the original 1999 format by a course curriculum team. In addition, several significant differences existed among the eight professions on both factors. Mainly, medical students scored lower on the "teamwork" factor and higher on the "professional identity" factor than physical therapy, occupational therapy, and nutrition/dietetics students, mostly with moderate to high effect sizes. A lower score on "teamwork" means medical students were less interested in collaboration, and a higher score on "professional identity" means there was

a sense that they had a better understanding of what would be expected of them as professionals.

In Study #2, factor analyses conducted on the pre and post RIPLS scores resulted in a four-factor model based on variance and eigenvalue data, but only two factors were reliable enough to conduct pre and post analyses which revealed no significant differences. Measures of internal consistency remained high for both factors, after eliminating four items from the two unused factors and reanalysis.

Recommendations from these studies made to the IPHC course curriculum team include making use of the original version of the RIPLS in a pre/post format and examining areas where the course curriculum may better address constructs that have been found by previous research that examined the RIPLS. These findings suggest the RIPLS-2010 and RIPLS-2013 to be inconsistent and suffering from non-normality in item data. It appears that while a positive result is that most students agree with the tenets of IPE, the course may not be able to improve this agreement because of a potential ceiling effect, rendering the instrument insensitive to more specific attitudes about IPHC.

CHAPTER I

INTRODUCTION

> "If we expect students to learn about teamwork and professional roles, and to be ready for collaborative practice, it seems both logical and educationally necessary that we include teamwork in health professional curricula and, critically, that we also explore the most effective way of delivering learning activities to promote future collaboration."
>
> (Thistlethwaite, 2012)

The notion of interprofessional work in health care is not a new concept, while interprofessional education (IPE) has been developing more recently in the literature. Lumague and colleagues (2006), a group of allied health profession students, see the purpose of interprofessional education (IPE) as:

> On the stroke rehabilitation unit, we had discussions around drug scheduling with the pharmacy student…received updates on patient status from nursing, and learned techniques for facilitating communication with patients with aphasia from the speech language pathology student. Furthermore, our social work team members provided us with strategies for handling the emotional and financial concerns of our patients. As physiotherapists, we were able to teach other health care team members, like the nursing student, proper lifting and transfer techniques to ensure

> both her safety and the safety of her patients. These interactions are just a few examples of the numerous ways in which physiotherapists rely on the interprofessional team to enhance care and maximize patient outcomes. (p. 249)

In this paragraph from a physiotherapy student's perspective, some benefits of IPE seem clear, most notably increased communication and teamwork. Several national and international organizations and committees have implored academic institutions to support and research IPE in collaboration with academic health centers such as university-affiliated hospitals and clinics. However, several challenges are inherent in undertaking a monumental change in health profession curricula and pedagogy (Institute of Medicine, IOM, 2001; World Health Organization, WHO, 1988).

A *Lancet* commission (Frenk et al., 2010) advocated for team-based care, and thus team-based learning, rather than education in "professional silos" teaching from outdated and static curricula (p. 1924). The metaphor of teaching and learning in "silos" was deemed a form of socialization to a professional norm by Oandasan and Reeves (2005), in that doing so without a focus on reaching out to other professions for input creates a discipline-specific culture that is difficult for students to break. The international side of the development of IPE has been led by the WHO in a series of articles dating back to 1988 (1988, 2007a, 2007b, 2010). *Learning Together to Work Together* was the title of the report promoting IPE as the single most important way to enhance collaboration and teamwork (WHO, 1988).

In light of the changing nature of health care systems, Frenk and colleagues implored educators to redesign health care education, that "what is clearly needed is a

thorough and authoritative re-examination of health professional education, matching the ambitious work of a century ago" (2010, p. 1923). Furthermore, the future work environments of these health care students (i.e. hospitals and clinics) ought to be proactive in supporting interprofessional collaboration in order to strengthen clinical programs or risk falling behind in the competition for patient care (Reinke & Hammer, 2011).

Educators have recognized that graduates of programs in allied health need new skills to better work together to reduce medical errors, increase collaboration, and improve staff relationships. An expert panel of allied health professionals sponsored by the Interprofessional Education Collaborative issued a document titled *Core Competencies for Interprofessional Collaborative Practice*, which detailed ways of moving beyond profession-specific practices in order to facilitate students' efficacy as members of the interprofessional clinical team (Interprofessional Education Collaborative Expert Panel, IECEP, 2011). The hope is that this call for earlier IPE in health profession curricula will result in better overall patient care when students enter the workforce. Currently, several groups support this push, including Joint Commission on Accreditation of Healthcare Organizations, The Accreditation Council for Graduate Medical Education, Commission on Collegiate Nursing Education, American Association of College of Nursing, Association of Schools of Allied Health Professions, Commission on Dental Accreditation, Accreditation Council for Pharmacy Education, and the Interprofessional Professionalism Measurement Group (Johnson, 2012).

In the United States, a team from the most influential non-governmental organization for health care, the IOM, cited patient-centered care as the impetus for

redesigning health care education in a more interprofessional manner. *Crossing the Quality Chasm: A New Health System for the* 21st *Century* (2001) and *Health Professions Education: A Bridge to Quality Care* (2003) are documents that set forth the expectations from the IOM for all health care professionals to work together to improve patient care.

Interprofessional Health Care Course

To this end, an Interprofessional Health Care course (IPHC) was created in 2003 by a medical school task force at University of North Dakota. The course was offered to students from health professions, mainly medicine, nursing, physical therapy, and occupational therapy, for one credit in a six-week session. An academic semester includes two sessions, for a total of four sessions per year. While enrollment has grown steadily since 2003, it currently includes 60-90 students from eight different professions: medicine, nursing, physical therapy, occupational therapy, communication science and disorders, music therapy, social work, and nutrition/dietetics. Students from medicine and nursing usually combine to make up over 50% of the students in each course.

The students are divided up into groups of 8-12 each and are facilitated by a faculty member from one of the eight major disciplines involved in the class. Class topics for the period under evaluation (2010-2012) in the current studies centered on two different case studies. The first was about an older woman who suffers from a fall, has poorly managed diabetes, a fifth grade-level education, and low income. The second was about a twenty-four year old student who is in a car crash and needs triage, emergency, and intensive treatments from a variety of departments. The facilitator guided them while reading through the case, asked students questions, assigned learning tasks to emphasize

different roles professionals in their disciplines might play, and evaluated the students' assignments and involvement in the course. Each week was one three-hour class for a total of 18 total in-class hours. Since spring 2010, the course has been directed by co-leaders from the UND School of Medicine and Health Sciences and College of Nursing, and has been facilitated by several faculty members from each of the departments, schools, or colleges listed above.

Statement of the Problem

Three main issues appear in the IPE literature as barriers to progressive research in this field. Ironically, the first problem with the literature is the literature itself—that it is beset with low powered research, anecdotal evidence, and systematic reviews that found no studies worthy of inclusion. The second issue to discuss is the wide array of learning outcomes and instruments used for evaluation. Finally, the lack of a cohesive theoretical framework to guide IPE research is discussed in brief in this section, and explicated in Chapter 2. It is hoped that the current studies will be a positive addition to the literature, using a reliable instrument, and guided by a sound theoretical framework.

IPE Literature

The *Lancet* report from Frenk and colleagues (2010) cited existing professional competencies in the health professions as mismatched with patient and population priorities. They implored a move away from "fragmented, outdated, and static curricula that produce ill-equipped graduates" (p. 1923). These graduates turn into professionals who struggle with teamwork and communication. Studies have demonstrated how poor communication may result in increased patient mortality, length of hospital stay, and

increased readmission rates at hospitals (Baggs, Ryan, Phelps, Richeson, & Johnson, 1992; Baggs et al., 1999).

While the nature of health care has changed rapidly in recent decades, it seems health care education had not. Several academic sites and health care centers worldwide have taken the IOM and WHO recommendations and attempted to move the field of IPE forward. Cooper, Carlisle, Gibbs, and Watkins (2001) found a great amount of diversity in the literature on interdisciplinary education. Several composite analyses of research have reported questionable or inconclusive results regarding the effectiveness of IPE. Reeves et al. (2008) published an updated Cochrane review (from a Cochrane review by Zwarenstein et al. in 2000, that found no studies meeting the inclusion criteria) to assess the effectiveness of IPE as opposed to education for allied health students who learn separately from each other. Proving the point that better research is needed in this area, a meta-analysis was not possible for that review. More recently, Lapkin, Levett-Jones, and Gilligan (2011) conducted a systematic review and also found the evidence for improving communication skills and clinical skills among allied health profession students was inconclusive. Furthermore, Mu, Chao, Jensen, and Royeen (2004) suggested many current allied health care professionals lack understanding of the purpose of working as an interprofessional team and the roles and responsibilities of other professionals.

Learning Outcomes and Instruments of IPE

Barr, Koppel, Reeves, Hammick, and Freeth (2005) cite the premise of IPE—that students who learn together will function as a better team in the workforce, which might lead to improved patient outcomes. Other goals of IPE may be improving students' attitudes toward other professions, improving teamwork, and increasing knowledge of

interprofessional collaboration (Cooper, Carlisle, Gibbs, &Watkins, 2001; Hammick, Freeth, Koppel, Reeves, & Barr, 2007; Reeves, 2001). It is yet unknown if a particular intervention or style of IPE is effective in fostering these goals. On the point of instrumentation, Solomon and Salfi (2011) suggested few well-validated measures of the issues of IPE (such as collaboration and communication) exist. In summary, although IPE efforts are increasing, they are often scattered, lacking consistent learning outcomes and validated instruments in order to detect pedagogical efficacy.

Theoretical Issues

The IECEP (2011) reported that IPE "now suffers from a lack of guidance from appropriate theories" (p. 33), a position in concurrence with Cooper, Carlisle, Gibbs, and Watkins (2001) who explained no theories seem to have informed the development of IPE. Clark (2006) agreed that the field of IPE is in need of development of a theoretical foundation and several have suggested models (Barr et al., 2005; D'Amour & Oandasan, 2005; Oandasan & Reeves, 2005; Parsell & Bligh, 1998). Fewer authors seem to have developed an experiment or investigation based off of one of these, or another theory as a foundation for hypothesizing results and framing outcomes. Clark (2006) suggested a unifying aspect of any theory of IPE address the "challenge…to be able to see the world through the eyes of other professions, to be able to frame the patient's problem and the potential solutions to it in the terms of understanding of other kinds of health care providers" (p. 578). A theory of understanding interprofessionalism, however, encompasses students in academic centers as well as professionals in the workforce, since everyone who is working in a health care setting might be included.

To conclude, it is important to note that interprofessional research has been in existence for decades. However, there remain critical issues regarding the strength of the literature, learning outcomes evaluated by appropriately validated instruments, and a lack of theoretical guidelines for conducting such research.

Purposes of Studies

The purposes of study #1 are to assess the reliability of the Readiness for Interprofessional Learning Scale (see p. 93, RIPLS, Parsell & Bligh, 1999) that was used in IPHC from 2010-2012 and compare students by discipline. The first study includes an analysis of twelve course sessions ($N = 631$) of data from a modified version of the RIPLS (RIPLS-2010). Study #2 purposes include an assessment of the reliability of a different version of the RIPLS (RIPLS-2013) and the effectiveness of the spring 2013 session 1 IPHC course. The second study is a pre and post design using the RIPLS-2013 ($N = 66$). The goal is to gain insight as to the potential effect of this course in preparing students for collaborative, interprofessional work in the future.

Rationale and Benefits of the Studies

Thistlethwaite (2012) stated a main rationale for IPE is for students to understand their responsibilities, the roles of others on the health care team, how to provide care that is patient-centered, and how to reduce medical error by improving communication and teamwork. While IPE educators and administrators continue toward those goals, research is needed to ground a theory of IPE, better validate evaluation tools such as IPE surveys, and discover future arenas for IPE development based on the needs of this evolving endeavor.

This research is meant to evaluate IPHC, which is a variation of IPE at one university. The course in question has a heterogenous group of students, from upperclassmen to graduate and professional students. Some students have a great amount of health care experience while others do not. This course also has one group of professionals not found in any of the other literature referenced above—music therapy. Most previous research in this area includes medicine and nursing, while the rehabilitation therapies such as occupational therapy, physical therapy, and speech-language pathology (more broadly called communication science and disorders) also appear in prior literature. While music therapy is a newer addition as a health profession, it is also a profession found in areas where a bulk of IPE literature is reported from, including Canada, the United Kingdom, and Australia. The RIPLS-2010 and RIPLS-2013 that were used as evaluative tools since this course's inception have not been analyzed, although the original version (Parsell & Bligh, 1999) has been validated by other research teams. The utility of the RIPLS-2010 and RIPLS-2013 remains in question until it is statistically analyzed for reliability across course sessions.

These studies analyze two variations of the RIPLS. Study #1 also compares data across all professions represented from 2010-2012 in the IPHC course. These years were used because there were no significant changes to the course curriculum or RIPLS in those sessions, twelve in all. The years prior to 2010 also had lower enrollments in the course and fewer professions. Music therapy was the last profession added to the course in 2010, so all eight professions had some representation in each year of this study. This span of years also offered 631 potential surveys for analysis, making it one of the largest studies of the RIPLS compared to the published literature (see Chapters 2 and 3 for

details on the RIPLS). Also, very few other studies compared students by profession, especially those who had taken an 18-hour course, rather than an interprofessional day or standalone experience as part of a larger, non-IPE curriculum. If the RIPLS-2010 was a reliable instrument for these years, then the factors that emerge could be better analyzed in relationship to the curriculum that was offered at that time.

Study #2 includes a pre and post factor comparison after a factor analysis of a different version of the RIPLS, called RIPLS-2013. This version was more closely related to the original Parsell and Bligh (1999) survey. The study was conducted in spring 2013 when the curriculum was modified somewhat away from a two-case format, although the course objectives, facilitator methods, and course logistics (time of day, total time in course, credit number, grading policy) remained the same. Also, a significant benefit to this study is using a pre and post design with the RIPLS-2013, which has not been reported in the literature. If the RIPLS-2013 has the sensitivity to measure the effectiveness of the IPHC course, using the RIPLS-2013 as a pre and post instrument should continue for future sessions of the course.

Research Questions and Hypotheses

As stated at the beginning of this chapter, the current dissertation is an evaluation of the RIPLS in two forms, first including a comparison by professions and second in a pre and post design comparing factors. Subsumed under these purposes were four specific research questions. A-priori hypotheses were proposed for each question.

Research Question #1: The RIPLS-2010

The first research question focused on the analysis of the revision of the RIPLS-2010 that was used for evaluation purposes of the 2010-2012 IPHC sessions.

Specifically, was the RIPLS-2010 reliable based on the students' self-report at the end of each session? Drawing upon conclusions from previous research (Parsell & Bligh, 1999; Reid, Bruce, Allstaff, & McLernon, 2006), it was hypothesized that this RIPLS-2010 would yield two main factors with moderately high factor and overall reliability. Reid et al. (2006) included all 18 items of the RIPLS-2010 to find the factors of teamwork and professional identity. The remaining items in that study (23 in total) formed a third factor they called "patient centeredness." The key difference is that the study investigated professionals rather than students as in the current research. Regarding this version of the instrument, the current study included an exploratory factor analysis and measures of internal consistency to test this hypothesis on instrument reliability for this population.

Research Question #2: Comparisons by Profession

The second research question was intended to compare the students' responses to the RIPLS-2010 depending on the discipline they were studying. Specifically, across the eight professions, are there any differences between student groups by factor? Previous research by Rose and colleagues (2009) found medical and physical therapy students believed they needed to know more content than nursing and occupational therapy students. All four of those professions are part of this study. Therefore, it was hypothesized that medical and physical therapy students would score lower on a factor similar to teamwork and higher on professional identity if those two factors were found similar to the research of Reid et al. (2006).

Research Question #3: The RIPLS-2013

Study #2 was intended to answer research questions #3 and #4. The third question was similar to the first question of this dissertation, as study #2 data came from

the spring 2013 session of IPHC. The course committee began using a new version of the RIPLS (RIPLS-2013), which was similar to the original Parsell and Bligh (1999) document with one item removed: "Learning with health care students before qualification would improve relationships after qualification" (see Appendix C for a comparison of RIPLS versions). Specifically, how does the RIPLS-2013 factor analysis of post scores compare with the previous publications such as Parsell and Bligh (1999) and Williams, Brown, and Boyle (2012)? The latter used 17 of the 18 items in the current study and proposed a four factor model. Again, it was hypothesized that the RIPLS-2013 was a reliable instrument, most likely with three factors since it was closer to the three factor Parsell and Bligh (1999) version than the Williams et al. (2012) version.

Research Question #4: Pre and Post Comparisons by Factor

The fourth research question was also an impetus to conduct study #2. Specifically, does the IPHC course have an effect on student self-report of interprofessional learning based on the RIPLS-2013? Haskins (2008) conducted a retrospective pre and post analysis of the IPHC course based on the original RIPLS (Parsell & Bligh, 1999), but that design did not compare survey responses 1) by factor and 2) before and after a six week IPE course. Therefore, as this method has not been used by previous research, a specific hypothesis was difficult to formulate. However, it may be reasoned that since IPHC was the first course emphasizing IPE to health care students, there would be differences in mean scores by factor from pre to post. Alternatively, students may assume that with a course title of "Interprofessional Health Care," that a point of emphasis is growing that particular notion with them.

Delimitations and Assumptions

First, these studies were delimited to students who had enrolled in the UND IPHC course, either as an elective or a required course for their program of study. While several other institutions in the United States offer some form of IPE, no others were found to have the same six-week, facilitator-led structure for added data. Health care professionals were also not studied like they were in Reid et al. (2006) since most professionals in the area were UND alumni but had not received IPE training prior to its inclusion after 2003.

Second, because only post RIPLS were used for analysis in study #1, only students who had completed the entire course would have completed a RIPLS survey. No attempt was made to follow-up with students who had dropped the course prior to the final class period. Readiness for interprofessional learning was measured on a Likert-type scale of student self-report as in previous RIPLS research. Additionally, only quantitative RIPLS data from IPHC course sessions that took place from 2010-2012 were used in study #1. Although the items and format of the RIPLS remained the same throughout this period, the collection procedure changed to "scannable" bubble response forms as opposed to a simple checkbox form like the initial RIPLS. Because only some of the students had the opportunity to write additional comments, no qualitative data were analyzed for either study. In study #2, all students had the opportunity to respond to an open-ended question "about interprofessional education," but so few responded that the data were unsuitable for analysis.

