Delivering Interprofessional Education to Online Dietetics Students

by

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ABSTRACT

Interprofessional education (IPE) is an accreditation requirement and an important component of training for future registered dietitian nutritionists (RDNs). The dietetics program at the University of Arizona (UA) prepares students to become RDNs and has an online program to increase access to dietetics training. The existing face-to-face program incorporated in-person IPE into the curriculum. However, there was limited IPE available to dietetics students in the online program due to logistical and resource issues. To address this problem of practice, an online IPE module was developed providing dietetics students the opportunity to build collaborative skills with students in other UA healthcare training programs.

A mixed methods action research study was designed to answer two research questions: (1) How and to what extent did participation an online IPE module impact online dietetics students' interprofessional attitudes? and (2) After participating in an online IPE module, in what ways did online dietetics students change their thinking regarding the roles of healthcare professionals? Participants were dietetics students enrolled in an upper-division online dietetics course. Data gathered included a retrospective pre-post survey, online team discussion responses, reflection journal entries, personal constructs related to health professional roles, and focus group interviews. Results suggested that the online IPE intervention had a positive impact on dietetics students' attitudes of interprofessional practice and enhanced their understanding of the roles of members of the interprofessional team. Both the quantitative and qualitative results indicated that after completing the intervention, participants' were more attuned to the importance of interprofessional practice and the need to collaborate to provide quality

patient care. There was also evidence that participants' thinking regarding different healthcare professionals' roles were more defined. The opportunity for participants to work on a final project as part of an interprofessional team likely contributed to the positive shared learning experiences and overall growth in interprofessional collaboration. In relation to practice, results indicate IPE should be included throughout dietetics training, and embrace students from a variety of public health disciplines. Future research should focus on exploring new approaches to engaging students in the online environment and evaluating the impact of IPE on students' future practice.

DEDICATION

This dissertation is dedicated to all the students I have worked with throughout my 17 years in higher education. They have been some of my best teachers. I applaud their inquisitiveness, resilience, and perseverance.

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CHAPTER 1

INTRODUCTION

Everybody eats. Food is a necessary component of life and, as such, the quantity and quality of food can have a profound cumulative impact on a person's health, both positive and negative. While the impact of food intake on health is an issue that has been examined for the last several thousand years of human history, the field of nutrition is relatively new (Hwalla & Koleilat, 2004). For example, most of the major vitamins were discovered in the early 20th century, although their deficiency effects were known much earlier. The science of nutrition has emerged as an important field of study to address public health issues related to chronic diseases such as diabetes and cardiovascular disease, and acute issues such as malnutrition (Hwalla & Koleilat, 2004; Tappenden et al., 2013).

The dietetics profession was officially established in 1917 with the creation of the American Dietetic Association (Hwalla & Koleitat, 2004; Marcason, 2015). World War II increased the demand for and recognition of dietetics professionals, who participated in organizing the feeding of troops, as well as treating injured soldiers with medical nutrition therapy (Hwalla & Koleitat, 2004; Marcason, 2015). Today, registered dietitian nutritionists (RDNs) are recognized as food and nutrition experts who have specific didactic and supervised practice training (Academy of Nutrition and Dietetics [AND], n.d.). Before earning the RDN credential, dietetics students must obtain a bachelor's degree that includes accredited didactic coursework, complete an extensive supervised practice experience, and pass a national registration exam. Training includes

undergraduate coursework in the basic sciences such as biology, biochemistry, and physiology; behavioral sciences such as psychology and sociology; and food and nutrition science. In order to maintain their credential, RDNs must complete 75 hours of continuing education every five years (AND, n.d.).

The field of dietetics has evolved along with our understanding of how diet effects individual and community health (Marcason, 2015). This has become an important issue because of the increased prevalence of diet-related chronic health diseases which have eclipsed infectious diseases as primary public health concerns (Patra, 2018). Due to the fact that many of the most prevalent chronic diseases are diet-related (e.g., cardiovascular disease, diabetes, obesity), RDNs play a unique role in prevention and treatment interventions. Unlike acute medical issues such as infections or injury, treatment of chronic disease is long-term and multifaceted, and thus necessitates a collaborative approach between healthcare teams and patients to establish appropriate, sustainable care plans (Franz et al., 2016).

The healthcare system has also seen dramatic shifts over the last several decades related to an aging population, a rise in chronic diseases, and changes in healthcare access and delivery (Fransworth et al., 2015). The passage of the Affordable Care Act (ACA) in 2010, a major driver of healthcare infrastructure change, reinforced the need for interprofessional and collaborative practice as a means to manage costs and deliver high quality, patient-centered care (Fransworth et al., 2015). The ACA favors development of Accountable Care Organizations (ACOs) and Patient-Centered Medical Homes (PCMHs) which emphasize cost-effective, well-coordinated care (Nester, 2016). The ACO model incentivizes interprofessional collaboration, in part, by holding healthcare practitioners

accountable for the health of their patients. As the ACA has increased access to healthcare, including preventative services such as nutrition counseling (Franz et al., 2016), it is impossible for healthcare professionals to work in silos to deliver high quality and cost-effective care (Nester, 2016). Although interprofessional practice is ideal, ACO and PCMH leaders have indicated that interprofessional communication is an ongoing barrier in coordination of patient care (Nester, 2016). This highlights the need for interprofessional education (IPE) to be provided to future healthcare professionals.

Although the need for IPE and interprofessional practice was suggested several decades ago (Institute of Medicine [IOM], 1972), the promotion of IPE became more intense after the IOM published pivotal reports on the topic (Fransworth et al., 2015; IOM 2000; IOM 2001; IOM 2003). The focus on IPE continued to intensify as the United States healthcare system adapted to changes in population health and policy initiatives such as the passage of the ACA (Fransworth et al., 2015). As a result of this focus on IPE, the Interprofessional Education Collaborative (IPEC) was formed by prominent national associations of schools of health professions to promote IPE within health professions training programs (Schmitt et al., 2011). IPEC (2011, 2016) developed four core competencies for interprofessional collaborative practice outlined in Table 1.

During this time, the World Health Organization (WHO) solidified a working definition of IPE as the process where “students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes” (WHO, 2010, p. 7). Consequently, the overarching goal of IPE is to train all students in healthcare training programs to work together in a deliberate and coordinated manner that facilitates a safer and more patient- and community-centered healthcare

system (IPEC, 2011). As such, RDNs have the potential to contribute significantly within interprofessional teams because prevention and treatment of diet-related chronic diseases are the major issues facing the healthcare system (Fransworth et al., 2015).

Table 1

IPEC Competencies

Competency	Theme	Description
1	Values/Ethics	Work with individuals of other professions to maintain a climate of mutual respect and shared values.
2	Roles/Responsibilities	Use the knowledge of one's own role and those of other professions to appropriately assess and address the health care needs of patients and to promote and advance the health of populations.
3	Interprofessional Communication	Communicate with patients, families, communities, and professionals in health and other fields in a responsive and responsible manner that supports a team approach to the promotion and maintenance of health and the prevention and treatment of disease.
4	Teams and Teamwork	Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan, delivery, and evaluate patient/population-centered care and population health programs and policies that are safe, timely, efficient, effective, and equitable.

Larger Context

A dietetics workforce demand study reported that interdisciplinary health care teams, consisting of practitioners such as medical doctors, pharmacists, dietitians, and nurses, will be drivers of healthcare innovation and that RDNs will need to have strong

collaboration skills to effectively participate in such teams (Rhea & Bettles, 2012). Training future healthcare providers to work as part of interprofessional teams is seen as a means to address critical healthcare issues such as reducing medical errors, decreasing healthcare delivery costs, improving patient and provider satisfaction, and increasing community engagement (Epstein, 2014; IOM, 2015; Zwarenstein et al., 2009). In addition, as ACOs have emerged through changes in the healthcare landscape (e.g., ACA legislation), the need for training collaborative-ready practitioners is high. Efforts at the organizational level to facilitate IPE, however, have been relatively slow in the dietetics profession overall (Eliot & Kolasa, 2015).

In 2017 the Accreditation Council for Education in Nutrition and Dietetics (ACEND), which sets accreditation standards for Didactic Programs in Dietetics, released updated standards (ACEND, n.d.). These revised standards included two specific guidelines related to incorporating IPE into undergraduate curricula. According to the new ACEND (n.d.) standards, undergraduate dietetics graduates must be able to:

- Describe interprofessional relationships in various practice settings, and
- Identify and describe the work of interprofessional teams and the roles of others with whom the registered dietitian nutritionist collaborates in the delivery of food and nutrition services.

The standards are deliberately broad to allow individual dietetics programs to interpret and deliver IPE that meets the needs of students in their specific contexts. Although the standards indicate that IPE must be addressed in dietetics programs, ACEND does not provide guidance as to how these standards should be delivered. This has resulted in dietetics educators looking to other agencies for guidance such as the IOM, IPEC, WHO,

and the Health Professions Accreditors Collaborative (HPAC) which have outlined visions and frameworks for IPE in healthcare training programs (HPAC 2019; IPEC, 2016; IOM, 2013; IOM, 2015; WHO, 2010).

As the accrediting body of all dietetics programs in the United States, ACEND provides leadership and guidance regarding the didactic training and preparation of dietetics professionals. The organization aligns itself and collaborates with other entities that provide guidance on educational standards, including IPE. In accordance with this role, ACEND elected to join HPAC whose goal is to unite health professionals in addressing the need for team-based approaches to patient care, with a major focus on IPE (HPAC, 2019). HPAC released *Guidance on Developing Quality Interprofessional Education for Health Professions* in 2019 which defines quality IPE and outlines appropriate IPE environments (HPAC, 2019). According to the report, "The urgent need for health professionals to work together and create new models of care is unprecedented" (HPAC, 2019, p. 7). ACEND acknowledged this urgency, and more targeted efforts are underway to elevate IPE, including actively engaging in HPAC and IOM's Global Forum on Innovation in Health Professional Education (Eliot & Kolasa, 2015). Additionally, a dietetics IPE task force was developed and members include RDNs who serve as educators or administrators in dietetics programs. The task force was charged with amplifying and sharing IPE among the dietetics community.

Local Context

University of Arizona (UA) Nutritional Sciences Department offers a dietetics program that prepares undergraduate students to become credentialed RDNs, with significant training in clinical nutrition and medical nutrition therapy. RDNs are expected

to deliver high quality patient care in conjunction with other healthcare professionals in diverse settings such as hospitals, nursing homes, and community health centers. To this end, a critical component of our program's training in clinical nutrition and medical nutrition therapy is the RDN's role as a member of the interprofessional health care team.

In early 2018, the UA Nutritional Sciences Department was approved by ACEND to offer its dietetics degree program in a completely online format, becoming one of only four online dietetics programs in the country. From 2018 to 2020, dietetics faculty adapted face-to-face courses to the online format, being conscientious of accreditation requirements and best practices in online education. It was apparent that certain aspects of the face-to-face curriculum, particularly IPE, were difficult to offer in the online environment. Several factors contributed to the difficulties, including lack of time and resources dedicated to developing a quality online IPE program, and the difficulty in connecting online dietetics students with students in other health professions programs. Although IPE can be challenging to deliver in the online environment, ACEND accreditation requirements reinforce the need of delivering IPE to online students (ACEND, n.d.) despite the challenges.

As chair of UA's Nutritional Sciences Undergraduate Programs Committee, my role included overseeing all new and existing programs, including the UA online dietetics program. As an RDN myself, I am professionally vested in championing dietetics students and delivering high quality curriculum and professional training. My role in developing the online dietetics program was to assist with seeking national accreditation, coordinate delivery of the program with the UA online team, and facilitate the adaptation of curriculum and courses to the online environment. One of the key measures of success

for the online dietetics program was to provide to online students the same rigorous and quality experience students receive in the face-to-face program. IPE was a significant area where the face-to-face and online programs differed, indicating an inconsistency in how we were training students and evaluating student learning outcomes across the two programs.

The face-to-face dietetics program required IPE as part of an upper division course, NSC 435 *Medical Nutrition Therapy II*, where dietetics students physically meet with students from other healthcare disciplines (nursing, pharmacy, medicine) for a two-hour IPE event to discuss and reflect on patient case problems in real time. The face-to-face interprofessional teambuilding was possible because of the proximity of the UA main campus to the UA Colleges of Medicine, Pharmacy, and Nursing. Students in the online program, however, were dispersed widely across the United States and beyond, creating logistical barriers for interprofessional co-mingling. Dietetics student participation in these events was facilitated through ongoing collaborative efforts of dietetics leaders in my department and the UA's Center for Transformative Interprofessional Healthcare (CTIPH).

In spring 2019, I met with the clinical dietetics faculty regarding possible strategies to implement an online IPE curriculum. All agreed that the limited formal IPE was a significant issue that needed to be addressed in order to meet both accreditation standards and student learning outcomes. Moreover, it was vital that online dietetics students obtain training in interprofessional practice in order to be competent and adaptive in the healthcare setting.

In fall 2019, two dietetics faculty and I met with representatives from CTIPH, whose primary purpose is to advance IPE at the UA to encourage collaborative practice in future health professionals (CTIPH, n.d.). Although CTIPH is an interdisciplinary collaboration, Nutritional Sciences (my unit) was not represented on either the steering or curriculum committees, limiting our voice in shaping IPE at UA. One of the long-terms strategies of this current project was to integrate dietetics into the UA's IPE infrastructure in order to improve both access and quality of the program. During this meeting, an initial IPE program was envisioned that could connect online dietetics students and other students in face-to-face and/or online healthcare training programs.

Problem of Practice and Purpose of the Study

It was apparent that there was a disconnect between program level outcomes assessed in the face-to-face and online dietetics programs, as IPE was limited in the online program compared to the face-to-face program. Further, accreditation standards require IPE to ensure graduates can work effectively as part of an interprofessional healthcare team (ADEND, n.d.). The online environment creates challenges for delivery of IPE, although there is evidence that the model can support student learning (Earland et al., 2011; Evans et al., 2016). Still, IPE in dietetics is in its infancy and there is much to learn about how best to deliver IPE, particularly in the online environment. There is also scant reporting on United States dietetics programs and IPE in general, including online delivery of IPE (Eliot & Kolasa, 2015). There are few published studies of students' attitudes of IPE and successful delivery of IPE, particularly while learning in the online environment. Nonetheless, this limited research suggests that students generally respond

positively to IPE and the idea of interprofessional practice (Boyle et al., 2013; Earland et al., 2011; Evans et al., 2016; Ruebling et al., 2014).

Because of the limited research regarding IPE in dietetics programs and, more specifically, online dietetics programs, research was needed to better understand effective online IPE delivery. The purpose of this research study was to explore the feasibility of delivering IPE online to students in the UA online dietetics program. To that end, a tailored online IPE module was developed and delivered to dietetics students completing upper division program requirements. The intent was to provide IPE in accordance with accreditation standards, align the face-to-face and online programs regarding IPE, and improve online students' understanding and attitudes of interprofessional practice. Attitudes are defined as the positive and negative evaluation of an object or concept (Eaton & Visser, 2008), in this case, interprofessional practice. With this perspective in mind the following research questions were developed:

> Research Question 1: How and to what extent did participation in an online IPE module impact online dietetics students' interprofessional attitudes?
>
> Research Question 2: After participating in an online IPE module, in what ways did online dietetics students change their thinking regarding the roles of healthcare professionals?

These research questions were the starting point for this inquiry and provided focus to the overall approach of the research. The questions were answered using a mixed method approach. In exploring changes in attitudes, a survey and qualitative techniques were used to explore the online module's impact. In addition, changes in thinking with a specific focus on roles of healthcare professionals were explored using construct-

elicitation methodology as described by Kelly (1955). The findings from the research questions were used to elucidate the effectiveness of an online IPE module in promoting students' interprofessional competence.

CHAPTER 2

THEORETICAL PERSPECTIVES AND RESEARCH GUIDING THE PROJECT

Over the last several decades, the healthcare system has evolved into a complex and costly system, even as advances in medicine continue to occur (Frenk et al., 2010; Institute of Medicine [IOM], 2013; IOM, 2015). These changes impact health professions and the ways in which health professionals deliver care and interact with one another (IOM, 2013). For example, the types and number of healthcare specialists in the system have increased and healthcare efforts have shifted from treatment of primarily infectious disease to the treatment and prevention of chronic disease, due in part to the increase in life expectancy and adoption of westernized lifestyles (IOM, 2013). More recently, attention on social determinants of health and other community-focused issues has necessitated a team-based healthcare approach (Health Professions Accreditors Collaborative [HPAC], 2019). Therefore, coordination among healthcare professionals from different disciplines is a key factor in improving patient outcomes, reducing healthcare costs, and addressing community-based health issues (HPAC, 2019; IOM, 2013). Interprofessional approaches or the concept of interprofessionality is often suggested as a means to address disjointed healthcare delivery driven by siloed professional practice (D'Amour & Oandasan, 2005; Interprofessional Education Collaborative [IPEC], 2011; Spaulding et al., 2021; World Health Organization [WHO], 2010).

Interprofessionality is "the process by which professionals reflect on and develop ways of practicing that provides an integrated and cohesive answer to the needs of the client/family/population" (D'Amour & Oandasan, 2005, p. 9). The interprofessional

approach to healthcare favors coordination and collaboration among healthcare providers, patients, and their families to increase the effectiveness and efficacy of healthcare delivery (D'Amour et al., 2005). In order for healthcare providers to work effectively in interprofessional teams, healthcare training programs must develop curricula and competencies that promote this interprofessionality model and minimize professional silos (D'Amour & Oandasan, 2005; Frenk et al., 2010; IOM, 2013; WHO, 2010).

In traditional university-level healthcare training programs, including dietetics programs, there is often minimal contact between students of other healthcare disciplines, where learning primarily occurs in the context of their own profession, termed uniprofessional learning (Oandasan & Reeves, 2005). Students develop their worldview primarily through the lens of their specific discipline. This can potentially lead to siloed thinking and a decreased inclination to engage in collaborative practice with other healthcare professionals (Eliot & Kolasa, 2015). The complement to uniprofessional learning is interprofessional education (IPE), where "students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes" (WHO, 2010, p. 7). Clark (2006) noted that the true challenge of IPE is to encourage health professionals to see the world through the lens of other healthcare providers to enhance their collective problem-solving abilities.

