Destination Collaboration: Do Students Increase their Knowledge of Others Following an Interprofessional Learning Experience?

By

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A Thesis Submitted in
Partial Fulfillment of the
Requirements for the Degree of

Education Specialist
School Psychology

At

The University of Wisconsin - Eau Claire

July, 2017

Graduate Studies

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The University of Wisconsin-Eau Claire, 2017
Under the Supervision of Dr. Mary Beth Tusing

Collaboration among professionals of different backgrounds is required in several medical and social service fields. However, there is limited research about how to train undergraduate and graduate students in collaboration skills. The most commonly cited precursor to effective collaborative skills is the knowledge of one's own and others roles within a team. The aim of this study was to analyze the increase in knowledge of own and others disciplines for students who engaged in an interprofessional learning (IPL) opportunity at a university-based psychoeducational assessment clinic. Survey responses (both quantitative and open-ended) were completed before and after a semester of involvement in the clinic and specific questions pertaining to increases in knowledge were analyzed. The study revealed benefits to students in their knowledge of professions represented in the clinic as a result of even a short immersion in the clinical experience. Similar interprofessional training opportunities for pre-licensure education programs appears worthwhile. This research expounds on the literature on interprofessional education (IPE) that has primarily taken place with medical students.

Mary Beth Tusing 7/25/17
Dr. Mary Beth Tusing Date

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CHAPTER ONE

Introduction

In many professional settings, individuals are required to collaborate with colleagues from different professions as part of their daily work (Thannhauser, Russell-Mayhew & Scott, 2010). For example, in education, teachers and other school professionals (i.e., school nurses, school social workers, physical or occupational therapists, speech language clinicians) are required to collaborate on interdisciplinary teams when planning and providing services for students with disabilities (Individuals with Disabilities Education Improvement Act, 2004). In medical and social service settings, professionals are also called on to collaborate in order to provide the highest quality of care to clients (Thannhauser, et al., 2010).

Within education, many current school improvement initiatives require different professionals to work together to achieve important school outcomes. For example, Response to Intervention (RtI) and Positive Behavior Interventions and Supports (PBIS) require teams of educators to come together to review school-wide data, plan prevention and intervention programs, and deliver a broad array of services to support student learning and behavior (Wisconsin Department of Public Instruction- Pupil Services, n.d.). Similarly, the Wisconsin Department of Public Instruction's guiding principles (Wisconsin Department of Public Instruction- Principles for Teaching and Learning, n.d.) for teaching and learning state that student learning should be the collaborative responsibility of educators, parents, and community stakeholders. The principle states that collaboration benefits students when students, teachers, family and the community

have a common goal and are able to work together to provide support. Educators are to collaborate with colleagues in order to support classroom practices and students' success.

Effective skills for collaborating with other professionals are essential for the successful practice of school psychology. School psychologists collaborate with teachers, administrators, speech-language pathologists, occupational therapists, physical therapists, social workers, or counselors on a daily basis. The National Association of School Psychologists (2010) highlights collaboration as a practice that should "permeate all aspects of service delivery" (p. 4). According to the Model for Comprehensive and Integrated School Psychological Services (2010), school psychologists should have skills to consult and collaborate at the individual, family, group, and systems levels. School psychologists are expected to have skills and knowledge to partner with families, teachers, and other professionals to create safe, healthy, and supportive learning environments; work with school administrators to improve school-wide policies; and collaborate with community providers to coordinate services for students (National Association for School Psychologists- NASP Practice Model 10 Domains, 2010).

Benefits of Interprofessional Collaboration

Interprofessional collaboration is a contemporary term used to characterize situations in which individuals representing different professions work together (Thistlethwaite, 2012). The ultimate goal of interprofessional collaboration in education, medical or clinical settings is improved service delivery and outcomes for clients served including more integrated and comprehensive care (Barrett, Curran, Glynn & Goodwin, 2007). There have been researched benefits of interprofessional collaboration for the patient or client, the organization and colleagues who work collaboratively (Petri, 2010;

Furness, Armitage & Pitt, 2011; San Martin-Rodriguez, D'Amour & Leduc, 2008). Studies have found that patients of interprofessional teams of doctors and nurses reported higher overall satisfaction and improved symptoms (San Martin-Rodriguez et al., 2008). Nurses, medics, social workers and occupational therapists working collaboratively have showed increased confidence, better conflict managements and teamwork skills (Furness et al., 2011).

Statement of the Problem

Professional organizations, such as the National Association of School Psychologists, call on their professionals to demonstrate skills in collaborating with individuals from other professions (National Association of School Psychologists, 2010). While interprofessional collaboration is discussed and evaluated in medical settings, such as hospitals or outpatient clinics (Anderson & Lennox, 2009; Bilodeau et al., 2010; Williams et al., 2011), less research exists to guide practice in educational settings. This study evaluated knowledge outcomes associated with an interprofessional training experience offered through a university-based assessment clinic.

Research Questions

The current study was designed to provide data about the outcomes for student clinicians who completed a semester in the university-based psychoeducational assessment training clinic. The primary research questions of this study were: (a) do student clinicians' rate themselves as more knowledgeable of other professionals after completing an interprofessional training experience in a university-based assessment clinic? (b) does the number of clients served impact those results? (c) are students more knowledgeable of certain disciplines compared with others after working in an

interprofessional clinic? and (d) are student clinicians able to name more similarities between their own profession and the professions they collaborated with after the interprofessional training experience? Implications for pre-licensure education programs and interprofessional education are discussed. Recommendations for future research are presented in terms of analyzing benefits of interprofessional training opportunities for education program students.

CHAPTER TWO

Literature Review

This chapter will review literature relevant to the study's purpose, which was to evaluate changes in knowledge associated with participation in an interprofessional training experience offered through a university-based assessment clinic. First, common terms used in interprofessional collaboration (i.e., interprofessional education, interprofessional learning, interprofessional collaboration) are defined. Second, research on outcomes associated with interprofessional collaboration and education experiences is reviewed. Specific emphasis is placed on discussing changes in knowledge of one's own profession and other professions. Finally, methods of assessing outcomes from interprofessional collaboration and interprofessional education experiences are described.

Interprofessional Collaboration, Education, Learning and Practice

Given the increased emphasis on preparing helping professionals to work in interdisciplinary settings, professional literature on the topic of interprofessional practice has grown significantly in the past decade. Limited consensus on terms used to describe interprofessional practice, described as a "terminological quagmire" by Leathard (1994), makes reviews of the interprofessional practice literature challenging, however. Terms used to describe the processes of interdisciplinary collaboration often overlap. The most common terms in the literature are interdisciplinary collaboration, multi-disciplinary collaboration, interprofessional collaboration, interprofessional education and learning, and interprofessional practice.

Definitions of interprofessional collaboration, education and learning, and practice are important for researchers and educators attempting to quantify learning

outcomes for interprofessional training opportunities. Some researchers use multidisciplinary and interdisciplinary as synonyms while some have suggested the two are different. Some state that multidisciplinary teams approach problem solving by developing a cohesive plan made of individual goals based on each profession's proficiencies whereas interdisciplinary teams build on each other's expertise to accomplish shared goals. This suggests that interdisciplinary teams engage in more efficient collaboration than multidisciplinary teams (Ferguson, 2014). However, as recently as 2010, authors have noted that no common definition of interprofessional collaboration exists in the interprofessional literature (Thannhauser et al., 2010). The World Health Organization (WHO) first referenced interprofessional collaboration in 1978 when discussing the need for professionals from different disciplines to work together for better patient outcomes and stated, "interprofessional collaboration is the process of developing and maintaining effective interprofessional working relationships with learners, practitioners, patients, clients, families and communities to enable optimal health outcomes" (Thistlethwaite, 2012, p. 60). Barr and colleagues (2005) later defined interprofessional collaboration as opportunities for two or more professions "to learn from, with and about each other in order to improve collaboration and the quality of care." Additionally, they described interprofessional collaboration as a process of creating and nurturing effective working relationships with all involved in order to facilitate optimal health results.

Petri (2010) formally analyzed definitions of interdisciplinary collaboration in the healthcare literature. Her work was important in distinguishing interprofessional collaboration (IPC) from interprofessional education (IPE) and interprofessional practice

(IPP). Through a systematic review of 89 different definitions and references to interprofessional collaboration in nursing, medicine, social work, psychology, pharmacy, physical therapy, occupational therapy, and dentistry literature, Petri used content analysis to clarify how the term interdisciplinary collaboration was referenced and used in the literature. Terms and phrases were categorized based on relevant themes. Using commonly referenced attributes of interprofessional collaboration, Petri (2010) defined interprofessional collaboration as "an interpersonal process characterized by … professionals from multiple disciplines with shared objectives, decision-making, responsibility, and power working together to solve patient care problems" (p. 79). Related terms thought to be equivalent in meaning to interprofessional collaboration included: interdisciplinary collaboration, multidisciplinary collaboration, interprofessional teamwork, interprofessional working, collaborative practice, and interprofessional practice (Petri, 2010).