Third, the literature review was delimited to interprofessional or interdisciplinary research conducted in the health sciences field. Several other professional areas have

discussions around the research of collaboration in their fields, but they are qualitatively different than the training and education of health care professionals. The international nature of IPE in health education also provided a wealth of more specific literature from which to draw.

Fourth, the analysis for studies #1 and #2 included exploratory factor analysis (EFA). This analysis meant the conclusions drawn were not as strong as might have been gained with a more robust analysis. The pre and post study was only possible for study #2. Although there was pre and post data in study #1, it was not matched by individual code, and general changes by profession were not analyzed.

As in any study of education, specific courses, or pedagogical practices, the educators who work with the students who are being studied cannot be considered static, inflexible people delivering a specific kind of content. Rather, this course relies on facilitators, who are faculty members in each of the disciplines represented. Solomon and Salfi (2011) found that "students recognized that the facilitator was an important part of the learning experience" (p. 6). The facilitators may or may not have been part of the IPHC course committee. Most facilitators were from medicine or nursing due to the proportions of those two disciplines represented in the course. Facilitators' previous clinical experiences likely also play a role in how they interact with the materials and the students. Those clinicians who were active in interprofessional teams prior to or concurrent with their academic appointments might be more likely to discuss those experiences in the classroom. The converse might be true of clinicians who had more uniprofessional or multiprofessional experiences. Facilitators were assigned to a small group (8-10 students) and stayed on with that group for all portions of the six week

course session. It was assumed that facilitators adhered to the guide provided by the course committee to assure similarities between groups in terms of course direction and content. Also, because the RIPLS was tailored to student readiness for interprofessional learning, no facilitator data was gathered for analysis for the current study.

Finally, the researcher also assumed that students taking the surveys answered thoughtfully and carefully, as they were volunteers for this research. However, the course committee required the RIPLS to be completed in order for students to receive a final grade. Students may or may not have had opinions on the mandatory nature of completing these instruments which may have affected their responses.

Definitions and Acronyms

Regarding the current study, certain terms that are particular either to the statistical analysis or the field of IPE that recur in this paper are defined below to provide a uniform understanding of the writer's intent.

Discipline: refers to a particular major area of study. Medical students in their second year take the course; therefore their discipline is coded on surveys as "medicine." Also may be referred to as "major," "major area," or "profession."

*Interprofessional competencies in health car*e: "Integrated enactment of knowledge, skills, and values/attitudes that define working together across the professions, with other health care workers, and with patients, along with families and communities, as appropriate to improve health outcomes in specific care contexts" (IECEP, 2011, p. 2)

Interprofessional Education: occurs when "learners from two or more professions learn about, from and with each other to enable effective collaboration and improved

health outcomes" (Center for the Advancement of Interprofessional Education, 2002). Olenick, Allen, and Smego (2010) listed professions that also may participate in IPE that include but are not limited to nursing (including nurse practitioners or nurses with advanced degrees), medicine, pharmacy, social work, nutrition, physical therapy, occupational therapy, counseling, physician assistant, dentistry, emergency medical services including paramedics, radiology professionals, and respiratory care professionals.

Multiprofessional: implies several professionals from different areas of health care working side-by-side and with the patient, but without significant interaction. See Figure 1 for a visual depiction to emphasize there is no "sharing" between disciplines (Olenick et al., 2010).

Problem-Based Learning: Refers to an approach that encourages student learning through the presentation of a problem and student-driven initiatives to solve the problem (Richards & Inglehart, 2006)

Readiness for Interprofessional Learning: This concept, while introduced by Parsell and Bligh (1999) in the title of their instrument, is advocated by researchers who believe that when students believe in the value of collaboration and not in prejudice and professional rivalries and insecurities, they are more likely to accept techniques and skills training for IPE.

Readiness for Interprofessional Learning Scale: RIPLS; The initial Principal Components Analysis of this 19-item survey revealed a reliable instrument with the three factors of teamwork and collaboration, professional identity, and roles and responsibilities (Parsell & Bligh, 1999). Thannhauser, Russell-Mayhew, and Scott

(2010) found that the RIPLS, along with the Interprofessional Education Perception Scale, has been most often evaluated for validity and reliability.

Teamwork: Refers to "[c]oordinated action, carried out by two or more individuals, jointly, concurrently, or sequentially. It implies commonly agreed goals; a clear awareness of, and respect for others' roles and functions on the part of each member of the team; adequate human and material resources; supportive cooperative relationships and mutual trust; effective leadership; open, honest, and sensitive communications; and provisions for evaluation…It entails the ability to work as colleagues rather than a superior-subordinate relationship" (World Health Organization, 1988, p.6).

Transprofessional: an overlapping of health professional duties, including the patient at the center of all his/her care decisions; also sometimes considered an ultimate progression moving past interprofessional care. (Magrun & Tigges, 1982; Melvin, 1989).

Uniprofessional: described 19th and early 20th century notions of a physician making all patient decisions, also used to explain education in "silos," or profession-specific pedagogy with little or no input or reference to the role of other professionals in the health care environment (Oandasan & Reeves, 2005).

CS: Communication Science and Disorders

IOM: Institute of Medicine

IPE: Interprofessional Education

IPHC: Interprofessional Health Care course

MD: Medicine

MT: Music Therapy

ND: Nutrition and Dietetics

OT: Occupational Therapy

PT: Physical Therapy

RN: Nursing

SLP: Speech-Language Pathology

SW: Social Work

WHO: World Health Organization

Summary

This chapter was meant to orient the reader to the known and unknown aspects of IPE to this point in its brief history and present the overview of the critical need to study it further. It included a summary of the IPHC course, purpose of the study, rationale and benefits of the study, delimitations and assumptions, research questions and hypotheses, and acronyms and definitions of key terms. The following chapter provides an extensive literature review on the topic of IPE. Chapters 3 and 4 will present the methods and results of studies #1 and #2 with detailed statistical analysis, relationships with previous findings, limitations, and implications for current educators in IPE. Chapter 5 will provide a general discussion linking both studies to the current research base in this area.

CHAPTER II

REVIEW OF LITERATURE

Health care exists in many forms worldwide. In the United States, the Patient Protection and Affordable Care Act (2010) is the most visible sign of an evolution of care. Several new approaches to health care will likely be realized due to new funding sources for health care and its infrastructure (Kaiser Family Foundation, 2010; Steinbrook, 2009). Interprofessional health care will play a vital role in making these advances come to fruition.

In every type of system that is required to enact nationwide services, such as healthcare and education, there are macro and micro levels that must be developed, understood, analyzed, and evaluated for effectiveness. In terms of health care, the macro level of system wide changes usually happens only from the ground up, when the micro levels of individual and localized health care systems and educational institutions sense the need to evolve to affect the macro level system.

The following review of literature examines several areas, beginning with the history and impetus of IPE, first discussed as interdisciplinary or multiprofessional education. As this educational system began, more specific learning outcomes and modes to attain them arose, such as problem-based learning. While the concept of IPE is about forty years old, several authors have posited theories in which to root the concept of IPE. Aspects of the surveys used in the present study are also discussed regarding

their use in other related research. The factors posited in the original RIPLS research are also examined, including teamwork/collaboration, professional identity, and roles/responsibilities. The concluding portion of this section reiterates the purpose of this study and the critical need for more and better research in this area.

History of IPE

Interprofessional education is not a new concept. The World Health Organization (WHO, internationally) and the Institute of Medicine (IOM, domestically) have examined this idea for the better part of forty years (Johnson, 2012; Thistlethwaite, 2012). The initial and persisting objectives of promoting IPE are to align education of health professionals to promote better patient-centered care, reduce medical errors, and lower health care costs. The IOM issued a report at the 1972 Conference on the Interrelationships of Educational Programs for Health Professions. One recommendation in particular stated that, at the administrative level, "academic health centers must recognize an obligation to engage in interdisciplinary education and patient care, and regional consortia of health professional schools not otherwise associated with academic health centers should be formed to foster educational teamwork" (IOM, 1972, p. 8). Discussion centered around six questions: (1) Why educate teams? (2) Who should be so educated? (3) How should students be educated (classroom emphasis)? (4) How should students and professionals be educated (clinical emphasis)? (5) What are the requirements for educating health care delivery teams? (6) What are the obstacles?

Currently, IPE has a sizable international foothold, with a great deal of research coming from the United Kingdom and Canada, with Scandinavia, United States, and Australia providing a second tier of contributions. As of 2012, the United States has five

centers for IPE: University of Washington, University of Minnesota, Thomas Jefferson University, Saint Louis University, and Creighton University (Olenick et al., 2010).

While system-level issues differ in countries with universal health care as law (i.e. the National Health System in Great Britain) as opposed to the United States, it appears that the WHO is still the dominant body for instigating change in policies through in-depth research and international committee work. The international side of the development of IPE has been led by the WHO in a series of articles dating back to 1988 (1988, 2007a, 2007b, 2010). "Learning Together to Work Together" was the title of the report promoting IPE as the single most important way to enhance collaboration and teamwork (WHO, 1988). This report also used the term "multiprofessional education" rather than IPE. In later years, the terms uniprofessional, multiprofessional, interprofessional, and transprofessional became synonymous with a graduated level of desirability in terms of the working relationship allied health providers have with one another. For instance, while "uniprofessional" described 19th and early 20th century notions of a physician making all patient decisions, transprofessionalism is an overlapping of health professional duties, including the patient at the center of all his/her care decisions. Figure 1 depicts structural differences among multidisciplinary, interdisciplinary, and interprofessional approaches as related to the patient. The call toward a transprofessional health care model goes back to the 1980s as well (Magrun & Tigges, 1982; Melvin, 1989). Health team members should:

> …learn how to work efficiently together, and to understand: 1. The responsibility of the team as a group; 2. The role of each member in carrying out the team's responsibilities; 3. The extent to which roles of team members overlap; 4. The

processes needed for working together; 5. The part played by the team in the overall delivery system. (WHO, 1988, p. 7–8)

Olenick and colleagues believe the interlocking of each team member (Figure 1, bottom) implies shared goals, a commonality, and equality in coordination and accountability (2010).

Figure 1. Multidisciplinary, Interdisciplinary, and Interprofessional maps (Olenick et al., 2010). Used with permission from author (Appendix E).

Before considering the educational aspect of interprofessionalism, several authors pondered the move toward interdisciplinary health care in the mid-1970s. Nagi (1975) pointed out three themes in the literature, including status/power/authority/influence, roles and professional domains, and decision making/communication. Also mentioned were the potential negatives, such as the dilemma of gate-keeping decisions and how to approach creating interdisciplinary teams. Halstead (1976) conducted a 25-year review of articles specific to chronic disease care (e.g. heart disease, hypertension, stroke), noting three categories of that particular group of research: the opinion base, descriptive base, and the study base, which are progressively more founded in research regarding the effectiveness of team-based care. Most studies showed improved outcomes for patients who experienced team care than those in a control group. Given and Simmons continued this area of inquiry in an article subtitled "Fact or Fiction" relating to whether interprofessional care was indeed superior to traditional (1977). They identified important qualities that members of interprofessional health care teams should have, such accepting differences and perspectives of others, independence at work, understanding team roles, challenging and communicating ideas, and accepting team philosophies of care. The boundaries were obvious: varying educational levels of team members, power, salary and status, and personality characteristics that are static.

The WHO followed with the 1978 interprofessional collaboration paper but did not promote IPE specifically until a full decade later (Barr et al., 2005; Mandy, Milton, & Mandy, 2004; WHO, 1988). Thistlethwaite and Moran (2010) conducted a literature review in IPE interventions and found significantly more publications in the last decade as opposed to the 1980s and 1990s, suggesting a IOM (1999, *To Err Is Human: Building*

a Safer Health System) study may have been more of an impetus for research in IPE than the 1972 IOM conference or WHO 1988 studies.

The push to educate future allied health professionals has accelerated since then due to several factors. Chief among them is the impetus to improve patient care and reduce costs due to medical error. More recently, the IOM issued a publication entitled "To Err Is Human" (1999) that approximated 41,000 to 98,000 patient deaths in the United States due to medical error, most of which were largely preventable if better systems were in place, including interprofessional accountability. This report supported the foci of communication, collaboration, and change to assure quality patient care. Another report two years later (Crossing the Quality Chasm, 2001) specified that all health professionals ought to learn patient-centered care using evidence-based practice and quality improvement as the bedrock for such a curriculum.

IPHC Course

The move toward IPE was started at University of North Dakota in 2003 through a task force charged with beginning a more focused approach to IPE (Johnson, 2012). Dean H. David Wilson and Dr. Mary Wakefield with the Center for Rural Health gathered support for IPE at UND and began offering IPHC in 2006. The UND course is similar to two Canadian models. At University of Toronto, there is a five week course focusing on problem-based learning (PBL) with seven professions (UND replaces pharmacy with nutrition and dietetics and adds music therapy) on chronic disease management poststroke (Lumague et al., 2006). At McMaster University in Hamilton, Ontario, students also engage in PBL with facilitators from social work in small groups for three hour sessions. The UND course started as a once-per-week, six week course for

one credit, required by the disciplines of medicine, nursing, physical therapy, occupational therapy, communication science and disorders, and nutrition and dietetics, and as an elective for social work and music therapy students (although music therapy, communication science and disorders, and social work joined the course after its inception in 2006). Hoffman and Harnish (2007) demonstrated that mandatory IPE coursework could result in improved attitudes, interests, and professionalism in health care students.

Each week is one three-hour class for a total of 18 total hours. As of Spring 2012, 1824 UND students had taken the course since its inception in 2003, with increasing enrollment each year. Since Spring 2010, the course has been facilitated by several faculty members from each of the departments, schools, or colleges listed above. The course historically featured a problem-based learning (PBL) design, which incorporated fictional characters with a series of medical issues for students to navigate as small teams (as mentioned in Chapter 1). Each course included time to orient to the class and learn about classmates, investigate two fictional characters who have a variety of medical issues that require a great deal of collaboration across disciplines, and take a mid-term exam and a final exam. These two case studies were the centerpieces of the course until Fall 2012 when the curriculum was revised to feature only one more in-depth case study, but still in the PBL style.

Team STEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is a central component to the IPHC curriculum, as devised by the Agency for Health Care Research and Quality (AHRQ) and the Department of Defense. It is a series of tools and materials to optimize health care professionals' communication and

teamwork skills (Baker, Krokos, & Amodeo, 2008). Team STEPPS training is also a focus for allied health students at several facilities in the Upper Midwest as part of a collaboration with AHRQ, the North Dakota Health Care Review, the UND Center for Rural Health, and the North Dakota Critical Access Hospital Quality Network. The midterm exam and final exam were summative assessments that required IPHC students to work together and enact certain Team STEPPS concepts, such as mutual support and leadership. The faculty members who devised and continue to craft the IPHC curriculum attempt to match learning outcomes of IPE more broadly to class activities over the six week session.

Readiness for Interprofessional Learning Scale

The stated purpose of the Readiness for Interprofessional Learning Scale (RIPLS) was "to examine the attitude of health and social care students and professionals towards interprofessional learning" (Parsell & Bligh, 1999). Thannhauser, Russell-Mayhew, and Scott (2010) found twenty-three instruments used to measure aspects of IPE in the literature, however "only a limited number of these instruments are actually applicable to professionals working/learning together within a broad health discipline" (p. 338). Their search for psychometric properties included validity, reliability, and sample size, among others indicators, and suggested only the RIPLS and the Interdisciplinary Education Perception Scale (IEPS, Luecht, Madsen, Taugher, & Petterson, 1990) were worthy of further study. Of those two, the RIPLS was rated by Gillan, Lovrics, Halpern, Wiljer, and Harnett (2011) as having appropriately addressed assessment of reliability and validity, while the IEPS research only "somewhat" addressed these two aspects (p. e467). However, the RIPLS remains a very inconsistent and controversial instrument based on

the variety of results published since its inception.

Parsell and Bligh first explored interprofessional education (IPE) in the late 1990s (Parsell, Spalding, & Bligh, 1998;) and then developed the RIPLS (Appendix C) using students from eight different discipline areas (Dietetics, Nursing, Occupational Therapy, Physiotherapy, Podiatry, Prosthetics and Orthotics, Radiography, and Social Work) in Liverpool, England, and it has since been used in several validation studies, including in modified forms (McFadyen et al., 2005; Reid et al., 2006; Williams et al., 2012) and other languages (Tamura et al., 2012). The RIPLS is a 19-item survey, with a Likert-type scale of 1-5, where 1=strongly disagree and 5=strongly agree, and 3 is "neutral." Table 1 compares the various iterations of the RIPLS found in the literature and used in the IPHC course for the studies at hand.

The Principal Components Analysis (PCA) in the original 1999 study yielded a three-factor scale (teamwork/collaboration, professional identity, and roles and responsibilities) with a high overall Cronbach coefficient of 0.9. McFadyen et al. (2005) led a team from Scotland in a PCA with students from different health professions and criticized the original version, specifically the "roles" factor for "weak reliability data and the possible instability of the RIPLS instrument" (p. 598). Subsequent to a confirmatory factor analysis and structural equation modeling, McFadyen and colleagues coined four sub-scales (teamwork and collaboration, negative professional identity, positive professional identity, and roles and responsibilities), formulated a new version with a structural equation model, and found a better goodness of fit in their own sample of 247 health care students from seven disciplines. Subsequent analyses by Reid et al. (2006) and Williams, Brown, and Boyle (2012) also showed commonality with the factors of

teamwork/collaboration, professional identity, and roles and responsibilities, which will be expounded upon in the next section. Williams et al. (2012) added items to their analysis and suggest a fourth factor named "shared learning," but this factor has not been suggested by any ensuing research.

Table 1. RIPLS Variations.

Author(s) and year	Place	Population	Analysis	Items	Factors	Internal Consistency
Parsell & Bligh, 1999	UK	*N*=120 2nd year health care undergraduate students	PCA	19	3=teamwork/collaboration (9 items), professional identity (7 items), roles/responsibilities (3 items)	0.90
McFadyen et al., 2005	UK	*N*=247 undergraduate health care students	CFA and SEM	19	4=teamwork/collaboration (9), negative professional identity (3), positive professional identity (4), roles and responsibilities (3)	0.89
Reid et al., 2006	UK	*N*=546 Health care professionals	PCA	23	3=teamwork/collaboration, sense of professional identity, patient centeredness	0.76
IPHC 2010-2012	US	*N*=631 undergraduate and graduate level health care students	EFA	18	2=teamwork/collaboration (13), sense of professional identity (5)	0.82
Williams et al., 2012	AU	*N*=418 undergraduate health care students	PCA then Rasch model analyses	17	4=teamwork/collaboration (5), shared learning (7), professional identity (3), roles and responsibilities (2)	0.84
IPHC 2013	US	*N*=66 undergraduate and graduate level health care students	EFA	18	3=teamwork (8), professional identity (6), uniprofessionalism (2), roles (2)	0.88

PCA=Principal Components Analysis, EFA=Exploratory Factor Analysis,

CFA=Confirmatory Factor Analysis, SEM: Structural Equation Modeling.