IPE is identified as the bridge between the education system and the healthcare system to achieve better patient care and better health outcomes, and create more efficient and affordable education and healthcare systems (IOM, 2013). IPE, provided to students in pre-licensure healthcare training programs, is seen as a viable and critical

means by which the healthcare system can address growing complexities and create new models of patient care (HPAC, 2019; IOM, 2001; IOM, 2013; WHO, 2010). In recognition of the importance of IPE for the sustainability of a healthcare system, the WHO (2010) published the *Framework for Action on Interprofessional Education and Collaborative Practice* which emphasized the need for "collaborative ready" healthcare practitioners who are competent to work as part of an interprofessional team.

The potential beneficial impacts of incorporating IPE into health professions curricula are wide-ranging and include: increased collaboration skills (Bridges et al, 2011; Evans et al., 2016), decreased professional stereotyping (Ateah et al., 2011; Cooper et al., 2005; Darlow et al., 2015; Eliot et al., 2018; Hall, 2005; Oandasan & Reeves, 2005, Pollard et al., 2004) and improved communication (Eccott et al., 2012). One of the most cited benefits of IPE is that it promotes students' collaborative mindset (Eccott et al., 2012; Eliot et al., 2018; Evans et al., 2016; Ruebling et al., 2014). For example, Eliot et al. (2018) conducted a quantitative research study to investigate the impact of an introductory IPE course on improving collaboration skills. Researchers asked undergraduate and health professions students (n = 176) to complete the Self-Assessed Collaboration Skills survey before and after completing the IPE course. In the course, students were assigned to interprofessional teams and completed interactive activities such as *Name that Profession* and a team public service announcement video project. Statistical analysis of the pre- and post-survey scores indicated significant improvements in all survey domains including learning, information sharing, and team support. Researchers concluded that the benefit of improved self-assessed collaboration skills likely prepares students for future collaborative work (Eliot et al., 2018).

Another benefit of IPE is that, by exposing students to roles and responsibilities of different health professionals, students are less likely to engage in professional stereotyping and generally have more positive perceptions of other health professions, both of which promote collaborative readiness (Ateah et al., 2011; Darlow et al., 2015; Eccott et al., 2012). Ateah et al. (2011) found that a structured interprofessional experience promoted significant changes in students' negative thinking of other healthcare professions. The researchers found that students often base their initial views of other health professionals on societal stereotypes and not on personal experience. In this case, IPE provided students with the requisite experience to challenge those stereotypes (Ateah et al., 2011). Similarly, in a prospective controlled trial of an IPE intervention, student attitudes toward interprofessional teams showed a positive increase after completion of the training (Darlow et al., 2015).

Not only does IPE support increased understanding of other professionals and their roles, it can also improve communication between professionals of different disciplines. Using a mixed methods approach, Eccott et al. (2012) demonstrated that IPE improved students' ability to communicate with other team members and supported creating communities of practice, which are groups of individuals with shared goals and mutual engagement (Wenger, 1998). Researchers recruited 24 health professions students to complete an interprofessional problem-based learning module. All students completed pre- and post-surveys and participated in focus group interviews after completing the module. At the conclusion of the study, researchers noted that participants had "an exceptionally positive attitude towards interprofessional teamwork" (Eccott et al., 2012, p. 188). This increased understanding and appreciation of other

healthcare providers is a critical component of collaboration (Eliot et al., 2018) and building a collaborative-ready workforce in healthcare (Spaulding et al., 2021; WHO, 2010).

Although there are many documented benefits of IPE (Ateah et al., 2011; Bridges et al, 2011; Evans et al., 2016), delivering quality IPE has several challenges. Logistical issues such as coordinating face-to-face IPE curricula across programs, scheduling interactions between students who may be geographically separated, and overcoming discipline-specific differences in IPE needs have been reported (Dow et al., 2013; Jones et al., 2020; Lawlis et al., 2014). Educational administrators' support for IPE can also impact success, including whether administrators make IPE a funding priority and provide adequate training for faculty (Lawlis et al., 2014). In addition, because many healthcare training program requirements are rigid and crowded, IPE is often offered as an elective experience. This leads to IPE being thought of as less important, and therefore less relevant to students (Lawlis et al., 2014; Oandasan & Reeves, 2005).

Delivering IPE in an online environment, however, has been found to mitigate many of the logistical challenges traditional face-to-face programs encounter. Miers et al. (2007) found that an online interprofessional module was successful in connecting students in different healthcare training programs located across multiple campuses who might otherwise not come into contact with each other. Online modalities of IPE have also been reported to provide students flexibility to fit IPE curriculum into their busy schedules (Evans et al., 2016; King et al., 2010; Miers et al., 2007, Singh & Matthees, 2021), as well as allow time for reflection on interprofessional practice (McKenna et al.,

2014). Online delivery of IPE may also encourage more inclusive and meaningful contributions by students (Khalili, 2020). Several studies also demonstrated that online delivery of IPE was able to significantly increase students' understanding and perceptions of IPE and interprofessional practice (Boyle et al., 2013; Eccott et al., 2012; Evans et al., 2016; King et al., 2010; McKenna et al., 2014).

In addition, due to the SARS-CoV-2 (COVID-19) pandemic, the transition to online IPE has become more commonplace as a result of remote learning and social distancing requirements (Jones et al., 2020; Khalili, 2020). The COVID-19 pandemic had a significant impact on the educational system, disrupting nearly all face-to-face courses at the university setting. The transition was unexpected and immediate, causing many universities to reimagine how to teach curricula, including IPE, through remote learning (Jones et al., 2020; Khalili, 2020; Lackie et al., 2020).

Challenges of online IPE delivery have also been identified, including distracting technological issues that can make participation frustrating for students (Evans et al., 2016; Evans et al., 2020; King et al., 2010; Miers et al., 2007). The inability of students to read social and communication cues with asynchronous interactions may detract from the overall learning experience as well (Evans et al., 2016, Evans et al., 2020). Despite the challenges of delivering online IPE, the benefits likely outweigh the barriers, and providing models of online IPE are needed as online learning opportunities continue to grow (National Center for Educational Statistics, n.d.).

IPE in Dietetics

As previously discussed in the Introduction, RDNs are recognized as food and nutrition experts who have training in a variety of areas including the prevention and

treatment of acute and chronic disease (Academy of Nutrition and Dietetics [AND], n.d.). As such, they are integral members of interprofessional healthcare teams. Pre-credentialing IPE is critical for development of skills necessary to work interprofessionally and collaboratively. However, a recent scan of IPE in dietetics programs found only a handful of examples, most of which were face-to-face (Eliot & Kolasa, 2015). The ability to collaborate with other healthcare professionals is the key aspect of IPE and goes beyond traditional uniprofessional and multidisciplinary teamwork training that is typical in dietetics programs. Collaboration is a dynamic process involving sharing, partnership, and interdependency (D'Amour et al., 2005) that is developed in practitioners through exposure to pre-licensure IPE. Eliot and Kolasa (2015) outlined three benefits of IPE in dietetics. First, students are able to broadly apply collaborative skills in a variety of settings. Second, the collaborative skills obtained through IPE make students more competitive for employment opportunities as employers' transition to team-based approaches. Finally, learning with and from students in other health professions provides a better overall picture of the healthcare system, allowing students to be more adaptive and flexible. Although there is an established need for quality IPE in dietetics pre-credentialing curriculum, the Accreditation Council for Education in Nutrition and Dietetics has been relatively vague in providing direction to educators of dietetics practitioners (Eliot & Kolasa, 2015).

Other agencies such as the WHO and IPEC provide guidance on IPE curriculum, adopted by dietetic programs. Specifically, IPEC (2016) outlined four core competencies (see Chapter 1) which many healthcare training programs have adopted. These competencies have a strong focus on teamwork, collaboration, and communication.

They also imply that healthcare professionals must be self-aware and capable of working in complex systems where professionals both contribute discipline-specific knowledge and navigate shared experiences of practice. The understanding that IPE is a critical element of dietetics training drives this current research project.

Theoretical Frameworks

Understanding the importance of IPE in dietetics training, theoretical frameworks were considered for this research study which align with the overall intent and desired outcomes of IPE. The primary goal of IPE is for students to learn about, with, and from each other (WHO, 2010) implying a social aspect of learning espoused by multiple learning theories. Learning theories have not been consistently utilized in IPE research, but there is published literature providing guidance and recommendations regarding relevant theoretical frameworks (Barr, 2013; Clark, 2006; Hean et al., 2009; Hean et al., 2012; Oandasan & Reeves, 2005). Specifically, theories of adult learning and experiential learning that facilitate social engagement, collaboration, and the reflection process have been recommended when conducting research related to IPE (Barr, 2013; Clark, 2006; D'Eon, 2005; Hean et al., 2009; Oandasan & Reeves, 2005).

Additionally, Hean et al. (2012) suggested that a single theory is insufficient to inform research around IPE. Thus, two theories - Experiential Learning Theory (ELT) and Transformational Learning (TL) - were chosen to ground the research study and guide the development of the innovation and methods. Both ELT and TL integrate unifying concepts of social learning, hands-on experiences, and the use of reflection as an integral part of the learning process. These theories also connect with the teaching approach of problem-based learning (PBL) used in the IPE innovation.

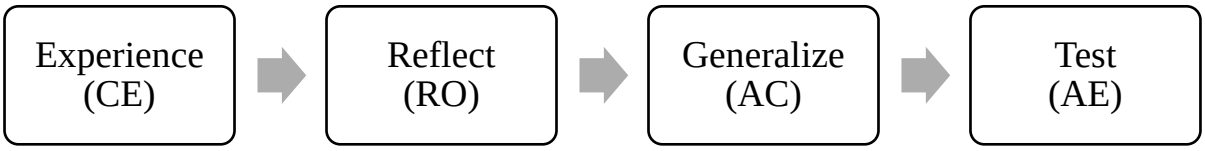
Experiential Learning Theory

Kolb (1984) posited that all learning is relearning, grounded in experience, where learners grapple with current beliefs and challenges to those beliefs, producing tension and conflict within the learner. Drawing from theorists such as John Dewey, Jean Piaget, and Paulo Friere, ELT suggests that learning is a life-long process where knowledge is created through transformation of experience (Kolb, 1984; Kolb & Kolb, 2006). In this way, the most effective approach for people to learn is by engaging in direct experiences. Through this process, learners are able to reflect on and create meaning from those experiences, and then formulate theories that can be applied to new experiences. This adaptation of learning is akin to the scientific method (Kolb, 1984), an analogy first articulated by Kelly (1955) through personal construct theory.

The foundation of ELT is a four-stage learning cycle – concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) – which describes the process whereby a learner makes sense of experiences through grasping and transforming experience (Kolb, 1984). See Figure 1 for a simplified version of the cycle (Cowan, 1998; Healey & Jenkins, 2000). In the learning cycle, CE and AC are considered opposite dimensions of grasping experience, and RO and AC are considered opposite dimensions of the transformation experience. For effective learning to occur, learners must experience all four stages in order, although learners may enter the cycle at any stage. The ELT learning cycle represents a holistic process that integrates the cognitive, affective, perceptual, and behavioral dimensions of learning (Kolb, 1984; Kolb & Kolb, 2006; McCarthy, 2010).

Figure 1

A Simplified Version of the ELT Learning Cycle



ELT and IPE. Kayes et al. (2005) suggested that ELT can provide a framework for organizing team learning through meaningful experiences, thus making the theory pertinent for studying IPE. In fact, there are a number of recent examples of ELT as a theoretical framework in IPE research (Brown & Bostic, 2016; Fewster-Thuente & Batteson, 2018; Murray et al., 2019; Poore et al., 2014). Poore et al. (2014) outlined the ways ELT can be operationalized for IPE, using the example of a simulation-based curriculum. Using the ELT lens, students had the opportunity to engage with others, examine values and ideas, and critically reflect on their experiences. The researchers concluded that ELT can be useful in informing the delivery of IPE as well as maximizing learning for students.

In a qualitative study, Fewster-Thuente and Batteson (2018) recruited 515 students from various health training programs (dietetics not included) to participate in a 90-minute patient rounding activity to explore the use of ELT as an appropriate theoretical foundation for IPE. Participants were randomly assigned to interprofessional teams. Each team reviewed a patient case study, participated in both scripted and unscripted role simulations, and then debriefed as a team at two timepoints during the activity. Results suggested appropriate alignment of the IPE rounding activity with the ELT stages. More specifically, utilizing the ELT learning cycle was found to enhance

students' awareness of metacognitive processes, norms, and beliefs that might impact interprofessionality and facilitate application of learning to future practice (Fewster-Thuente & Batteson, 2018).

There is a shortage of ELT research related specifically to IPE in dietetics. There are however, examples of studies in which experiential learning has been applied to different aspects of dietetics training (Desbrow et al., 2014; Leveritt et al., 2013; Schwartz et al., 2015; Swanepoel et al., 2016), indicating that the theoretical framework is applicable in dietetics education. In one qualitative study, third-year dietetics students (n = 31) completed a one-hour supervised clinic visit with a client to collect a diet history (Swanepoel et al., 2016). The structured clinic visit incorporated concepts of ELT including a meaningful experience with a real client, feedback from the supervising dietitian, and reflection through a written report. Researchers concluded that the clinic experience, grounded in ELT principles, provided an authentic, yet safe space to build confidence and develop professional identity.

Transformational Learning

TL "offers a theory of learning that is uniquely adult, abstract, and idealized, grounded in the nature of human communication" (Taylor, 2007, p. 173). Often associated with constructivist ideology, TL provides insight into how adult learners' thinking evolves over time through social engagement and critical dialogue (Taylor, 2007; Taylor, 2008). By engaging in transformational learning, learners consider their

own prior experiences and learning to confront individually held perspectives and paradigms (Snyder, 2008).

The theory has three requirements for learning to occur: (1) the context for learning must be appropriate for transformational learning, (2) the learner must engage in self-reflection, and (3) the learner must engage in critical discourse (Snyder, 2008). One of the core concepts of TL is the disorienting dilemma which facilitates paradigm shifts within learners that enable progression through the transformative process (Calleja, 2014; Taylor, 2007). The disorienting dilemma prompts self-reflection of previously held assumptions and beliefs, and ultimately helps learners develop new frames of reference (Calleja, 2014; Mezirow, 1994; Taylor, 2007). In order for learners to confront individually-held beliefs, they must intentionally act (Snyder, 2008). Critical discourse is a necessary and related concept to self-reflection and is the means by which learners engage with others to test new frames of reference (Snyder, 2008). Mezirow (1994) described discourse as a type of dialogue that enables assessment of individual beliefs by reviewing evidence for and against competing viewpoints.

TL, "…transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change" (Mezirow, 2009, p. 22). In essence, this is the overarching goal of IPE: to provide students the opportunity to gain exposure outside of the uniprofessional paradigm to enable future healthcare providers to be more inclusive, reflective, and adaptive. The *problematic frame of reference* is the uniprofessional silo of each healthcare discipline. The constructivist foundations of TL that highlight the importance of experience and social

interaction (Mezirow, 1994) align nicely with the model of interprofessionality. In addition, transformational learning has been shown to be possible in the online learning environment using asynchronous discussions encouraging critical discourse and adequate time for self-reflection (Taylor, 2007).

TL and IPE. There are few recent reports of TL being utilized in IPE (Charles et al., 2010) or in dietetics education research. The lack of published research using TL to inform IPE curriculum makes this a relatively novel theoretical framework in which to study IPE. Researchers have alluded to TL as one of the adult learning theories congruent with the principles of IPE, in large part because of the focus on reflective learning (Barr, 2013; Clark, 2009; Hean et al., 2009; Hean et al., 2012). IPE that facilitates reflection, along with critical thinking and openness to new ideas, produces the highest potential for meaning making (Stone, 2006), reinforcing TL's promise in informing IPE curriculum.

While limited published research exists regarding TL and IPE, there are several principles of TL that have been included in IPE interventions as a means to facilitate learning through social engagement, addressing biases, and promoting reflection (Curran et al., 2008; McKenna et al., 2014; Miers et al., 2007; Solomon & King, 2010). For example, McKenna et al. (2014) conducted a qualitative research study to explore student perceptions of an online IPE intervention. The researchers noted that students (n = 3) felt that they gained more insight in the online IPE module than they did in on-site clinical rotations. This was primarily due to the fact that there was less time during on-site clinical rotations to reflect on interprofessional practice. It has been suggested that IPE that provides opportunities for reflection supports students' self-efficacy and overall

learning (Cooper et al., 2005), and may promote metacognitive understanding of interprofessional practice (Clark, 2009).

Problem-based Learning

PBL is heavily influenced by adult learning principles emphasizing a student-centered approach allowing students autonomy in directing their own learning (Knowles, 1980; Clouston et al., 2010). Barrows (1983) argued that problem-solving and independent learning should be the cornerstone of training future healthcare professionals. PBL generally involves small groups of students working together on a problem contextualized through real life experiences (Savery & Duffy, 1995). There is usually little student preparation regarding the problem and few specific background details provided to learners. Students self-select learning objectives based on the group's assessment of the problem. Faculty facilitators are used as resources, but do not provide didactic training (Barrows, 1983). The approach of PBL aligns well with the adult learning principles of TL, as well as the active and experiential learning described by ELT.

Clark (2006) advocated for the use of PBL as an approach for IPE. This impetus comes from the goal of IPE for students to learn with, from, and about each other (WHO, 2010), which aligns with the small group dynamic of PBL. A handful of studies specifically used PBL as the basis for IPE interventions to develop students' communication and collaboration skills (Anderson & Thorpe, 2008; Eccott et al., 2012; King et al., 2010). Online examples include a pilot study by Eccott et al. (2012) wherein students in groups of five completed an online IPE module. Researchers found that students were able to identify learning outcomes for the group such as increased

confidence in collaboration and improved readiness for patient-centered care. Students identified PBL as a means to improve communication and identified critical features such as the requirement to set ground rules for the group to create a safe environment, and equal representation of disciplines in each group. Individually, students recognized the benefits of working together versus working in isolation and took responsibility for representing their profession in the group (Eccott et al., 2012).

In another online example, King et al. (2010) developed an online collaborative team-based intervention (ePBL) with the goal to develop student skills in information communication technology around IPE. ePBL emphasized the student-driven learning process, as the patient scenarios were not well-structured and required students to research problems and collaborate on potential solutions. Although the researchers viewed the intervention as successful, they recommended that students have the opportunity to introduce themselves in-person initially or participate in a synchronous online activity that serves the same purpose (King et al., 2010).