Petri (2010) characterized interprofessional education (IPE) as an antecedent to interprofessional collaboration. According to Petri, the literature discussed common elements that needed to be in place before interdisciplinary collaboration could be successful. The elements were educational in nature and included concepts such as learning about one's own role and the role of others in an interprofessional setting, being accepting of the role that other professions can have, developing interpersonal skills for working with individuals from different disciplines, and learning to trust and respect interprofessional colleagues. Research included examples of interprofessional education in pre-licensure academic settings or post-licensure practice settings. According to Petri (2010) the process of IPE and IPC leads to interprofessional practice. Interprofessional

practice was defined as situations where professionals used interprofessional collaboration as a part of their daily work for the betterment of the client and team.

Reeves and colleagues (2011) also reviewed how terms were used in interprofessional research and similarly acknowledged considerable overlap in the definition of terms existed. The authors suggested that interprofessional education was conceptually different from interprofessional collaboration and practice. According to their review, references to interprofessional education involved simulations, workshops, fieldwork, and coursework while interprofessional practice included practices in real world settings with fewer teaching opportunities and scaffolding of skills. As such, IPE refers to the overarching educational framework for IPC and can take place in a university with pre-professionals (Thistlethwaite & Moran, 2010).

Thistlethwaite (2012) expanded upon Reeve's references to interprofessional education. She defined interprofessional education, or interprofessional learning, as practices associated with the development of professional skills necessary for successful interprofessional practice. Some authors differentiate these two terms, citing that interprofessional education aims to develop knowledge, skills and behaviors necessary for collaboration, while interprofessional learning is defined as "learning arising from interaction between members of two or more professions" (Thistlethwaite, 2012, p.60). With this distinction, interprofessional learning may be the result of interprofessional education or it may happen spontaneously in the workplace or educational settings where professionals from different disciplines are required to collaborate.

Some teams find clear distinctions among terms in the literature describing interprofessional teamwork while some use terms interchangeably. This makes

reviewing the literature difficult as it is hard to draw out similarities and differences among the different efforts to evaluate outcomes in previous studies of interprofessional practices (IPE, IPL, IPC, IPP).

Outcomes of Interprofessional Practices

A significant amount of research has examined outcomes for interprofessional practice efforts. Thistlethwaite and Moran (2010) synthesized ideal learning outcomes found in 88 published studies of interprofessional education over a 21 year period prior to 2009. This study is one of the most comprehensive reviews of interprofessional education results. They identified six main categories of outcomes: improved teamwork, strong communication skills, increased learning/reflection, positive patient outcomes, optimistic changes in ethics/attitudes, and increased knowledge of roles/responsibilities. More recently, Bookey-Bassett and colleagues' (2016) concept analysis and Petri's (2010) review discussed outcomes as "consequences" from interprofessional collaboration. These reviews overlap considerably, indicating consistency over time in the outcomes studied. Studies evaluating improved teamwork commonly cited variables or skills such as attitudes toward collaboration with other professionals, improved collaboration with other professionals in the workplace, and cooperation and accountability.

There are numerous patient or client benefits from interprofessional practice including higher quality of care and patient satisfaction (Petri, 2010). Furness and colleagues (2011) found that patients in a mental health clinic rated their care more positively and reported higher levels of hope when receiving services in a clinic where strong collaboration among the nurses, medics, social workers and occupational

therapists existed (Furness et al., 2011). Additionally, a study that assessed the outcomes of interprofessional collaboration among physicians, residents and nurses working with oncology patients found several benefits to patients (San Martin-Rodriguez et al., 2008). As professionals worked more collaboratively, patients rated higher overall satisfaction with the care provided and improved pain.

Numerous studies have evaluated the benefits to the organization when teams collaborate effectively. Research has shown improved staff productivity and efficiency when interprofessional collaboration occurs (Petri, 2010). Furness and colleagues (2011) also found that nurses, medics, social workers and occupational therapists who worked collaboratively in an interprofessional setting showed increased confidence, stronger conflict management skills, and better developed teamwork skills. Similarly, Hjalmarson and colleagues (2013) reported several benefits to the health organization in a study of nurses, physiotherapists and occupational therapists working together in an orthopedic wing of a medical clinic. The medical professionals developed shared values for the intended outcomes of care, had clearer communication amongst themselves and with patients, generated more ideas for preventative solutions, and developed role transparency amongst themselves. Jacobsen and colleagues (2009) studied outcomes associated with a two week interprofessional training opportunity for undergraduate and graduate students from nursing, occupational therapy, pre-medicine, and physiotherapy in the orthopedic ward of a hospital. Clinical tutors worked to model and teach collaborative practice to the students. Those who participated demonstrated enhanced teamwork skills, organization skills, and a better understanding of the roles of different professionals on the team. Another study found that interprofessional opportunities

increased positive expectations among teammates and decreased the negative stereotypes of other professions (Mohaupt, Van Soeren, Andrusyszyn, MacMillan, Devlin-Cop, & Reeves, 2012). When professionals view interprofessional colleagues positively, cooperation is higher and colleagues share knowledge more readily (Jacobsen, Fink, Marcusssen, Larsen, & Baek Hansen, 2009).

Last, professionals benefit from engaging in an interprofessional training experience. Professionals report an increase in job and professional satisfaction when provided opportunities to collaborate interprofessionally. They also experience increases in knowledge and confidence about their careers (Bookey-Bassett et al., 2016; Petri, 2010). Williams and colleagues (2011) evaluated outcomes for interprofessional education workshop for students going into the medical field (paramedics, nursing, midwifery, occupational therapy, physiotherapy, and nutrition). The workshop focused on developing skills and attitudes for effective interprofessional collaboration. Findings showed that the students' attitudes towards collaborating and other professions were enhanced. Additionally, studies indicated long-term benefits for participants in interprofessional trainings. When attitudes were assessed over time, clinicians rated similarly high positive attitudes towards collaboration and other professions as when first assessed (Williams et al., 2011).

Knowledge of Different Professions

Thistlethwaite and Moran (2010) found knowledge of roles and responsibilities was the second most common outcome evaluated across the studies they reviewed. Other research has concluded that increased knowledge of roles and responsibilities for teammates was one of the most common outcomes to interprofessional education (Reeves

et al., 2011). Roles and responsibilities were defined as the knowledge and understanding of different professional roles, responsibilities and expertise of different health professions contributing to the collaborative process. Additionally, this definition included the knowledge of similarities and differences relating to roles, attitudes and skills of one's own profession when contrasted with other professions (Thistlethwaite & Moran, 2010).

More recently, Bookey-Bassett and colleagues (2016) replicated Petri's (2010) work and found that role awareness as the most commonly cited antecedent to effective collaboration suggesting that knowledge about roles is an essential precursor to collaboration. They defined role awareness as the "awareness of the knowledge, skills, and perspectives of other disciplines" and includes the competence to articulate one's one role and scope of practice along with the understanding and value of each profession's responsibilities in interdisciplinary work (Bookey-Bassett et al., 2016; Petri, 2010, p. 77). According to Bookey-Basset and colleagues, role awareness fosters interdependence on interprofessional teams, which is the ability to distinguish between one's own role and colleague's roles and use roles appropriately to promote high quality care.

Curran and colleagues (2011) completed a multi-site research project with the goal of developing an assessment rubric that could be used to measure competencies. These competencies were described as the understanding of the knowledge, clinical skills, interprofessional and problem solving skills necessary for exemplary professional practice. While completing that rubric, researchers concluded that interprofessional teams must have at least a basic level of understanding of each other's disciplines and the roles that each play within a system. They must also develop an understanding of their

unique values and styles of problem solving. According to Curran (2011), this type of knowledge increases the positive impressions of other professions and contributes to the effectiveness of the team.

Measures of Interprofessional Education Outcomes

There have been several efforts to develop measures of interprofessional training outcomes involving skills, perceptions, and attitudes (Curran et al., 2011). Past research suggests that measuring interprofessional collaboration along with interprofessional education and practice has been challenging. Some challenges include the lack of common definitions of terms, confusion over the attributes of collaboration and a lack of research establishing the validity of instruments (Thannhauser et al., 2010; Robben et al., 2011). Many of the tools developed lack support in terms of their measurement properties, such as reliability and validity (Thannhauser et al., 2010; Williams, Brown, & Boyle, 2012). The lack of measurement properties contributes to the challenge of replicating studies using like measurement tools.