Teamwork and Collaboration

The first subscale of the RIPLS proposed by Parsell and Bligh (1999) was labeled "team-working and collaboration" (p. 97). They reported a Cronbach's coefficient of 0.88, and the subscale included nine items all with factor loadings over 0.44. This subscale is the most widely agreed upon by other authors who used or modified the RIPLS. McFadyen et al. (2005) included nine similar items with an identical internal consistency of 0.88, while Reid et al. (2006) collected RIPLS from professionals rather than students and found this subscale included 13 items, again with the same Cronbach coefficient score. McFadyen et al. (2005) included a second analysis of structural equation modeling that also resulted in a high goodness-of-fit for the teamwork subscale in particular. Williams, Brown, and Boyle (2012) found slightly varied results, as they added items to the RIPLS on "shared learning," so they considered items from the original Parsell and Bligh (1999) survey as "loading" on to that factor instead of to teamwork and collaboration. Williams et al. (2012) suggested a five-item subscale for teamwork, with 0.74 as their Cronbach coefficient. Parsell and Bligh used the term "shared learning" in their research and on several items, stating that "shared learning is beneficial in a number of ways" but instead chose to name the subscale without those terms (1999, p. 97). Williams et al. (2012) claimed that the subscale included the words in several items, such as "Shared learning will help me to understand my own professional limitations" and "Shared learning will help me think positively about other healthcare professionals." Thus, they added this subscale term based on their final Rasch analysis of 17 items loading on four factors (shared learning, teamwork and

collaboration, professional identity, and roles and responsibilities).

Regardless of some slight variations across these four iterations, teamwork, in some form, was still considered a prominent construct to be considered. The original authors suggested this subscale "demonstrates a strong link between the positive outcomes of team-working and the adoption of a team-based approach to learning before qualification" (Parsell & Bligh, 1999, p. 97). Furthermore, Reid et al. (2006) compared professions across categories by subscale. In the area of teamwork, means from general practitioners (GPs) were significantly lower than both nurses and other allied health professionals (AHPs, a categorical term combining all professionals who were not GPs, nurses, or pharmacists). Horsburgh, Lamdin, and Williamson (2001) also used the RIPLS to compare medical, nursing, and pharmacy students, but did not perform any type of instrument analysis. Results indicated medical students (as opposed to professionals in the Reid study) scored the lowest on the item "shared learning with other health care students will increase my ability to understand clinical problems" (p. 879).

In summary, the ideals of teamwork and collaboration are most prominent in the RIPLS literature, and several versions of the RIPLS include a majority of items that are along this construct, as it is central to the tenets of IPE. However, medical students seem to score lower than other professions on several of the items in this subscale, indicating they may feel less of a need to be part of an interprofessional team, regardless of when they are surveyed: as undergraduates, graduate students, or professionals.

Professional Identity

Parsell and Bligh (1999) suggested the seven items they found for this subscale could be clustered into two groups, negative and positive, given the moderate Cronbach

coefficient they found of 0.63. Three items were positive factor loadings and four were negative, all above an absolute value of 0.40 to be included on this subscale. Essentially, these group titles reflect the nature of the items. For example, "I don't want to waste time learning with other health care students" is under the negative professional identity area, while "I would welcome the opportunity to work on small-group projects with other health care students" is considered a positive professional identity item. Parsell and Bligh acknowledged potential issues with this subscale, and stated "the structure and organization of academic disciplines reflects these professional ideologies and is directly at odds with the requirements of team-based health care" (1999, p. 98). McFadyen et al. (2005) more explicitly separated these two factors into three items each, as they decided to reverse code the items, which was not suggested by the original authors. Whether part of a three or four factor design, or subdivided into two separate factors, the concept of professional identity remained present in each substantive study of the RIPLS.

McFadyen, Webster, Maclaren, and O'Neill (2010) conducted a longitudinal analysis using the IEPS and the McFadyen et al. (2005) four-factor version of RIPLS with eight health professions, and found that both negative and positive professional identity declined over time. Negative professional identity items were reverse scored, meaning the scores were "perhaps more realistic rather than possibly initial idealistic levels" (p. 560). However, Horsburgh et al. (2001) cautioned against over-analysis on this subscale, and stated that educators "acknowledge that at first-year level students have not yet developed a professional identity" (p. 877). Generally, it is of interest whether students come to these programs of study with a certain amount of confidence in their understanding of the profession. Reid and colleagues (2006) surveyed professionals and

found general practitioners had "a stronger sense of professional identity than nurses, pharmacists, or allied health professionals…(suggesting) they bring preconceived 'maps' of their own roles to any educational process" (p. 420). Ultimately, the debate whether the subscale of professional identity is suitable for students, who likely have not developed this sense as well as health care workers, deserves more analysis before conclusions may be asserted.

Roles and Responsibilities

Roles and responsibilities, of the three most identified subscales since the original Parsell and Bligh (1999) study, is the most controversial because it has not resulted in reliable Cronbach coefficients and a consistent set of items. Horsburgh et al. (2001) suggested these items "are concerned with the idea that professional practice promotes some health professional roles, notably medical, over others" (p. 881). Parsell and Bligh (1999) reported a 0.32 Cronbach coefficient for the three items (absolute value factor loadings of 0.49-0.63). McFadyen et al. (2005) found this internal consistency "unacceptable" and "surprising that some researchers have opted to employ RIPLS without it being more rigorously tested" (p. 602). However, their work did result in a "roles and responsibilities" three-item factor with another low Cronbach score of 0.43, compared to a 0.42 two-item factor from Williams et al. (2012). The latter study considered the item "The function of nurses and therapists is mainly to provide support for doctors" to be in the "teamwork" factor, although Parsell and Bligh (1999) suggested it in their 3-item subscale. Regarding this particular item, Horsburgh et al. (2001) reported that medical students were least opposed to nurses and therapists having roles as support-providers to doctors, but also felt they had to know more than other

professionals. Similar to professional identity, one might argue that it seems appropriate if all health care students generally felt unsure about their future roles and responsibilities.

Furthermore, the notion of IPE could be considered a possible method to help students gain their senses of professional identity and roles and responsibilities. The fact remains in this literature, however, that students in some disciplines have different concepts than their peers and future co-workers. IPE pedagogy, therefore, is embedded in the IEPEC (2011) competencies that particularly address these three issues. Broadly, a theory that the pedagogical techniques may take root in is required for IPE.

Theoretical Framework

Hean, Craddock, and O'Halloran (2009) stated that attempts to review all theories applied to IPE was "overambitious and unwieldy" (p. 251). The following sections will explicate the need for a cohesive theory of IPE and posit the theory of interprofessionality, as well as its connections to social constructivism, socio-cultural theory, and team identity. The learning theories of Dewey (1966), Piaget (1973), Kirkpatrick (1967), and Vygotsky (1978) are often considered integral to understanding how students learn (Hean et al., 2009). For the current application however, Dewey's philosophies are more foundational while much of Piaget's cognitive development discourse concerns younger children, although current neuroscience research reflects an extended chronology of brain development (Blakemore, Dahl, Frith, & Pine, 2011). Kirkpatrick (1967) inverted a hierarchy of training processes: Reaction, Learning, Behavior, and Results, with "Results" on the top and the other three levels leading from the bottom up. Cooper, Carlisle, Gibbs, and Watkins (2001) categorized clinical IPE

outcomes against this four level design and suggested that learning theories, such as Dewey's and Piaget's, were rarely used in guiding the "development of interventions and outcomes measured" (p. 235). Thistlethwaite (2012) found most evaluation of IPE delivery was conducted only at Kirkpatrick's level of participant satisfaction (reaction) as opposed to a higher order level, indicating a lack of reporting on theoretical frameworks in IPE.

Need for a Cohesive Theory of IPE

The commentary that IPE is not often joined with a guiding theory or concept is common in the literature. The practice of IPE "draws on education, psychology, and sociology theories for its rationale and delivery," according to Thistlethwaite (2012, p. 65). However, several authors have suggested IPE researchers have not made a case for basing assessment and outcomes in theory (Barr et al., 2005; Clark, 2006; D'Amour & Oandasan, 2005). Even after those reports were published, an IEPEC report also stated IPE "now suffers from a lack of guidance from appropriate theories" (IEPEC, 2011, p. 33). Cooper et al. (2001) reported 73% of studies analyzed in a systematic review of IPE included "no evidence of links to underlying theory, neither in the description of the method nor in the choice of process or outcome measures" (p. 231). They discussed the need for future research in IPE to relate data to relevant theory in order to strengthen future findings. Hean, Craddock, and O'Halloran (2009) accused researchers *en masse* of simply reverse-fitting their strategies into a framework, rather than rooting curricular design in a model. D'Amour, Ferrada-Videla, San Martin Rodriguez, and Beaulieu (2005) suggested that no conceptual frameworks captured the concepts underlying interprofessional collaboration to that point. Thistlethwaite (2012) more positively stated

"there are a number of theories that may serve as frameworks for further work" (p. 67) while Hean and colleagues simply referred to the "plethora of theories" as an "un-navigable quagmire" (2009, p. 250). These commentaries have echoed the need to operationalize a cohesive theoretical framework of IPE.

Interprofessionality

Despite the more recent criticisms of the lack of accepted theories, the IPHC course is rooted in interprofessionality as a framework for conceptualizing the pedagogy of the course and IPE at UND more broadly. D'Amour and Oandasan (2005) stated this term "concerns the processes and determinants that influence IPE initiatives as well as determinants and processes inherent to interprofessional collaboration" (Figure 2).

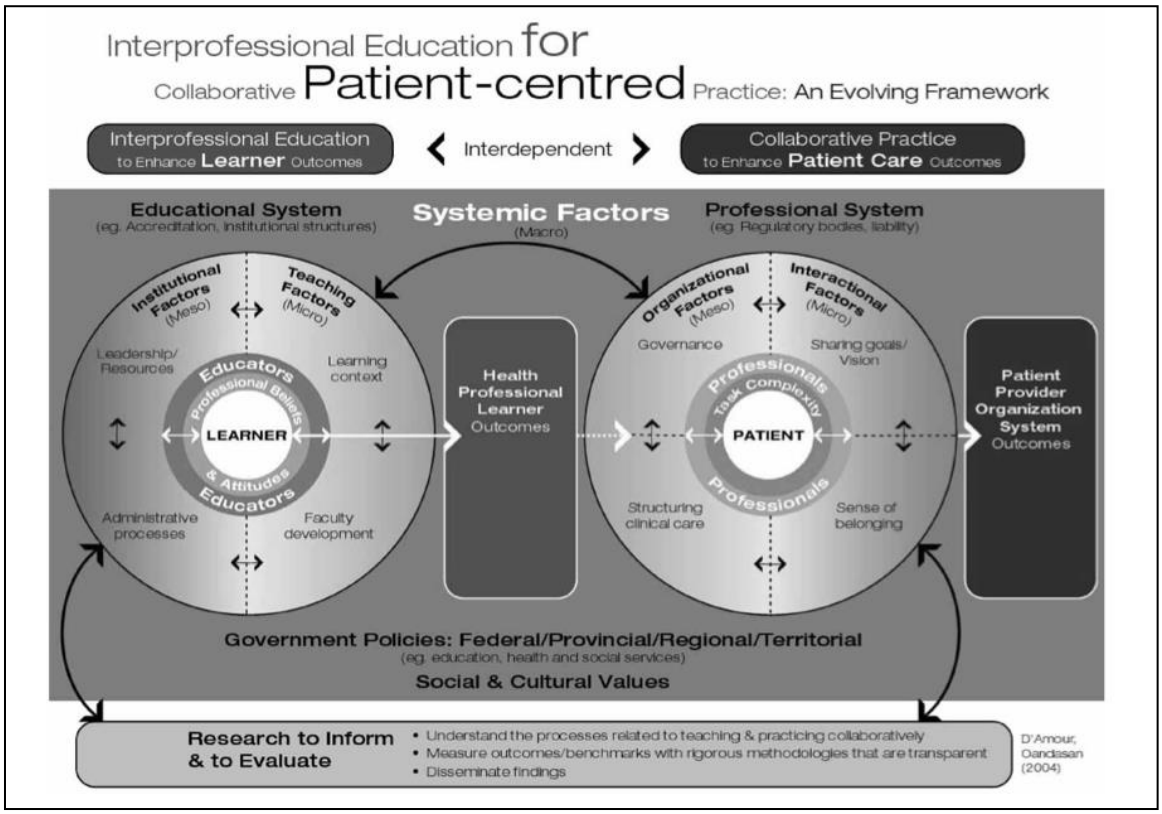

Figure 2. The Interprofessionality Framework. (D'Amour & Oandasan, 2005). Used with permission from author (Appendix D).

In this sense, the theory of interprofessionality is broad enough to connect learners (center of the educational system circle) to patients (center of the professional system circle). Interprofessional educators evaluate how the organizational and interactional factors in the health care system (macro level) affect collaborative practice, and design appropriate learner outcomes on the micro level that transfer student attitudes and beliefs into social and cultural values.

The definition of interprofessionality is "the development of a cohesive practice between professionals from different disciplines" (D'Amour & Oandasan, 2005, p. 9). The idea is similar to the WHO (1988) framework in that there are separate but interdependent foci on learner outcomes via the educational system and patient care outcomes in the professional system that are both determinant of the broader, systemic change in health care that is the goal of the WHO and subsidiary organizations. The three level system (micro-teaching, meso-institutional, and macro-system) are positioned within the two larger circles of "patient" and "learner," placing a great amount of importance on keeping those two groups at the center of distinguishing IPE from collaborative practice.

There are five main components of the framework, but the focus for the current studies is the second component specific to IPE.

1. Interdependency between interprofessional education and collaborative practice
2. Interprofessional education to enhance learner outcomes
3. Collaborative practice to enhance patient outcomes

4. Systemic factors – macro level
5. Research to inform and evaluate

Interprofessionality is a cross-system theoretical framework that engages in two larger concepts: student learning and social and cultural values (Figure 2). While several theories of adult and college student learning exist, interprofessionality is most closely related to social constructivism—the concept of learners in a society who are creating knowledge together. Constructivism (Figure 3), more broadly, requires students to understand values of IPE like teamwork and collaboration. On the point of social and cultural values, interprofessionality draws from socio-cultural theory—the importance of the interaction of society and individuals in developing higher order functions, such as task complexity, as found in the "patient" wheel of Figure 2. The following sections explore three theories that form the framework of interprofessionality.

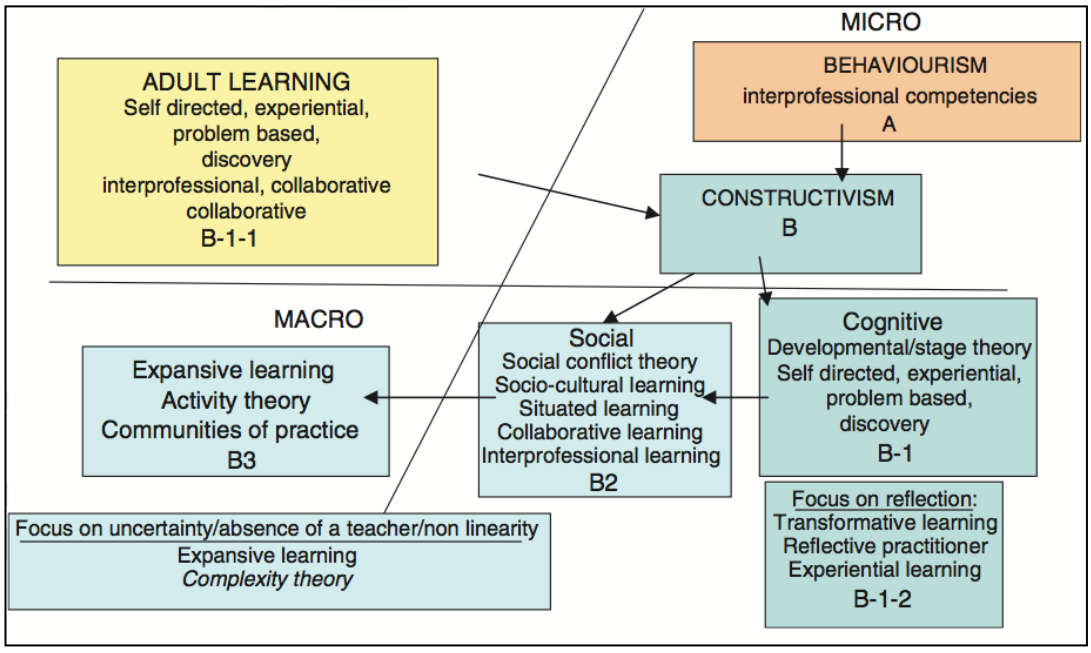

Figure 3. Hean et al., (2009) Overview of Learning Theories in IPE. Used with permission from author (Appendix F).

Social Constructivism

Many constructivist theorists start with the premise that learning is a construction of and by the learner, first and foremost. Sub-areas of constructivism include cognitive and social aspects (Figure 3). Cognitive constructivism is defined as a process that learners go through to create a foundational experience to later build on. Professionals dealing with this theory understand that the theory is not meant to frame curriculum delivery, but why a curriculum is conceived and delivered in this constructivist manner.

More specifically, social constructivism is a theory that emphasizes the people and structures in one's environment that impact how one constructs that environment in order to learn. It becomes important for facilitators to create a climate for students to engage actively with the roles, beliefs, values and cultures of students in other disciplines. Thus, health professions students should "engage actively with the roles, beliefs, values, and cultures of other professionals" (Thistlethwaite, 2012, p. 65).

Here is another point where the second component of Interprofessionality, "Interprofessional education to enhance learner outcomes," intertwines with social constructivism. D'Amour and Oandasan (2005) added bi-directional arrows to their illustration to recognize a socialization process wherein the learner and the educator influence each other throughout an IPE experience. The learner is interested in developing the new knowledge with others, particularly peers or a facilitator and is reinforced (as in behaviorism) with achieving at a higher level. Vygostky's (1962) concept of scaffolding comes into play at this stage. A facilitator removes the temporary pedagogical scaffold (or perhaps it is unnecessary and the student herself removes it) and a sense of autonomy and completion are gained, similar to professional identity in IPE.