Previous Cycles of Action Research

While the theories and associated research discussed here provide direction and contextualization, previous cycles of research conducted also inform this current study. Previous cycles of action research were conducted to refine the approach to the stated problem of practice and provide insight and guidance into the development of the innovation. The cycles also informed what worked (and what did not) and provided a framework for this current study.

Cycle 0

In spring 2019, the Cycle 0 research study was undertaken to answer the following research questions: 1) what were the needs of online dietetics students with respect to interprofessional education? And, 2) how might interprofessional education best be delivered to online students? Qualitative data collection methods were used to explore providing structured IPE to online dietetics students and to obtain pertinent feedback from dietetics faculty.

Two key dietetics faculty heavily involved with curriculum management, accreditation compliance, and program assessment were recruited using purposeful sampling. Semi-structured interviews were conducted with each participant to elicit insights into online IPE delivery. A total of eight questions were asked to both participants, including a final open-ended comment response. Two examples of questions asked were: “What are the needs of online dietetics students regarding interprofessional education?” and “How might interprofessional education be delivered online?” Interview questions are included in Appendix A.

After data collection was completed, audio recordings were reviewed several times to gain a better understanding of the concepts discussed by each participant. In lieu of formal coding of the qualitative data and development of themes, key ideas were identified that exemplified participants responses to the questions and highlighted pertinent information used to inform future cycles of research. The analysis of the interviews revealed three key ideas related to delivering online IPE to dietetics students: professional teamwork, collaboration with healthcare disciplines, and embedding IPE in courses.

Related to the first Cycle 0 research question, both participants cited professional teamwork and collaboration as important foundational skills developed through IPE, implying that these should be required components of quality IPE. The participants emphasized the importance for dietetics students to learn about their roles and the roles of other healthcare professionals. Equally as important was the concept that other healthcare professionals must also learn about the role of the registered dietitian nutritionist (RDN):

> It's really valuable not only for [dietetics students] to be exposed to other people in whatever setting you set it up with, but I think it's highly valuable that the other people that are working with [dietetics students] see what our students' knowledge-base is and our skill-sets (Participant AA, personal communication, April 9, 2019).

Additionally, participants noted that although students are trained primarily in uniprofessional settings, it is impossible to practice as an RDN in isolation as one participant emphasized, "Getting them to realize that just because [dietetics students] want to do something doesn't mean that they can do it in isolation. They need to collaborate" (Participant AA, personal communication, April 9, 2019). The other participant noted that training needs to "mimic the healthcare environment" (Participant BB, personal communication, April 19, 2019) to provide meaningful and relevant experiences that align with actual practice.

Relevant to the second Cycle 0 research question, participants were asked about how to deliver IPE in the online environment. They highlighted the need to engage with other healthcare training programs on campus to create well-rounded IPE experiences for students in all programs. One participant stated, "I think it would be good to try to maybe communicate with other health disciplines within the school, see what they have going on online and see how we could pull something like that" (Participant BB, personal

communication, April 19, 2019). Participants suggested that the current face-to-face IPE curriculum provided across the institution could possibly be extended to include an online component for use by both face-to-face and online students, although the logistics of this option were not discussed.

Further, there was agreement that one way to provide online IPE is to embed it into an existing required course or courses. One participant shared her experience using this model with the face-to-face students, “For me, it’s clear and simple. It’s in this class and I know who went, I know who didn’t go, and so we have it built into the program” (Participant AA, personal communication, April 9, 2019). The other participant suggested that possibly threading IPE assignments throughout students’ coursework could be beneficial in building knowledge and skills around interprofessional practice across the curriculum, “…every semester they get a good assignment that touches on [IPE]” (Participant BB, personal communication, April 19, 2019). Another alternative suggested by the participants was to require online students to participate in a self-identified experiential learning opportunity in their area such as attending intensive care unit rounds with an RDN.

Cycle 0 results suggested that key dietetics faculty are attuned to the significance of IPE and acknowledged the need for online dietetics students to have the opportunity to gain these skills. In order to deliver IPE to online students, collaboration with other institutional healthcare disciplines will be needed, providing the very interprofessional experiences that define IPE. In envisioning how to deliver IPE to online dietetics students, results from this initial exploratory study suggested that embedding IPE into existing courses could be a practical approach, from both the curricular and assessment

standpoints. Questions remain regarding the most effective, valuable and efficient approaches to deliver quality IPE in an online format and what types of online activities might be advantageous in meeting IPE goals. These questions informed the next cycle of research conducted the following semester.

Cycle 1

In fall 2019, the Cycle 1 study was conducted with the purpose of obtaining feedback from IPE stakeholders regarding how to deliver quality IPE online, as well as trialing the use of a pre-existing online IPE module and assessment tool. The following research questions were developed to guide the Cycle 1 inquiry: 1) how did University of Arizona (UA) dietetics faculty, UA online dietetics students, and UA faculty of other health professions programs perceive quality online IPE? And 2) how and to what extent did implementation of a pilot IPE activity affect students' perceptions regarding working with other healthcare professionals?

A parallel mixed methods approach was utilized for this study. Purposive sampling (Teddlie & Yu, 2007) was used to recruit three dietetics faculty and one faculty member from the UA College of Pharmacy; individual interviews were conducted with each participant. Convenience sampling was used to recruit two undergraduate online dietetics students over the age of 18. Individual semi-structured interviews were conducted with UA faculty, three in person and one via Zoom. Questions focused on what kinds of activities should be included in an online IPE module, strategies for engaging students from different healthcare programs, and identifying challenges regarding the delivery of IPE in an online environment. Faculty interviews were conducted to answer the first research question. The research plan included a focus group

interview of the student participants, but because of low student participation (n = 2) and time constraints, the focus group interview was not conducted. This limited the extent to which results could inform the first research question.

To help answer the second research question, students were asked to complete an intervention sequence which included the Readiness for Interprofessional Learning Scale (RIPLS) pre-test, a 30-minute online IPE activity, and the RIPLS post-test. The RIPLS (see Appendix B) is an open-access survey tool that can be used to assess students' readiness for interprofessional learning by evaluating their attitudes and perceptions of IPE (National Center for Interprofessional Practice and Education [NCIPE]), 2016). The RIPLS is a 19-item instrument that uses a 5-point Likert scale (McFayden et al., 2005) and was adapted for use with my student population. Survey data were collected using two methods to test the feasibility. The pretest was given via the survey function in Desire2Learn (D2L), the UA learning management system, and the post-test was given via the free online survey tool, SurveyMonkey to test functionality of both tools.

For the pilot online IPE activity, a free and open-access eLearning module was utilized. The module entitled, "What is Interprofessional Practice?" was created by Arizona State University's Center for Advancing Interprofessional Practice, Education, and Research (CAIPER, n.d.). The 30-minute module included case study-based, interactive components. Each student completed the module asynchronously and without interaction with other students or faculty.

Key findings from my Cycle 1 research were drawn from the analysis of semi-structured interviews conducted with UA faculty, as well as a general assessment of the quantitative data collected from students' RIPLS pre- and post-tests. Integration of the

qualitative (faculty interviews) and quantitative (student pre- and post-tests) data was not conducted because of the limited number of participants, significantly minimizing any inferences that could be made.

The analysis of the faculty interviews generated two major themes: online IPE logistics and online IPE learning. With regard to online IPE logistics, participants stressed the need to develop partnerships across the university between other healthcare training programs to address the complexities of online IPE. Because IPE by its very nature is interdisciplinary, so must be any attempt to create a new IPE program. One faculty member reinforced the notion that an interdisciplinary approach has to be at the forefront of any IPE implementation plan, "I think step one is working with other disciplines, us, the instructors or a planning body" (Participant DD, personal communication, October 10, 2019). Based on the feedback from some participants, there was also an acknowledgement of potential limitations of broad collaboration among disciplines. As one participant noted, "I think it probably would be a little while to really reach out and find the right people…to have a good partnership" (Participant EE, personal communication, October 7, 2019). Another participant talked about finding "champions" (Participant FF, personal communication, October 7, 2019) who are committed to elevating IPE on the UA campus, and be willing to extend options to the online environment.

Another logistical aspect of IPE discussed by the participants was when to incorporate IPE into the curriculum. While there is some research to support early introduction of IPE (Cooper et al., 2005; Eliot et al., 2018; Oandasan & Reeves, 2005; Pollard et al., 2004), participants consistently supported the delivery of IPE curriculum to

upper level dietetics students. One participant stated, “I’ve always considered IPE to be more for those upper division professional students” (Participant EE, personal communication, October 7, 2019). Additionally, because dietetics training is at the undergraduate level while most other healthcare training programs are at the graduate level, participants noted potential mismatches in preparation if IPE was provided to dietetics students too early in their training, “If the nutrition students feel like the other health science students have had content [such as] anatomy/physiology and they haven’t had that required course, they may feel left out” (Participant FF, personal communication, October 7, 2019).

With regard to the theme of online IPE learning, participants reiterated the need to involve other healthcare disciplines in creating the online IPE curriculum. Similarly, all participants agreed that the hallmark of quality IPE included involving students from different healthcare training programs. It is not enough to provide students with depictions (videos, readings, etc.) of other healthcare providers or ask that they participate in hypothetical role-playing. While logistically challenging in an online setting, one participant noted,

> I think for it to be really meaningful, [the IPE has] to have an opportunity for them to work on one project or have one outcome and have to work together to come up with that project or output, so they can really get a sense of, you know, what value each discipline contributes to that project (Participant DD, personal communication, October 10, 2019).

In general, the data obtained from the pre- and post-tests were insufficient to draw any real conclusions as to the benefit of the online IPE module. Student responses between the pre- and post-tests were very similar, as were comparisons between student responses. Both pre- and post-test responses indicated students’ perceptions of

interprofessional practice, roles and responsibilities, and professional identity were positive.

While the pilot online IPE activity provided some benefits to students such as providing important foundational knowledge regarding IPE and its purpose, there were notable drawbacks. Students completed the activity independently, having no interaction with other students or an opportunity to reflect on their experience. Students did not have an opportunity to learn from and with each other (WHO, 2010), indicating that this one activity alone was not comprehensive in terms providing collaborative training.

The faculty interviews also served another important purpose in strengthening ties with "IPE champions" who could help support future inquiry. Through the work of both Cycle 0 and Cycle 1, I was able to identify dietetics and other faculty to form a small working group to help guide development and delivery of an online IPE module.

Due to the low number of student participants, the RIPLS survey data were insufficient to evaluate the impact of the eLearning IPE module, and therefore, it was difficult to draw conclusions regarding the second research question. However, piloting the survey and different survey delivery methods (D2L and Survey Monkey) was instructive. It was apparent that students were able to access and complete the survey without issue. While the RIPLS is a validated tool to assess students' readiness for IPE learning (McFayden et al., 2005), I found there were more recently developed assessment tools that might better capture student attitudes of IPE, specifically the Interprofessional Attitudes Scale (IPAS) (Norris et al., 2015), used in the current study. With this and other insights gained from Cycle 0 and Cycle 1 the next iteration of the action research process was developed which is outlined in Chapter 3.

CHAPTER 3

METHODOLOGY

The purpose of this action research study was to investigate the impact of an online interprofessional education (IPE) intervention on dietetics students' attitudes concerning interprofessional practice and thinking regarding roles of healthcare professionals. As discussed in Chapter 1, accreditation standards require IPE content to be included in dietetics programs. However, IPE was not formally incorporated into the online dietetics program when the program was originally developed. The limited availability of formal IPE resulted in a gap in the curriculum, presenting an opportunity to develop and pilot an online IPE module that incorporated best practices in IPE and explored outcomes using a mixed methods action research (MMAR) approach (Ivankova, 2015).

As a philosophy, action research is characterized as a systematic inquiry performed by educators for themselves in iterative cycles of planning, action, and review (Dick, 2017; Mertler, 2017). The action research process is intended to facilitate improvements in practice and professional development by enabling educators to conduct research and apply findings to their specific context (Herr & Anderson, 2012; Noffke, 2012). Using an action research lens, this research design and implementation aimed to provide a solution driven by participatory improvement (Dick, 2017) that addressed the IPE gap in the online dietetics program. A mixed methods approach helped uncover a more nuanced and enhanced perspective of the problem, utilizing qualitative and quantitative data in a complementary and integrated way (Ivankova, 2015). Collecting

and interpreting both types of data together provided a richer understanding of the intervention's impact (Mertler, 2017), and best aligned with the research questions.

Setting

The research took place at the University of Arizona (UA) in the Department of Nutritional Sciences (NSC) within the department's accredited dietetics program. Accreditation is maintained through the Accreditation Council for Education in Nutrition and Dietetics (ACEND), which sets standards for training students in interprofessional practice. Twelve faculty members, including myself, teach in the dietetics program and all have some level of experience developing and delivering online content. Two specific dietetics faculty provided guidance and input on the development of the online IPE module. Additionally, two members of the UA Center for Transformative Interprofessional Healthcare (CTIPH), who coordinate face-to-face IPE events, provided additional input on the development of the IPE module. Lastly, instructional design specialists from the UA Office of Digital Learning (ODL) and the UA Office of Instruction and Assessment (OIA) were consulted during development of the intervention to ensure the use of best practices in the online course design.

Unlike students enrolled in the online dietetics program, senior dietetics students in the face-to-face program are required to complete one IPE event hosted by CTIPH. Typically, the interprofessional events have been provided in an in-person format where dietetics students are grouped with students from other healthcare training programs to complete activities and discussions. Each in-person IPE event is about three hours in length. Due to SARS-CoV-2 (COVID-19) restrictions beginning March 2020, the in-person IPE events were modified to be delivered as synchronous virtual events

approximately two hours in length. The intervention for this study was loosely modeled after the in-person and virtual events, but utilized an online curriculum distributed over a three-week period. Approval for the study was obtained from the Institutional Review Boards (IRB) of both UA and ASU. IRB documentation is provided in Appendix C.

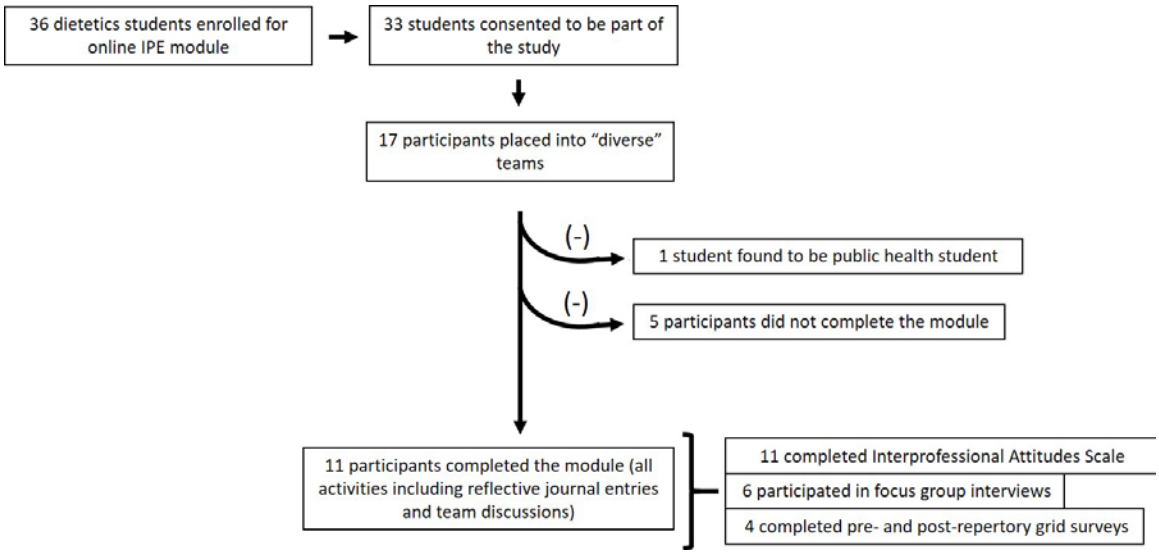
Participants

Participants included UA undergraduate dietetics students enrolled in the online version of NSC 435 *Advanced Medical Nutrition Therapy* (MNT) *II*, a program requirement for all dietetics students. This four-credit course is the final in a series of three MNT courses that explore disease prevention and management through the use of lifestyle and nutrition therapies, including a variety of nutrition interventions that complement other medical- and health-related interventions. After completing the advanced MNT course, students have an appreciation of a registered dietitian nutritionist's (RDN) scope of practice and the role of an RDN in treating nutrition-related issues. Since the advanced MNT course is an upper-level program requirement, the majority of enrolled students were seniors. The instructor for the course required the online IPE module as part of the class, but neither required participation in the study nor provided an incentive (e.g., extra credit) for participation. All participants who enrolled in the study were female and all were seniors. Other demographic data were not gathered to help maintain confidentiality due to the small sample size. While other students (e.g., medicine and pharmacy) completed the IPE module, data were only collected from dietetics students to maintain a defined focus for the study. Of the other disciplines who completed the module, one was from medicine, three were from nursing, seven were

from pharmacy, and 30 were from public health. Figure 2 provides an overview of participant enrollment and completion of the module and study activities.

Figure 2

Participant Progression and Completion of Study Activities



Recruitment

Dietetics students represented a relatively small pool of potential participants necessitating the use of the purposive recruitment method. Teddlie and Yu (2007) describe purposive or non-probability sampling as a technique where specific cases are selected as opposed to random selection of participants. The IPE module was required for all students in the NSC 435 course, thus all students enrolled in the course in the spring of 2021 were asked to opt-in to the study. Recruitment information was announced through the learning management system, Desire2Learn (D2L), and via official institutional email. Students self-enrolled into the IPE module during the enrollment period, at which time they were asked for consent to participate in the study. While all students registered for the NSC 435 course were required to complete the online IPE module (including

study-related data collection), data analysis occurred only for those students who consented to be participants in the study.

Students from other healthcare training programs – nursing, medicine, pharmacy, and public health – were invited to complete the online IPE module as well via email blasts. Students self-enrolled through a link provided in the email. While these students were not part of the study, their participation in the IPE module provided the interprofessional environment characteristic of quality IPE. All students enrolled in the module completed the same activities, regardless of their status as participant in the study.

Placement into Interprofessional Teams

To promote students' learning with, from and about each other, all students were placed into interprofessional teams of four or five members for the duration of the module. After the module enrollment period deadline passed, the total number of registrants was assessed, as well as their specific discipline, to determine appropriate interprofessional team assignments. The priority was creating as diverse interprofessional teams as possible in order to maximize exposure to different professional roles and perspectives. I defined a diverse team as having students from at least three distinct disciplines. For example, a diverse team might consist of students from the following disciplines: dietetics, medicine, and public health. Some diverse teams had duplicate disciplines, but they always consisted of at least three disciplines and consisted of four or five people. An example of a non-diverse team might include two dietetics students and two public health students. Only data from dietetics participants who were placed into diverse teams were used in the final analysis of the study.