Thannhauser and colleagues (2010) reviewed 23 published instruments used to evaluate different aspects of interprofessional collaboration and education. Their review evaluated qualitative and quantitative methods of assessing outcomes. Instruments targeted domains including attitudes, readiness, or interactional factors needed for interprofessional collaboration (Thannhauser et al., 2010). Measurements included were used to assess students in medical fields (nursing, physical therapy, occupational therapy, dietician, pharmacy, physician, psychiatry) and other helping professions (social work, clinical psychology, marriage and family therapy, law enforcement). The findings of this

assessment review suggested that many scales lack theoretical and psychometric development, making reliable data collection of interprofessional collaboration difficult.

Two scales were rated positively by the Thannhauser review, the Readiness for Interprofessional Learning Scale (RIPLS; Thannhauser et al., 2010; Parsell & Bligh, 1999) and the Interprofessional Perception Scale (IPS; Golin & Ducanis, 1981). The RIPLS has been used in several studies that included students from several medical fields. The RIPLS's design is a five-point Likert scale that has 19 items. This tool is used to measure readiness for interprofessional learning with three factors; one factor is titled roles and relationships (Parsell & Bligh, 1999). Questions in this scale included; "communication skills should be learned with other health care students/professionals," "shared learning before and after qualification will help me become a better team worker," and "I am not sure what my professional role will be/is."

The IPS has been used to assess medical and educational professionals' attitude towards their own profession, professions they collaborate with, and their opinions of how other professions rate their professions (Golin & Ducanis, 1981). These assessment tools utilize self-report questionnaires in order to measure perceptions and attitudes that contribute to successful interprofessional collaboration. For example, a study examining vision therapists and orientation and mobility specialists asked participants to decide whether vision therapists are competent, well trained, defensive and ethical among others using a true/false scale.

While researchers find consistently that knowledge about roles and responsibilities is a meaningful antecedent to assess, there is not a consistent means of measuring increases in knowledge. Outcome studies of interprofessional practices have

used questionnaires, similar to the content of the RIPLS and IPS measures, as well as qualitative approaches involving interviews. Jacobsen and colleagues (2009) used semi-structured interview methods to examined interprofessional collaboration outcomes associated with completing an immersion in the Danish Interprofessional Training Unit (ITU). The ITU consisted of nursing, occupational therapy, physiotherapy, and medical students running an orthopedic ward for two weeks. Interviews with health care pre-professionals were completed before and after their immersion in the clinic. Specific questions pertaining to the outcomes of the ITU were used including teaching students interprofessional teamwork and teaching the understanding and strengthening of their individual professional roles. Themes across the interview responses suggested that working together led to self-reported increases in interprofessional teamwork and a better understanding of each other's competencies and changed previously held prejudices and stereotypes.

Similarly, Bilodeau and colleagues (2010) used semi-structured interviews and questionnaires to examine the impact of participating in interprofessional education and practice opportunities on professionals' knowledge about others' professions. Participants were pre-professional students in healthcare as well as professionals working in primary care facilities. The interviews and questionnaires asked participants to rate the degree of their knowledge about each other after completing the course. The courses used lectures, small group discussions, guest lectures, web-based discussion forums and simulation activities. Results indicated an increase in knowledge about each discipline represented (Bilodeau et al., 2010).

Implications of Current Research

Previous research has shown that knowledge of other professions is instrumental in effective interprofessional practice (Bookey-Bassett et al., 2016). Those studies included participants who were professionals in or students intending to enter the medical field. In addition, research suggests no common tools for assessing increases in knowledge of the roles of others while completing an interprofessional training experience (Thannhauser et al., 2010). The current research investigated the benefits of an interprofessional learning opportunity for pre-licensure students. The current training experience emphasizes interprofessional learning is it is an opportunity for students to learn through the interaction among other professions. As such, it could be labeled an interprofessional education (IPE) experience since it aims to develop knowledge, skills and behaviors for collaboration (Thistlethwaite, 2012). Additionally, the current research intends to evaluate changes in student clinicians' knowledge of other professions using open ended responses and qualitative ratings before and after an immersion in an interprofessional training experience. Additional items analyzed included the discipline rated and the number of cases students worked on. The discipline rated is included in order to analyze whether students clinicians were more or less knowledgeable of one discipline over another. The number of cases serves as the time spent immersed in the experience. This may suggest the length required for benefits in the knowledge of others.

CHAPTER THREE

Methods

This chapter describes the setting, participants, and the methodology for the study. A pre-experimental design was used to assess student clinician knowledge of other professions before and after working together in a university-based interprofessional psychoeducational assessment clinic. The current study was part of a larger investigation of interprofessional learning outcomes at a university training clinic.

Setting

This study was conducted at a midsized, midwestern university training clinic. A main purpose of the training clinic is to enhance students' interprofessional collaboration skills. Student clinicians from several professional training programs worked together to provide comprehensive academic and psychological assessments related to client referral concerns. Clients were from the local community and were typically referred by parents, schools, or physicians. Generally, clients were children ranging from four years of age to 18 and their parents. Student clinicians either volunteered to work in the clinic or participated as part of a required practicum. They were either graduate students in school psychology and communication sciences and disorders or undergraduates majoring in social work, nursing, special education, or psychology (reading team). Each profession was also represented by a faculty supervisor with professional experience in his or her respective field.

Clinical Experiences

Faculty supervisors supported student clinicians in their development of discipline specific skills and thinking. Each faculty member supervised the clinical practice of

students from their own profession. Supervision approaches with student clinicians varied and were dependent upon the student's level of training, purpose for involvement in the clinic, and role with each case. Faculty supervisors also worked to model interprofessional collaboration for all student clinicians by participating in interprofessional group discussions regarding assessment plans and case conceptualizations. Further, two faculty supervisors monitored each case and facilitated in person and online group discussions regarding the case.

Each interprofessional team of student clinicians and faculty members met formally three times while working with the client. In the first meeting, clinicians reviewed referral information and determined what data was needed to address the referral questions. Following the initial interprofessional meeting, each discipline determined their discipline specific assessment plans individually. Clients completed two days of assessment at the clinic, which included individual, four-hour appointments with discipline specific teams representing reading education, communication sciences and disorders, special education, and school psychology. The nursing and social work teams collaborated to complete home visits, and the school psychology team completed school visits at the child's school of enrollment.

After teams completed assessments specific to their profession, the interprofessional team met again to integrate the assessment results, conceptualize the case, and consider recommendations for the family and school relative to the client's referral question. Between formal meetings, student clinicians collaborated with one another via an online confidential discussion board, emails, and in person discussions. The degree of contact between formal meetings varied by case and student clinicians.

Teams sometimes observed each other's assessment work with the client. Finally, the interprofessional team met one last time after the client's staffing to process the case and outcomes.

Each semester, six clients were served by the clinic. Each discipline was represented on teams assigned to each case; however, the number of student clinicians differed by case. Similarly, the number of cases to which each student clinician was assigned varied. The work completed by student clinicians varied by case and was dependent on the assessment referral questions. School psychology clinicians typically interviewed the client's parents, reviewed educational records, observed the client at school, and interviewed teachers. They also assessed the client's academic, intellectual, and social-emotional functioning. Behavioral assessments were also completed as needed. Social work and nursing student clinicians completed interviews with parents. They also completed a home visit to better understand medical, developmental, and social history and to identify family strengths and challenges. Communication sciences and disorders clinicians gathered information about speech and language development and current functioning. Reading interventionists assessed academic skills and methods to support the client's reading development. Finally, the special education clinicians completed comprehensive assessments of the clients' academic skills.

Participants

Participants were student clinicians across three semesters of the university clinic's operation. Table 1 describes demographics of the sample. There were 122 possible participants over the three semesters (36 in semester one, 46 in semester two, and 40 in semester three). The total number of participants who completed the survey

was 102 (28 in semester one, 35 in semester two, and 33 in semester three). Fifty-nine percent of student clinicians were undergraduates at the institution and the remaining were graduate students. Undergraduate majors from special education (14.9%), psychology (17.9%), nursing (6%), and social work (17.9%) were represented. Sixteen percent of the graduates students were from the university's communication sciences and disorders program and 26% were enrolled in the school psychology graduate program. Student clinicians were predominately female (97%) and between the ages of 18 and 41 ($M = 23$, $SD = 4.36$). Each semester, most clinicians worked with more than one client (60.9%) and dedicated approximately 26-50 hours to the experience (Range = 8-100 +). Student clinicians from the disciplines of communication sciences and disorders, nursing, and psychology all worked on more than one case during the semester. Student clinicians from the other disciplines (social work, school psychology, special education) had respondents who worked either on one case or more than one case.