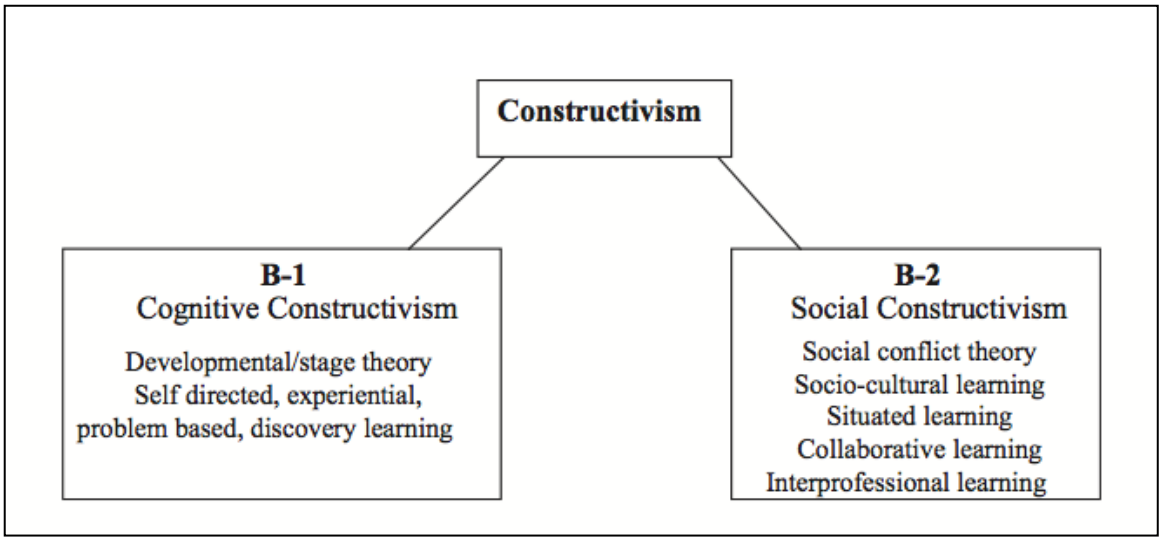

Figure 4. Constructivism (Hean, Craddock, & O'Halloran, 2009). Used with permission from author (Appendix F).

Ultimately, as in Figure 3, students may be able to move from a micro to a macro level of analysis, including communities of practice, which is not only specific to social constructivism.

Thistlethwaite (2012) suggested a constructive alignment to better assess IPE that "draws on both constructivist learning theory and instructional design…(that) emphasizes student-centred learning and the creation of meaning from the learning experience" (p. 62). More specific to social constructivism is that content is not taught. Instead, a professional in one of the eight allied health care fields facilitates the student's creation of it. In this sense, the "construction" of learning is not just the student and facilitator together, but students learning from students in other disciplines, and it is the facilitator's purpose to create a classroom environment conducive to this construction. Social constructivist theory is most commonly attributed to Vygotsky (1978), who conceived of the "Zone of Proximal Development (ZPD)." The ZPD is a comparison: what can the student learn on her own versus what she can learn with several others, even from other

disciplines, in a group-directed environment? The difference between two levels of understanding is the "zone" that is remedied by the approach that affords the opportunity to understand a concept better.

Socio-cultural Theory

As constructivism breaks down to social versus cognitive constructivism (Figure 4), a sub-area called socio-cultural learning exists. The theory that guides this concept, socio-cultural theory, is another branch of Vygotsky's ideas on how a culture at large is a large part of higher order thinking, which is often required of health professionals. The culture of IPE is created by having facilitators who are also interprofessional (as is the case in IPHC), but also by bringing together students from different professions. Allport's (1954) contact hypothesis factors into a framework that features the makeup of a particular culture. This hypothesis is not just about bringing disparate groups, or even rivals, together in order to change a culture to one that is interprofessional, in this case. Thistlethwaite (2012) augmented Allport's hypothesis, adding the importance of all members having equal status, working on common goals, and institutional support. Hean et al. (2009) cited D'eon (2005) as "the most comprehensive utilization of socio-cultural learning and specifically the concept of scaffolding" (p. 257). While D'eon's (2005) research integrated the concepts of ZPD and scaffolding, the author also mapped the ideas on tasks that were simple to those that grew in complexity. IPE tasks might be considered writing short essays on IPE (simple) or role playing discussions with other team members (complex).

Team identity

On the interprofessionality framework diagram (Figure 2), the patient "wheel" includes a side labeled "interactional factors." The two divisions therein, "sharing goals/vision" and "sense of belonging," are part of the final sub-concept of interprofessionality: team identity. While proponents of IPE might suggest that team identity and teamwork should be part of the "learner" wheel as well, this concept is only present for professionals in terms of their interaction with each other and patients. The WHO definition of teamwork, which "entails the ability to work as colleagues rather than a superior-subordinate relationship," is also important to the development of team identification (World Health Organization, 1988, p.6).

Team identity has been considered by researchers in organizational psychology, and some more specifically with a focus on the health care industry rather than education. Mitchell, Parker, Giles, Joyce, and Chiang (2012) theorized that as a team identification is formed, value congruence is also gained. Value congruence, in their studies, refers to a shared concept of goals, similar to the previous two sub-concepts of interprofessionality. Specifically, perceived value congruence has been suggested to improve group performance and innovation—desired outcomes for every health care team. Remarking specifically on interprofessional health care, Mitchell et al. posited that social identity, as linked to professions, "has been argued as a critical source of interprofessional conflict" (2012, p. 14). As seen in Figure 5, interprofessionality has its basis in three broader concepts: social constructivism, socio-cultural theory, and team identity. The IPE offering examined in the current studies is rooted in interprofessionality as the IPHC curriculum team created course objectives that align with learner outcomes.

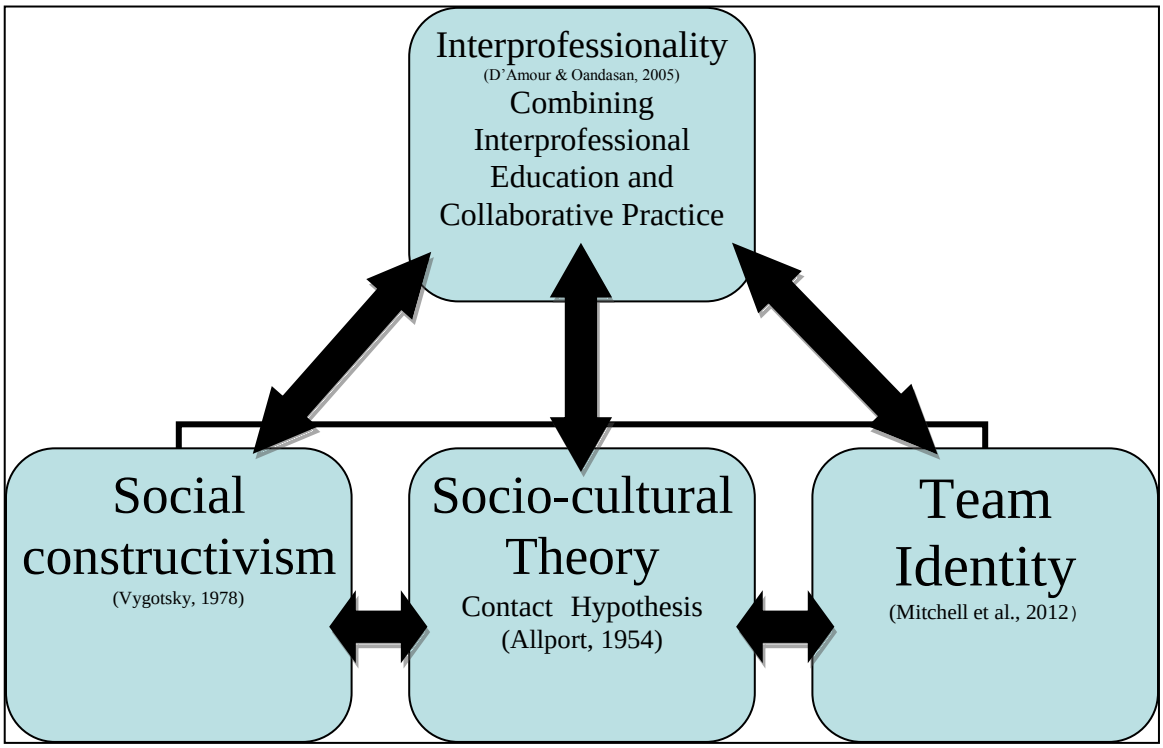

Figure 5. Interprofessionality.

Learning Outcomes of IPE

As in the interprofessionality model, learner outcomes must be interdependently "tied" to patient outcomes. Thistlethwaite and Moran (2010) extensively searched the literature to learn if the pushes from the WHO, IOM, and allied health educators worldwide to integrate IPE had resulted in promising learning outcomes that might transfer into better patient outcomes. Specifically, they asked if learning outcomes were aligned with curriculum and assessment for IPE. Learning outcomes included three categories: profession-specific (also considered uniprofessional, or skills only one profession learns and performs, such as anesthesiology), generic outcomes for two or

more professions (e.g. swallowing issues that may be addressed by occupational therapists or speech-language pathologists), or generic outcomes that all health professionals should gain (communication and teamwork). The results of this investigation include the top three learning outcomes the WHO began to support globally, including teamwork, roles/responsibilities, and communication in health care teams. It is of note that two of these three, teamwork and roles/responsibilities, were subscales on the RIPLS (Parsell & Bligh, 1999). The challenge then became more individualized as educators decided how best to attain those outcomes given limited resources of money and time, not to mention issues of culture change for traditionally static programs of study in allied health care education.

Several analyses of research have reported questionable or inconclusive results regarding the effectiveness of IPE on learning outcomes. Recently, Shrader, Kern, Zoller, and Blue (2012) found teamwork skills, as evaluated by trained observers with a researcher-provided checklist, were significant predictors of clinical outcome scores in simulated clinical settings. However, a self-report survey on attitudes toward interdisciplinary education was not a predictor. Gillan, Lovrics, Halpern, Wiljer, and Harnett (2011) found no tools in the literature addresses all IPE learner outcomes while Reeves et al. (2008) searched for studies for a Cochrane analysis, but turned up too few studies for a proper meta-analysis.

Barr et al. (2005) re-stated the premise of IPE that students who learn together will function as a better team in the workforce, which might lead to improved patient outcomes. This team also composed an often-used hierarchy of outcomes from learners as "reactionary" to providing benefits to patients and clients at the top (Curran, Sargeant,

& Hollett, 2007; Gillan et al., 2010). Further research in the area of IPE competency-attainment with larger sample sizes and consistency with regard to instruments and measures might lead educators toward a more pedagogically sound framework for devising IPE interventions. Olenick and colleagues (2010) constructed a concept map (Figure 6) that uses colors to divide aspects of IPE, including green for "IP learning" which includes assessment of competencies, evaluation of learning, and theory building as a way of conceptualizing the many needs in creating an interprofessional culture and system, including education.

Verma, Paterson, and Medves (2006) called for a new competency model specific to interprofessionalism due to the accelerated rates of change in health care for the 21st century. They agreed with Barr and colleagues (2005) who also believed a new model for IPE was overdue. Thistethwaite and Moran (2012) criticized studies such as Nisbet, Hendry, Rolls, and Field (2008) that defined outcomes as "evaluation of a learning initiative or activity" (p. 513) or research that assumed learning outcomes to be inherent in the evaluation tool, usually based on attitudes toward IPE rather than actual changes in knowledge.

Several European groups have solidified in the recent decade in order to create frameworks for the development of learning outcomes in IPE. The Combined Universities Interprofessional Learning Unit in Sheffield, United Kingdom, produced the Interprofessional Capability Framework (ICF). The ICF is centered on the students' capabilities instead of competencies (Walsh, Gordon, Marshall, Wilson, & Hunt, 2005).

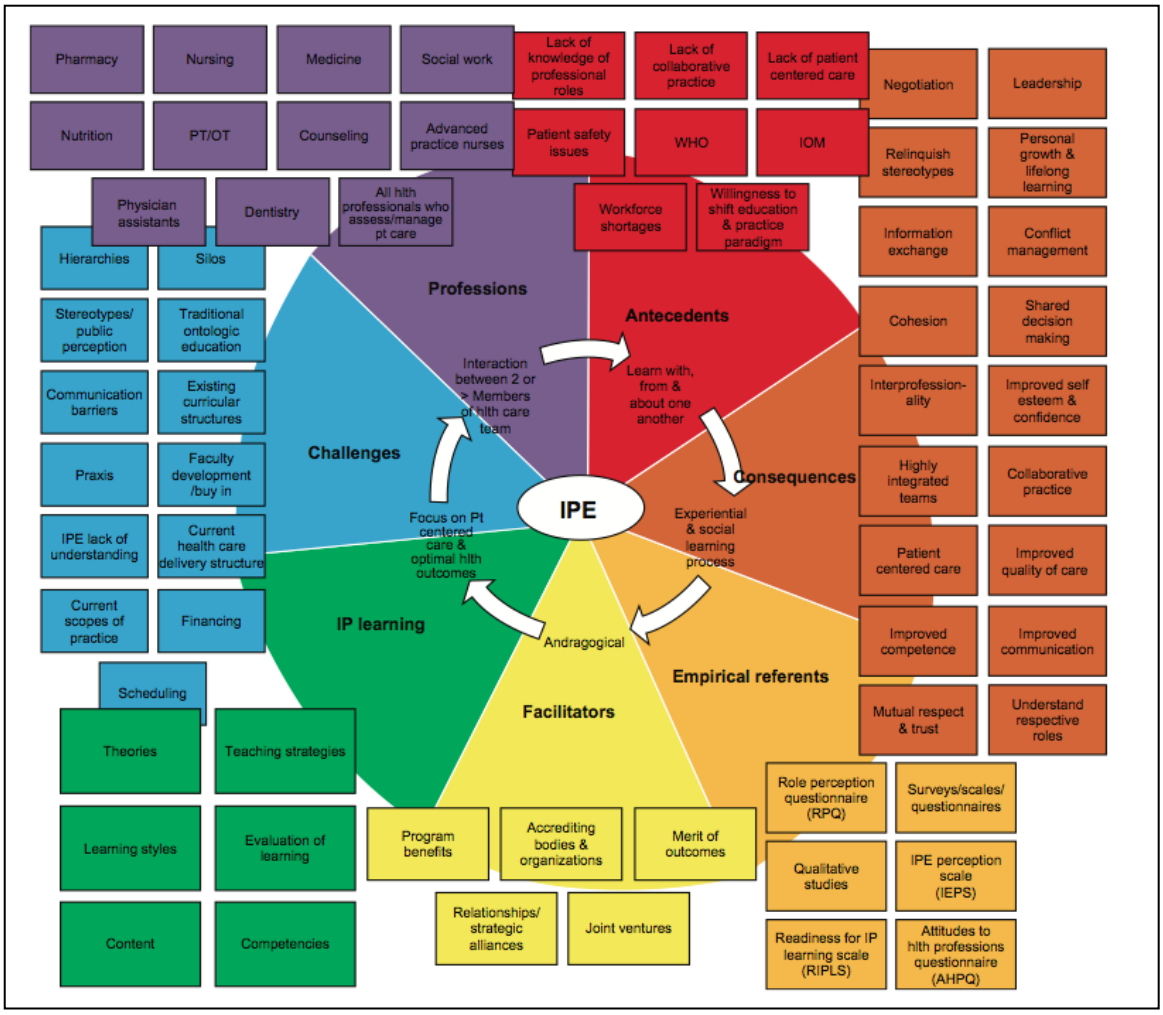

Figure 6. Iterative Color Wheel Concept Map. (Olenick et al. 2010). Used with permission from author (Appendix E).

The British Columbia Competency Framework for Interprofessional Collaboration, produced by the College of Health Disciplines at the University of British Columbia, Vancouver (Canada) and the Interprofessional Network of British Columbia, are slightly askew from the WHO (1988) definitions, defining three domains: interpersonal and communication skills; patient-centered and family-focused care; and collaborative practice. The Inter Professional Learning Curriculum Framework Group of the University of Sydney (Australia) includes several learning outcomes with an

overarching goal for students to be able to display a positive attitude toward teamwork and be effective and safe in caring for patients.

Challenges of IPE

The IECEP report details an extensive list of the "challenges to IEP" and then highlights a "positive example" of a particular institution and how the educators worked through the challenge (2010, p. 35). The report list includes: Institutional Level Challenges, Lack of Institutional Collaborators, Practical Issues, Faculty Development, Assessment issues, and Lack of Regulatory Expectations. As an example, the report explains how the Medical University of South Carolina elected to choose IPE as a 10-year Quality Enhancement Project in order to garner administrative support at the institutional level. Faculty development is addressed by incentivizing activity in the IPE program in the tenure and promotion process so active faculty members fostering IPE in the university are rewarded with additional time in contractual work and sometimes financial benefits.

Any transformational change will include several barriers in the process. For IPE, the IEPEC list is a starting point, but continued systems improvement will require a great deal of creativity and commitment from faculty, administrators, and students. One consideration that seems to be in the favor of institutions making this change is that the timing might be better in the midst of health care reform, at least in the U.S., rather than when it was called for in the 1970s and 80s. Olenick and colleagues (2010) also implore professionals to consider the risk of keeping traditional educational configurations in place. Where IPE is not integrated, they "contribute to silo-based health care delivery

structures where hierarchies exist and prohibit effective communication and collaboration" (p. 82).

Attitudes of Students Toward IPE

Several studies have used the RIPLS as a measure of allied health care students' attitudes toward IPE. As IPE can include any number of professionals, it is important to note the differences in which ones were compared in certain studies, and on what types of variables. It is also imperative that the research outcomes do not portray certain professions with a "broad brush" stereotype, since the important aspect of this review is to note similarities and differences without inferring causation. The preponderance of studies focus, however, on medical students, since they seem to be part of most IPE programs regardless of region.

Hertweck et al. (2012) studied physician's assistants (PA) specifically, and compared their scores on the 19-item, four subscale version of the RIPLS instrument to scores of counseling psychology, occupational therapy, or physical therapy students. PA students' mean scores were significantly lower on three of the four subscales (teamwork and collaboration, negative professional ID, and roles and responsibilities) than the other three professions' combined mean scores, and in overall scores. Curran, Sharpe, Forristal, and Flynn (2008) also reported a lower overall score for medical students on "negative professional identity" when compared to nursing, pharmacy, and social work students in Canada. They also recommended further examination of gender, profession, and year of study of the allied health students as the primary variables to consider regarding the RIPLS.