Role of the Researcher

For this study, I was an insider, someone who studies their own practice (Herr & Anderson, 2012), as both the main contributor in delivering the intervention and an observer related to student engagement with the intervention. As an action researcher-practitioner, I led the visioning and development of the IPE intervention. My responsibilities included facilitating the delivery of the intervention with participants, overseeing student progress throughout the intervention, and conducting all data collection and analyses. Dietetics faculty, CTIPH members, OIA, and ODL provided guidance on the development of the intervention to ensure that the characteristics of quality IPE were addressed and accreditation standards were met. In this way, I was considered an insider collaborating with other insiders, which is suggested as a means to increase the impact of one's research (Herr & Anderson, 2012).

As an RDN, I was also an insider because of my training as a dietetics professional and my experience working as part of interprofessional teams. Throughout the research process, I acknowledged my positionality as an educator-practitioner with prior professional training and experience working in the healthcare setting. Based on those experiences, it was possible that conscious or unconscious biases related to different aspects of the interprofessional team could have impacted my judgment. I regularly reflected on the potential for researcher reflexivity (Creswell & Miller, 2000; Gibbs, 2012) and worked to recognize and limit personal biases.

Intervention

IPE is considered a critical component of future healthcare providers' training (Health Professions Accreditors Collaborative [HPAC], 2019; Interprofessional

Education Collaborative [IPEC], 2011; IPEC 2016; Institute of Medicine [IOM], 2015; WHO, 2010). Formal IPE was provided to students in the online dietetics program on a limited basis. This was the impetus for the intervention proposed here. The format of the intervention was modular by design, which allowed it to be embedded into one of the required courses in the dietetics curriculum. The format provided flexibility in content delivery to accommodate scheduling and other logistical issues, while also providing IPE in the context of relevant practice-related content.

Both IPEC (2016) competencies (see Chapter 1) and HPAC (2019) guidance were used as a foundation for creating the proposed intervention. HPAC (2019) supports the use of online and virtual modalities as part of quality IPE curriculum and outlines four expectations of quality IPE as: (1) having a stated rationale, (2) establishing outcome-based goals, (3) including deliberate design, and (4) performing assessment and evaluation. The intervention incorporated all four aspects of quality IPE, with the exception of some elements related to the third point. HPAC recommends a deliberate design approach that spans the length of an entire healthcare training program. In the context of this study, such an approach was not feasible. In addition to the HPAC recommendations, stakeholders were engaged in the development of the intervention, including UA dietetics faculty, UA CTIPH, and UA online instructional design specialists.

The intervention focused on the roles and responsibilities of healthcare providers and promoting positive attitudes toward interprofessional practice and collaboration. Students were engaged in a collaborative project around the focal area of weight management in the context of a weight-inclusive model (Tylka et al., 2014). This focal

area was chosen because it is a current issue the healthcare system is facing and it's relevant to all healthcare providers. A sequence of three distinct phases over the course of three weeks (see Table 2) were designed to engage students on issues of interprofessional practice and collaboration. Module activities included readings, videos, reflective journal entries, and written team discussions. All module activities and data collection instruments were provided through the D2L site designed specifically for the online module. The module outline is provided in Appendix D.

Phase I – Module Orientation

After participants consented to partake in the study, they were given access to the D2L site for the online IPE module and asked to complete the pre-intervention requirements (see Data Sources section). Participants and other students were given access to the pre-intervention information starting two weeks before the start of Phase II. In this initial phase, participants and other students oriented themselves to module goals, objectives, and activities. Students were grouped into interprofessional teams of four or five students and were introduced to team members via D2L. An introduction to IPE and practice was provided via readings and links to resources, all of which provided context for students' work in Phase II. After reviewing the resource information, students were asked to complete their first reflective journal entry. This entry focused on the purpose of IPE and the students' assessment of its importance in interprofessional practice.

Table 2

IPE Intervention Plan

Topics	Timeline	Student Tasks	Deliverables
		Phase I – Module Orientation	
Interprofessional education Why are you here? Meet your team	Prior to the online IPE module	*Review*: D2L site, module goal, learning outcomes *Read*: IPE definition	Reflective journal entry #1
		Phase II - Module	
Interprofessional teams	Module week 1	*Read*: Heyd 2016 Book Review of Collaborative Caring	Team discussion #1 – Your role as an interprofessional team member
Understanding weight bias in healthcare	Module week 2	*Complete*: Harvard Implicit Association Test on weight *Read*: Tomiyama et al. (2018) and Tylka et al. (2014) Other optional materials based on interest *Teams*: schedule a time to meet via Zoom (optional); begin work on digital resource	Team discussion #2 – Weight bias Reflective journal entry #2
Knowledge in action	Module week 3	*Review*: resources provided in D2L relating to resource topic *Teams*: continue/finalize work on digital resource; meet to finalize resource	Reflective journal entry #3 Digital resource for IP providers
		Phase III – Post-module Activities	
What did you learn?	After completing module	*Teams*: complete digital resource and submit	Module evaluation

Phase II - Module

This phase signaled the official start of the three-week IPE module. In Phase II, participants: (1) interacted virtually with students from other healthcare training programs; (2) completed a self-awareness activity—the Implicit Association Test (IAT)

for Weight (Project Implicit, n.d.); (3) engaged in two written team discussions; and (4) coordinated efforts to create a digital resource aimed at providing guidance to interprofessional practitioners on weight management issues. Students were also asked to read relevant articles on the topic of interprofessional practice and identify additional resources to support the development of the digital resource. Written team discussions and a second reflective journal entry allowed students to explore—individually and as a group—concepts presented in the module, specifically, interprofessional collaboration and weight-inclusive best practices.

Three main topics were presented in Phase II to facilitate shared meaning making and team building: (1) interprofessional teams; (2) understanding weight bias in healthcare; and (3) knowledge in action. For the first two topic areas, relevant readings and online resources were provided. Teams were also asked to participate in written team discussions related to the first two topic areas. The final topic area, knowledge in action, enabled students to apply interprofessional teamwork principles through creation of a digital resource for interprofessional providers.

Phase III – Post-module Activities

After completing the module, participants had a week to complete post-module activities, including a final reflective journal entry. The final reflection asked students to describe their experience with the online IPE module and their learning regarding interprofessional practice. For various reasons, some participants and interprofessional teams needed additional time to submit work from the end of Phase II and submitted their work during this final wrap-up phase.

Data Sources

Triangulation was achieved using a mixed methods approach (Creswell & Miller, 2000; Dick, 2017; Freeman et al., 2007; Ivankova, 2015) in which quantitative and qualitative data were collected concurrently in order to enhance interpretation of the results (Ivankova, 2015; Mertler, 2017). Data sources were chosen based on their utility to answer the study research questions, the evidence of their appropriateness for this study based on published literature, and for their feasibility given the intervention approach and time constraints of the study.

Quantitative Data

Two primary quantitative data sources were utilized. Personal construct theory (Kelly, 1955) was used both pre- and post-intervention. Data from this methodology were used to map participants' thinking. Additionally, the Interprofessional Attitude Scale (IPAS) is a validated instrument used to assess students' attitudes of IPE and interprofessional collaborative practice (National Center for Interprofessional Practice and Education, 2016; Norris et al., 2015). Data were used to assess the impact of the intervention on participants thinking of interprofessional roles.

Personal Construct Theory. Personal construct theory (PCT) is a theory of methodology and data analysis, and not a theoretical framework. The theory posits that individuals create constructs in order to make sense of the world around them (Kelly, 1977; Kelly 2003). PCT is rooted within a constructivist framework (Butler, 2009) where each individual develops a unique system of constructs to process and predict events, a philosophical concept called constructive alternativism (Butler, 2009; Kelly, 1977; Kelly, 2003). For example, someone may say that broccoli is delicious, and in that individual's

construct system, broccoli is placed into a sort of “like” category. This personal construct also implies that the individual believes that broccoli is not off-putting. In this way constructs are described as bipolar where something is both affirmed and negated simultaneously (Beail, 1985; Fransella et al., 2004).

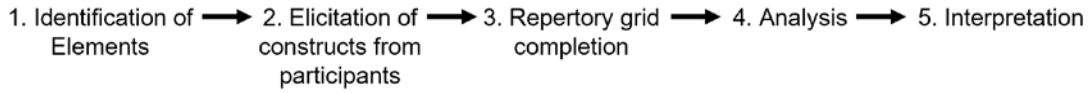
The quantitative methodological technique of PCT is the repertory grid which facilitates identification of personal constructs within a specific area and explores the relationships between them (Beail, 1985). Constructs are defined as a set of patterns individuals use to understand the world around them (Harlim, 2016; Kelly, 1963). Elements are defined as examples of a particular topic. As such, elements are used to represent the specific area of interest to be investigated and can either be identified by the investigator or elicited from participants (Jankowicz, 2004). In the current study, the area or domain of interest was interprofessional practice and the elements were the interprofessional healthcare team members.

PCT has five stages (Beail, 1985) outlined in Figure 3. PCT was used before and after the intervention to analyze the potential impact of the intervention on personal constructs related to roles of healthcare professions. Elements were pre-determined (Stage 1), versus being solicited from participants, as dietitian, nurse, pharmacist, and medical doctor. Personal constructs were elicited (Stage 2) from participants using an online Qualtrics questionnaire with open-ended questions. Each question asked participants to compare two members of the interprofessional healthcare team, which is referred to as a pairwise comparison. Questions provided on the pre- and post-exposure pairwise comparison questionnaire were identical. Examples of open-ended, pairwise comparison questions included, “How is a dietitian’s role similar to a pharmacist’s role?

How are they different?" and "How is the role of a nurse similar to the role of a dietitian? How are they different?" Answers to questions from the pre-exposure questionnaire were analyzed and a list of 11 unique constructs were identified.

Figure 3

Five Stages of Personal Construct Theory



The 11 constructs identified in Stage 2 were used to create the pre- and post-repertory grids (Stage 3) that were administered in Qualtrics. Both the pre- and post-repertory grids were created and provided to participants within three to five days after participants completed the pairwise comparison questionnaires. Participants were asked to respond to prompts using a five-point Likert scale where 1 was *strongly disagree*, 2 was *disagree*, 3 was *undecided/unsure*, 4 was *agree* and 5 was *strongly agree*. For example, participants were asked to indicate their level of agreement to the statement, "The role of a nurse is to suggest food and nutrition supplements." The pairwise comparison questionnaire and repertory grids are provided in Appendix E. Stage 4 of PCT is reviewed in the *Data Analysis* section and Stage 5 is reviewed in Chapter 5.

IPAS. The IPAS was validated using factor analysis (Cronbach alpha coefficients of 0.62 to 0.92) which produced a 27-item scale with five sub-constructs: (1) teamwork, roles and responsibilities, (2) patient-centeredness, (3) interprofessional biases, (4) diversity and ethics, and (5) community-centeredness (Norris et al., 2015). Each sub-construct includes several items that align with the IPEC competencies. Table 3 presents the IPAS sub-constructs and example items. Participants were asked to respond to

statements using a five-point Likert scale where 1 was *strongly disagree*, 2 was *disagree*, 3 was *neutral*, 4 was *agree* and 5 was *strongly agree*. The instrument was provided to participants using Qualtrics survey software. The IPAS instrument is available in Appendix F.

Table 3

Examples of IPAS Sub-constructs

IPAS Sub-constructs	Example IPAS Items
1. Teamwork, roles, and responsibilities	1.8 It is not necessary for health sciences students to learn together.
2. Patient-centeredness	2.4 In my profession, one needs skills in interaction and cooperating with patients.
3. Interprofessional biases	3.2 I have prejudices or make assumptions about health professionals/students from other disciplines.
4. Diversity and ethics	4.2 It is important for health professionals to understand what it takes to effectively communicate across cultures.
5. Community-centeredness	5.6 It is important for health professionals to be advocates for the health of patients and communities.

A retrospective pre-post method was used to limit response-shift bias (Bhanji et al., 2012; Drennan & Hyde, 2008; Howard & Dailey, 1979; Howard, 1980). Response-shift bias occurs when participants' thinking of the constructs being measured are impacted due to a change in understanding of those constructs (Howard & Dailey, 1979; Howard, 1980). For example, participants completing a traditional pre-survey may overestimate their understanding of interprofessional teamwork, roles and responsibilities

and agree with statements within that sub-construct. Theoretically, participants would have a deeper understanding and appreciation of the different roles and responsibilities of interprofessional team members after completing the intervention. In this light, participants completing the post-survey may again agree with the statements. Results, therefore, may show no significant change in pre- and post-survey responses, but not because the intervention was ineffective. Instead, participants' frame of reference may have changed due to exposure to the intervention (Howard & Dailey, 1979; Howard, 1980).

To address the possibility of response-shift bias, participants were given the retrospective pre-post survey *after* they completed the intervention. Changes in attitudes of interprofessional practice were measured by first asking participants to assess their attitudes before the intervention and then, in the same survey, assess their attitudes after the intervention (Bhanji et al., 2012; Drennan & Hyde, 2008). This allowed participants to respond to statements using the same frame of reference.

Qualitative Data

Collecting qualitative data that solicits rich descriptions of the phenomenon being studied adds to the credibility of a research study (Creswell & Miller, 2000; Denzin & Lincoln, 2018). A variety of qualitative data were collected in order to triangulate the data (Creswell & Miller, 2000; Dick, 2017; Freeman et al., 2007; Ivankova, 2015). As previously stated, qualitative data sources included reflective journal entries, written team discussions, and focus group interviews.

Reflective journal entries. Participants completed three reflective journal entries in the first and second phases of the intervention. Prompts were provided to help elicit

responses about participants' experience with IPE and interprofessional practice, as well as their interprofessional attitudes. Journal entries were completed through the D2L Discussions tool but were not open for peer viewing and comments. The reflective journal entry prompts are included in Appendix G.

Team discussions. Discussions were meant to facilitate critical discourse in the spirit of transformational learning (Snyder, 2008). Participants and students from other healthcare training programs engaged in two written discussions with their team on the topics of interprofessional practice and addressing weight bias using an interprofessional approach. The discussions included an initial post and then responses to other team members' posts. Discussions were online and asynchronous to allow students time for adequate self-reflection (Taylor, 2007). The format also allowed participants in different time zones and with varying schedules to fully engage with their team. All discussions were completed through the D2L Discussions tool, which allowed threaded discussions and responses among team members. Team discussion prompts are provided in Appendix H.

Focus group interviews. Semi-structured focus group interviews were conducted after participants completed all IPE module activities, the IPAS retrospective pre-post survey, and the post-repertory grid. All 11 participants were invited via email to participate in focus group Zoom interviews, and a total of six agreed to participate. Two focus group interviews were scheduled, three participants per group. Only audio was recorded for each Zoom session; video was not deemed necessary. During one of the interview sessions, one participant lost internet connection and an individual follow-up session was scheduled to capture this participant's responses. Each group was asked the

same questions and time was provided for all participants to respond and have a voice (Mertler, 2017). All interviews were conducted by me to maintain consistency. Focus group interview questions are provided in Appendix I. Table 4 provides an overview of all collected data. It includes the data source, the timeline of collection, what each data source is measuring, and expected outcomes for each.

Table 4

Data Collection Timeline with Connections to RQs

Data Source	Timeline	Measuring (Connection to RQs)
PCT/ repertory grids	Before Phase I & after Phase III	Comparisons of interprofessional roles (RQ2)
Reflective journal entries	Phase I & II	Reflections on interprofessional team experience and interprofessional attitudes (RQ1)
Team discussions	Phase II	Thinking regarding roles of interprofessional team members; role of interprofessional team members to address a public health issue (RQ2)
Retrospective pre- and post-IPAS	After Phase III	Interprofessional attitudes before to after completing intervention (RQ1)
Focus group interviews	After Phase III	Interprofessional attitudes and learning that occurred over the course of the module (RQ1) Thinking regarding roles if interprofessional team members and the role of the dietitian (RQ2)

Data Analysis

Quantitative and qualitative data analyses were conducted after participants completed the IPE intervention and all post-intervention activities. Analysis of both quantitative and qualitative data occurred at the same time to align with the concurrent triangulation mixed-methods design (Ivankova, 2015; Mertler, 2017). An overview of the stated research questions, corresponding data sources, and data analyses are provided in Table 5.

Table 5

Research Question Mapping to Data Sources and Data Analyses

Research Question	Data Sources	Data Analyses
RQ 1: How and to what extent does participation in an online IPE module impact online dietetics students' interprofessional attitudes?	• Pre and post survey - Interprofessional Attitudes Scale (IPAS); retrospective "pre" survey • Reflective journal entries • Focus group interviews	• Cronbach's alpha • Descriptive statistics • Paired samples *t*-test (retrospective pre/post survey) • Coding and summarizing qualitative data
RQ 2: After participating in an online IPE module, in what ways do online dietetics students change their thinking regarding the roles of healthcare professionals?	• Personal construct theory • Written team discussions • Focus group interviews	• Repertory grid analyses - hierarchical cluster analysis through the use of dendrograms • Coding and summarizing qualitative data

Quantitative Analysis

Analyses of the personal construct theory data and IPAS data were completed using SPSS 25. For all paired samples t-test analyses, a 95% confidence interval and $p <$

.05 (two-tailed significance) were used. Qualtrics was used as a means to collect quantitative data, but all analyses were done in SPSS and not in the application itself.

Personal Construct Theory. At the conclusion of the study the pre- and post-repertory grid responses were downloaded from Qualtrics and entered into SPSS for analysis. A total of six participants completed both the pre- and the post-repertory grids. Two participants had questionable responses where the same numeric response was entered for all or the majority of the items (e.g., selected 4 for all Likert items for multiple elements). These data were judged to be untrustworthy, and therefore, the data from those two participants were excluded from the final analysis.

Repertory grid data (n = 4) were analyzed using Ward's Method of hierarchical cluster analysis to highlight relationships among constructs (Ward, 1963). Ward's Method was selected because it is a common approach that uses Euclidean metrics and highlights construct similarities (Fraboni & Cooper, 1989). From these analyses, pre- and post-exposure dendrograms were generated for each of the four healthcare disciplines – nurse, dietitian, pharmacist, and medical doctor - resulting in eight total dendrograms. Each dendrogram was reviewed visually to identify clusters of constructs where the level of agreement was most similar among participants. Means were then calculated for each cluster for all of the pre- and post-exposure dendrograms. Means were also calculated for all items on the pre- and post-repertory grids to gain further insights.