Table 1

Participant Demographics

Discipline	Total		Gender		Age		Clients	
	n	%	Female	Male	*M*	*SD*	1	2+
Undergraduates								
Social Work	12	17.9	91.7%	8.3%	22	3.03	11	1
Psychology (reading)	12	17.9	100%	0%	19	5.40	0	11
Nursing	4	6	100%	0%	21	12.90	0	4
Special Education	10	14.9	100%	0%	19	7.11	6	3
Graduate								
School Psychology	18	26.9	83.3%	16.7%	25	4.59	8	10
Communication Sciences and Disorders	11	16.4	100%	0%	26	6.05	0	11
Total	67		97%	3%	23	4.36	25	39

Measures

Research on interprofessional collaboration indicates that one of the most referenced precursors necessary for effective collaboration is role awareness and responsibilities (Bookey-Bassett et. al., 2016). This is defined as an understanding of one's one role and knowledge of others' roles on a team (Bookey-Bassett et. al., 2016). Given that increased role knowledge was a heavily cited antecedent for effective interprofessional collaboration, the current study examined changes in clinician-reported knowledge of other and their own professions after the clinicians worked together in an

interprofessional assessment clinic. Numeric analyses were used to examine changes in student clinicians' knowledge of other professions in likert and open ended responses. To better describe the sample of participants, demographic information was also collected and included discipline represented, age, gender, number of cases worked, and level of training.

Interprofessional Learning Perceptions Survey.

Several published surveys have been designed to measure antecedents, components, or outcomes of interprofessional learning (Thannhauser et al., 2010). Two of these surveys, the Readiness for Interprofessional Learning Scale (RIPLS) and the Interprofessional Perception Scale, were used to develop the current assessment tool. The RIPLS was designed to measure the readiness of participants for interprofessional learning (Parsell & Bligh, 1998). The Interprofessional Perception Scale was designed to measure professionals' perceptions of their own profession and their perceptions of other professions (Golin & Ducanis, 1979). When the surveys were combined, thirty-three items were used. Questions assessed student clinicians' perceptions of roles and responsibilities of each profession represented in the clinic experience, self-reported knowledge of each profession, and attitudes toward interprofessional collaboration. For the current study, only items pertaining to the research questions were analyzed.

Demographic information.

Several demographic questions were included on the Interprofessional Learning Perceptions Survey. These included discipline, age, gender, number of cases worked, and level of training. Student clinicians were asked to choose from a multiple choice box which of the six disciplines they represented. Age was determined from the birthdate

(MM/DD/YYYY), which was also used as a matching variable in order to pair beginning of semester responses to end of the semester responses without including overt identifying information. Gender was selected in a binary choice (male or female) as was level of training (undergraduate or graduate). Student clinicians were then asked how many cases they worked on over the semester with multiplies choices of 1 – 6 as options. The number of cases served was asked in order to draw conclusions about the time spent in the interprofessional experience on the knowledge gained. This was in independent variable in the current research.

Likert scale responses.

Two questions in the Interprofessional Learning Perceptions Survey assessed clinician knowledge of other professions. The first question included a prompt for the student clinician to rate his or her knowledge of other professions working in the clinic (e.g., "How knowledgeable are you about the discipline of social work."). The question listed all six disciplines represented in the clinic: communication sciences and disorders, nursing, reading intervention, school psychology, social work, and special education. Participants were asked to select a choice on a four point Likert scale (1 = not at all knowledgeable, 2 = somewhat knowledgeable, 3 = knowledgeable, and 4 = very knowledgeable).

Open-ended responses.

After likert-scale items were completed, student clinicians were asked to list similarities between their own profession and the other professions working in the clinic. Specifically, five open ended prompts stated, "List the similarities between your discipline and ____", so that the participant compared his/her discipline to each of the

other professions represented in the clinic. The response option was a text box of approximately five lines of text that stretched to accommodate an unlimited response length.

Procedure

All procedures for the study were approved by the University's Institutional Review Board (IRB). The main purpose in this study was to examine changes in knowledge before and after the clinic experience, so the survey was completed prior to and after the interprofessional work. Prior to completing the survey at the beginning of the semester, most student clinicians attended a 90-minute clinic orientation. The orientation reviewed clinic procedures and expectations for participation. In the orientation, student clinicians met each other and were introduced to each other's professions. Interprofessional collaboration was defined and discussed as an expected outcome for the training experience. Following the orientation and before clinic work began, participants were asked to complete the survey.

The surveys were completed online using Qualtrics software (Smith, Smith, Smith, & Orgill, 2002). To promote participation, three reminder emails were distributed to participants for both the pre and post surveys. Participants consented to the study after reading the initial page of the online survey. The survey took respondents approximately 20 to 30 minutes to complete. Data were collected over three semesters and therefore includes the perceptions of three different interprofessional teams of student clinicians who completed the semester long experience. The combined response rate over the three semesters was 83%.

Data Analysis

Likert scale survey responses were analyzed through the Statistical Package for the Social Sciences 18.0 software (IBM SPSS Statistics; Nie, Bent, & Hull, 1968). A three-way factorial design was used with three independent variables: number of clients served (between subjects factor), discipline rated (within subjects factor), and the time of the survey (pre, post; within subjects factor). The dependent variable was student clinicians' rating of his or her knowledge of each of the professions represented on the interprofessional team. A repeated measures analysis of variance examined changes in student clinician knowledge of other professionals after working in the interprofessional setting. Effects associated with number of cases completed and the discipline rated were also examined. Thirty-three responses were not included, because the respondent did not provide beginning or end of the semester responses. The incomplete responses were not representative of a particular discipline or number of cases.

Open-ended responses were used in this study to collect additional information about student knowledge of professions represented in the clinic. Students were asked to list similarities between their profession and other professions in the clinic setting. This approach was similar to the work of Thannhauser and colleagues (2010) and was intended to capture another aspect of the student clinician knowledge of the roles and responsibilities of colleagues in the clinic setting.

A total of 70 responses were analyzed for themes, while only matched open-ended responses from the beginning of the semester to end of the semester were analyzed numerically. First, all responses, beginning of the semester and end of the semester were reviewed for common ideas, phrases or words. This first analysis was completed to

determine commonalities among the responses regardless of incomplete data sets. Themes were determined by the frequency of connected ideas. Second, opened ended responses were coded to analyze 1) the number of words represented in the responses and 2) the number of ideas represented in the responses (Appendix B). The open ended responses were also coded for length and number of ideas, with the hypothesis that changes in how much students wrote or the number of ideas in their writing might be representative of a greater awareness of professions by the end of the semester. A rubric was created to define the parameters of a "word" and an "idea". A word was defined by a meaningful arrangement of letters situated between spaces or punctuation marks (Oxford Dictionary, n.d.). Additionally, abbreviations such as "meds" or "fam" were included as one word. Acronyms such as RtI, SPED, CSD, or IEP were counted as one word, regardless of if the acronym comprised of several words combined. When an entry was left blank, this counted as zero words.

An idea was defined as one complete thought or opinion (Oxford Dictionary, n.d.). Student clinicians were asked to rate similarities between professions so discussion of differences was counted as zero ideas. Likewise, when participants clearly stated the roles of one discipline but not the similarities, zero ideas were counted. Ideas had to be distinct from each other. As such, when student clinicians stated synonymous ideas, only one idea was counted (i.e. we work with other professions and other disciplines is one idea). A list of ideas separated in some meaningful way was accepted as different ideas such as when ideas were separated by lines, backslashes or commas. When ideas were in the same sentence but included more than one idea, it was classified as more than one idea (i.e. we work with families and children is two ideas). Like the number of words, if

there was no response in a particular entry or if there was just a question mark it was counted as zero ideas.

The number of words and the number of ideas were identified by two raters (researcher and additional rater). The additional rater was a professional speech-language pathologist. The rater was trained using the rubric and two examples, one displaying the number count for ideas and another for words. Then, the raters identified each participant's pre and post response to the survey (inter-rater reliability = .93). Then, any disagreements were discussed between the two raters and the number of items was identified collaboratively. There were 36 complete open-response data sets that were matched beginning of the semester to the end of the semester Certain participants provided answers to the open-ended responses either before the experience or after the experience with some providing both. Those who provided answers both before the experience and after sometimes had a response box empty (i.e. rate the similarities between your discipline and social work was left empty while the remaining four disciplines had complete responses). Incomplete responses were not associated with certain disciplines as all disciplines were represented. Likewise, the number of cases worked was not associated with more or less incomplete response sets.

The individual's responses were analyzed as to whether the number of ideas and words they provided about each discipline increased, decreased or stayed the same from the beginning of the semester to the end of the semester. Next, changes in descriptions for each specific discipline rated (e.g. social work, etc.) was analyzed to determine whether participants' responses changed in complexity from the beginning of the semester to the end of the semester in unique ways for certain disciplines. Additionally,

the disciplines rated mean scores for the beginning of the semester number of ideas and words were compared to the end of the semester responses.

CHAPTER FOUR

Results

The current study was designed to investigate the outcomes for education program student clinicians who completed a semester in the university-based psychoeducational assessment training clinic. The primary purpose of this study was to analyze whether student clinicians became more knowledgeable of other disciplines after working together for a semester in the clinic. Additional questions were posed about whether the number of cases worked on impact those results and if student clinicians become more knowledgeable of certain disciplines than others. Lastly, are student clinicians able to list more similarities between their profession and others after completing the clinic experience?