Medical students have been perceived by nursing and other students as less caring, less dedicated, more arrogant, and with poor teamwork skills (Horsburgh, Lamdin, & Williamson, 2001; Tunstall-Pedoe, Rink, & Hilton, 2003), while they were found to perceive nursing students as less academically qualified, less competent, and lower in status (Rudland & Mires, 2005). Rose et al. (2009) found more specific information regarding medical students' opinions on IPE as compared to nursing, physical therapy (PT) and occupational therapy (OT) on the RIPLS and IEPS at the end of a first year interprofessional mentor program. In terms of competence and autonomy, medical and PT students rated themselves higher than OT and nursing. On the RIPLS, medical students scored higher in the area of roles/responsibilities, meaning they 1) felt they understood their professional role, 2) agreed that "function of nurses and therapists is to support physicians" (p. 198), and 3) believed they need more knowledge and skills than their colleagues in other professions. One particularly salient discussion point regarding the differences among these four groups is that physicians and PTs earn a doctoral degree for entry level practice, while nurses and OTs do not, so there is a perception that the title of the degree is reflective of scope of practice for the different professions, including clinical autonomy.

Hawk et al. (2002) and Goelen, De Clercq, Huyghens, and Kerckhofs (2006) also compared these professions (with others, for 8 total in the Hawk study) and found similar results within a 95% confidence interval for PT and nursing. Goelen et al. (2006) also contrasted Rose et al. (2009) in that PT and medical students scored lower than OT and nursing in terms of need for cooperation in the former study. It should also be noted that Goelen's team surveyed preprofessional, undergraduate level students, which falls in line

with previous research that suggests IPE ought to begin in the undergraduate curriculum before stereotypes of other professions can negatively influence attitudes towards IPE (Carpenter, 1995; Hojat et al., 1997; Tunstall-Pedoe, Rink, & Hilton, 2003; Rudland & Mires, 2005), including work dissatisfaction and poor communication (Ryan & McKenna 1994). Mandy, Milton, and Mandy (2004) compared podiatry and physiotherapy (UK study) students and noted that podiatry students gained more appreciation for physiotherapy as a profession, but the reverse was not true; rather, the IPE in this case seemed to reinforce the physiotherapy students' preconceptions of podiatry curricula.

One of the current studies, since it involves medical students in their second year of school (as mandated by the School of Medicine and Health Sciences program of study), may add to understanding of differences among several professions in terms of IPE and its usefulness. Many studies have shown more mature students, students with health care experience, and medical students and medical residents (further along the American medical school curriculum) as having more negative attitudes toward IPE (Hojat et al., 1997; Leipzig et al., 2002; Tanaka & Yokode, 2005) and interprofessional interaction (Pollard, Miers, & Gilchrist 2004).

Research Purpose

To address the research questions posed in the introduction, two studies were conducted in order to address the past and present course effectiveness. The purpose of the first study was to analyze the RIPLS-2010 to learn about its utility for this course and discover any trends by profession. The data was collected over three years, or twelve total sessions of student data from IPHC. The methods, results, and discussion are presented in Chapter 3.

Study #2 involved the analysis of a pre and post sample of one session of IPHC students. There were two purposes of the second study: 1) To determine the reliability of the RIPLS-2013 and 2) to compare pre and post scores by factor depending on the results of the previous analysis. Methods, results, and discussion are presented in Chapter 4. The final chapter presents a general discussion of both studies and links them to the related literature in the field of IPE.

CHAPTER III

STUDY #1

Methodology

The Institutional Review Board (IRB) at the University of North Dakota (UND) in Grand Forks, North Dakota approved this study. This methods section discusses the participants, instrument, design, and procedure used in this study. The results and discussion specific to study #1 conclude this chapter.

Participants

Students in each discipline represented in the IPHC course (MD, RN, PT, OT, CS, MT, ND, and SW) enrolled in a single six-week session of the course for one credit. For instance, a student may have taken the course fall or spring semester, in session one or two of that semester, over six weeks. Some programs require students in that discipline to take the class, as opposed to taking it as an elective. The total number of RIPLS-2010 analyzed was 631, for an average of 53 students per session over the twelve sessions of IPHC.

Instrument

This survey analysis was used to evaluate a modified version (RIPLS-2010) of the RIPLS (Parsell & Bligh, 1999), which is a self-completion inventory meant to measure the attitudes of allied health profession students regarding teamwork, roles/responsibilities, and professional identity. The version was identical to the Reid et

al. (2006) version used with allied health professionals, except that study included twenty-three items and an extra factor they called “patient centeredness.”

The RIPLS-2010 had 18 items, instead of the Parsell and Bligh (1999) 19-item version, rated on the same 1-5 Likert-type scale (see Appendix C for a listing of items in each version of the RIPLS). There was a space for students to write in their major, but no other identifying information was requested on the form. Three items from the original RIPLS but not in the current study were: “I'm not sure what my professional role will be,” “It is not necessary for undergraduate health care students to learn together,” and “I don't want to waste my time learning with other health care students.” Two items added by Reid et al. (2006) and thus replicated for the version used in the current study were “There is little overlap between my role and that of other health care professionals” and “I would feel uncomfortable if another health care professional knew more about a topic than I did.”

Design

This research study used a post hoc design, as the researcher collated three years of RIPLS-2010 data that was already in existence at the time the research questions were posed. The data was collated from a Microsoft Excel document and imported into Statistical Package for the Social Sciences (SPSS 21) software for analysis. A descriptive analysis of student demographics, exploratory factor analysis, and measures of internal consistency was conducted. The second analysis was a Kruskal-Wallis test, a non-parametric equivalent to an analysis of variance to determine if there were differences between the unequal numbers of students in each profession. The independent variables were the eight professions and the dependent variable was RIPLS-2010 scores.

Procedure

Students may have taken the RIPLS-2010 one of two ways over the three years of surveys evaluated. They either took the RIPLS-2010 by 1) placing a cross (X) in one box for each question to indicate the extent to which they agreed or disagreed with each statement on a Likert-type 1-5 scale or 2) read the item on a separate sheet and then filled in the 1-5 number on a separate "scannable" form that was machine-read to create the database. Data that were already filed by course administrators were collated by the researcher into one complete database. Students were required to complete the RIPLS-2010 in order to receive a final grade for the course, as they were usually given the survey at the very end of the final class period. Durrant and Dorius (2007) suggested that mandatory survey responses in an IPE course would still gather meaningful data for analysis. The mandatory nature of these data also means a higher yield for analysis, which made for a large sample in terms of analysis of a RIPLS-2010 version compared to the literature.

The collected RIPLS-2010 forms or scanned response forms were delivered by the class facilitators to the course coordinator, who is then responsible for compiling a rough version of the data and filing the surveys in locked, secure filing cabinets or password-protected computers to maximize confidentiality of the documents.

Results

The analyses for study #1 were carried out in order to answer the following research questions:

1. Was the RIPLS-2010 a reliable instrument?

2. Across the eight professions, are there any differences, regardless of factor, between student groups?

Reliability of the RIPLS-2010

Results of descriptive, reliability, and factor analyses indicated the 2010-2012 sample had a moderately high degree of reliability. First, analysis included examination of the descriptive statistics, including the mean, standard, deviation, skewness, and Cronbach's coefficient for the scale.

Table 2. Professions in IPHC, 2010-2012.

Profession	Total	Percent
Nursing	226	36.7
Medicine	128	20.8
Physical Therapy	95	15.4
Occupational Therapy	68	11.0
Social Work	33	5.4
Communication Science and Disorders	29	4.7
Nutrition and Dietetics	28	4.5
Music Therapy	9	1.5
Totals	631	100.0

Nursing and medical students made up 57.5% of the student categories in the three years analyzed, which is typical of most of the previous literature on interprofessional education that centered on these two professions (Table 2). In this sample, it is worthwhile to note nursing majors are in their senior year as undergraduates, while medical students are in their second year of the medical school curriculum. More students typically enroll in session 1, which is the first 6 weeks in a given semester (Table 3). Since medical, nursing, and physical therapy students are mandated to take the

course at a particular time in their curricula with a cohort, these cohorts are likely somewhat larger earlier in the semester, before any students may need to drop out of the program. In general, student enrollment increased for the three years under review, partly due to adding the newer disciplines of nutrition/dietetics and music therapy, and partly due to the growing popularity of the course. Most students enrolled in IPHC in a fall semester session.

Table 3. Students by Session, Year, and Semester, 2010-2012.

	Number	Percent
Session		
One	353	55.9
Two	278	44.1
Year		
2010	153	24.2
2011	217	34.4
2012	261	41.4
Semester		
Fall	408	64.7
Spring	223	35.3

Table 4 includes the individual item means and standard deviations. The highest mean for the first component was item 5: "Patients ultimately benefit if health care professionals work together to solve patient problems." The lowest mean was for item 11: "I would welcome the opportunity to work on small-group projects with other health care professionals." The second component included a high mean of 2.2 for item 18 "I have to acquire much more knowledge and skills than other health care professionals"

Table 4. Item Means and Standard Deviations of the RIPLS-2010.

	Item	Mean	*SD*
1	Learning with other health care professionals will help me become a more effective member of a health care team	4.67	0.66
2	If small group learning is to work, health care professionals need to trust and respect each other	4.74	0.60
3	Teamworking skills are essential for all health care students to learn	4.72	0.61
4	Shared learning will help me to understand my own limitations	4.40	0.74
5	Patients would ultimately benefit if health care professionals worked together to solve patient problems	4.80	0.59
6	Shared learning with other health care professionals will increase my ability to understand clinical problems	4.49	0.79
7	Learning with healthcare students from other disciplines before would improve relationships after	4.44	0.77
8	Communications skills should be learned with other health care professionals	4.59	0.68
9	Shared learning will help me to think positively about other professionals	4.42	0.78
10	Shared learning with other health care professionals will help me to communicate better with patients and other professionals	4.55	0.69
11	I would welcome the opportunity to work on small group projects with other health care professionals	4.35	0.83
12	Shared learning helps to clarify the nature of patient problems	4.47	0.77
13	Shared learning before would help healthcare professionals become better team workers	4.51	0.75
14	Clinical problem solving should only be learned with professionals from my own discipline	1.65	0.82
15	The function of nurses and therapists is mainly to provide support for doctors	1.50	0.76
16	There is little overlap between my role and that of other health care professionals	1.86	0.93
17	I would feel uncomfortable if another health care professional know more about a topic than I did.	1.96	0.95
18	I have to acquire much more knowledge and skills than other health care professionals	2.20	1.13

and a low mean of 1.5 for item 15: "The function of nurses and therapists is mainly to provide support for doctors." Of note is that item 18 also had the highest standard deviation of 1.13. Skewness scores for these items ranged from -4.41 to 1.82 and all items were found via Kolmogorov-Smirnov tests of normality to be non-normal at the $p <$ .001 level.

A one-way analysis of variance showed that the effect of year was significant on the teamwork factor ($F(2, 625) = 5.04$, $p < .05$) and professional identity factor ($F(2, 624) = 3.89$, $p < .05$). Post hoc analyses using the Bonferroni criterion for significance indicated that 2011 scores ($M = 4.62$, $SD = 0.48$) were higher than in 2012 on this factor ($M = 4.46$, $SD = 0.59$). Regarding the professional identity factor, 2012 scores ($M = 1.93$, $SD = 0.78$) were significantly higher than in 2010 ($M = 1.77$, $SD = 0.63$).

Prior to conducting the exploratory factor analysis, preliminary tests and assumptions were undertaken to determine whether this was an appropriate statistical analysis. A Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) was conducted, resulting in a Chi-square of 8355.1, and score of .962 (on a scale of 0 to 1). The Bartlett's test of sphericity was significant at $p < .05$. All MSAs on the anti-image correlation matrix were higher than 0.88. A high KMO score and significant test of sphericity are required in order to appropriately conduct a factor analysis.

Two components met Kaiser's eigenvalue criterion of > 1, and explained 65.5% of the variance (Table 5). This was evident from the scree plot, with an "elbow" showing two components contributing most of the variance as well (Figure 7). Therefore, the remaining analysis as shown in Table 6 was conducted using Promax rotation to examine for simple structure. The lowest factor loadings were still very high—including .701 in

the pattern matrix and .692 in the structure matrix, so this criterion was also met. Two clear statistical factors emerged.

The internal consistency measures for each factor are displayed in Table 7 and are considered very high. There was a moderately negative correlation due to the teamwork factor including positively phrased items and the professional identity factor including negatively phrased items that were not reverse scored. Given the strong factor groupings and internal consistency measures, it was concluded that this version of the RIPLS was considered a reliable instrument, but the skewed nature of the individual item means are of concern as to the normality of the data.

Profession Differences by Factor

Several differences were found when compared by discipline. Before conducting further analysis based on professions, a non-parametric analysis of variance (ANOVA) test of homogeneity was conducted to address the issue of non-normative data based on the wide range of students in each discipline (Table 8). Nordstokke and Zumbo (2007) recommended this type of preliminary analysis in order to ensure that a non-parametric test was called for rather than a typical ANOVA. The F scores for both factors resulted in significant differences, rejecting the null hypothesis of a normal set, and indicating that a Kruskal-Wallis test was appropriate for the factors that were assigned the titles of teamwork [$F(7,606) = 3.671$, $p < .05$] and professional identity [$F(7,605) = 2.57$, $p < .05$] based on previous literature subscales.

The Kruskal-Wallis test resulted in scores of mean rank for both factors by profession, accounting for the wide range of students, from nine in music therapy to 226 in nursing, and allowed for conservative comparisons (Table 9). Results indicated both

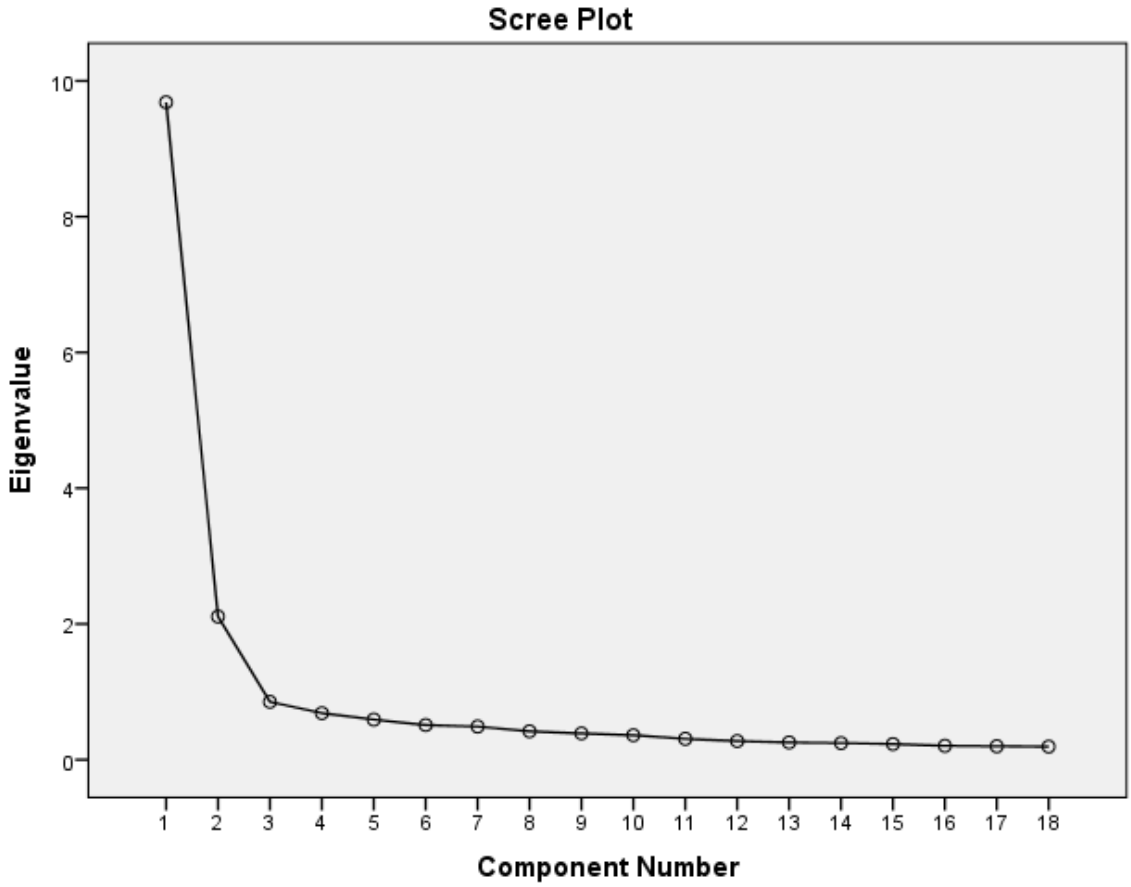

Figure 7. Scree plot.

factors were significant with small effect sizes (Table 10). A matrix of multiple comparisons with Chi square scores and eta squared effect sizes is found in Table 11.

Multiple comparisons procedures were conducted to compare the medical students to each of the others, based on previous research suggesting differences with students in this major. These tests were conducted using Bonferroni adjusted alpha levels of .007 (.05/7, number of comparisons made). The Tukey-Kramer method was used to control for Type I error rate due to multiplicity when generating pair-wise multiple comparisons (PMCs) with four or more groups. PMCs are used to evaluate all pairs of means that could be compared among the eight groups (Hayter, 1984).

Table 5. Total Variance Explained.

	Initial Eigenvalues	
Component	Total	% of Variance
1	9.685	53.807
2	2.109	11.718
3	.852	4.734
4	.686	3.812
5	.592	3.287
6	.510	2.836
7	.488	2.713
8	.419	2.329
9	.387	2.151
10	.362	2.008
11	.308	1.709
12	.274	1.524
13	.254	1.412
14	.246	1.364
15	.232	1.286
16	.205	1.137
17	.198	1.101
18	.193	1.073

This method compares values that are the minimum differences between the mean ranks of the two groups in each comparison that can be declared statistically significant and account for unequal samples. For instance, the minimum significant difference (MSD) between medicine (mean rank=215.98) and nursing (307.31) was a Chi-square value of 61.30, but the actual difference in mean ranks was 91.33, higher than the MSD, resulting in pairwise significance at the .007 level (Table 12).

Specific to the teamwork factor, four pairwise comparisons were significantly different. Moderate effect sizes (η^2 .05 to .12) were found between nursing and medicine, while large effect sizes (η^2 >.12) were found between medicine and physical therapy,

medicine and occupational therapy, and medicine and nutrition. On the factor of

Table 6. Promax Rotated Component Factor Loadings.