IPAS. Participant responses to the survey (n = 11) were downloaded from Qualtrics and entered into SPSS for analysis. To explore the internal consistency of the survey, Cronbach's alpha was calculated (Fraenkel & Wallen, 2005). Before completing the calculation, item 1.8 was reverse coded in SPSS because the item was worded in the

reverse. This maintained a consistent scale across all items. For all other IPAS analyses, item 1.8 was coded normally. Descriptive statistics for each sub-construct, as well as each survey item were calculated. Paired samples *t*-test analyses were calculated at the sub-construct and item levels to compare the mean scores between the retrospective pre- and post-survey responses and determine if any differences were statistically significant.

Qualitative Analysis

For all qualitative data analyses, the computer assisted analysis software program, HyperRESEARCH, was used as a means to organize and code the data. Each qualitative data source - reflective journal entries, team discussions, and focus group interviews - was evaluated separately using an inductive and iterative approach (Creswell & Guetterman, 2019). The data were first organized by data source into Word documents and read several times to gain a general understanding of the data. In the margins of the Word documents, initial ideas and concepts were noted by hand. The data were then uploaded to HyperRESEARCH for formal coding.

Formal coding was conducted at the line level using open coding (Saldaña, 2016). Codes were then organized into themes using several different approaches. The first approach utilized a feature of HyperRESEACH called code mapping. Code mapping is a diagraming function in which relationships between codes can be visually displayed. Other techniques were used as suggested by Saldaña (2016) including identifying a "trinity" of major themes and creating a "top 10" list of quotes from each data source to identity the most significant ideas. Use of HyperRESEARCH helped to maintain an audit trail (Creswell & Miller, 2000), or documented record, of the qualitative data analysis by tracking all codes, code descriptions, and theme development such as code mapping.

Reflective journal entries and team discussions. Journal entries (n = 11) and discussion posts with threaded responses (n = 11) from each participant were downloaded from D2L into Word documents and then uploaded into HyperRESEARCH. Each set of participant data was coded using the process outlined in the previous section. For team discussions, participants' initial posts and responses to team members' posts were analyzed.

Focus group interviews. Semi-structured interviews were conducted (n = 6) via Zoom after participants completed the IPE module and all other study activities. The Zoom recording included audio only which aligned with the IRB protocol. The recordings were saved on a password protected computer for transcription. Transcripts were obtained from Zoom and were manually reviewed and corrected for any errors. The finalized transcripts were then uploaded to HyperRESEARCH and coded using the established approach outlined in the previous section.

Project Trajectory

Data were collected during the spring 2021 semester. Table 6 provides an overview of the entire project trajectory. The project started with obtaining IRB approval, which was obtained on December 3, 2020 for ASU and December 22, 2020 for UA. During this time, the IPE intervention was finalized, which included building the module D2L site in preparation for the start of the spring 2021 semester. Recruitment efforts began in early January 2021 and extended through the end of the month. Once participants were recruited and consented, they were given access to the IPE module D2L site two weeks before the start of the module. Students from other healthcare training

programs who enrolled in the online IPE module, were also given access to the D2L site at the same time.

Table 6

Timeline and Procedures for the Study

Timeline	Procedures
November, December 2020	• Finalized IPE module in collaboration with dietetics faculty, CTIPH members, instructional design specialists • Built D2L site for IPE module • Finalized reflective journal entry and team discussion prompts • Prepared consent materials and obtained IRB approval
January 2021	• Recruited and requested consent from dietetics students • Collaborated with CTIPH to invite students from other healthcare training programs to complete the IPE module • IPE module self-registration
February 2021	• Completed Stages 1 through 3 of PCT pre-exposure data collection (construct elicitation, repertory grid creation and administration) • Participants completed Phase I (module orientation)
March 2021	• Participants completed Phase II (IPE module) • Monitored participant reflective journal entries and team discussion posts • Completed Stages 1 through 3 of PCT post-exposure data collection (construct elicitation, repertory grid creation and administration)
April 2021	• Participants completed Phase III (post-module activities) • Participants completed retrospective pre-post IPAS • Organized and conducted participant focus group interviews
May, June, July 2021	• Completed data analysis

In February 2021, participants completed Stages 1 through 3 of the PCT pre-exposure data collection process. In late February, participants were asked to complete

the module orientation and pre-intervention study activities prior to the start of the module on March 1, 2021. Once the IPE module officially began (Phase II) participants completed the reflective journal entries, team discussions, and completed the final project in collaboration with interprofessional team members. The IPE module ran for three weeks, from March 1 through March 19, 2021. After completion of the IPE module, participants were asked to complete all post-module activities of Phase III by the first week of April as well as the PCT post-exposure data collection process. Participant focus group interviews were conducted in mid-April 2021.

CHAPTER 4

RESULTS

Data analysis results are presented and contextualized within the research question they aim to answer. For research question 1 (RQ1): *How and to what extent does implementation of an online IPE module impact online dietetics students' interprofessional attitudes?*, results from the retrospective pre- and post-Interprofessional Attitudes Scale (IPAS), reflection journal entries, and focus group interviews are presented. For research question 2 (RQ2): *After participating in an online IPE module, in what ways do online dietetics students change their thinking regarding the roles of healthcare professionals?*, results from personal construct theory, team discussion responses, and focus group interview responses are presented. Because focus group interviews were used to answer both RQ1 and RQ2, results that inform each specific question were included under the corresponding sub-section. All the direct quotes provided in the qualitative data analysis were taken verbatim from the raw data, including any misspellings, parentheses, and punctuation.

Research Question 1

The impact of the online IPE module on participants' interprofessional attitudes was first explored. The quantitative data analysis included the IPAS, while the qualitative data analysis included three reflection journal entries and focus group interviews. Results for each of the data sources are reported below. Because the focus group interviews were used to answer both research questions, only results specific to this research question are presented here.

Interprofessional Attitudes Scale

Participants completed the retrospective pre- and post-IPAS after they completed the intervention to assess changes in interprofessional attitudes before and after the intervention. Analyses presented below include the instrument's measure of internal reliability, as well retrospective pre- and post-IPAS descriptive statistics and paired samples *t*-tests. For all paired samples *t*-test analyses, a 95% confidence interval and $p < .05$ (two-tailed significance) were used.

Measure of Internal Reliability. Estimating internal reliability of a survey allows a researcher to determine if the survey results consistently reflect the constructs being measured (Field, 2017). In the case of the IPAS, it has one primary construct, *interprofessional attitudes,* as well as the five sub-constructs outlined in Chapter 3. In order to estimate reliability of the survey, Cronbach's alpha was calculated for each sub-construct, as well as for the primary construct (all items). Results are presented in Table 7. Although the designation of acceptable varies amongst researchers, an alpha equal to or greater than 0.65 is generally considered acceptable (Field, 2017; Vaske et al., 2017).

For four of the five of survey sub-constructs and for the primary construct, the coefficient alpha estimate of reliability was equal to or greater than 0.65, which indicates acceptable reliability (Field, 2017; Vaske et al., 2017). For example, the alpha for the *Teamwork, Roles and Responsibilities* (items 1.1 to 1.9) sub-construct was greater than 0.80 for both the pre- and post-survey, indicating a low amount of error variance. The alpha for the sub-construct *Community-centeredness* had an alpha of 0.422 (post-survey only), suggesting possible unacceptable variance error.

Table 7

Coefficient Alpha of Reliability for IPAS Retrospective Pre- and Post-survey

n = 11	Within Construct Items	Number of Items in Construct	Pre-survey Coefficient Alpha Estimate of Reliability	Post-survey Coefficient Alpha Estimate of Reliability
Construct				
1 - Teamwork, Roles, & Responsibilities	1.1-1.9	9	.885	.876
2 - Patient-Centeredness	2.1-2.5	5	.908	.875
3 - Interprofessional Biases	3.1-3.3	3	.648	.647
4 - Diversity & Ethics	4.1-4.4	4	.884	.864
5 - Community-Centeredness	5.1-5.6	6	.840	.422
Overall (Interprofessional Attitudes)	1.1-5.6	27	.933	.864

Sub-construct Analysis. The survey responses were based on a five-point Likert scale from 1 - *strongly disagree* to 5 - *strongly agree*. The retrospective pre- and post-survey means and standard deviations for the IPAS sub-constructs are shown in Table 8. In general, the mean scores showed a trend toward more agreement from the pre- to post-survey responses. *Teamwork, Roles, and Responsibilities, Diversity and Ethics,* and *Community-centeredness* all showed increases after the intervention. There was little change in *Patient-centeredness,* and *Interprofessional Biases* showed a decrease.

Table 8

Descriptive Statistics for IPAS Retrospective Pre- and Post-survey Sub-constructs

	Retrospective			
	Pre-survey Score		Post-survey Score	
n = 11 Sub-construct	*M*	*SD*	*M*	*SD*
1 - Teamwork, Roles, & Responsibilities	3.93	.645	4.38	.527
2 - Patient-Centeredness	4.58	.623	4.76	.418
3 - Interprofessional Biases	3.24	.818	3.21	.749
4 - Diversity & Ethics	4.50	.622	4.80	.350
5 - Community-Centeredness	4.14	.586	4.53	.306

To evaluate the significance of the changes seen in the mean scores for each sub-construct in the retrospective pre- and post-survey, paired-samples *t*-tests were conducted. Significant differences were seen in three of the five sub-contracts: *Teamwork, Roles, and Responsibilities; Diversity and Ethics*; and *Community Centeredness*. Results are shown in Table 9. For example, there was a significant difference in means related to sub-construct *Community-centeredness* before exposure to the IPE intervention and after (M = .394, SD = .410; t (10) = -2.52, p = .010). There was no significant difference found between the mean score of the pre- and post-survey for the sub-construct *Interprofessional Biases* given that the pre- and post-survey means were so similar.

Table 9

Paired Samples t-test for IPAS Retrospective Pre- and Post-survey Sub-constructs

n = 11 Sub-construct	*M*	*SD*	*t* value	df	*Two-tailed sig.*
1 - Teamwork, Roles, & Responsibilities	.455	.597	-2.52	10	.030
2 - Patient-Centeredness	.182	.352	-1.72	10	.117
3 - Interprofessional Biases	.030	.433	.232	10	.821
4 - Diversity & Ethics	.295	.416	2.36	10	.040
5 - Community-Centeredness	.394	.410	3.19	10	.010

Item Analysis by Sub-construct. An analysis of each item of the survey was conducted, including descriptive statistics and paired samples *t*-tests, to gain more insight into specific interprofessional attitudes. The item analysis is presented by sub-construct to assist in contextualizing the results. Table 10 presents the descriptive statistics for the items in the first sub-construct, *Teamwork, Roles, and Responsibilities*. Responses to eight of the nine items show a trend toward more agreement, with higher mean scores on the post-survey as compared to the pre-survey. Item 1.8 was worded in reverse of the other eight items; the item stated that shared learning for health professions students is not necessary. For this item, the post-survey mean score was lower than the pre-survey mean score, indicating the participants had a higher level of disagreement with the statement after completing the intervention.

Table 10

Descriptive Statistics for IPAS Sub-construct 1 – Teamwork, Roles, & Responsibilities

	Retrospective			
	Pre-survey Score		Post-survey Score	
n = 11 Item	*M*	*SD*	*M*	*SD*
1.1 Shared learning before graduation will help me become a better team worker.	3.91	.831	4.27	.786
1.2 Shared learning will help me think positively about other professionals.	3.91	1.044	4.45	.688
1.3 Learning with other students will help me become a more effective member of a heal care team.	3.91	.831	4.73	.467
1.4 Shared learning with other health sciences students will increase my ability to understand clinical problems.	3.73	.467	3.91	.302
1.5 Patients would ultimately benefit if health sciences students worked together to solve patient problems.	4.45	.820	4.82	.603
1.6 Shared learning with other health sciences students will help me communicate better with patients and other professionals.	4.09	.701	4.55	.688
1.7 I welcome the opportunity to work on small group projects with other health sciences students.	3.73	1.009	4.09	.701
1.8 It is not necessary for health sciences students to learn together.	2.27	1.272	2.00	1.414
1.9 Shared learning will help me understand my own limitations.	3.91	.831	4.64	.505

Of the nine items analyzed in the first sub-construct using the paired samples t-test, two items (1.3 and 1.9) were found to have statistically significant differences between the pre- and post-survey mean scores (see Table 11). Participants' level of agreement regarding the impact of shared learning on becoming more effective members of the healthcare teams (item 1.3) changed significantly after completing the intervention

(*M* = .818., *SD* = .751; *t* (10) = -3.614, *p* = .005). Likewise, after the intervention participants had a higher level of agreement regarding the impact of shared learning on understanding their own limitations (*M* = .727, *SD* = .786; *t* (10) = -3.068, *p* = .012).

Table 11

Paired Samples t-test for IPAS Sub-construct 1 – Teamwork, Roles, & Responsibilities

n = 11 Item	*M*	*SD*	*t* value	df	*Two-tailed sig.*
1.1 Shared learning before graduation will help me become a better team worker.	.364	1.120	-1.077	10	.307
1.2 Shared learning will help me think positively about other professionals.	.545	.820	-1.096	10	.052
1.3 Learning with other students will help me become a more effective member of a health care team.	.818	.751	-3.614	10	.005
1.4 Shared learning with other health sciences students will increase my ability to understand clinical problems.	.182	.603	-1.000	10	.341
1.5 Patients would ultimately benefit if health sciences students worked together to solve patient problems.	.364	.674	-1.789	10	.104
1.6 Shared learning with other health sciences students will help me communicate better with patients and other professionals.	.455	.688	-2.193	10	.053
1.7 I welcome the opportunity to work on small group projects with other health sciences students.	.364	1.206	-1.000	10	.341
1.8 It is not necessary for health sciences students to learn together.	.273	1.191	.760	10	.465
1.9 Shared learning will help me understand my own limitations.	.727	.786	-3.068	10	.012

For the sub-construct *Patient-centeredness*, mean scores generally increased from the pre- to post-survey (see Table 12). Participants' level of agreement increased for patient-centered concepts such as establishing trust, thinking of the patient as a person,

and understanding the patient's side of the problem (items 2.1, 2.3 and 2.5). Other concepts such as communicating compassion and cooperating with patients (items 2.2 and 2.4) did not increase, but the overall level of agreement to the statements was high with mean scores above 4.50 for both items.

Table 12

Descriptive Statistics for IPAS Sub-construct 2 – Patient-centeredness

	Retrospective			
	Pre Score		Post Score	
n = 11 Item	*M*	*SD*	*M*	*SD*
2.1 Establishing trust with my patient is important to me.	4.73	.647	4.91	.302
2.2 It is important to me to communicate compassion to my patients.	4.73	.647	4.73	.467
2.3 Thinking about the patient as a person is important in getting treatment right.	4.45	.820	4.82	.405
2.4 In my profession, one needs skills in interacting and cooperating with patients.	4.55	.820	4.55	.820
2.5 It is important for me to understand the patient's side of the problem.	4.45	.688	4.82	.405

Table 13 presents the paired samples *t*-test results for the *Patient-centeredness* sub-construct. Of the five items, only item 2.5 related to the importance of understanding the patient's side of the problem was found to have a statistically significant change in mean scores between the pre- and post-survey (M = .364, SD = .505; t (10) = -2.390, p = .038). This indicates that after exposure to the intervention participants had a higher level of agreement.

Participants' level of agreement on items in the sub-construct *Interprofessional Biases* was generally lower on both the pre- and post-survey as compared to items in the

other sub-constructs, particularly for items 3.1 and 3.2 (see Table 14). For example, when asked to consider whether participants themselves had prejudices or made assumptions about students or professionals of other disciplines (item 3.2), there was a low level of agreement (M = 2.73, SD = 1.191) on the pre-survey, and an even lower level of agreement on the post-survey (M = 2.36, SD = 1.120). However, when assessing whether prejudices and assumptions of other healthcare disciplines get in the way of delivery of health care (item 3.3), participants' level of agreement was relatively high on the pre-survey (M = 4.00, SD = 1.000) and increased on the post-survey (M = 4.27, SD = .786). When the pre- and post-survey mean scores of each item were compared, no statistically significant differences were found (see Table 15).

Table 13

Paired Samples t-test for IPAS Sub-construct 2 – Patient-centeredness

n = 11 Item	*M*	*SD*	*t* value	df	*Two-tailed sig.*
2.1 Establishing trust with my patient is important to me.	.182	.405	-1.49	10	.167
2.2 It is important to me to communicate compassion to my patients.	.000	.447	.000	10	1.000
2.3 Thinking about the patient as a person is important in getting treatment right.	.364	.674	-1.789	10	.104
2.4 In my profession, one needs skills in interacting and cooperating with patients.	.000	.447	.000	10	1.000
2.5 It is important for me to understand the patient's side of the problem.	.364	.505	-2.390	10	.038

Table 14

Descriptive Statistics for IPAS Sub-construct 3 – Interprofessional Biases

	Retrospective			
	Pre Score		Post Score	
n = 11 Item	*M*	*SD*	*M*	*SD*
3.1 Health professionals/students from other disciplines have prejudices or make assumptions about me because of the discipline I am studying.	3.00	1.000	3.00	1.000
3.2 I have prejudices or make assumptions about health professionals/students from other disciplines.	2.73	1.191	2.36	1.120
3.3 Prejudices and assumptions about health professionals from other disciplines get in the way of delivery of health care.	4.00	1.000	4.27	.786

Table 15

Paired Samples t-test for IPAS Sub-construct 3 – Interprofessional Biases

n = 11 Item	*M*	*SD*	*t* value	df	*Two-tailed sig.*
3.1 Health professionals/students from other disciplines have prejudices or make assumptions about me because of the discipline I am studying.	.000	.447	.000	10	1.000
3.2 I have prejudices or make assumptions about health professionals/students from other disciplines.	.364	.809	1.491	10	.167
3.3 Prejudices and assumptions about health professionals from other disciplines get in the way of delivery of health care.	.273	.647	-1.399	10	.192

Tables 16 and 17 present descriptive statistics and paired samples *t*-test results, respectively, for the sub-construct *Diversity and Ethics*. Similar to other sub-constructs, level of agreement increased for all items from the pre-survey to the post-survey. For example, when asked to assess their level of agreement regarding providing excellent treatment to patients regardless of their background, the mean score was 4.55 (*SD* = .820) on the pre-survey and 4.91 (*SD* = .302) on the post-survey. While there was a trend toward higher levels of agreement for each item, no statistically significant differences were found between pre- and post-survey scores.