Data Screening

The data were screened for missing data using the non-identifying variable of birthdate. Sixty-seven likert responses were included while thirty-three responses were not included because the respondent did not provide beginning and end of the semester responses. The incomplete responses were not representative of a particular discipline (s) or number of cases. Seventy open-ended responses were analyzed for themes while 36 matched responses were analyzed numerically.

Question One

To examine whether participation in an interprofessional assessment clinic experience was associated with increases in knowledge of other professions, student clinicians' ratings of their knowledge of other professions was submitted to a three-way, mixed factor, repeated measures analysis of variance. Number of cases (one versus more

than one) and discipline rated (social work, school psychology, reading, nursing, special education, communication sciences and disorders) served as between-subjects variables. Time (beginning of semester, end of semester) served as the within-subjects variable. An underlying assumption in repeated measure analysis of variance is that of sphericity, so a test of sphericity violations was completed. The Mauchly's Test of Sphericity was significant $W = .42$, χ^2 (14) = 49.35, $p < .001$ for discipline rated, suggesting an increased probability of Type I error when interpreting the repeated measures analysis of variance. When sphericity is violated, it is recommended that the critical F value for subsequent analysis of variance be corrected with the Huynh-Feldt coefficients (Lund & Lund, 2013). The Huynh-Feldt correction was interpreted for discipline rated.

There were significant main effects for time of rating, F (1, 59) = 24.99, $p < .001$, partial eta^2 = .298; discipline rated F (1, 55) = 8.47, $p < .001$, partial eta^2 = .435; and number of cases F (1, 59) = 7.801, $p < .05$, partial eta^2 = .117. The effect size for time of rating was large. Mean scores increased from the beginning of the semester (M = 2.31) to the end of the semester (M = 2.62), suggesting that, overall, student clinicians reported higher levels of knowledge about other disciplines after the interprofessional experience. The effect size for discipline rated was also large. Overall, participants reported knowing more about some disciplines than others (Table 2). Ratings of knowledge were highest for social work, school psychology and special education (nursing M = 2.11, communication science and disorders M = 2.35, reading M = 2.45, social work M = 2.49, special education M = 2.69, school psychology M = 2.68). Finally, the effect size for the number of cases was moderate. Student clinicians who worked on more than one case

reported more overall knowledge about disciplines represented in the clinic (M = 2.610) than student clinicians who only worked on one case (M = 2.316).

Table 2

Student Clinicians' Knowledge Ratings of Each Discipline

Discipline Rated	*M*	*SD*
Nursing	2.11	0.10
CSD	2.35	0.17
Reading	2.45	0.09
Social Work	2.49	0.10
School Psychology	2.68	0.11
Special Education	2.69	0.10

We were most interested in whether there were greater effects for changes in knowledge of other disciplines if students worked on more than one case and whether students reported learning more about some disciplines than others as a function of time (beginning/end of the semester). There was not a significant interaction when assessing time (beginning to end of the semester) and the number of cases worked F (1, 59) = .058, p = .81, partial eta^2 = .011 or time and discipline rated F (4.986, 295) = 1.540, p = .177, partial eta^2 = .025. This suggests no meaningful difference in the change in knowledge when students worked on more than one case from the beginning to end of the semester. Likewise, there was no meaningful difference in the change of knowledge for certain disciplines over others at the end of the semester. Lastly, there was not a significant interaction when assessing time, discipline rated and the number of cases worked on F (4.986, 295) = .986, p = .426, partial eta^2 = .016. This may suggest that student clinicians

did not learn more about certain disciplines after the semester experience whether they worked on one case or more than one case.

Interactions between ratings before and after the clinical experience by number of cases completed and discipline rated were also explored. There was a significant interaction between discipline rated at the number of cases F (4.162, 295) = 4.032, $p <$ .05, partial eta^2 = .064 (Table 3). The effect size was moderate. Students who worked on more than one case typically reported themselves as more knowledgeable for all professions except for social work. When rating social work, student clinicians that worked on more than one case rated themselves as less knowledgeable than those who worked on only one case.

Table 3

Discipline Rated by Cases

	Social Work		Nursing		Special Education		CSD		Reading		School Psych.	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Cases 1 n = 24	2.69	.16	1.96	.16	2.58	.15	2.08	.18	2.08	.13	2.50	.17
Cases 2+ n = 37	2.30	.13	2.27	.13	2.80	.12	2.62	.15	2.82	.11	2.85	.14

*CSD = communication sciences and disorders

Open-Ended Responses

All 70 responses, where student clinicians responded at the beginning of the semester, end of the semester or both, were reviewed for common ideas, phrases or words. Responses that included "no idea" or "not sure" were more common in the beginning of the semester than at the end of the semester. Also, students tended to phrase items more tentatively at the beginning of the semester like, "I don't know much about nursing, but I would guess that we both use research to inform our decisions and practice."

Common ideas from both the beginning and end of the semester were working with similar clients and references to a client-centered practice. Several students remarked that their profession and others "work in schools," have a "client-centered focus," "often work with same clients and collaborate to advocate for individuals" and "focus on the family." There were also references to collaboration or the need to work on a team both at the beginning and end of the semester. Several responses used the word holistically in order to describe similarities between their profession and others. "We use holistic approach to finding solutions" and "work together to understand child holistically" were two responses.

Beginning and end of the semester responses also included specific roles that overlapped between two professions. "We both work primarily with students in school and recognize that reading is an essential skill in education. We are both knowledgeable in reading-specific assessments and methods to improve all parts of students' reading skills"- Special education student about reading. "CSD and nursing both can make visits to the home/school of the clients that are being evaluation. Both are caring professions

that make sure the client is of good health. They also both have contact with the client's family and caregivers to support the assessment process"- CSD student about nursing. "Focus on math, reading, oral language, and other areas that School Psych assesses"- school psychology student about special education.

Themes identified in the open ended responses were present for the beginning and the end of the semester. Many students referenced overlapping roles, used "holistic approach" or "client-centered focus" at the beginning of the semester, even before the immersion in the interprofessional clinic experience. Those who tended to remark on roles at the beginning of the semester also remarked on roles at the end of the semester. Likewise, if student clinicians remarked on collaboration and client-centered practice, they did so both at the beginning and end of the semester.

In addition to the themes identified, the open ended responses were analyzed numerically. When beginning of the semester responses were compared to end of the semester responses, student clinician comparisons of their own profession to other disciplines represented in the clinic were not longer or did not include more ideas. Mean scores for the beginning of the semester number of ideas ($M = 1.68$) and the end of the semester number of ideas ($M = 1.5$) indicates a slight decrease in average number of ideas represented in responses. Similarly, mean scores for the beginning of the semester number of words ($M = 11.76$) and end of the semester number of words ($M = 10.23$) indicates a decrease in average number of words. Responses were described as either increasing in ideas or words after the semester, decreasing or stayed the same. The majority of responses decreased from the beginning of the semester to the end (Table 4). Using number of words and number of ideas as markers for complexity of responses,

identifiable differences in the sophistication or complexity of similarities described from beginning of the semester to end of the semester were not found. Student clinicians were generally able to find one or more similarities at the beginning of the semester and the end of the semester.

Together, the qualitative and quantitative data from the open-ended responses suggests some meaningful change in knowledge of similarities from the beginning of the semester to the end of the semester after completing the psychoeducational assessment clinic experience.

Table 4

Changes in Complexity of Open Ended Reponses

Discipline Described		Number of Ideas M (SD), Range	Number of Words M (SD), Range
Social Work	Beginning of Semester	2.08 (1.52), 0-5	14 (12.12), 0-55
	End of Semester	2.08 (1.84), 0-8	13.14 (11.07), 0-44
	Percent Change	29%	42%
School Psychology	Beginning of Semester	1.51 (1.65), 0-7	9.71 (11.29), 0-44
	End of Semester	1.28 (1.43), 0-5	9.03 (11.91), 0-42
	Percent Change	26%	21%
Nursing	Beginning of Semester	1.44 (1.32), 0-6	10.86 (9.50), 0-43
	End of Semester	1.22 (1.17), 0-5	9.00 (9.81), 0-47
	Percent Change	26%	34%
Reading	Beginning of Semester	1.47 (1.42), 0-5	9.78 (10.14), 0-36
	End of Semester	1.42 (1.56), 0-5	10.14 (12.28), 0-49
	Percent Change	29%	24%
Special Education	Beginning of Semester	1.83 (1.48), 0-5	15.83 (12.22), 0-40
	End of Semester	1.92 (1.61), 0-6	13.22 (10.73), 0-44
	Percent Change	32%	39%
Communication Sciences and Disorders	Beginning of Semester	1.72 (1.49), 0-5	10.36 (8.76), 0-36
	End of Semester	1.08 (1.30), 0-5	6.83 (7.52), 0-25
	Percent Change	18%	24%
Disciplines Combined	Beginning of Semester	1.68 (1.48), 0-7	11.76 (10.88), 0-55
	End of Semester	1.50 (1.50), 0-8	10.23 (10.79), 0-49
	Percent Change	26%	31%

CHAPTER FIVE

Discussion

The current study investigated the outcomes for student clinicians who completed a semester in the university-based psychoeducational assessment training clinic. Specifically, we were interested in exploring differences in knowledge of other professions after an interprofessional learning opportunity. The primary research questions asked whether student clinicians became more knowledgeable of the disciplines after working together to complete cases in the clinic. We examined knowledge change in two ways. First, we explored whether ratings of knowledge for each profession changed from the beginning to the end of the semester. Student clinicians were asked to rate themselves on a likert scale of how knowledgeable they were of each profession. Additional questions examined whether the number of cases served was associated with differences in knowledge of other professions and if student clinicians reported more knowledge about certain disciplines over others. Second, we evaluated whether students responded differently from the beginning of the semester to the end when asked to list similarities between their own and other disciplines.