	Pattern Matrix		Structure Matrix	
	Component 1	Component 2	Component 1	Component 2
Q1	**.874**	.007	**.871**	-.374
Q2	**.871**	.123	**.818**	-.256
Q3	**.872**	.086	**.834**	-.294
Q4	**.834**	-.019	**.842**	-.382
Q5	**.859**	.134	**.800**	-.240
Q6	**.780**	-.089	**.819**	-.429
Q7	**.811**	-.072	**.843**	-.426
Q8	**.858**	.026	**.847**	-.348
Q9	**.810**	-.093	**.851**	-.446
Q10	**.875**	.005	**.873**	-.376
Q11	**.706**	-.086	**.743**	-.393
Q12	**.801**	-.077	**.834**	-.426
Q13	**.814**	-.008	**.818**	-.363
Q14	-.0125	**.701**	-.431	**.755**
Q15	.002	**.739**	-.320	**.738**
Q16	.042	**.751**	-.285	**.733**
Q17	.114	**.742**	-.209	**.692**
Q18	-.030	**.762**	-.362	**.776**

Table 7. Measures of Internal Consistency on Two Factors.

Subscale	Items	F1	F2	Cronbach
Teamwork	Q1-13	--	-0.45*	.96
Professional Identity	Q14-18		--	.79

*$p < .05$

teamwork in each case involving medicine, the medical students scored lower than the other profession in the comparison on items indicating less agreement that teamwork was an important element in health care.

Table 8. Non-Parametric Analysis of Variance Test of Homogeneity.

Factor	*df*	*F*	*P*
Teamwork	606	3.67	.00*
Professional Identity	605	2.57	.01*

*$p < .05$

Table 9. Kruskal-Wallis Test.

Profession	*N*	Teamwork Mean Rank	Professional Identity Mean Rank
Nursing	226	307.31	267.04
Medicine	128	215.98	415.96
Physical Therapy	94	342.65	264.67
Occupational Therapy	68	381.29	298.54
Social Work	32	304.86	334.19
Communication Science and Disorders	29	317.88	302.74
Nutrition and Dietetics	28	397.25	267.00
Music Therapy	9	385.89	303.78

Table 10. Chi-Square Test by Factor.

	χ^2	*df*	*p*	Cramer's *V*
Teamwork	60.48	7	.00*	0.12
Professional Identity	68.53	7	.00*	0.13

*$p < .05$

Table 11. Kruskal-Wallis Multiple Comparisons on Teamwork χ^2 (Effect size, η^2).

	RN	MD	PT	OT	SW	CS	ND
RN	--						
MD	21.73(.06)	--					
PT	2.68(.01)	30.34(.14)	--				
OT	8.99(.03)	35.62(.18)	2.82(.02)	--			
SW	.00(.00)	8.83(.06)	1.4(.01)	5.62(.06)	--		
CS	.16(.00)	8.54(.05)	.58(.00)	3.42(.04)	.33(.01)	--	
ND	6.54(.03)	20.50(.13)	2.99(.03)	.23(.00)	6.2(.11)	3.69(.07)	--
MT	1.67(.01)	8.40(.06)	.56(.01)	.12(.00)	2.8(.07)	1.63(.04)	.18(.01)

Table 12. Least Significant Difference Between Mean Ranks on Teamwork.

	RN	MD	PT	OT	SW	CS	ND
RN	--						
MD	61.30*	--					
PT	68.01	75.27*	--				
OT	76.64	83.15*	88.21	--			
SW	104.66	109.52	113.41	118.79	--		
CS	109.30	113.96	117.70	122.89	142.07	--	
ND	111.02	115.61*	119.30	124.42	143.39	146.81	--
MT	188.35	191.09	193.35	196.55	209.07	211.43	212.33

*$p < .007$

On the second factor of professional identity (Tables 13 and 14), four comparisons were found to be statistically significant. Moderate effect sizes (η^2 .05 to .12) were found between two pairs: medicine and occupational therapy as well as medicine and nutrition. Large effect sizes (η^2 >.12) existed between nursing and medicine as well as physical therapy and medicine. In each case, the medical students scored higher than the other group in the comparison indicating they had a more solidified sense of their professional identity. These items had connotations that were

counter to the nature of IPE, such as a dislike for collaboration or insecurity about a professional's responsibilities within the team structure.

Table 13. Kruskal-Wallis Multiple Comparisons on Professional Identity χ^2 (Effect size, η^2).

	RN	MD	PT	OT	SW	CS	ND
RN	--						
MD	54.12(.15)	--					
PT	.01(.00)	37.82(.17)	--				
OT	1.94(.01)	21.55(.11)	1.65(.01)	--			
SW	5.44(.02)	9.54(.06)	5.07(.04)	1.11(.01)	--		
CS	1.29(.01)	12.10(.08)	1.27(.01)	.01(.00)	.19(.00)	--	
ND	.00(.00)	14.34(.09)	.00(.00)	.83(.01)	2.1(.04)	.73(.01)	--
MT	.62(.00)	4.92(.04)	.67(.01)	.01(.00)	.34(.01)	.02(.00)	.33(.01)

Table 14. Least Significant Difference Between Mean Ranks on Professional Identity.

	RN	MD	PT	OT	SW	CS	ND
RN	--						
MD	61.25*	--					
PT	67.94	75.15*	--				
OT	76.56	83.02*	88.07	--			
SW	104.52	109.34	113.22	118.59	--		
CS	109.15	113.77	117.51	122.69	141.84	--	
ND	110.86	115.42*	119.11	124.22	143.16	146.57	--
MT	188.06	190.78	193.03	196.23	208.73	211.09	211.98

*$p < .007$

Discussion

Study one explored the reliability of the modified RIPLS and compared professions by factor with an analysis of three years of student data. Research questions were:

1. Was the RIPLS-2010 reliable based on the students' self-report at the end of each session?
2. Across the eight professions, were there any differences, regardless of factor, between student groups?

Summary of Results

Research Question #1

The results of this study indicate that the RIPLS-2010 offers high factor reliability. Previous iterations of the RIPLS have included a three factor (Parsell & Bligh, 1999; Reid et al., 2006) or four factor (McFadyen et al., 2005) model, and reported lower Cronbach coefficient scores for each factor than those reported in the present study. However, this is the first study to include the particular professions listed, and used a higher total number of surveys by comparison to Reid et al. (N = 120; 2006) and McFadyen et al. (N = 308 and 247 in separate analyses; 2005). Reid et al. (2006) reported Cronbach coefficients for teamwork and collaboration (0.88), patient-centeredness (0.86), and sense of professional identity (0.69). McFadyen et al. (2005) conveyed Cronbach coefficients for teamwork and collaboration (0.79 and 0.88 in separate analyses), negative professional identity (0.60 and 0.76), positive professional identity (0.76 and 0.81), roles & responsibilities (0.40 and 0.43).

Research Question #2

Medical students scored lower than students in nursing, physical therapy, occupational therapy, and nutrition/dietetics on the factor of teamwork where a higher mean is indicative of a willingness to collaborate with other health professionals and patients. Medical students scored higher than nursing, physical therapy, occupational

therapy, and nutrition/dietetics students in the other health professions on the factor of professional identity, where higher scores meant students felt they understood the nature of all personnel on the health care team.

Limitations

There are some weaknesses to this study that should be taken into account for future similar analyses of the RIPLS in this or other IPE classes. This was an analysis of surveys collected after the IPHC course. The range of undergraduate to mid-level graduate/professional work is very difficult to parse outside of profession. Surveying only graduate-level students in these professions may better control for this potential confound.

Other potential limitations include any slight changes made to the curriculum in terms of delivery by a variety of different facilitators over the time period for the study. While the general content did not change, tweaks to the facilitator guide materials could not be controlled for in this study as it was based on existing data. An accurate accounting of facilitator expertise would be very valuable as a means for controlling content delivery throughout the various semesters. The ANOVA by year that resulted in differences by factor is not easily explained, but inconsistency in course facilitation and delivery of content should be taken into consideration as a confound.

CHAPTER IV

STUDY #2

Methodology

The Institutional Review Board (IRB) at the University of North Dakota (UND) in Grand Forks, North Dakota approved this study. The purposes of this study were to evaluate a second version of the Readiness for Interprofessional Learning Scale (RIPLS-2013) based on the sample of a single session of Interprofessional Health Care (IPHC) students and compare scores by factor before and after to learn whether the course may have made a difference in what Parsell and Bligh (1999) termed "readiness for interprofessional learning." This methods section explains the participants, instrument, design, and procedure. The results and discussion specific to study #2 conclude this chapter. Discussion that compares both studies follows in Chapter 5.

Participants

The first session in the 2013 spring semester included sixty-six (N = 66) health care students with majors of medicine (n = 16), nursing (n = 23), communication science and disorders (n = 6), occupational therapy (n = 8), physical therapy (n = 12), and social work (n = 1).

Instrument

The survey used in this study, RIPLS-2013, was identical to the original 19-item RIPLS (Parsell & Bligh, 1999) except it omitted the item "Learning with health care students before qualification would improve relationships after qualification." This item

was also omitted in Williams et al. (2012) due to lack of fit in their analysis.

Design

Allied health care students enrolled in a single six-week session of the IPHC course for one credit. In this session, no students from music therapy or nutrition and dietetics were enrolled. These programs have smaller overall numbers of students and encourage IPHC as an elective rather than a required course, so they do not always have enough students to have the discipline represented in the overall course numbers in certain sessions. All students took the RIPLS-2013 on week 1 by filling in the number of agreement (1-strongly disagree to 5-strongly agree) on a "scannable" form that was machine-read with responses entered into a database for analysis. At the final class period (week 6), the RIPLS-2013 was presented to each student by small group facilitators who also collected the scannable forms and delivered them to the course coordinator, who was then responsible for entering the data and filing the surveys in locked, secure filing cabinets and password-protected computers to maximize confidentiality of the anonymous documents. Students were required to complete the RIPLS-2013 in order to receive a final grade for the course, which was a mandate from the IPHC course committee. For this analysis, the two levels of the independent variable were the RIPLS-2013 administration times before and after the IPHC course, and the dependent variable was the RIPLS-2013 scores.

Procedure

The director of IPE at UND granted permission for this analysis of the RIPLS-2013 in session 1 of the spring 2013 semester of IPHC, which was a precondition for IRB approval. Prior to this analysis, only post scores or retrospective post scores (using two

sets of post scores from different samples) had been analyzed in the literature (Haskins, 2008). Therefore, this instrument required the students to create a personal code of the first three letters of the student's first name, the last three letters of the student's last name, their year of birth, and discipline. This coding system was used previously by Parsell and Bligh (1999) and was approved by the IPHC course committee for the purposes of this study in matching pre and post scores.

A reliability analysis and an exploratory factor analysis were performed on pre and post data using Statistical Package for the Social Sciences (SPSS 21) software to compare to prior publications on other versions of the RIPLS and the previous study in this paper, which also used a modified 18-item version (RIPLS-2010). Once factors were considered, a comparison of the differences of means by factor were analyzed. A comparison of the RIPLS-2010 from study one and the current study, as well as previous published research on this instrument, is available in the Appendices.

Results

There were two research questions that prompted study #2. First, was the RIPLS-2013 reliable based on the students' self-report at the beginning and end of the spring 2013 first class session of IPHC?

The RIPLS-2013 was found to have low-to-moderate overall reliability based on measures of internal consistency and an exploratory factor analysis. Analysis included examination of the descriptive statistics, including the mean and standard deviation scores along with skewness test of normality.

Table 15. Professions Represented in IPHC, Spring 2013.

Profession	Total	Percent
Nursing	23	34.8
Medicine	16	24.2
Physical Therapy	12	18.2
Occupational Therapy	8	12.1
Communication Science and Disorder	6	9.1
Social Work	1	1.5
Totals	66	100.0

Nursing and medical students made up 58.9% of the student categories in this study, with similar proportion to study #1 (Table 15). Also similar to the previous sample, females made up a very high percentage of the total students (83.3), while there were slightly more graduates taking this session of the course (graduate = 56.1%, undergraduate = 43.9%). While age was not a factor in previous RIPLS research, it received cursory examination in this study with 53 of the 66 students born between 1988 and 1991 (approximately 22-25 years old), indicating a small number of older students in these professional programs of study. As was the case with the post analysis of the RIPLS-2010, all items on both the pre and post analysis of the RIPLS-2013 were found to be non-normally distributed.

Factor Analysis and Reliability

Williams, Brown, and Boyle (2012) conducted a factor analysis on their version of the RIPLS and reported the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to demonstrate suitability for this analysis. Those data are also reported for the current study in pre and post format (Table 16).

Pre score analysis resulted in four components exceeding Kaiser's eigenvalue criterion of > 1, and explained 64.62% of the variance. However, the scree plot of pre scores (Figure 8) indicates only one strong factor. Further analysis of the Promax rotations indicated conflicting components that might comprise any main factor. Several items demonstrated complex structure (Tables 19 and 20). Given these weaknesses, no discernable factors were identified for further reliability analyses.

From the post factor analysis, four components were shown to meet Kaiser's eigenvalue criterion of > 1, and explained 72.8% of the variance (Table 17). However, Velicer and Jackson (1990) suggested that referring only to Kaiser's criterion may result in overextraction of components and was the "least accurate of the (extraction) procedures studied" (p. 10). The authors suggest better procedures to take into consideration, including the scree test by Cattell (1966). Therefore, the scree plot for post scores is included in Figure 9 and suggested two primary factors that made up 58.27% of the variance. Factor loadings indicated items 1-8 were likely a strong factor. Items 9-15 also loaded together, with the exception of item 11. Only two items each loaded on the potential third and fourth factors.

Table 16. Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity.

Test	Pre	Post
KMO Chi-Square	637.19	843.59
Score	0.824	0.853
Bartlett's Test	.000	.000

Table 17. Total Variance Explained for Pre and Post Scores.

	Initial Eigenvalues			
	Pre		Post	
Component	Total	% of Variance	Total	% of Variance
1	7.650	42.501	7.928	44.042
2	1.615	8.973	2.562	14.231
3	1.297	7.205	1.437	7.985
4	1.070	5.942	1.176	6.533
5	.968	5.379	1.000	5.555
6	.829	4.608	.812	4.511
7	.731	4.059	.572	3.176
8	.667	3.706	.450	2.502
9	.559	3.105	.410	2.277
10	.521	2.897	.372	2.065
11	.463	2.570	.299	1.660
12	.431	2.395	.201	1.117
13	.348	1.934	.190	1.054
14	.277	1.537	.165	.918
15	.210	1.165	.133	.741
16	.166	.921	.126	.701
17	.128	.710	.105	.581
18	.071	.394	.063	.350

The possible factors were then grouped for reliability analysis and named, shown in Table 18. The two factors (teamwork and professional identity) had a Cronbach coefficient of .95 and .89, indicating good attitudinal constructs and were significantly different, demonstrating discriminant validity. Items 9 and 10 were reverse scored to match items 12-15 in the construct which were positively phrased, resulting in a moderate positive correlation. The other two factors were not considered suitable for further analysis (uniprofessionalism at .62 and roles and responsibilities at .42).

Paired Samples

A paired samples *t*-test was conducted on two of the four factors from the factor analysis to answer the fourth research question: Does the IPHC course have an effect on

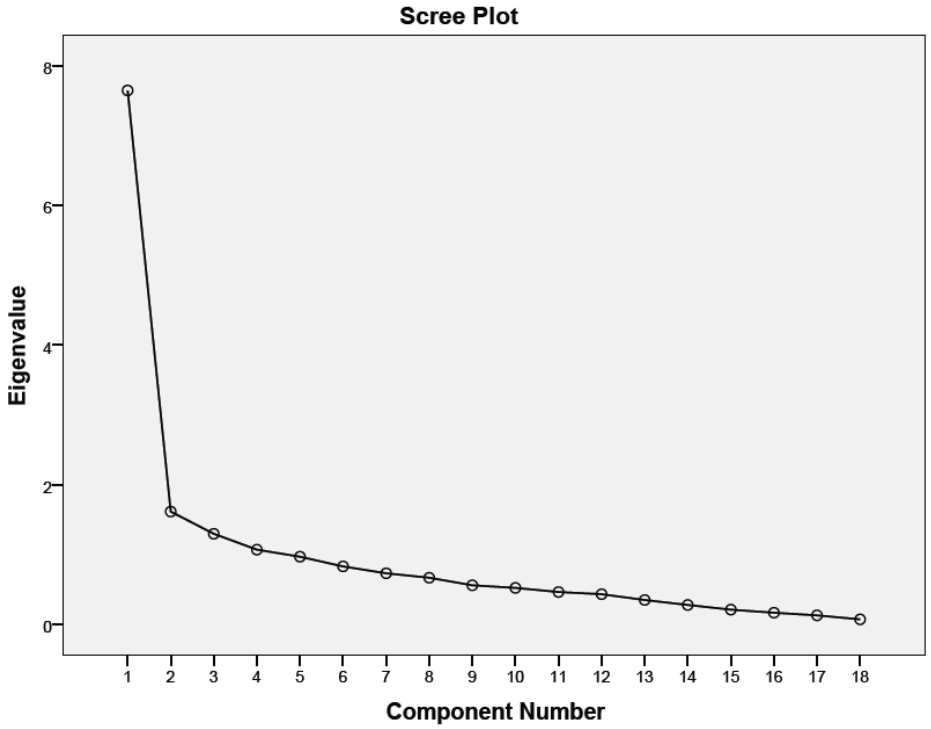

Figure 8. Scree Plot of Pre Scores.

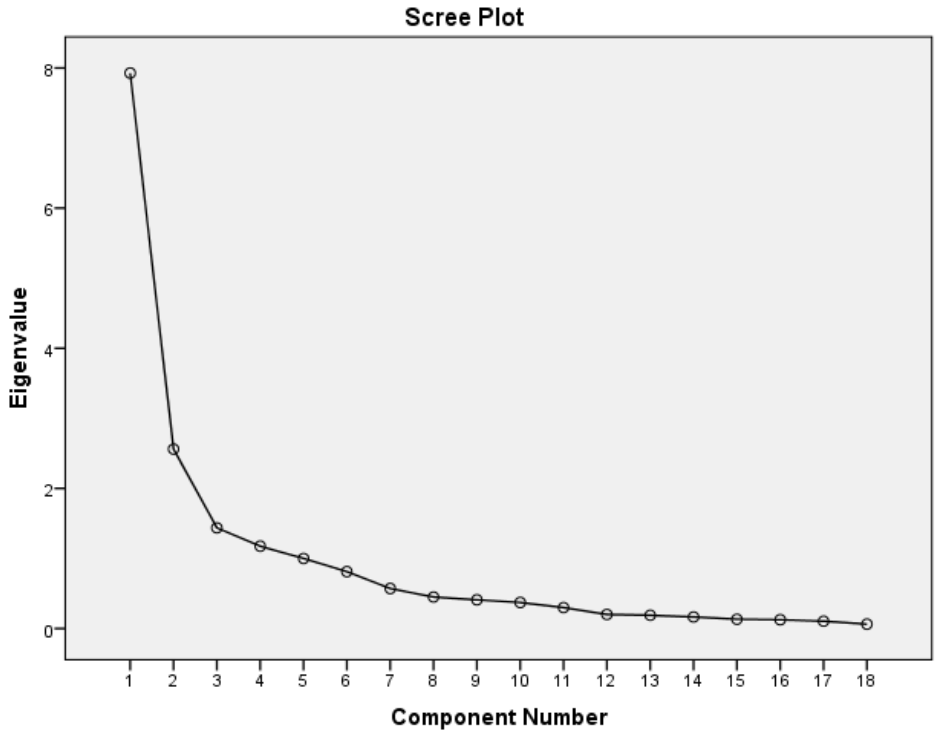

Figure 9. Scree Plot of Post Scores.

student self-report of interprofessional learning based on the RIPLS-2013? Individual pre and post means and standard deviations along with difference scores are found in Table 21. When compared by factor, no statistically significant differences were found by the paired *t* test analysis (Table 22).