Table 16

Descriptive Statistics for IPAS Sub-construct 4 – Diversity & Ethics

	Retrospective			
	Pre Score		Post Score	
n = 11 Item	*M*	*SD*	*M*	*SD*
It is important for health professionals to:				
4.1 Respect the unique cultures, values, roles/responsibilities, and expertise of other health professionals.	4.45	.688	4.82	.405
4.2 Understand what it takes to effectively communicate across cultures.	4.45	.688	4.73	.467
4.3 Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	4.55	.688	4.73	.467
4.4 Provide excellent treatment to patients regardless of their background.	4.55	.820	4.91	.302

Table 17

Paired Samples t-test for IPAS Sub-construct 4 – Diversity & Ethics

n = 11 Item	*M*	*SD*	*t* value	df	*Two-tailed sig.*
It is important for health professionals to:					
4.1 Respect for unique cultures, values, roles/responsibilities, and expertise of other health professionals.	.364	.674	-1.789	10	.104
4.2 Understand what it takes to effectively communicate across cultures.	.273	.467	-1.936	10	.082
4.3 Respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.	.182	.405	-1.491	10	.167
4.4 Provide excellent treatment to patients regardless of their background.	.364	.674	-1.789	10	.104

For the final sub-construct, *Community-centeredness*, levels of agreement increased from the pre- and post-survey mean scores for all items (see Table 18). The greatest change in mean score was for item 5.4 related to the importance of health professionals working with non-clinicians, where the pre-survey mean score was 3.55 (*SD* = .688) and the post-survey mean score was 4.18 (*SD* = .751). This change was found to be statistically significant (*M* = .636, *SD* = .674; *t* (10) = -3.130, *p* = .011). Likewise, participants level of agreement reading the importance for healthcare professionals to work on projects that promote community and public health (item 5.4) increased significantly from the pre- and post-survey (*M* = .455, *SD* = .522; *t* (10) = -.887, *p* = 0.16). Paired samples *t*-test analyses for all items in sub-construct 5 are presented in Table 19.

Table 18

Descriptive Statistics for IPAS Sub-construct 5 – Community-centeredness

	Retrospective			
	Pre Score		Post Score	
n = 11 Item	*M*	*SD*	*M*	*SD*
It is important for health professionals to:				
5.1 Work with public health administrators and policy makers to improve delivery of health care.	4.27	.905	4.64	.674
5.2 Work on projects to promote community and public health.	4.00	.632	4.45	.522
5.3 Work with legislators to develop laws, regulations, and policies that improve health care.	4.09	.944	4.45	.688
5.4 Work with non-clinicians to deliver more effective health care.	3.55	.688	4.18	.751
5.5 Focus on populations and communities, in addition to individual patients, to deliver effective health care.	4.36	.809	4.64	.505
5.6 Be advocates for the health of patients and communities.	4.55	.688	4.82	.405

Table 19

Paired Samples t-test for IPAS Sub-construct 5 – Community-centeredness

n = 11 Item	*M*	*SD*	*t* value	df	*Two-tailed sig.*
It is important for health professionals to:					
5.1 Work with public health administrators and policy makers to improve delivery of health care.	.364	.674	-1.789	10	.104
5.2 Work on projects to promote community and public health.	.455	.522	-2.887	10	.016
5.3 Work with legislators to develop laws, regulations, and policies that improve health care.	.364	.674	-1.789	10	.104
5.4 Work with non-clinicians to deliver more effective health care.	.636	.674	-3.130	10	.011
5.5 Focus on populations and communities, in addition to individual patients, to deliver effective health care.	.273	.467	-1.936	10	.082
5.6 Be advocates for the health of patients and communities.	.273	.467	-1.936	10	.082

Reflective journal entries

Three overarching themes were identified from the reflective journal entry text data that related to participant attitudes regarding interprofessional practice – *Foundations of Interprofessional Teams, Interprofessional Learning,* and *Benefits of Interprofessional Practice* (see Table 20). The theme *Foundations of Interprofessional Teams* represents how participants described the necessary elements of a functioning interprofessional team which are embodied in codes such as *trust, open mind,* and *building consensus*. Participants also described the learning that happened as a result of exposure to the IPE intervention, as well as the positive outcomes of interprofessional

practice. These concepts are presented by the themes, *Interprofessional Learning* and *Benefits of Interprofessional Practice*, respectively.

Table 20

Themes and Example Open Codes Identified from Reflective Journal Entries

Theme	Example Open Codes
Foundations of Interprofessional Teams	building consensus collaborating open mind respect trust
Interprofessional Learning	networking professional perspective sharing expertise shared learning
Benefits of Interprofessional Practice	cost effectiveness impact on medical errors improved patient care stronger healthcare system synergy well-rounded approach

Foundations of Interprofessional Teams. In the journal entries, several participants discussed the characteristics of a successful interprofessional team. The described characteristics provided insight into how their attitudes about interprofessional teams may have evolved throughout the IPE intervention. One participant wrote, "My teammates have also taught me that their roles are just as important as mine and we all deserve the same amount of respect" (Participant C, personal communication, March 18, 2021). Some participants described the development of trust and respect as a consequence of learning about and internalizing the roles of other team members as exemplified by this participant's comment:

> If all potential members of a treatment team have a deepened understanding of each member's unique role on that team, the team functions more efficiently and

> effectively. This benefits the patient and each professional because it establishes a circle of trust (Participant G, personal communication, March 5, 2021).

Understanding team members motivations was also articulated by one participant as foundational for interprofessional teams to provide coordinated care.

Interprofessional Learning. Engaged learning in the IPE intervention impacted participant attitudes related to interprofessional practice. Some participants discussed the ways in which interprofessional practice can lead to better patient outcomes. One participant reflected:

> I learned the importance of working with other disciplines to achieve a well-rounded approach to patient care. If each of us accepts the responsibility to provide input to patient care in our area of expertise and also to help educate other team members in the aspects or our role, the benefit will always be to the patient (Participant F, personal communication, March 17, 2021).

Another participant noted that through the experience of the IPE intervention, their attitude changed with regard to asking questions of other healthcare providers and engaging in a dialogue about best approaches to patient care:

> I have also learned that it is ok to ask another professional a question about the patients [sic] care and that we should have an open line of communication with each other to allow for questions and comments to be voiced without feeling hesitant (Participant C, personal communication, March 18, 2021).

In interprofessional teams where a student from the public health discipline was a member, participants often made specific mention of the learning that occurred and the new insights gained into the importance of this discipline. For example, one participant noted:

> I had two public health majors on my team and I gained a deeper appreciation for their role in overall health as often they have the first opportunity to provide education and insight to the public regarding better health and health outcomes (Participant G, personal communication, March 22, 2021).

Benefits of Interprofessional Practice. Another way in which participant attitudes were impacted relates to the benefits they attributed to interprofessional practice, such as more well-rounded patient care, decreased medical errors, and more cost-efficient care. For example, one participant wrote, "Without proper training in interprofessional roles, more medical errors occur because the patient isn't being treated as a whole, and the left hand may not know what the right hand is doing" (Participant G, personal communication, March 5, 2021). Also discussed was the synergist effect of teamwork where the collective is more effective than the sum of its parts, "The collaboration of interprofessional education allows professionals to work together to achieve the same goals. This allows them to achieve together more than they can achieve individually" (Participant A, personal communication, March 1, 2021). Table 21 presents example quotes from the reflective journal entries that align with each of the three themes.

Table 21

Participant Quotes from Reflective Journal Entries (*n* = 11)

Theme	Example Quotes
Foundations of Interprofessional Teams	• "My teammates have also taught me that their roles are just as important as mine and we all deserve the same amount of respect" (Participant C, personal communication, March 18, 2021). • "It is important that a doctor and an RDN for example, who both have different scopes of practice, are able to communicate and collaborate effectively to provide patient care" (Participant D, personal communication, March 2, 2021). • "Understanding each other's motivations for implementing interventions can be key to composing the most effective plan that the patient can carry out effectively" (Participant K, personal communication, March 4, 2021). • "If all potential members of a treatment team have a deepened understanding of each member's unique role on that team, the team functions more efficiently and effectively. This benefits the patient and each professional because it establishes a circle of trust" (Participant G, personal communication, March 5, 2021).
Interprofessional Learning	• "I learned the importance of working with other disciplines to achieve a well-rounded approach to patient care. If each of us accepts the responsibility to provide input to patient care in our area of expertise and also to help educate other team members in the aspects or our role, the benefit will always be to the patient" (Participant F, personal communication, March 17, 2021).

Theme	Example Quotes
Interprofessional Learning, continued	• "The content that [teammates] provided was very educational for me and expanded my knowledge base beyond just thinking of the topic from a nutritional perspective" (Participant F, personal communication, March 17, 2021). • "I have also learned that it is ok to ask another professional a question about the patients [sic] care and that we should have an open line of communication with each other to allow for questions and comments to be voiced without feeling hesitant" (Participant C, personal communication, March 18, 2021). • "I had two public health majors on my team and I gained a deeper appreciation for their role in overall health as often they have the first opportunity to provide education and insight to the public regarding better health and health outcomes" (Participant G, personal communication, March 22, 2021).
Benefits of Interprofessional Practice	• "The collaboration of interprofessional education allows professionals to work together to achieve the same goals. This allows them to achieve together more than they can achieve individually" (Participant A, personal communication, March 1, 2021). • "…working together allows us to learn from each other and allow others to fill in our knowledge deficits. This method allows us to provide the client with well-rounded support and information" (Participant H, personal communication, March 11, 2021). • "Without proper training in interprofessional roles, more medical errors occur because the patient isn't being treated as a whole, and the left hand may not know what the right hand is doing" (Participant G, personal communication, March 5, 2021). • "In any healthcare, there is a need for collaborative care team-based models that can ensure the highest quality of care for a patient and in today's economy at the lowest price for them" (Participant D, personal communication, March 2, 2021).

Focus group interviews

When analyzing the focus group interviews for content related to changes in participant interprofessional attitudes (RQ1), four major themes were identified – *Shared Learning, Shifts in Perspective, Broadened Knowledge-base,* and *Insights into Future Practice*. Example open codes associated with each theme are listed in Table 22. Each theme represents the ways in which participants attitudes were impacted after completing the IPE intervention. For example, the theme *Shifts in Perspective* reflects how participants articulated the growth in their viewpoints on interprofessional practice and other disciplines. Open codes associated with this theme included *attitude change* and the in vivo code "*see through their lenses*." Participants also discussed the ways in which the

IPE intervention increased their understanding of interprofessional practice, represented by the theme *Broadened Knowledge-base*.

Shared Learning. The theme of *Shared Learning* represents participants' description of learning that occurred as a consequence of collective knowledge-making. Participants described aspects of their team's interactions and how those facilitated new insights. One participant shared, "…it was cool to learn about everyone's different profession and how we all have the same goal and can give feedback and learn from each other" (Participant E, personal communication, March 31, 2021). Through shared learning experiences there were also opportunities to break down barriers of communication and appreciate each individual's unique perspectives. For example, one participant noted, "…[we were] respectful of each other and each other's opinions. They also weren't afraid to ask questions to me and what I do, and questions to them and what they do…" (Participant C, personal communication, April 6, 2021).

Table 22

Themes and Example Open Codes Identified from Focus Group Interviews Related to RQ1

Theme	Example Open Codes
Shared Learning	communication connecting same goal teamwork working together
Shifts in Perspective	attitude change biases positive attitude "see through their lenses"

Theme	Example Open Codes
Broadened Knowledge-base	eye-opening not knowing about interprofessional teams realizing own knowledge gaps
Insights into Future Practice	exposure before entering field improving patient outcomes real world experience

Shifts in Perspective. Participants articulated changes in interprofessional attitudes as they grappled with pre-conceived notions of other healthcare disciplines and challenged biases they might have held. One concept that was mentioned often was empathy, such as in this participant's comment, "I felt that I was able to be a bit more empathetic towards the other professions because we were able to, like, we see through their lenses and you know, become more open minded towards these other professions…" (Participant I, personal communication, March 30, 2021). The same participant recognized her bias against the public health discipline prior to completing the IPE intervention:

> …one bias I had towards the public health would be that they just…um…like their education is very broad, and so they may not know like as much or any…subject as well as they should. But seeing what they do know and interacting and communicating with them, then you're able to take away that bias and be like okay, so this is what public health person actually does. And so you're able to like empathize more with the role (Participant I, personal communication, March 30, 2021).

This is another example of the impact public health students had on participants, specifically related to promoting changes in interprofessional attitudes.

Broadened Knowledge-base. Several participants noted the knowledge gained after participating in the IPE intervention. For some participants, the concept of an interprofessional team was new and changed the way they envisioned the healthcare

system in general. One participant stated, “I honestly haven't had too much background, like in volunteering or working in like healthcare settings so having this…um…kind of really opened my eyes…” (Participant B, personal communication, March 30, 2021). Related again to the discipline of public health, one participant discussed her realization that dietetics and public health are natural partners, “…it gave me a broader understanding of what somebody who works in public community health, and, the overlap with dietetics and how much I don't know. It became apparent to me that those two should go together…” (Participant G, personal communication, March 31, 2021).

Insights into Future Practice. Attitudes about interprofessional practice were impacted when participants could see the direct application of what they learned in the IPE intervention to real-world practice. One participant noted:

> …when we were creating the resource material, we all decided on like a topic, and what we wanted to do and, um, our roles and so when we went to put in our comments and fill it in, I could see what they were missing in the resource, and so I was able to put like the necessary information that dietitians would be able to put. And so, seeing that like actually happen and be like okay ‘hey you're missing this information’…I'm sure that's what happens in the real world too, in hospitals and clinics (Participant I, personal communication, March 30, 2021).

A similar sentiment was echoed in this participant comment, “I think this can really help kind of facilitate when we are out there in the real world thinking about going to that next professional and asking them, you know, what they think about patient care” (Participant K, personal communication, March 30, 2021). Table 23 presents example quotes from the focus group interviews that align with each of the four themes.

Table 23

Participant Quotes from Focus Group Interviews Related to RQ 1 (*n* = 6)

Theme	Example Quote
Shared Learning	• "Like before…I was thinking of just myself…just my job and my duties and then meeting these other people…[we were] respectful of each other and each other's opinions. They also weren't afraid to ask questions to me and what I do, and questions to them and what they do, and how we can work together to give the best patient care" (Participant C, personal communication, April 6, 2021). • "…to think of the healthcare system as a whole, that's what really like changed my attitude towards, like we're all working together…we should be sharing ideas and really working as a team to better our clients…" (Participant B, personal communication, March 30, 2021). • "…it was cool to learn about everyone's different profession and how we all have the same goal and can give feedback and learn from each other" (Participant E, personal communication, March 31, 2021).
Shifts in Perspective	• "I felt that I was able to be a bit more empathetic towards the other professions because we were able to, like, we see through their lenses and you know, become more open-minded towards these other professions…" (Participant I, personal communication, March 30, 2021). • "…I think maybe [it] helps increase our sensitivity to the fact that it's not just one practitioner, it's everyone combined. Just like it's not one symptom with the patient, you know, it's the whole picture, the whole person" (Participant G, personal communication, March 30, 2021). • "…one bias I had towards the public health would be that they just um like their education is very broad, and so they may not know like as much or any…subject as well as they should. But seeing what they do know and interacting and communicating with them, then you're able to take away that bias and be like okay, so this is what public health person actually does. And so you're able to like empathize more with the role" (Participant I, personal communication, March 30, 2021).
Broadened Knowledge-base	• "…I honestly haven't had too much background, like in volunteering or working in like healthcare settings so having this um kind of really opened my eyes…" (Participant B, personal communication, March 30, 2021). • "…it gave me a broader understanding of what somebody who works in public community health, and, the overlap with dietetics and how much I don't know. It became apparent to me that those two should go together…" (Participant G, personal communication, March 31, 2021). • "…I really didn't honestly know. I didn't know much about the public health profession…I really wasn't sure, um, what the healthcare professionals, besides like just a general kind of thing like public health like, I wasn't entirely sure [how] they would interact with me, but now I definitely have a more clear idea after completing this IPE module" (Participant E, personal communication, March 31, 2021).
Insights into Future Practice	• "…when we were creating the resource material, we all decided on like a topic, and what we wanted to do and, um, our roles and so when we went to put in our comments and fill it in, I could see what they were missing in the resource, and so I was able to put like the necessary information that dietitians would be able to put. And so, seeing that like actually happen and be like okay 'hey you're missing this information'…I'm sure that's what happens in

Theme	Example Quote
Insights into Future Practice, continued	the real world too, in hospitals and clinics" (Participant I, personal communication, March 30, 2021). • "I think this can really help kind of facilitate when we are out there in the real world thinking about going to that next professional and asking them, you know, what they think about patient care" (Participant K, personal communication, March 30, 2021). • "I think [it's] really helpful, um, and that's something that I learned too out of this experience, being able to have that exposure to work with other health care professionals and, um get the opportunity to work on something before we actually get to that point" (Participant B, personal communication, March 30, 2021).

Research Question 2

The second research question addressed the impact the IPE intervention had on participants' thinking regarding the roles of healthcare professionals. Personal construct theory (Kelly, 1955) was used to quantitatively map participants' thinking, while the qualitative data analysis included two written team discussions and focus group interviews. Results for each of the data sources are reported below. Because the focus group interviews were used to answer both research questions, only results specific to the second research are presented in this section.

Personal Construct Theory

Recall that participants completed the PCT process including the quantitative methodological technique of PCT, the repertory grid, both before and after exposure to the intervention. Each of the 11 constructs used on the repertory grids were given a specific code in SPSS which included a tag to indicate which discipline was being evaluated where _N is nurse, _RD is dietitian, _Ph is pharmacist, and _doc is medical doctor. In addition, SPSS automatically provided a numeric label for each construct as well. Table 24 provides the list of SPSS codes, numeric labels, and corresponding constructs.