This study extended previous research about interprofessional education. Previous research by Stone (2013) concluded that people do not become expert collaborators by increasing their knowledge about the topic they are collaborating on, but instead, they are strong collaborators by becoming an expert on the roles and knowledge base of the people they collaborate with. He posits that one can teach collaboration by practicing collaboration in settings that are similar to where professionals will practice in the future. Numerous scholars have provided arguments for the importance of

understanding each other's professional skills, expertise, and role similarities and differences when engaging in interprofessional practice. The clinical experience in this study meets the definition of interprofessional education (any type of educational, training, teaching or learning session in which two or more health and social care professions are learning interactively (Reeves, Goldman, & Oandasan, 2007)). This research utilized responses from student clinicians on a survey delivered before and after an interprofessional learning opportunity. Questions asked students to rate how knowledgeable they were about each discipline and to provide a list of similarities between their own and other professions.

Knowledge of Others

The change in ratings of how knowledgeable students were from the beginning of the semester to the end of the semester was statistically significant with a large effect size. This may suggest that the student clinicians' mean rating of how knowledgeable they were of the professions represented in the clinic increased after an immersion in the semester of assessment clinic training experience. This is similar to previous research that showed immersion in real-life interprofessional training clinics lead to participants becoming more knowledgeable of other's competencies (Jacobsen et al., 2009; Bilodeau et al., 2010; Mohaupt et al., 2012).

In addition to changes in overall knowledge of professions from the beginning of the semester to the end of the interprofessional learning experience, student clinicians reported greater knowledge for some professions than others. These changes in ratings after the interprofessional learning opportunity are similar to previous research suggesting that medical students felt more knowledgeable of their own as well as other

disciplines through working together in a real-life training experience (Jacobsen et al., 2009; Bilodeau et al., 2010). Student clinicians were less knowledgeable of the roles and responsibilities of nurses than special education, school psychology and social work students. This may speak to some role confusion of some disciplines over others on an interprofessional team or to how the disciplines worked together. Nursing students often completed home visits, interviewed families, and provided background about clients. Depending on the client, they may not have had atypical detailed health histories to share. Special education and school psychology students completed several hours of intellectual, social/emotional/behavioral, and academic testing in the clinic. Other student clinicians sometimes observed these testing sessions. Social work students often worked with nursing students to conceptualize background information and create connections to supports and the community. This may or may not happen within the clinic setting. Student clinicians may not have had as many opportunities to work with the nursing students and learn about their roles and responsibilities in this context. This confusion about nurses' roles as compared to other disciplines may lead to decreased collaboration with that profession. Previously, research suggested that role confusion can be linked to negative stereotyping and decreased collaboration skills such as communication (Mohaupt et al., 2012).

Previous research has suggested that through an interprofessional experience, students can gain knowledge about certain disciplines' roles on an interprofessional team (Ateah et al., 2011). Unlike those findings, in this study there was no interaction between the disciplines rated at the beginning of the semester to the end of the semester. There was no differential change in knowledge from the beginning of the semester to the end

depending on what discipline was rated. Additionally, there was no significant interaction when assessing time, discipline rated and the number of cases worked on. This lack of interaction may suggest that, overall, student clinicians did not learn more or less about certain disciplines over others whether they worked on one case or more from the beginning of the semester to the end of the semester. Those that worked on more than one case did not report feeling more knowledgeable after the experience of certain disciplines than those that worked on one case.

Results indicated a statistically significant difference for student clinicians who worked on one case versus those who worked on more than one case indicating that student clinicians who worked on more than one case reported higher levels of knowledge for professions in the clinic. The effect size was moderate. However, there was not a significant difference for the number of cases student clinicians worked when looking at a change from the beginning of the semester to the end. While participants who worked on more cases reported having an overall greater level of knowledge for professionals in the clinic, there was not a differential change in their knowledge from the beginning to the end of the semester when compared to participants who worked on only one case. Findings from this study suggest that when it comes to developing knowledge about other professions, perhaps it is just as beneficial to work on fewer projects together. Perhaps, even a short amount of time observing other professions completing roles and working collaboratively towards a goal can increase students' knowledge of those professions. Future research may investigate what aspect of this collaborative work (observing, working on common goals, sharing information, etc.) is most beneficial. Additionally, most interprofessional experiences have more goals than just developing

knowledge of other professions. Additional research may explore whether the time spent working interprofessionally in similar settings is associated with other important interprofessional outcomes such as communication skills or teamwork.

The lack of interaction of number of cases worked over time could also mean that those who worked on more than one case had more background knowledge or previous exposure to the disciplines rated prior to beginning the clinic experience. The demographics of student clinicians who worked on more than one case or only one case may help explain this result. Students who worked on only one case were predominantly first year students in school psychology and undergraduate social work and special education students. Special education students and social work students tended to be younger students, perhaps, with less professional experience than their counterparts. The nursing students in the study often had an associate's degree in the field before re-entering school to pursue additional degrees. This additional interprofessional background and experience may have influenced student clinicians' ratings of how knowledgeable they felt of the other professions in the clinic setting. Future research might consider the degree to which prior professional experiences are associated with different outcomes for interprofessional learning opportunities.

Interestingly, even though there were not significant changes in self-reported knowledge of each profession from the beginning of the semester to the end of the semester, there were differences in knowledge for each discipline when the number of cases completed varied for participants. This may suggest that how student clinicians rated each discipline varied depending on whether they participated in one case or more than one. The demographics of students may have also been associated with why these

differences emerged. Like previously stated, the makeup of students who worked on one case versus more than one was different. Those who worked on more than one case tended to have more professional experiences as they were older graduate or undergraduate students. School psychology students had completed other practica and had a previous introductory experience in this interprofessional clinic. The one case group had more undergraduate students with less professional experience involving work with others and less experience within their own profession as well.

Interestingly, those who worked on more than one case all rated themselves as more knowledgeable of each discipline except for the discipline of social work. However, student clinicians were asked to rate each discipline, including their own and all but one social work student clinician worked on only one case. Social workers may have rated themselves as more knowledgeable than other disciplines of the roles of social workers. It is important to note that students from the discipline of social work completed roles on the team depending on the needs of the clients. In some instances, social work students may have completed typical responsibilities as a part of the team while other cases may have required additional or limited duties from that discipline. Considering these role variations based on the case worked, another hypothesis for these results may be that student clinicians that worked on only one case saw social workers completing typical roles of the discipline. This could have influenced their rating of how knowledgeable they felt about social work since they may have seen roles that matched their background knowledge of the discipline. Perhaps those that worked on more than one case observed social workers performing several roles and felt less knowledgeable of

the discipline after working on more cases. These variables could have influenced the findings between the number of cases worked and the discipline rated.

Similarities between Professions

Overall, the themes and differences between the beginning and the end of the semester responses may have suggested some knowledge increases in terms of acknowledging the need to collaborate. The question that asked student clinicians to rate similarities between their own and the other professions was open-ended. All open-ended responses that had even partially completed responses at the end of the study were analyzed for themes. Complete responses from participants before and after the clinic were matched and analyzed numerically. These matched responses were analyzed to see if comparing the responses from the end of the semester to responses from the beginning of the semester suggested changes in student clinicians' knowledge of professions represented in the clinic.