Table 18. Measures of Internal Consistency by Factor Based on Post RIPLS (*N* = 66).

Subscale	Items	F1	F2	Cronbach
Teamwork	Q1-8	--	.52*	.95
Professional Identity	Q9, 10, 12, 13, 14, 15		--	.89

*$p < .05$

Table 19. Pattern Matrix Factor Loadings of Pre and Post Scores.

	Pre				Post			
Item	1	2	3	4	1	2	3	4
1	-.066	**.756**	.327	.065	**.827**	.141	-.093	.041
2	-.150	**.708**	.189	-.073	**.836**	.146	-.155	.227
3	.199	.204	**.612**	-.035	**.899**	.180	-.143	-.110
4	-.046	.199	**.715**	.216	**.857**	.154	.065	-.041
5	.069	.335	**.612**	-.051	**.860**	.188	-.105	-.227
6	.433	.373	.108	.081	**.744**	.227	-.291	-.055
7	.424	**.509**	.030	.115	**.728**	.249	-.329	.145
8	.281	.334	.184	-.313	**.845**	.187	-.207	-.196
9	-.379	.064	-.410	.235	-.228	**-.521**	.176	.190
10	-.356	-.150	-.314	.235	-.429	**-.472**	-.055	.458
11	**-.839**	-.275	.516	-.009	-.270	**-.**166	**.689**	.008
12	**.850**	-.337	.186	.074	.280	**.818**	-.150	.127
13	**.742**	-.012	.181	.077	.382	**.787**	.001	-.015
14	**.892**	.053	.032	.076	.114	**.909**	.041	-.084
15	**.810**	.129	.110	.083	.063	**.915**	-.070	-.065
16	.170	.087	-.069	**.792**	.036	-.380	.391	**.511**
17	.190	-.330	.281	**.780**	-.009	.027	.008	**.827**
18	-.440	.347	.039	**.559**	-.183	.053	**.865**	.073

Table 19. Structure Matrix Factor Loadings of Pre and Post Scores.

	Pre				Post			
Item	1	2	3	4	1	2	3	4
1	.414	**.789**	.442	-.129	**.840**	.338	-.281	-.030
2	.292	**.695**	.291	-.185	**.851**	.333	-.334	.148
3	**.618**	.434	**.770**	-.329	**.931**	.412	-.356	-.192
4	.325	.302	**.671**	-.011	**.853**	.350	-.140	-.106
5	**.553**	**.510**	**.737**	-.315	**.895**	.418	-.318	-.304
6	**.623**	**.577**	.389	-.182	**.811**	.429	-.469	-.145
7	**.621**	**.686**	.327	-.143	**.797**	.432	-.495	.047
8	**.648**	**.551**	.496	**-.533**	**.894**	.420	-.412	-.278
9	**-.653**	-.234	**-.660**	.495	-.365	**-.590**	.286	.292
10	**-.676**	-.416	**-.600**	.493	-.**528**	**-.594**	.114	.547
11	**-.693**	**-.533**	.027	.211	-.394	-.291	**.744**	.085
12	**.766**	.071	**.526**	-.260	.463	**.856**	-.289	-.030
13	**.800**	.347	**.537**	-.267	.**540**	**.850**	-.168	-.162
14	**.902**	.446	.479	-.292	.304	**.905**	-.089	-.233
15	**.891**	**.501**	**.531**	-.289	.271	**.908**	-.185	-.219
16	-.137	.020	-.198	**.731**	-.124	-.443	.438	**.583**
17	-.119	-.309	.073	**.675**	-.039	-.055	.048	**.811**
18	-.485	.069	-.277	**.664**	-.290	-.083	**.876**	.119

Discussion

Study #2 explored the reliability of the RIPLS-2013 instrument and compared scores by factor before and after students took the IPHC course in spring semester of 2013. The pre and post comparison by factor aspect of the study was a new use of the RIPLS found nowhere else in the literature.

Summary of Results

This particular modification of the RIPLS, the RIPLS-2013, resulted in two primary factors of teamwork and professional identity, found also in study #1 and as two of the three factors in the original RIPLS (Parsell & Bligh, 1999). Two other factors that

Table 21. Paired Means, Standard Deviations, and Differences of the RIPLS-2013.

#	Item	n	Pre		Post		Dif
			M	*sd*	*M*	*Sd*	
1	Learning with other students will help me become a more effective member of a health care team	66	4.52	.59	4.47	.71	.05
2	Patients would ultimately benefit if health care students worked together to solve patient problems	66	4.73	.45	4.73	.62	.00
3	Shared learning with other health care students will increase my ability to understand clinical problems	66	4.47	.62	4.36	.78	.11
4	Communications skills should be learned with other health care students	66	4.58	.58	4.48	.75	.10
5	Shared learning will help me to think positively about other professionals	66	4.38	.63	4.35	.79	.03
6	For small group learning to work, students need to trust and respect each other	65	4.68	.47	4.55	.69	.13
7	Teamworking skills are essential for all health care students to learn	66	4.70	.46	4.61	.65	.09
8	Shared learning will help me to think about my own limitations	64	4.41	.61	4.34	.72	.07
9	I don't want to waste time learning with other health care students	65	1.72	.67	1.71	.68	.01
10	It is not necessary for health care students to learn together	66	1.62	.67	1.58	.61	.04
11	Clinical problem solving can only be learned with students from my own school/college/department	66	1.47	.56	1.55	.71	-.08
12	Shared learning with other health care students will help me to communicate better with patients and other professionals	66	4.39	.82	4.15	.93	.24
13	I would welcome the opportunity to work on small group projects with other health care students	66	4.18	.74	3.98	.98	.20
14	Shared learning will help to clarify the nature of patient problems	66	4.29	.70	4.17	.89	.12
15	Shared learning before qualification will help me become a better team worker	66	4.23	.76	4.23	.76	.00
16	The function of nurses and therapists is mainly to provide support for doctors	65	1.91	.86	1.65	.84	.26
17	I am not sure what my professional role will be	66	1.89	.68	1.61	.82	.28
18	I have to acquire much more knowledge and skills than other health care students	66	2.38	.91	2.36	1.05	.02

Table 22. Means, Standard Deviations, and *t* Test of the RIPLS-2013.

Construct	*n*	Pre		Post		*t*	*p*	*d*
		M	*sd*	*M*	*sd*			
Teamwork	66	4.56	.40	4.49	.62	1.08	.29	.13
Professional Identity	66	4.29	.60	4.21	.66	1.20	.24	.13

met Kaiser's eigenvalue criterion of > 1 did not add a great deal of variance or appear to cause a considerable "elbow" on the scree plot. This exploratory factor analysis showed a two factor model, not found in other examinations of this instrument, although the items that proved problematic in the literature and on this analysis are not always consistent (McFadyen et al., 2005; Reid et al., 2006). No pre and post differences were significant when comparing means of the two factors that had acceptable measures of internal consistency, indicating there was very little, if any, change due to the IPHC class.

Research Question #3

The first research question for study #2 was important because this study used a second variation of the RIPLS, which was heretofore unanalyzed as a way to evaluate the effectiveness of this course. The RIPLS-2013 demonstrated a two-factor model. The original RIPLS authors suggested a three-factor model (Parsell & Bligh, 1999). However, a four-factor structure had been gaining evidence in the literature (McFadyen et al., 2005; Reid et al., 2006; Thannhauser et al., 2010; Williams, Brown, & Boyle, 2012). The RIPLS-2013 should be considered a low-to-moderate instrument in terms of reliability based on this analysis. Evidence for this conclusion includes complex structure on several items in both structure and pattern matrices and low factor variances.

Research Question #4

An informal analysis of the pre and post format for the RIPLS-2013, which was a novel use of this instrument in this study, was to examine the means item-by-item regardless of significance. It is of note that, of an 18-item instrument, most items changed less than a quarter of a point in either direction. One interpretation might be that students generally see the benefit of IPE, and their starting "pre" scores reflect that before they are exposed to any aspects of the course.

Second, but perhaps equally important despite the lack of significant statistical change on most items, is that most went in the non-preferred direction. In the teamwork factor, all eight items decreased in agreement from pre to post measures.

Limitations

Study #2 was meant to posit another modification of the RIPLS and examine pre and post differences that may have been measured due to the impact of the IPHC course on the attitudes of the students. However, this study had several limitations. First, there were issues with the sample. Students were required to complete the instrument both before and after the course in order to receive a final grade. As coercion helped garner more completed data sets, it also creates the possibility of bias in responses, just as in study #1 (Durrant & Dorius, 2007). The IPHC course committee, while open to changing the instrument from the RIPLS-2010 to the RIPLS-13, also requested a change back to the original 19-item Parsell and Bligh (1999) version for session 2, so comparing pre and post scores of both sessions in the spring semester in order to double the sample size was not possible. Additionally, the total number of participants was suitable for analysis as a whole group, but a breakdown of scores by profession would have subdivided

professional groups into much smaller numbers unsuitable for robust quantitative analysis. The convenience sample of students in the class also meant less possibility for generalizability to broader student populations.

Second, this study of a six week session and most of the other research on the RIPLS is based on very short term, course-based interventions. Whether any notable changes can be made to the "readiness" of an individual for interprofessional learning is up for debate. Furthermore, the question of whether the RIPLS is sensitive enough to demonstrate attitudinal changes in students after short periods of instruction and learning is valid. Students, regardless of whether they are at the graduate or undergraduate level or come to IPHC with previous health care career experience, have likely had instructors in courses previous to IPHC who inject their biases on interprofessional learning into classroom discussions and debate. This could seem like a good reason to use the RIPLS pre and post, so the measure is on any differences made, but the question is still whether a six week, one credit course might counteract any bias from a faculty member from the student's own professional area.

Finally, the rationale for which items were included in the current version of the RIPLS is unknown, as a matter of internal IPHC course committee debate. While the current instruments both had 18 items, the RIPLS-2013 omitted a question from the original RIPLS ("Learning with health care students before qualification would improve relationships after qualification"). The reason for the omission is unknown, but it does match Williams and colleagues (2012) based the results of their principal components and Rasch analyses. For means of comparison, it is always preferable that the instruments compared are identical and data are gathered with similar methods.

CHAPTER V

DISCUSSION

The study of interprofessional education (IPE) practices remains nascent but growing. While several instruments have been considered by researchers to evaluate the utility of pedagogical efforts to reinforce the value and importance of IPE to students, the Readiness for Interprofessional Learning Scale (RIPLS) is one of the most studied (Thannhauser, Russell-Mayhew, & Scott, 2010). Educators of health professional students who are aware of the IECEP competencies and the work of the last two decades by organizations like the Institute of Medicine (IOM) in promoting IPE are most likely aware of the main thrusts in IEP. These issues include, but are not limited to, patient centered care, teamwork/collaboration, gaining a positive professional identity, understanding the roles and responsibilities of everyone on a health care team, and shared learning. These ideas have been posited by previous researchers on versions of the RIPLS (Horsburgh et al., 2001; McFadyen et al., 2005, Parsell & Bligh, 1999; Reid et al., 2006; Williams et al., 2012).

The purposes of these studies were to assess the reliability of the RIPLS-2010, used in Interprofessional Health Care (IPHC) from 2010-2012, compare students by discipline, and then evaluate the effectiveness of the spring 2013 session 1 IPHC course using a pre and post design with the RIPLS-2013. Of interest in this investigation was whether this unique modification of the RIPLS in study #1 was more or less reliable than

previous versions in the literature and how a separate modification of the RIPLS (RIPLS-2013), when used as a pre and post instrument, might be used to demonstrate the effectiveness of a course through growth of the instruments' factors. In particular, the students in the course used to gather these data were from a variety of disciplines in health care, so it was important to learn how their experiences, both before IPHC and during, might differ from one another. Study #1 was conducted by an exploratory factor analysis (EFA) of all RIPLS-2010 taken at the end of the course in each session from 2010-2012. Study #2 also conducted an EFA on the smaller group of students in a single session, but included a pre and post design to gauge whether the course might have affected any attitudinal changes regarding readiness for interprofessional learning.

These studies relied on the RIPLS, a self-report inventory that has been scrutinized by researchers in many iterations since the original from Parsell and Bligh (1999). While self-report inventories should always be analyzed with caution since they are dependent upon the student's opinion at a moment in time, it is important to note how prepared students might be to be exposed to the notions of interprofessional learning, especially if the concept is very new to them.

Summary of Findings

Four research questions and their hypotheses were posed in Chapter 1. The following summary reiterates and summarizes the results as they relate to the hypotheses formed. A further discussion of these two studies and discussion of implications concludes this chapter.

1. In study #1, was the RIPLS-2010 reliable based on the students' self-report at the end of each session from 2010-2012?

2. Across the eight professions, were there any differences, regardless of factor, between student groups?
3. In study #2, was the RIPLS-2013 reliable based on the students' self-report?
4. Did the IPHC course have an effect on student self-report of interprofessional learning based on the RIPLS-2013?

Study #1

Results of study #1 indicated that the RIPLS-2010 was a reliable instrument. Although there were just two main factors, both had high measures of internal consistency, strong factor loadings, and were significantly different, an indication of discriminant validity. The comparisons by profession resulted in four significant differences on both factors of teamwork and professional identity, between medical students and nursing, physical therapy, occupational therapy, and nutrition/dietetics students. It appears that medical students, by their second year in a program, feel less urgent about the need to adopt ways of thinking that are considered interprofessional in nature.

Study #2

Study #2 resulted in a less clearly defined set of factors outside of the two main factors of teamwork and professional identity. Cronbach coefficients indicated a moderately high reliability for those two factors in the oblique (Promax) rotated matrix. However, the third and fourth factors had only two items associated with them, and were thus problematic. The pre and post comparison of the two factors that were suitable for analysis, teamwork and professional identity, did not reveal any differences, indicating the IPHC course may not have had a noticeable effect for this particular session.

Discussion

RIPLS-2010 Reliability

Overall, students appear to have a favorable impression of IPE, given generally high scores on the teamwork factor and lower scores on professional identity, due to negatively-phrased questions, which is in alignment with results from Reid et al. (2006). The item scores, according to skewness tests, meant items did not represent a normal distribution of variability across the sample. In essence, students had 100% agreement on all items on teamwork, and had 100% disagreement that they were secure in their professional identity. The factors that emerged strongly of teamwork and professional identity match several previous validation attempts of slightly revised RIPLS, including principal components analyses, structural equation modeling research, and a Rasch analysis (McFadyen et al., 2005; Reid et al., 2006; Williams et al., 2012).

Teamwork

The significant differences between professions when compared one-on-one were of particular interest, and matched the findings of Reid et al. (2006) when specifically addressing medical students. Medical students rated the factor of teamwork lower than nursing, physical therapy, occupational therapy, and nutrition/dietetics students. Traditional health professions education may have played a role in establishing the physician's role as the "lead," and that notion may have filtered to medical students. Whitehead found physicians to have an effect on the teamwork aspects of interprofessionality: "…doctors are particularly influential players in the medical hierarchy" (2007, p. 1,011). Horsburgh and colleagues (2001) also found medical students less likely than nursing and pharmacy students to adhere to a shared learning

model that emphasized the teamwork factor. The three largest significant differences were between MD students and PT, OT, and ND. The MD students in the present study are in their second year and are pursuing a doctoral-level degree for entry to the profession, similar to PT students. Yet, MD students in their second year have likely had significantly less time in more experiential clinical/practicum settings than undergraduates in fields such as RN and MT. It may be possible that once these students have put in more time during clinical rotations and residencies, they may get a better sense of the need for teamwork with other professions. However, the fact remains that at the end of a course designed to promote this type of collaboration and understanding of other health care professions, MD students did not seem to have the same attitudes as their future colleagues from other professions, which aligned with the research of Horsburgh et al. (2001) and Rose et al. (2009).

Overall, ND had the highest mean rank for teamwork (397.25) while SW (304.86) was second lowest only to medical students. At this university, both ND (undergraduate) and SW (undergraduate or first year graduate level) are found in the College of Nursing, although the two curricula are rather different.

Professional Identity

The second factor of professional identity revealed nearly identical differences between MD students and the same four professions, in that MD students scored significantly higher than their peers, meaning they felt they should learn more with students from their own discipline, have more knowledge than others, that others' roles are to support them, and see little overlap between their perceived role and other health care professionals. Two comparisons in particular, MD students to nursing and physical

therapy students, resulted in high effect sizes as well (0.15 and 0.17, respectively). Medical students were the only discipline to average over a "2" out of 5 on item 18 about having to acquire more knowledge and skills than other professions, which was the item in the professional identity factor with the biggest standard deviation. This difference may be accountable for the larger effect sizes when compared with nurses and PT, and yet, most of the literature on IPE centers on these three professions as the most prominent for interprofessional activity.

Parsell and Bligh (1999) sought to define this second factor, stating that there is "an area of conflict between the retention of professional identities through adherence to a discipline-based approach to learning, and a 'readiness' for sharing expertise with other students through team-based approaches to learning" (p. 98). This might be the main idea that is not coming across to MD students in particular. Steps should be taken to identify barriers for MD students to sharing expertise that they believe must have so much more of than their peers. Any other modes of learning with other disciplines may better help MD students more easily abandon the notion of retaining one's professional identity, which may be perceived as "under siege" during team-based learning activities. Reid et al. (2006) discussed the notion that "tradition approaches (to teaching and learning) seem to have encouraged the development of a strongly individualistic work ethic and culture for GPs (General Practitioners)," which may prevent MD students from adapting to the culture of learning and working together (p. 420).