Table 24

SPSS Codes Used on Dendrograms and Corresponding Constructs

The role of a [Nurse (_N), Dietitian (_RD), Pharmacist (_Ph), or Doctor (_doc)] is to…	
SPSS Code	Construct
1 suggfood_nutsupp	suggest food and nutrition supplements.
2 evalptprog	evaluate patients' progress.
3 undrstndDNI	understand drug-nutrient interactions.
4 recdrugs	recommend drugs to help the patient.
5 dxissue	determine underlying issues (diagnosing the issue).
6 provideguidance	provide guidance to other healthcare providers.
7 followguidance	follow guidance from other healthcare providers.
8 workindpdntly	work independently and develop their own interventions for the patient.
9 buildrapport	understand and build rapport/trust with patients.
10 providecare	provide care that meets the needs of the patient.
11 interactptdirect	interact with the patient in more of a direct way (1:1).

Participant repertory grid responses were evaluated using dendrograms to determine which constructs were most similar with regard to participants' level of agreement. Clusters of similar constructs are visually displayed within the dendrogram on the horizontal axis, with the vertical scale representing more dissimilar constructs. Means for each cluster were calculated to further evaluate changes seen with clusters. Figure 4 presents the pre-exposure (on the left) and post-exposure (on the right) dendrograms for nurses. Table 25 presents the pre- and post-exposure means for each cluster on the dendrogram for nurses. For all cluster analyses, clusters are labeled from highest to lower mean value.

Figure 4

Pre- and Post-exposure Dendrograms of Roles for Nurses (*n* = 4)

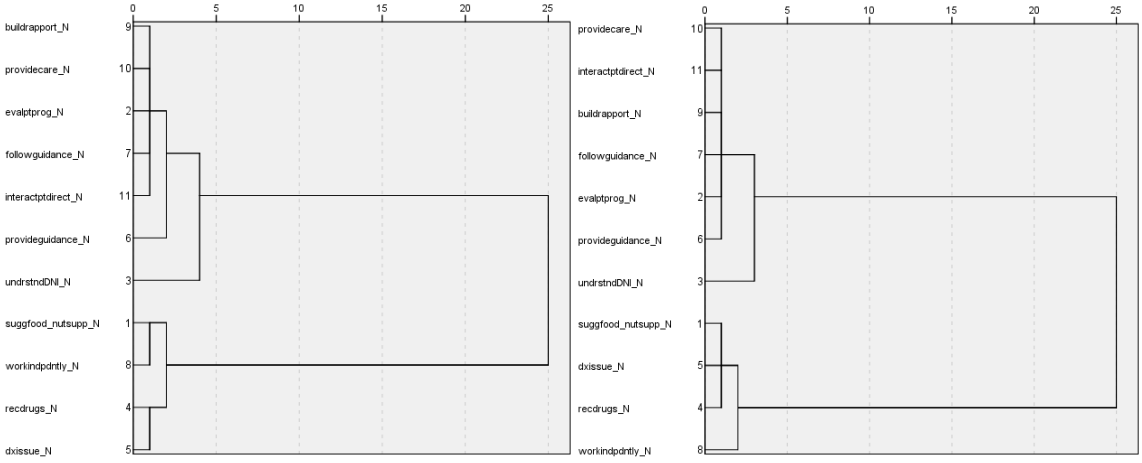


Table 25

Pre- and Post-exposure Dendrogram Cluster Analysis of Roles for Nurses (*n* = 4)

	Pre-exposure			Post-exposure		
	Constructs	*M*	*SD*	Constructs	*M*	*SD*
Cluster 1	9, 10, 2, 7, 11, 6	4.67	.236	10, 11, 9, 7, 2, 6	4.88	.160
Cluster 2	3	3.50	1.291	3	4.00	1.414
Cluster 3	1, 8, 4, 5	2.06	.851	1, 5, 4, 8	2.06	1.265

When participants evaluated the role of a nurse, a high level of agreement was seen for Cluster 1 both pre- and post-exposure, with means of 4.67 (*SD* = .236) and 4.88 (*SD* = .160), respectively. Cluster 1 included constructs such as *understand and build rapport/trust with patients* and *provide care that meets the needs of the patient*. This finding suggested that these constructs, or roles, for nurses were stable before and after the intervention. The same was true for Cluster 3, although for these constructs, participants had a lower level of agreement with pre- and post-exposure mean of 2.06 (*SD* =.851 pre-intervention and SD = 1.265 post-intervention). Constructs in Cluster 3 included *recommend drugs to help the patient* and *determine underlying issues*

(diagnosing the issue). Greater changes were seen in Cluster 2 which included one construct, *understand drug-nutrient interactions,* where the pre-exposure mean was 3.50 (*SD* = 1.291) and post-exposure mean was 4.00 (*SD* = 1.414).

Figure 5 presents the pre- and post-exposure dendrograms for dietitians. The clusters after exposure to the intervention appear to be more defined compared to the pre-exposure dendrogram. For example, on the post-exposure dendrogram there are more constructs in which participants had similar levels of agreement. Table 26 presents that means for each cluster pre- and post-exposure.

Figure 5

Pre- and Post-exposure Dendrograms of Roles for Dietitians (*n* = 4)

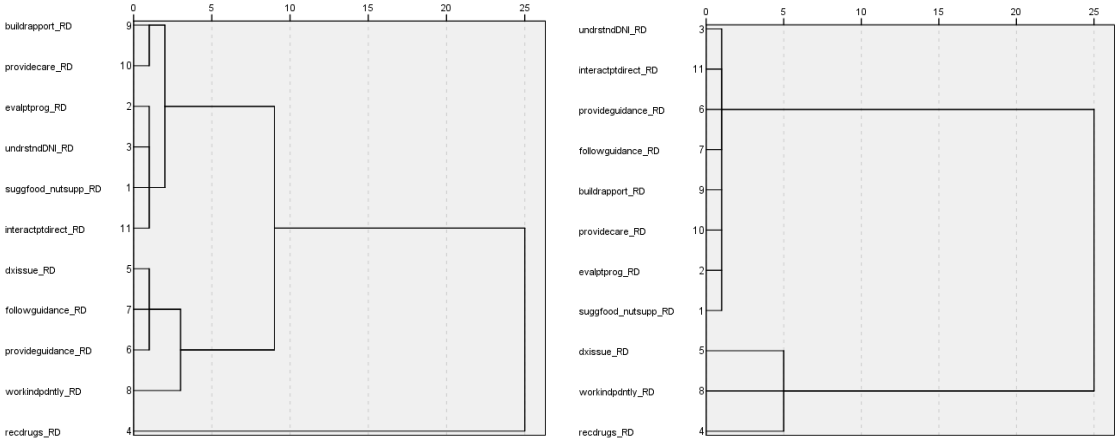


Table 26

Pre- and Post-exposure Dendrogram Cluster Analysis of Roles for Dietitians (*n* = 4)

	Pre-exposure			Post-exposure		
	Constructs	*M*	*SD*	Constructs	*M*	*SD*
Cluster 1	9, 10, 2, 3, 1, 11	4.79	.315	3, 11, 6, 7, 9, 10, 2, 1	4.88	.144
Cluster 2	5, 7, 6	3.92	.419	5	3.25	1.500
Cluster 3	8	3.50	1.291	8	3.00	1.155
Cluster 4	4	2.00	1.414	4	1.50	.577

Th level of agreement for the constructs in Cluster 1 was high with pre- and post-exposure means of 4.79 (*SD* = .315) and 4.88 (*SD* = .144), respectively. In the pre-exposure analysis construct six, *provide guidance to other healthcare providers*, and seven, *follow guidance from other healthcare providers*, were in Cluster 2 indicating a lower level of agreement. In the post-exposure analysis, these constructs moved to Cluster 1 indicating a possible impact of the intervention on participants' thinking related to the roles of dietitians. Participants' level of agreement for constructs five, *determine underlying issues (diagnosing the issue)*, eight, *work independently and develop their own interventions for the patient*, and four, *recommend drugs to help the patient*, decreased after exposure to the intervention.

Figure 6 presents the pre- and post-exposure dendrograms for pharmacists. Results are visually less clear and do not show any distinct changes. Table 27 presents the cluster means for each dendrogram which provides further evidence of indistinct changes from before and after the intervention. For example, construct eight, *work independently and develop their own interventions for the patient,* was included in Cluster 3 in the pre-exposure dendrogram with a mean of 3.25 (*SD* = 1.500) and Cluster 4 in the post-dendrogram with a mean of 3.00 (*SD* = 1.414). This indicates participants' level of agreement decreased from before to after the intervention. Alternately, constructs one, *suggest food and nutrition supplements*, and six, *provide guidance to other healthcare providers*, appear in Clusters with higher mean scores post-exposure, indicating a higher level of agreement after the intervention. Other constructs seem to be fairly stable before and after the intervention.

Figure 6

Pre- and Post-exposure Dendrograms of Roles for Pharmacists (*n* = 4)

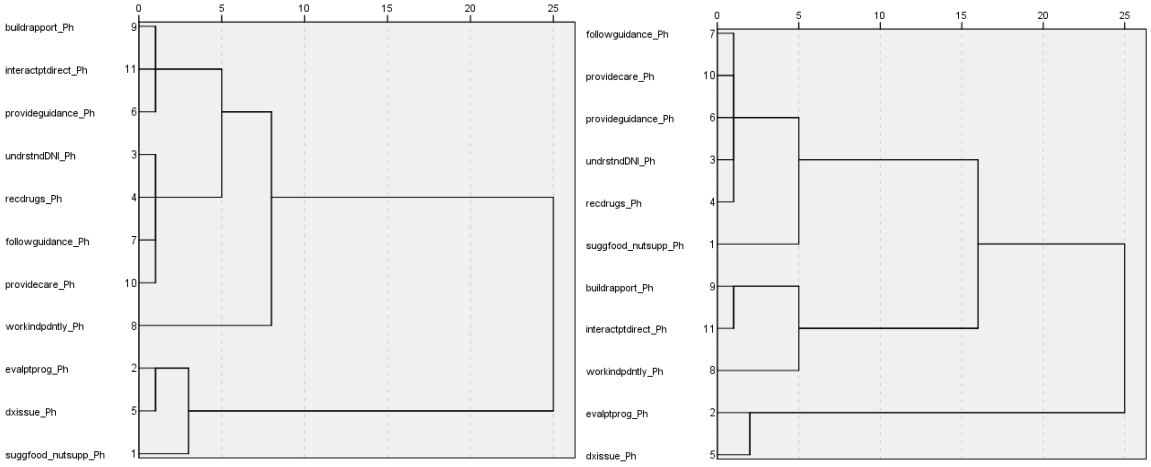


Table 27

Pre- and Post-exposure Dendrogram Cluster Analysis of Roles for Pharmacists (*n* = 4)

	Pre-exposure			Post-exposure		
	Constructs	*M*	*SD*	Constructs	*M*	*SD*
Cluster 1	3, 4, 7, 10	4.56	.427	7, 10, 6, 3, 4	4.85	.300
Cluster 2	9, 11, 6	4.00	.981	1	4.00	1.414
Cluster 3	8	3.25	1.500	9, 11	3.88	1.436
Cluster 4	1	3.25	1.500	8	3.00	1.414
Cluster 5	2, 5	2.25	1.041	2, 5	2.38	.750

In the dendrograms for medical doctors, clusters appear to be more distinct after exposure to the intervention as compared to before exposure (see Figure 7). Table 28 presents the pre- and post-exposure cluster analysis for medical doctors. Cluster 1 has stable mean scores both pre- and post-exposure, with constructs three, seven, and 11 added in post-exposure analysis. Construct one, *suggest food and nutrition supplements*, moved from Cluster 2 to Cluster 3, indicating an increased level of agreement after the intervention. Construct eight, *work independently and develop their own interventions for the patient*, was in Cluster 2 in the pre-exposure analysis and in Cluster 3 in the post-

exposure analysis, indicating a decreased level of agreement after the intervention. These changes represented participants' refinement of the roles of a medical doctor after completing the intervention.

Figure 7

Pre- and Post-exposure Dendrograms of Roles for Medical Doctors (*n* = 4)

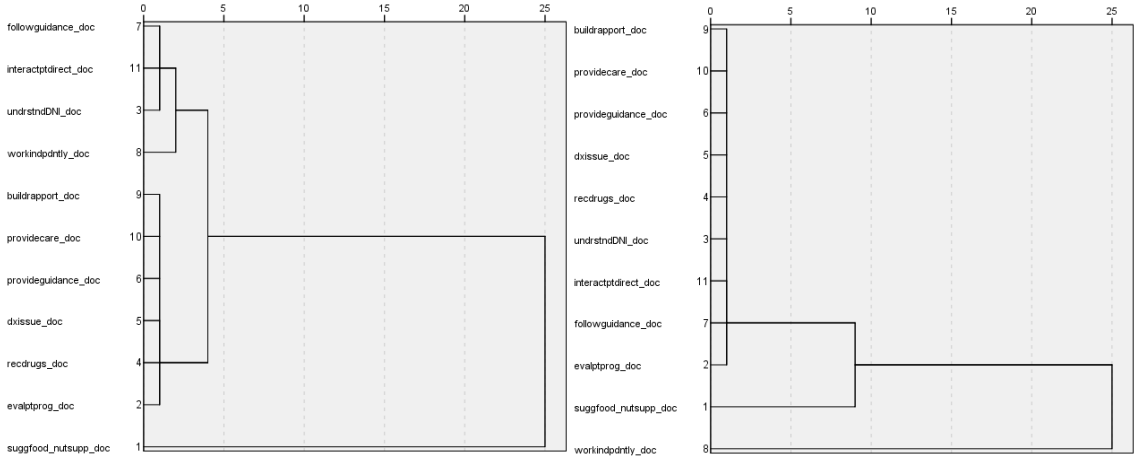


Table 28

Pre- and Post-exposure Dendrogram Cluster Analysis of Roles for Medical Doctors (*n* = 4)

	Pre-exposure			Post-exposure		
	Constructs	*M*	*SD*	Constructs	*M*	*SD*
Cluster 1	9, 10, 6, 5, 4, 2	4.75	.500	9, 10, 6, 5, 4, 3, 11, 7, 2	4.92	.056
Cluster 2	7, 11, 3, 8	4.44	.515	1	4.25	1.500
Cluster 3	1	3.00	1.414	8	2.75	1.500

Table 29 presents the pre- and post-exposure mean scores for all of the constructs by discipline. Individual mean scores were generally consistent with the dendrogram analyses. Across all disciplines Construct 9, *understand and build rapport/trust with patients*; Construct 10, *provide care that meets the needs of the patient*; and Construct 11, *interact with the patient in more of a direct way (1:1)* indicated participants' level of agreement was high both before and after the intervention. For Construct 8, *work*

independently and develop their own interventions for the patient, mean scores decreased before and after the intervention for all disciplines, except for nurses where the mean scores were the same.

Table 29

*Pre- and Post-exposure Means for All Constructs by Discipline**

Constructs	Pre-exposure		Post-exposure	
n = 4	*M*	*SD*	*M*	*SD*
1 suggfood_nutsupp_N*	1.75	.500	2.25	1.500
2 evalptprog_N	4.75	.500	4.75	.500
3 undrstndDNI_N	3.50	1.291	4.00	1.414
4 recdrugs_N	2.25	.957	2.00	1.414
5 dxissue_N	2.75	1.500	2.50	1.732
6 provideguidance_N	4.00	.816	4.50	.577
7 followguidance_N	4.50	.577	5.00	.000
8 workindpdntly_N	1.50	.577	1.50	.577
9 buildrapport_N	5.00	.000	5.00	.000
10 providecare_N	5.00	.000	5.00	.000
11 interactptdirect_N	4.75	.500	5.00	.000
1 suggfood_nutsupp_RD*	4.75	.500	5.00	.000
2 evalptprog_RD	4.75	.500	5.00	.000
3 undrstndDNI_RD	4.75	.500	4.75	.500
4 recdrugs_RD	2.00	1.414	1.50	.577
5 dxissue_RD	3.75	.500	3.25	1.500
6 provideguidance_RD	4.00	.000	4.75	.500
7 followguidance_RD	4.00	.816	4.75	.500
8 workindpdntly_RD	3.50	1.291	3.00	1.155
9 buildrapport_RD	5.00	.000	5.00	.000
10 providecare_RD	5.00	.000	5.00	.000
11 interactptdirect_RD	4.50	.577	4.75	.500
1 suggfood_nutsupp_Ph*	3.25	1.500	4.00	1.414
2 evalptprog_Ph	2.50	1.291	2.75	.957
3 undrstndDNI_Ph	4.75	.500	5.00	.000
4 recdrugs_Ph	4.75	.500	5.00	.000
5 dxissue_Ph	2.00	.816	2.00	.816
6 provideguidance_Ph	4.00	.816	4.75	.500
7 followguidance_Ph	4.25	.500	4.75	.500
8 workindpdntly_Ph	3.25	1.500	3.00	1.414
9 buildrapport_Ph	4.00	1.155	3.75	1.500
10 providecare_Ph	4.50	.577	4.75	.500
11 interactptdirect_Ph	4.00	1.155	4.00	1.414
1 suggfood_nutsupp_doc*	3.00	1.414	4.25	1.500
2 evalptprog_doc	4.75	.500	4.75	.500
3 undrstndDNI_doc	4.50	.577	5.00	.000
4 recdrugs_doc	4.75	.500	5.00	.000
5 dxissue_doc	4.75	.500	5.00	.000
6 provideguidance_doc	4.75	.500	5.00	.000
7 followguidance_doc	4.50	.577	4.75	.500
8 workindpdntly_doc	4.25	.500	2.75	1.500
9 buildrapport_doc	4.75	.500	5.00	.000
10 providecare_doc	4.75	.500	5.00	.000
11 interactptdirect_doc	4.50	.577	4.75	.500

* N = nurse, RD = registered dietitian, Ph = pharmacist, doc = medical doctor

Team discussion responses

Participants responded to discussion prompts during the module pertaining to their role on the interprofessional team and the role of the interprofessional team in addressing health issues (i.e., obesity and weight bias). Both initial posts on the D2L discussion board and responses to teammates were analyzed resulting in the identification of four major themes – *Registered Dietitian Role, Other Interprofessional Roles, Shared Goals,* and *Teamwork.* Each theme represented some aspect of change in thinking related to roles of healthcare professionals on the part of the participants. Themes and examples of corresponding open codes are listed in Table 30.