Similar themes emerged in beginning and end of the semester responses and included references to similar client base (students, families, etc.), client-centered practice, need for collaboration, holistic approach, and teamwork. The themes described were present both at the beginning of the semester and the end of the semester, indicating no increase or changes in the content of ideas expressed at the beginning of the semester to the end of the semester. This may suggest that many student clinicians acknowledged that all professions need to collaborate and will serve similar clients as a part of their future roles. There was no evidence that any profession rated was described with more or less commonalities than other professions. When the responses were categorized based on the discipline the participant represented, there were no differences in themes based on

the respondent's discipline. Most student clinicians attended a 90-minute orientation to the clinic's purpose and mission before completing the initial survey. It is possible that completion of the orientation prior to the beginning of the semester survey could have contributed to these themes emerging in beginning of the semester survey results.

Even though the themes from beginning of the semester to end of the semester response did not appear to change, responses that included "no idea," "not sure," or "I don't know much about this profession" were more common in the beginning of the semester than at the end of the semester. Only a few participants responded at the end of the semester with question marks or "no idea" responses. Student clinicians were more likely to not respond, or respond with "not sure" or "don't know" when asked to rate similarities between their profession with nursing and social work. There was not a particular participant discipline this was more common for as all were represented. This may suggest less knowledge of the similarities between professions with nursing or social work.

The prompt for these responses was to list similarities between professions while some student clinicians listed both similarities and differences. One trend observed in the open-ended responses was that participants listed differences along with similarities at the end of the semester. Some student clinicians responded with a similarity between their own and another profession and then included a difference. For instance, a special education student remarked on nursing and said, "similarity- both have the interest of the client in mind / difference- they work in the home and we work with the client in the clinic." According to Thistlethwaite and Moran's (2010) review of common outcomes, the increase in the knowledge of similarities and differences between professions is a key

component in the roles and responsibilities domain. By acknowledging similarities and differences between professions, participants may have been showing an increase in role awareness and an increase in knowledge.

There were no numerical differences between the beginning of semester responses and the end of the semester responses. The open ended responses were coded for length and number of ideas, with the hypothesis that changes in how much students wrote or the number of ideas in their writing might be representative of a greater awareness of other professions by the end of the semester. Looking at the results, there was no differences in responses from before and after the clinical experience. However, this method of coding the responses may have limited our interpretation of the results. Most importantly, the original coding scheme did not count differences as an idea when calculating the number of ideas. By excluding ideas that discussed differences, we may have dismissed evidence of the learning of profession's roles and responsibilities. Also, the numeric analysis of the open ended responses appeared to have missed some information captured by the review of response for common themes. The rubric sought to quantify the length of responses with the assumption that longer responses would have more ideas and that more ideas would mean an increase in the knowledge of similarities. However, if participants became more knowledgeable of others, it is possible that responses would have been more succinct. Additionally, supplying differences between professions may also have shown more knowledge of roles and responsibilities. The result of the numeric analysis of the open-ended questions is different from the previous results of the rating of knowledge question which suggested a change in rating over time.

Implications

Findings suggest there were benefits associated with participation in the interprofessional clinic experiences. At the conclusion of the experience, student clinicians reported higher levels of knowledge for the different professions represented in the clinic. This was evident in likert ratings of knowledge for each profession as well as open ended descriptions of similarities between each profession and their own. This is particularly noteworthy given that very little overt training of interprofessional collaboration skills or education about the roles, responsibilities and similarities among the disciplines was included in this experience. Results are consistent with previous research highlighting the benefits of providing students with opportunities to build collaboration skills in similar settings to those they will practice in the future (Anderson & Lennox, 2009; Bilodeau et al., 2010; Stone, 2013).

The result of the time spent in the interprofessional training experience was also interesting. Conclusions from this research indicate benefits to even a brief opportunity to collaborate on an interprofessional team. Student clinicians felt more knowledgeable of the professions following the immersion of even one case in this interprofessional experience. This outcome is poignant in that it may suggest that the time spent working within the clinical experience was not an essential variable for increased knowledge of others. However, it is important to recognize that enhanced knowledge of other professions and one's own profession is only one of many desirable outcomes for interprofessional practice opportunities. While this study did not find that working on more cases was associated with greater increases in knowledge about other professions, the study did not explore other interprofessional outcomes. Additional opportunities to

collaborate with other disciplines may be needed to achieve growth on variables such as communication skills (Sargeant, MacLeod & Murray, 2011).

The result of the open-ended questions also suggested some increases in the knowledge of professions. The emergent themes suggested that student clinicians were able to list similarities between professions. Student clinicians responded that many disciplines need to use collaboration in their practice and serve similar clients. The numeric analysis of the open-ended question suggested no change between the beginning of the semester to end of the semester. This is different from the result of the rating of knowledge question which suggested a change in rating over time. This may suggest that student clinicians felt more knowledgeable of the disciplines but were not able to generate more similarities between their professions. While there were not interactions by discipline from the beginning to the end of the semester, there were themes to suggest that students responded less with "I don't know" when asked to list similarities at the end of the semester. This suggests that the two methods (likert scale and open-ended) complimented each other.

Interprofessional outcomes may vary based on the setting. Previous research studied the outcomes for medical students who participated in interprofessional education or training. The current study found that some participants were confused of the roles of nurses. This may be because nurses in this study completed tasks needed for a psychoeducational assessment clinic versus the more traditional roles completed by nurses in healthcare. Similar confusion was found in other research conducted in the medical professions that showed that participants in an IPE experiences rated themselves as less knowledgeable of the multidimensional roles of nurses (Ateah et al., 2011).

Within another context, student clinicians may have felt more knowledgeable of the roles of nurses. Therefore, the results of this study can be compared to similar clinic settings with comparable participants.

A final implication of this study has relevance for the ongoing practice of the assessment clinic. In this sample, some student clinicians rated that they were less knowledgeable of certain disciplines. Within the open-ended response, participants often stated they were unsure of the roles of nurses and social workers. This may mean that roles and responsibilities of some disciplines were confusing for student clinicians, even after completing this interprofessional experience. The results of this study may suggest that participants in this clinic need direct teaching about the typical roles and responsibilities of other disciplines in order to improve their knowledge of those disciplines or more requirements to observe other professions completing their roles on the team. However, due to some methodology issues in the overall study, it may be important to explore these outcomes further to guide clinic planning.

Limitations

There are several limitations in the current study. The three primary limitations are participant selection, limits in measures, and limits in the analysis methods. Each one is discussed below with implications for future research to address these limitations.

This study relied on voluntary participation. Some students volunteered to be a part of the clinic while others were required to participate for a class or as a part of a program requirement. However, everyone who participated in this study volunteered to complete the survey before and after the clinical experience. Those who participated may have had more background knowledge or experience with other professions and

volunteered for the experience because of their experiences. Additionally, those who participated fully in the survey may have overrepresented positive changes as a result of the experience relative to those who declined to participate.

This research was a pre-experimental design. Student clinicians were not randomly assigned to participate on one or more than one case. Their involvement varied based on their purpose for working in the clinic. For instance, social work students and special education students primarily worked on only one case while communication sciences and disorders and nursing students mostly worked on two. In the current study, this variance in the number of cases worked for certain disciplines may have created an interaction between the discipline rated and the number of cases worked. Social work students may have rated themselves as very knowledgeable of their own discipline. Student clinicians may enter the training experience feeling very knowledgeable of their own field. Future research may explore controlling for the amount of participation each discipline had or using a method of analysis that controls for this non-random relationship between participant backgrounds and time spent in the clinic.

There were some limitations in the measures used in this study. This study relied on self-report measures of knowledge without any empirical evidence of that knowledge. Many student clinicians from several disciplines volunteered to be a part of the clinical experience. Similar research on the skills of collaboration relies on self-report measures (Thannhauser et al., 2010). However, there are no known measures in the research that assess knowledge changes that use objective evidence.

Student clinicians were asked to rate how knowledgeable they were of every profession, including their own profession. Thus, changes in ratings of knowledge for

disciplines represented in the clinic may reflect that student clinicians felt more knowledgeable of their own discipline, other disciplines, or both. This may have contributed to differences in the understanding of the nursing profession as nurses were the smallest number of participants. Future research may aim to separate the questions that asked student clinicians to rate how knowledgeable they felt of their own profession and other professions. Then, more conclusions can be drawn between increases in understanding own roles and the roles of others like previous research (Jacobsen et al., 2009).

The survey was conducted at the beginning of the semester and the end of the semester in order to evaluate changes in knowledge. One limitation about the timing of the survey was that the initial survey was sent to participants after the 90-minute orientation meeting for student clinicians. The orientation meeting described several aspects of the clinic and provided an introduction to interdisciplinary collaboration. This could have influenced students' ratings of how knowledgeable they felt about the disciplines before their immersion in the clinic and the themes that emerged in the open-ended responses. Future research may attempt to control for this variable by investigating whether student clinicians attend the orientation meeting and if that attendance influences their ratings of how knowledgeable they feel of each discipline.