Limitations

These two studies were conducted despite limitations that should be considered prior to parsing out their implications. In study #1, the RIPLS-2010 was not a validated

version of the RIPLS, and it is not understood how that version was deemed suitable for use by the IPHC course curriculum team. Even though factor analysis results suggested the instrument was reliable, use of a validated instrument is preferable in order to make claims and compare them to previously garnered data (McFadyen et al., 2005; Parsell & Bligh, 1999; Reid et al., 2006; Williams et al., 2012). Second, validity is threatened by periodicity, in that there were likely some fluctuations in the nature of the course, facilitators used, and curricula changes outside of the course but specific to the disciplines involved over the three years of data that was gathered. Third, there is an argument to be made that withholding a grade as a coercion to complete this survey may bias the results, which is a valid statistical concern, although it did help create the high sample size, which is an ethical trade off and should be taken into account. Finally, the disparate numbers of students who took the course means that error was more difficult to control for in the profession comparisons by factor, even given the use of conservative, non-parametric statistics. No "blanket" statements should be made about all MD students or their faculty members because the results of a survey on students' attitudes toward IPE.

In study #2, while advantageous to study this one-time use of the RIPLS-2013 (this one exactly like the original Parsell and Bligh except for a single removed item), it did mean that a lower sample size could be problematic. Certainly, it did not allow for cross-profession analysis as in study #1, and some researchers have claimed that factor analysis with a sample of less than 300 is inappropriate (Field, 2005) or that particular ratios of items-to-participants must be met (Costello & Osborne, 2005). As the study occurred in the spring semester, there were fewer students generally (fall semester

garners more students taking the course) and there were two professions usually in IPHC that were unrepresented in the sample. Finally, as this study was an exploratory factor analysis and a first-time use of the RIPLS as a pre and post instrument, cause and effect should not be applied to the findings.

Implications for Practice

Given that these two studies were conducted on past cohorts of health professions students, caution should be taken when considering implications for IPE specific to the IPHC course. However, two main points have emerged from these studies regarding 1) the nature of evaluating IPE with the RIPLS and 2) the importance of IPE.

First, the RIPLS remains one of the most used, validated, and reliable surveys internationally, and has remained so since 1999 when introduced by Parsell and Bligh. Analysis of many of the items remains important to better understand how students perceive the larger concepts of IPE, such as teamwork and professional identity. Given that these broader concepts are agreed upon by main bodies including the IEPEC, WHO, and IOM, future discussions around these concepts as goal areas with be crucial for IPE development.

Second, more health professions are part of major health systems, so educators must be wary of whether students involved in IPE have a shared mental model of the importance of this kind of education. An introductory course such as IPHC is a good first step to creating a culture of interprofessionality across campuses, but it is not a panacea that should be isolated from other coursework and practicum experiences. It remains the case that students who learn together will likely work better together, identifying the value of teamwork and collaboration, while seeking their own professional identities

during the entirety of their academic careers.

Recommendations

The two areas of IPE evaluation and the continued importance of developing IPE may be improved in several ways by educators and researchers. These two studies provide information to health professions researchers regarding the need for valid ways of garnering student attitude data on the topic of IPE. While the push for interprofessionality is increasing in the professional ranks, a similar push should continue in academic settings to develop education practices that promote the concepts represented by the RIPLS research already in existence. Findings of the current studies warrant further research on the RIPLS and other instruments used to evaluate the utility of different pedagogical techniques for IPE. The disparities among all RIPLS studies prior to and including these studies mean the instrument has serious flaws that may mean its reliability is too compromised for use in future studies.

First, IPHC may be considered an amalgam of IPE techniques for replication by other universities. The successes of the course have included nearly a decade of students being introduced to IPE through IPHC, a broad array of professions represented, an active base of facilitators from each of the represented professions, and generally positive scores, no matter which iteration of the RIPLS was used. While IPE is not a fully-implemented series of courses that teach all of the professions side-by-side, the IPHC course is one main effort at team-based learning, as advocated by Frenk et al. (2010), as opposed to learning in "silos" (Oandasan & Reeves, 2005). However, it is meant as an introduction to IPE that should be supplemented later in health profession curricula with courses that combine professions before graduate and professional school as well as

clinical practica during rotations, residencies, and internships so students are able to enact IPE techniques learned.

Second, these studies support Haskins (2008) call for more robust examinations of IPE effectiveness, specifically "high quality, randomized control trials…as related to student characteristics is needed" (p. 99). Longitudinal studies could also accurately show changes in attitudes of IPE over time. The current studies include a mixture of levels, from junior undergraduates to students in the second year of a doctoral-level professional program. Controlling for education level, prior experience in health care (for non-traditional students, in particular), and gender (as females tend to make up higher percentages of these samples) in addition to pedagogical techniques, would substantially strengthen the literature base to provide better suggestions for universities looking to bolster their IPE.

Third, Haskins (2008) also found MD students had somewhat differing attitudes on the value of collaboration and perceive their role as primary, or leader, in every team setting. Care should be taken to evaluate how MD students perceive the importance of collaboration upon application to a program of study. It is likely that applicants who value teamwork and have evidence of collaboration in other settings while an undergraduate, during volunteer and service work, or in athletics or other extracurricular settings will also find such value in the health care field. Also, students pursuing a terminal degree, such as Medical Doctor or Doctor of Physical Therapy seem less willing to consider IPE practices. Rose et al. (2009) suggested that PT students also fall into this category, with the advent of the Doctor of Physical Therapy degree as a clinical credential. Programs in other countries that require a doctorate or equivalent for health

care practice should consider the possibility that the notion of having a higher degree title may be a simple but important factor whether an individual pursuing that degree values teamwork.

Fourth, the RIPLS has only been analyzed with a 1-5 scale that includes the "neutral" or "undecided" middle ground. Use of a broader scale (more than five items) could help address issues of non-normality in smaller samples, especially in terms of skewness and kurtosis figures. Also, a ceiling effect (floor effect for the items of professional identity) is clear in the current studies, as exemplified by extreme means and standard deviations that compromise a quality interpretation. Also, the scale items have been revised for other sample populations, such as students, professionals, and more experienced clinicians. Future iterations of the RIPLS could be separated to clarify wording in items so professionals are asked about "working" together, while students are asked about "learning" together. Another question asks about communicating with patients and other professionals, but those could be considered as two separate questions.

Finally, as IPHC course enrollment seems to continue to grow, analyses of these data could be conducted to continue to evaluate the utility of the RIPLS. Questions could be asked regarding the ability to glean useful information from this survey that has been validated, albeit in several different forms. Furthermore, the learning objectives of the course may or may not align with the original intent of the instrument. Given the amount of research on IPE courses, it is of utmost importance that educators recognize the need for quality evaluation of pedagogical practices. Faculty development in IPE and administrative support are essential components in advancing health care systems to be more teamwork-focused and patient-centered.

Therefore, educators and researchers must continue to keep the future patients of health care students at the center of their decision-making processes, including IPE course development and evaluation. It is clear that IPE is an international movement incorporating professionals and educators from several disciplines, which brings challenges and opportunities. While the IOM and WHO cite IPE as a very important aspect in improving health care for patients, considering and implementing an evidence-based pedagogical model requires time, multi-site endeavors, and funding in order to pilot programs and then "upscale" them appropriately.

APPENDICES

Appendix A
RIPLS-2010

Interprofessional Learning (RIPLS) – FALL 2012 – Session II **POST**

This questionnaire is designed to test the readiness and attitudes of health professionals towards inter-professional learning. For the purposes of the questionnaire, interprofessional learning is defined as mixed health professional groups, learning with, from and about each other at the same learning events with a view to improving collaboration and the quality of care.

Please respond to the following questions by placing a cross [X] ***in one box for each question to indicate the extent to which you agree or disagree with each statement.***

DISCIPLINE_____

Teamwork and Collaboration	1 strongly disagree	2 disagree	3 neutral	4 agree	5 strongly agree
1. Learning with other health care professionals will help me be a more effective member of a health care team.	☐	☐	☐	☐	☐
2. If small group learning is to work, health care professionals need to trust and respect each other.	☐	☐	☐	☐	☐
3. Team-working skills are essential for all health care professionals to learn.	☐	☐	☐	☐	☐
4. Shared learning will help me understand my own limitations.	☐	☐	☐	☐	☐
5. Patients ultimately benefit if health care professionals work together to solve patient problems.	☐	☐	☐	☐	☐
6. Shared learning with other health care professionals will increase my ability to understand clinical problems.	☐	☐	☐	☐	☐
7. Learning with healthcare students from other disciplines before would improve relationships after.	☐	☐	☐	☐	☐
8. Communication skills should be learned with other health care professionals.	☐	☐	☐	☐	☐
9. Shared learning will help me to think positively about other health care professionals.	☐	☐	☐	☐	☐
10. Shared learning with other health care professionals will help me to communicate better with patients and other professionals.	☐	☐	☐	☐	☐
11. I would welcome the opportunity to work on small-group projects with other health care professionals.	☐	☐	☐	☐	☐
12. Shared learning helps to clarify the nature of patient problems.	☐	☐	☐	☐	☐
13. Shared learning before would help healthcare professionals become better team workers.	☐	☐	☐	☐	☐

OVER

Sense of Professional Identity

	1 strongly disagree	2 disagree	3 neutral	4 agree	5 strongly agree
14. Clinical problem-solving skills should only be learned with professionals from my own discipline.	☐	☐	☐	☐	☐
15. The function of nurses and therapists is mainly to provide support for doctors.	☐	☐	☐	☐	☐
16. There is little overlap between my role and that of other health care professionals.	☐	☐	☐	☐	☐
17. I would feel uncomfortable if another health care professional knew more about a topic than I did.	☐	☐	☐	☐	☐
18. I have to acquire much more knowledge and skills than other health care professionals.	☐	☐	☐	☐	☐

Appendix B
RIPLS-2013

Readiness for Interprofessional Learning Scale (RIPLS) Questionnaire

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The purpose of this questionnaire is to examine the attitude of health and social care students and professionals towards interprofessional learning.

Your name: (develop your own 'personal code' by using the following formula):

First 3 letters from your first name: ☐ ☐ ☐ **Last 3 letters** from your last name: ☐ ☐ ☐

Year of birth: 19 ☐☐ **Your discipline**: _____ **Gender**: ☐M ☐ F

Schooling (circle one): Undergraduate Graduate/Professional School

---

Please complete the following questionnaire.

		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1.	Learning with other students will help me become a more effective member of a health care team					
2.	Patients would ultimately benefit if health care students worked together to solve patient problems					
3.	Shared learning with other health care students will increase my ability to understand clinical problems					
4.	Communications skills should be learned with other health care students					
5.	Shared learning will help me to think positively about other professionals					
6.	For small group learning to work, students need to trust and respect each other					
7.	Teamworking skills are essential for all health care students to learn					
8.	Shared learning will help me to think about my own limitations					
9.	I don't want to waste time learning with other health care students					
10.	It is not necessary for health care students to learn together					

11.	Clinical problem solving can only be learned with students from my own school/college/department					
12.	Shared learning with other health care students will help me to communicate better with patients and other professionals					
13.	I would welcome the opportunity to work on small group projects with other health care students					
14.	Shared learning will help to clarify the nature of patient problems					
15.	Shared learning before qualification will help me become a better team worker					
16.	The function of nurses and therapists is mainly to provide support for doctors					
17.	I am not sure what my professional role will be					
18.	I have to acquire much more knowledge and skills than other health care students					

If you have any further comments regarding interprofessional education please enter them in the box

Appendix C
Comparison Table of RIPLS

#	Item	Parsell & Bligh, 1999	McFadyen et al., 2005	Reid et al., 2006	RIPLS-2010	Williams et al., 2012	RIPLS-2013
1	Learning with other students will help me become a more effective member of a health care team	1	1	1	1	1	1
2	Patients would ultimately benefit it health care students worked together to solve patient problems	2	2	5	5	2	2
3	Shared learning with other health care students will increase my ability to understand clinical problems	3	3	6	6	3	3
4	Learning with health care students before qualification would improve relationships after qualification	4	4	7	7		
5	Communication skills should be learned with other health care students	5	5	8	8	5	4
6	Shared learning will help me to think positively about other professionals	6	6	9	9	6^	5
7	For small group learning to work, students need to trust and respect each other	7	7	2	2	7^	6
8	Team-working skills are essential for all health care students to learn	8	8	3	3	8	7
9	Shared learning will help me to understand my own limitations	9	9	4	4		8
10	I don't want to waste my time learning with other health care students	*10*	*10-*			*10*	*9*
11	It is not necessary for undergraduate health care students to learn together	*11*	*11-*			*11*	*10*
12	Clinical problem-solving skills can only be learned with students from my own department	*12*	*12-*	*14*	*14*	*12*	11#
13	Shared learning with other health care students will help me to communicate better with patients and other other professionals	*13*	*13-*	10	10	13^	*12*
14	I would welcome the opportunity to work on small-group projects with other health care students	*14*	*14+*	11	11	14^	*13*
15	Shared learning will help to clarify the nature of patient problems	*15*	*15+*	12	12	15^	*14*
16	Shared learning before qualification will help me become a better team worker	*16*	*16+*	13	13	16^	*15*
17	The function of nurses and therapists is mainly to provide support for doctors	**17**	**17**	*15*	*15*	17^	**16**
18	I'm not sure what my professional role will be	**18**	**18**			**18**	**17**
19	I have to acquire much more knowledge and skills than other health care students	**19**	**19**	*18*	*18*	**19**	18#
20	There is little overlap between my role and that of other health care professionals			*16*	*16*		

21	I would feel uncomfortable if another health care professional knew more about a topic than I did.	*17*	*17*
22	I like to understand the patient's side of the problem	19*	
23	Establishing trust with my patients is important to me	20*	
24	I try to communicate compassion to my patients	21*	
25	Thinking about the patient as a person is important in getting treatment right.	22*	
26	In my profession one needs skills in interacting and cooperating with patients	23*	

Numbers are correlated with what that item was on the article it appeared in (column).
Regular font=Teamwork/Collaboration
Italics are Professional ID (Neg or Pos); Plus sign is positive role identity, minus sign is negative
Bold is "Roles and Responsibilities"
Asterisk is "Patient-centeredness"
Carrot is “Shared Learning”
Pound sign is “Uniprofessionalism”

Appendix D
D'Amour Graphic Permission

Knight, Andrew

From: D'Amour Danielle <danielle.damour@umontreal.ca>
Sent: Wednesday, October 23, 2013 1:00 PM
To: Knight, Andrew
Subject: RE: Use of the Interprofessionality graphic for a dissertation

M Knight,
I am glad to hear that you found this paper useful. It is my pleasure to give you the permission to reproduce the graphic.
Sincerely yours
Danielle D'Amour

Danielle D'Amour, inf., Ph.D.
Professeure titulaire
Faculté des sciences infirmières
Chercheure Centre FERASI et IRSPUM
Université de Montréal
Tél. 514-343-7578
danielle.damour@umontreal.ca

Faculté des sciences infirmières
Créez le rythme »»
Université de Montréal

De : Knight, Andrew [mailto:andrew.knight@email.und.edu]
Envoyé : 19 octobre 2013 23:04
À : D'Amour Danielle
Objet : Use of the Interprofessionality graphic for a dissertation

Hello Dr. D'Amour –

I am composing a dissertation on use of the Readiness for Interprofessional Learning Scale with an interprofessional education course at the University of North Dakota. I have found your 2005 paper positing the framework of interprofessionality of great use, and I am wondering if I may have your permission to publish the graphic you used in the dissertation

Thank you for considering this request,

Andrew Knight, MA, MT-BC
Assistant Professor
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College of Arts and Sciences
Department of Music
3350 Campus Road, Hughes 268, Stop 7125
Grand Forks, ND, USA 58202
Office telephone: 701.777.2836
Twitter: @KnightMTBC

Appendix E
Olenick Graphic Permission

Knight, Andrew

From: Maria Olenick <molenick@fiu.edu>
Sent: Thursday, October 24, 2013 1:37 PM
To: Knight, Andrew
Subject: RE: permission to use iterative color map for interprofessional education in dissertation

Absolutely! I am happy you found those items useful! Best of luck on your dissertation! If there is anything else I can do to be of assistance please let me know!

Maria

FIU | Nicole Wertheim College of Nursing & Health Sciences
FLORIDA INTERNATIONAL UNIVERSITY

Maria Olenick PhD, RN
Clinical Assistant Professor
Assistant Director of Nursing
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From: Knight, Andrew [mailto:andrew.knight@email.und.edu]
Sent: Thursday, October 24, 2013 1:35 PM
To: Maria Olenick
Subject: permission to use iterative color map for interprofessional education in dissertation

Hello Dr. Olenick –

I am composing a dissertation on use of the Readiness for Interprofessional Learning Scale with an interprofessional education course at the University of North Dakota. I have found your "iterative color wheel concept map" and graphic depiction of "multiprofessional And interprofessional disciplines" of great use, and I am wondering if I may have your permission to reprint the graphics in my dissertation.

Thank you for considering this request,

Andrew Knight, MA, MT-BC
Assistant Professor
UND THE UNIVERSITY OF NORTH DAKOTA
College of Arts and Sciences
Department of Music

1

Appendix F
Hean Graphic Permission

Knight, Andrew

From: Sarah Hean <shean@bournemouth.ac.uk>
Sent: Friday, October 25, 2013 1:48 AM
To: Knight, Andrew
Subject: Re: permission for use of IPE constructivist framework graphics requested
Attachments: twitter-bird-blue-on-white_web2.png

Dear Andrew
That would be absolutely fine.

Good luck with the dissertation.

Best wishes

Sarah

Dr Sarah Hean
Associate Professor
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http://staffprofiles.bournemouth.ac.uk/individual?uri=http%3A%2F%2Fstaffprofiles.bournemouth.ac.uk%2Findividual%2Fshean
Associate Editor Journal of Interprofessional Care http://informahealthcare.com/jic Board Member: Centre for the Advancement of Interprofessional Education www.caipe.org.uk<http://www.caipe.org.uk>
Chair: In-2-Theory: interprofessional theory and scholarship network http://www.facebook.com/groups/IN2THEORY

On 24 Oct 2013, at 18:38, "Knight, Andrew" <andrew.knight@email.und.edu<mailto:andrew.knight@email.und.edu>> wrote:

Hello Dr. Hean –

I am composing a dissertation on use of the Readiness for Interprofessional Learning Scale with an interprofessional education course at the University of North Dakota. I have found your "social constructivism" graphics from your 2009 article of great use, and I am wondering if I may have your permission to reprint the graphics in my dissertation.

Thank you for considering this request,

Andrew Knight, MA, MT-BC
Assistant Professor
<image001.png>
College of Arts and Sciences
Department of Music

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