There were limitations in the analysis of the data in this study. There were 36 matched open-ended responses from the beginning of the semester to the end of the semester with 34 responses not used due to missing portions of data sets at the beginning of the semester or the end of the semester. The missing data for the open responses in this study was not found to be correlated with certain disciplines or time spent in the

clinic. Open ended responses that did not include both a beginning of the semester response and an end of the semester response were not analyzed. As a result, themes or changes in responses may have been lost. Those who completed the open-ended responses at the end of the semester but not the beginning of the semester may have indicated growth or changes in knowledge of other professions. They may have been able to respond to the question after the experience when they could not at the beginning. It is noteworthy that less than half of the participants provided beginning and end of the semester responses to the open ended question. As a result, the responses that were analyzed may not be representative of broader sample of participants. It is possible that those who responded may represent those who felt more positive or negative about the experience.

The open-ended responses were analyzed using a rubric to quantify the complexity of the responses. The idea that the increase in words and ideas suggests more complex answers was theoretical, which may not be accurate as responses may become more succinct or accurate following interprofessional learning opportunities. Additionally, the coding of the responses included only similarities while some respondents provided similarities and differences. This may have deflated some of the knowledge differences of roles and responsibilities between the beginning of the semester and the end of the semester.

Future Research

Future research may aim to further the interprofessional education research for pre-licensure education students. Most previous research includes post or pre-licensure students in medical fields (nurses, physicians, occupational therapists, physical therapists,

pharmacists, etc.) (Petri, 2010). Additional research may further the findings of this study by controlling some of the variables for students including such as the number of cases each discipline work on. Having more generalizable research about the benefits for education students could change the opportunities included in institutions that train our educators. This research suggested that working together in a clinical setting affected students' rating of how knowledgeable they felt of each profession. Additional research has suggested that breaking down silos among professions is an ideal way to teach collaborative practices (Bilodeau et al., 2010). This research suggests that student clinicians learned about the roles and responsibilities of others by observing and working together. Future research may also look at the impact of including overt education about the roles of other professions students often collaborate with and the differences in outcomes between overt education of roles and the outcomes from an interprofessional immersion experience.

This study focused on two main questions, "How knowledgeable are you in the discipline of __" and "List similarities between you discipline and ___". Different survey design logic may include having participants only rate other professions instead of including their own profession or include analysis that separates students' ratings of their own profession from the ratings of other professions. With these separate ratings, one would be able to analyze more about knowledge changes after an interprofessional experience. Future research may focus on other aspects of knowledge of roles and responsibilities. Several components comprise Thistlethwaite and Moran's (2010) definition of the outcome roles and responsibilities. Additional studies may want to

discuss differences among professions, overlapping roles, professional boundaries, philosophical ideologies, and knowledge of specific attributes disciplines bring to teams.

In terms of the open-ended response, future research may develop rubrics for open-ended responses that include more sophisticated analysis of responses. Focusing a rubric more guided to the outcomes of roles and responsibilities may show more knowledge gained after this interprofessional experience. Additionally, a rubric may be created to show other outcomes associated with interprofessional education. Future research may want to create a rubric for identifying themes that match the outcome goals of the training clinic, similar to other open-ended research on interprofessional education opportunities (Jacobsen et al., 2009).

Conclusions

This study extends research on interprofessional learning opportunities to an educational setting. Exposure to an interprofessional training experience for student clinicians was beneficial in increasing their knowledge of professions represented in the clinic setting. Benefits were seen even without overt education of the roles and responsibilities of others or long training experiences. However, more time spent in the experience did not mean that student clinicians became more knowledgeable of different professions. These findings should be considered relative to the unique features of the samples of participants. Future research may aim to control the variable of the number of cases completed in order to draw additional conclusions. Knowledge of the roles and responsibilities of professions continues to be an important outcome of interprofessional education and precursor for effective interprofessional collaboration.

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Appendix A
Interprofessional Learning Perceptions Survey

Q1 Hello, Jessica Spurr, a graduate student in the School Psychology Program at UW-Eau Claire, is gathering information about the Human Development Center (HDC). The purpose of this research is to learn more about interdisciplinary collaboration practices while working on cases in the HDC. Interdisciplinary collaboration, also called interprofessional collaboration, refers to when two or more professions work together in order to increase the quality of care. Disciplines and professions are used interchangeably in this survey. You are invited to participate in this study if you are interested. There are no direct benefits to you from your participation; however, the information will be useful to the research team in order to determine the effects of working in a team. If you choose to participate in this research, you may be asked to participate in a questionnaire. It is expected that participation in this research project will take approximately 20-30 minutes of your time. Your participation is entirely voluntary. You may discontinue your participation in the study at any time without penalty. Once enough information has been collected, the research team will have access to the information, but no one other than members of the research team will be able to link the names with the corresponding responses. All forms will be kept in a secure place. If data from this study are presented or published, your identity will not be divulged in any way. If you have any questions about the treatment of human subjects in this study you may call or write Dr. Don Bredle, Chair, Institutional Review Board for the Protection of Human Subjects, Schofield 17, University of Wisconsin-Eau Claire,WI 54702, telephone 715-836-2373. If you have any additional questions about the purpose of this research, contact Jessica Spurr, email: spurrjc@uwec.edu, telephone: (651) 485-0667. You have been asked, and have agreed, to participate in questionnaire research about interdisciplinary collaboration. By clicking "Yes, I agree to participant" below, you acknowledge that you understand the information previously provided and are aware that your participation is voluntary and anonymous, and that your responses will be kept confidential. You are free to decline at any point without penalty.

- ❍ Yes, I agree to participate (1)
- ❍ No, I do not agree to participate (2)

If No, I do not agree to parti... Is Selected, Then Skip To End of Survey

Q2 Which is your discipline?
- ❍ Social Work (1)
- ❍ School Psychology (2)
- ❍ Reading Education (3)
- ❍ Nursing (4)
- ❍ Special Education (5)
- ❍ Communication Sciences and Disorders (6)
- ❍ Other (7)

Q3 What is your gender?
- ❍ Male (1)
- ❍ Female (2)

Q4 What is your level of training?
- ❍ Undergraduate (1)
- ❍ Graduate (2)

Q37 How many cases did you work on in the Human Development Center this semester?
- ❍ 1 (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6 (6)

Q38 How many hours did you devote to your Human Development Center experience? (Please consider all aspects of your HDC experience including preparation, direct contact with clients, supervision, report writing?
- ❍ Less than 10 hours (1)
- ❍ 10-25 hours (2)
- ❍ 26-50 hours (3)
- ❍ 51-100 (4)
- ❍ More than 100 hours (5)

Q5 What is your birthdate? Ex. 05/22/1990

Q6 Did you attend the Human Development Center orientation meeting on 9/17/13?
- ❍ Yes (1)
- ❍ No (2)

Q27 Please rate yourself in the following questions.

	Not at all Knowledgeable (1)	Somewhat Knowledgeable (2)	Knowledgeable (3)	Very Knowledgeable (4)
How knowledgeable are you about the discipline of Social Work? (1)	○	○	○	○
How knowledgeable are you about the discipline of Nursing? (2)	○	○	○	○
How knowledgeable are you about the discipline of Special Education? (3)	○	○	○	○
How knowledgeable are you about the discipline of Communication Sciences and Disorders? (4)	○	○	○	○
How knowledgeable are you about the discipline of Reading Education? (5)	○	○	○	○
How knowledgeable are you about the discipline of School Psychology? (6)	○	○	○	○

Q29 What kinds of barriers did you encounter while working on this interdisciplinary team?

Q30 List the similarities between your discipline and...

Q31 Social Work.

Q32 School Psychology.

Q33 Nursing.

Q34 Reading Education.

Q35 Special Education.

Q36 Communication Sciences and Disorders.

Appendix B

Rubric for Words and Ideas- Open Ended Responses
(List Similarities Between Your Profession and ____)

- **Word count-**
    - A word is a meaningful arrangement of letters situated between spaces or punctuation marks.
    - Abbreviations= 1 word
        - Ex. (meds for medications, fam for family, etc.)
    - Acronyms=1 word (even acronyms for two words combined into one)
        - Ex. (RtI, IEPs, SPED, CSD)
    - No entry = 0 words

- **Number of ideas-**
    - An idea is one complete thought or opinion.
    - Student clinicians are asked to rate similarities
        - When participant describes what one discipline does= no idea count, cannot just describe what one discipline does, have to discuss the similarities between the two disciplines
        - Listing differences = no idea count, has to be similarities
    - Ideas are sometimes repeated but only distinct ideas are counted
        - When two ideas are essentially the same idea = 1 idea
            - Ex. We contact families and caregivers = 1 idea since families and caregivers are synonyms
    - Ideas are not always separated into different components but separate ideas are each counted
        - List of ideas separated by commas, backslashes, or on a different line = # of ideas
        - Two ideas in one sentence= separate ideas
            - Ex. We work with children and families = 2 ideas (we work with children, we work with families)
    - No words in the response = 0 idea