Table 30

Themes and Example Open Codes Identified from Team Discussion Responses

Theme	Example Open Codes
Registered Dietitian Role	dietitians are important professional identity RD expertise
Other Interprofessional Roles	pharmacist public health unique knowledge valuing other roles
Shared Goals	patient health shared goals stronger healthcare system trust in providers
Teamwork	communication “new insights” “pooling our skills” supportive working together

Registered Dietitian Role. Through participating in the IPE intervention, participants thinking about their own role as a dietitian evolved, becoming more solidified. When prompted to discuss the role of the dietitian, participants articulated the contributions dietitians make in caring for patients that were unique to their discipline. In this specific discussion, participants shared with teammates the expertise of a dietitian, but also conveyed a sense of professional identity and confidence related to their contributions as part of an interprofessional team through the use of the first-person perspective. One participant wrote:

> I can determine if a patient is malnourished using previous weight trends, appetite, and nutrition focused physical exam and use this information to determine proper goals to help maximize nutrition and avoid further risks. It is important to consider this as proper nutrition can help with improving overall clinical status which is important to all members of the health care team. This is slightly different from other professions as this requires decent nutritional background and well guided practice to be able to complete this type of work (Participant J, personal communication, March 10, 2021).

Some participants also delineated between the scope of practice of a dietitian, and how that scope of practice connects with their role as part of the interprofessional team. For example, one participant posted:

> As a dietitian it is also my role to try to make lifestyle changes patient focused and to make it their decision and to make them feel empowered. My role on the team is to try to make this the norm and to make sure the patient is being treated fairly and for their presenting condition (Participant C, personal communication, March 11, 2021).

This participant's discussion post was specifically in reference to weight bias in healthcare, the primary focus of the IPE intervention. The participant articulated that, after learning about weight bias, her role as a dietitian was to set an example for the team with regards to appropriate patient-centered care.

Other Interprofessional Roles. Participants articulated their shifts in thinking regarding the roles of other healthcare disciplines after reading teammates' posts describing their disciplines. One participant responded to a teammate this way:

> I know when I write my nutrition assessments I look for the patient being at increase [sic] risk of X, YZ based on their percent wait [sic] change or gain along with looking [a]t the labs too! It's so important to understand and accomplish the full picture when working with the client and it definitely sounds like you have the right skills for that too (Participant E, personal communication, March 2, 2021).

Another participant noted the unique contributions of their team member in public health which highlighted the impact of students in this discipline had on participants:

> I think you make a great addition to our team with your knowledge of public health outreach. In some cases, you may be one of the first encounters people have with members of an interprofessional health team. The public advocate gets the word out and can increase the efficiency of the entire team by boosting education (Participant G, personal communication, March 5, 2021).

This sentiment was reiterated by another participant commenting on the role of the pharmacist, "Your role is vital to the healing process! You have more knowledge of drug information than anyone on the team" (Participant G, personal communication, March 5, 2021).

Shared Goals. In some of the discussion posts, participants articulated a recognition that interprofessional team members have similar roles with regard to delivering patient-centered care, and thus share common goals. One participant posted, "My role is to educate and help people get to a place where they can autonomously and consistently develop long term healthy habits that meet their nutritional needs. As a team, our goal is the same" (Participant F, personal communication, March 9, 2021). The

concept of shared goals was particularly apparent when participants discussed patient-centered approaches when treating obesity:

> I believe my role is to make patients feel comfortable sharing their thoughts about their weight and allow them to self-motivate into change rather than forced into or through humiliation. This can also be said about any other professional roles dealing with the patient's direct care (Participant J, personal communication, March 17, 2021).

Because weight bias in healthcare was the focus of the IPE intervention, participant discussions of shared compassion and non-judgmental patient care were consistently at the forefront.

Teamwork. While participants shared insights into their role as a dietitian and the roles of the other disciplines, they also wrote about the team as a whole and the contributions of the interprofessional team. For example, one participant wrote, “Having various members from different aspects of the medical field helps cover each base and makes sure that the patient is receiving a well-rounded report that they can trust in” (Participant H, personal communication, March 3, 2021). Another participant, in response to a teammate’s post, wrote about the collective team impact on providing patient care, “I like the way you discussed the differences and similarities of pharmacists with other professionals on the team. It is about pooling our skills to offer the best medicine” (Participant G, personal communication, March 5, 2021). Sample participant quotes for each theme are provided in Table 31.

Table 31

Participant Quotes from Team Discussion Responses (*n* = 11)

Theme	Example Quotes
Registered Dietitian Role	• "I can contribute an understanding of the body in not only a medical way but in a nutritional way. This knowledge and skills differs from other professions because it allows me to bring to the team a well rounded [sic] approach towards the human body where I know a little bit about everything not only the nutrition aspect" (Participant C, personal communication, March 10, 2021). • "I can determine if a patient is malnourished using previous weight trends, appetite, and nutrition focused physical exam and use this information to determine proper goals to help maximize nutrition and avoid further risks. It is important to consider this as proper nutrition can help with improving overall clinical status which is important to all members of the health care team. This is slightly different from other professions as this requires decent nutritional background and well guided practice to be able to complete this type of work" (Participant J, personal communication, March 10, 2021). • "As a dietitian it is also my role to try to make lifestyle changes patient focused and to make it their decision and to make them feel empowered. My role on the team is to try to make this the norm and to make sure the patient is being treated fairly and for their presenting condition" (Participant C, personal communication, March 11, 2021). • "My role as a dietician [sic] in the interprofessional team is to navigate the patient's wellbeing and quality of care through nutritional interventions and counseling on diet and lifestyle" (Participant K, personal communication, March 4, 2021).
Other Interprofessional Roles	• "I like the role you have chosen as I am new to the healthcare setting and have not really thought of this particular role" (Participant D, personal communication, March 2, 2021). • "I know when I write my nutrition assessments I look for the patient being at increase [sic] risk of X, YZ [sic] based on their percent wait [sic] change or gain along with looking [a]t the labs too! It's so important to understand and accomplish the full picture when working with the client and it definitely sounds like you have the right skills for that too" (Participant E, personal communication, March 2, 2021). • "Your role is vital to the healing process! You have more knowledge of drug information than anyone on the team" (Participant G, personal communication, March 5, 2021). • "I think you make a great addition to our team with your knowledge of public health outreach. In some cases, you may be one of the first encounters people have with members of an interprofessional health team. The public advocate gets the word out and can increase the efficiency of the entire team by boosting education" (Participant G, personal communication, March 5, 2021).

Theme	Example Quotes
Shared Goals	• "My role is to educate and help people get to a place where they can autonomously and consistently develop long term healthy habits that meet their nutritional needs. As a team, our goal is the same" (Participant F, personal communication, March 9, 2021). • "As providers on the interprofessional team, it is not our job to judge or shame people for their choices, whether they contribute to the problem or not. It is to provide aide, education and encouragement to improve their health outcomes" (Participant G, personal communication, March 11, 2021). • "I believe my role is to make patients feel comfortable sharing their thoughts about their weight and allow them to self-motivate into change rather than forced into or through humiliation. This can also be said about any other professional roles dealing with the patient's direct care" (Participant J, personal communication, March 17, 2021). • "Being able to work in a team together as one, with the same vision, will be the key to forming a stronger healthcare system" (Participant B, personal communication, March 5, 2021).
Teamwork	• "I enjoy working in teams as it allows bonding and trust and new insights on each patient and different issues that may arise" (Participant C, personal communication, March 10, 2021). • "I like the way you discussed the differences and similarities of pharmacists with other professionals on the team. It is about pooling our skills to offer the best medicine" (Participant G, personal communication, March 5, 2021). • "Having various members from different aspects of the medical field helps cover each base and makes sure that the patient is receiving a well-rounded report that they can trust in" (Participant H, personal communication, March 3, 2021). • "…the RD cannot complete many tasks alone and needs several other team members to complete these goals" (Participant J, personal communication, March 10, 2021). • "As a dietitian it will be vital for me to become an expert in my field and be able to perform my duties to the best of my abilities. Throughout this process, teamwork with others in the interprofessional team will be just as important" (Participant B, personal communication, March 5, 2021).

Focus group interviews

When analyzing the focus group interview transcripts for data specifically related to participants' change in thinking regarding roles of healthcare professionals (RQ 2), two major themes were identified – *Registered Dietitian Role* and *Other Interprofessional Roles*. The two themes and example open codes associated with each are presented in Table 32.

Table 32

Themes and Example Open Codes Identified from Focus Group Interviews Related to RQ2

Theme	Example Open Codes
Registered Dietitian Role	dietitians are important misconceptions about dietetics professional identity sharing registered dietitian expertise
Other Interprofessional Roles	appreciating interprofessional roles differing perspectives "every role is important" respect understanding different roles

Registered Dietitian Role. How participants thought about their own discipline of dietetics was impacted by participating in the IPE intervention. In the interviews, participants noted that, by learning about the roles of other healthcare discipline, they gained insights into their role as a dietitian on the interprofessional team. One participant stated:

> …we had a good mix of healthcare professionals, there was like a pharmacist, public health, and I think the environmental. So with these roles in mind, they, I was able to kind of see like what they do and how they like target like they're like education, and so the roles didn't really feel abstract to me because you learn, and you read like in your textbooks and in the classes about what the other professions can do, but you don't actually work with them, but being able to work with these people allowed me to kind of see what they do and understand their perspective more. And then that helps me be able to understand what my role as a dietitian is, how do I fill in the gap of the healthcare system (Participant I, personal communication, March 30, 2021).

The team interactions were also an opportunity for participants to share their expertise and influence teammates' thinking regarding the dietetics profession. One participant noted, "I think that, from my dietetics student's perspective, it helped clear up some of

the misconceptions that other professionals had about dietetics" (Participant G, personal communication, March 31, 2021). There was also a sense of professional pride in the contributions that dietitians provide to the interprofessional team, "…it made me be able to appreciate my role as a dietitian" (Participant I, personal communication, March 31, 2021).

Other Interprofessional Roles. The IPE intervention impacted participants' thinking with regard to the roles of other healthcare professionals on the team, as one participant articulated:

> …I think it was valuable to all of us, because we're able to share our different…um…unique roles and perspectives and I think pretty much everyone in our group expressed that 'oh hey I didn't know that' when we were all getting to know each other. So it definitely increases awareness between other professionals and their roles in healthcare (Participant G, personal communication, March 31, 2021).

Also conveyed was the sentiment that each team member brought their unique skills and training, that taken as a whole, offered the best approach to patient care. The impact of public health students' participation in the IPE intervention was also reiterated by participants, such as in this comment, "I guess I didn't realize that it was a separate entity all of its own, but I've learned the value of it definitely and it's the seed. Public health from the community branch, especially…they plant the seeds" (Participant G, personal communication, March 31, 2021). Example participant quotes for each theme are listed in Table 33.

Table 33

Participant Quotes from Focus Group Interviews Related to Changes in Thinking Regarding Roles of Healthcare Professionals (*n* = 6)

Theme	Example Quotes
Registered Dietitian Role	• "…we had a good mix of healthcare professionals, there was like a pharmacist, public health, and I think the environmental. So with these roles in mind, they, I was able to kind of see like what they do and how they like target like they're like education, and so the roles didn't really feel abstract to me because you learn, and you read like in your textbooks and in the classes about what the other professions can do, but you don't actually work with them, but being able to work with these people allowed me to kind of see what they do and understand their perspective more. And then that helps me be able to understand what my role as a dietitian is, how do I fill in the gap of the healthcare system" (Participant I, personal communication, March 30, 2021). • "I think that, from my dietetics student's perspective, it helped clear up some of the misconceptions that other professionals had about dietetics" (Participant G, personal communication, March 31, 2021). • "…a lot of people didn't realize that dietitians have an active role in hospitals in the clinical sense, like they didn't know that it was dietitians who were doing things like writing tube feeding orders" (Participant G, personal communication, March 31, 2021). • "…it made me be able to appreciate my role as a dietitian" (Participant I, personal communication, March 31, 2021).
Other Interprofessional Roles	• "…I think it was valuable to all of us, because we're able to share our different, um unique roles and perspectives and I think pretty much everyone in our group expressed that 'oh hey I didn't know that' when we were all getting to know each other. So it definitely increases awareness between other professionals and their roles in healthcare" (Participant G, personal communication, March 31, 2021). • "… every role is important, because we all have our own niche and specialty and that's why we all learn our own specialties to be able to give a whole well rounded approach for patients" (Participant I, personal communication, March 30, 2021). • "…I guess I didn't realize that it was a separate entity all of its own, but I've learned the value of it definitely and it's the seed. Public health from the community branch, especially…they plant the seeds" (Participant G, personal communication, March 31, 2021).

Overall, the results indicated that the intervention had a generally positive impact on participants attitudes and thinking related to different aspects of IPE and practice. Both the quantitative and qualitative results highlighted the participants' insightful

perceptions regarding working in teams and professional collaboration. In the next chapter, there is a comprehensive analysis regarding how these results inform our knowledge about IPE delivery in the online environment.

CHAPTER 5

DISCUSSION

The original problem of practice that initiated the current research study was the lack of access online dietetics students had to formal interprofessional education (IPE) opportunities. Because IPE is a dietetics accreditation requirement (ACEND, n.d.) and includes critical knowledge for students' future practice, there was added urgency to tackling this lack of access. To address the problem of practice, an online IPE intervention was designed and developed to incorporate opportunities for students from different healthcare disciplines to virtually learn about, from, and with each other. Expected outcomes of the study included changes in participants' attitudes towards different aspects of interprofessional practice such as increased appreciation of shared learning and teamwork, and decreased levels of bias toward other healthcare disciplines. After the intervention, it was also anticipated that participants would have a deeper appreciation of the roles and contributions of each discipline on the interprofessional team.

Overall, evidence from this mixed methods study suggest that the three-week, online IPE intervention promoted meaningful changes in dietetics students' attitudes of interprofessional practice and enhanced their understanding of the roles of the different members of the interprofessional team. Participants generally had positive experiences completing the module and working in interprofessional teams. They articulated learning and growth across several relevant areas related to interprofessional practice. This was demonstrated in both the quantitative and the qualitative findings.

Discussion of Results

Results from the Interprofessional Attitudes Scale (IPAS) suggest that the intervention had a positive impact on participants' attitudes in the specific areas of teamwork and community-centeredness. After completion of the intervention, participants' increased level of agreement was statistically significant regarding the ability of shared learning to assist them in becoming a more effective team member and understanding their own limitations. These findings were reinforced by the qualitative results from the reflective journal entries and focus group interviews where participants articulated that working with their interprofessional team allowed them to see beyond the nutrition perspective. Shared learning opportunities provided throughout the intervention likely contributed to this outcome, as participants noted that knowledge gaps were exposed and they now recognized the benefits of collaboration and teamwork in providing quality patient care. Boyle et al. (2013) reported similar findings regarding the importance of shared learning in IPE to improve teamwork and communication skills.

In the reflective journal entries and focus group interviews, participants suggested essential characteristics of successful teams, including open-mindedness, respect, and trust. One participant mentioned how interprofessional care creates "a circle of trust" (Participant G, personal communication, March 5, 2021) that benefits both the interprofessional team and the patient. Singh and Matthees (2021) reported similar findings after participants completed an online IPE intervention; participants articulated the importance of IPE in developing trust and improved communication between team members. Similarly, Jones et al. (2020) found that participants who completed an online IPE intervention were more empathetic towards other healthcare disciplines. In my study,

the development of trust, respect, and empathy for other healthcare disciplines was noted by five participants after the intervention. This was an interesting finding, and perhaps directly targeting aspects such as empathy in an intervention could be an effective approach to facilitating interprofessional team building.

Several studies reported similar findings regarding health students' positive attitudes toward IPE and practice (Boyle et al., 2013; Darlow et al., 2015; Earland et al., 2011; Evans et al., 2016; Jones et al., 2020; Liller et al., 2020; McKenna et al., 2014). Interventions in these studies ranged from an online review of interprofessional readings and videos (Boyle et al., 2013) to virtual interprofessional learning through patient scenarios (Earland et al., 2011). The length of the interventions in these studies were wide-ranging, with one intervention lasting approximately six hours (Liller et al., 2021), indicating that even relatively brief exposure to IPE can be effective. In some studies, online interventions included little to no student interaction (Boyle et al., 2013; McKenna et al., 2014). While it is encouraging that a variety of IPE approaches can produce positive outcomes, to meet the spirit of the WHO's (2010) definition of IPE, students of different disciplines should engage directly with each other. As such, a strength of my study was the promotion of shared learning through online team discussions and a team project.

IPAS results related to community-centeredness were significant with regard to working on public health projects and working with non-clinicians as part of interprofessional practice. These results suggest that participants were significantly and positively influenced by interactions with their public health team members. Qualitative results were similar. For example, five participants mentioned gaining a deeper respect

for the public health discipline and discussed the important contributions these professionals made as part of the interprofessional team. These findings highlight the need for public health students to be included in IPE activities and share relevant professional perspectives in areas such as chronic disease prevention and social determinants of health. Better integration of public health students into IPE activities has been recognized as a priority for public health programs (Addy et al., 2015; Averill et al., 2020).

The impact of the intervention is less apparent, however, regarding biases toward healthcare disciplines. This differs from other studies where professional biases and stereotyping clearly decreased after IPE interventions (Ateah et al., 2011; Liaw et al., 2014; Lockeman et al., 2017). For example, Ateah et al. (2011) found that after an in-person IPE intervention, perceptions of other healthcare disciplines were more positive among participants as compared to before completing the intervention. In my study, the IPAS results indicated that participants assessed themselves as having relatively lower levels of bias toward other health professionals, both before and after the intervention. However, participants assessed other health professionals as having a moderate level of bias towards the dietetics profession before the intervention, and no significant changes were seen after the intervention. Of note, the level of agreement regarding whether professional biases negatively impact delivery of healthcare was relatively high before the intervention and increased after, although not significantly. A possible explanation is that participants recognized professional biases as an issue, but their self-assessment of their own biases was indicative of response bias where participants felt social pressure to represent themselves in a positive light (Lavrakas, 2008; van de Mortel, 2008). The

qualitative data provided additional insights, although more indirectly, suggesting that prior to the intervention, participants were less empathetic and had a more hierarchical view of the different healthcare disciplines as compared to after the intervention.

Changes in thinking regarding roles of different healthcare professionals were also impacted by the intervention as evidenced by the personal construct theory (PCT) results. Although the shifts were subtle, dendrograms showed that participants had a more defined view of the roles for nurses, dietitians, and medical doctors after the intervention. The results for pharmacists were less clear, which could be attributed to the fact that the weight bias focus of the IPE was not a topic area in which pharmacy students had as much professional expertise to contribute. There were some roles, such as building rapport with the patient and providing care that meets the patient's needs, which participants indicated were shared across disciplines, and were consistent both before and after completing the intervention. This suggests that participants were already attuned to patient-centered approaches before the intervention and believed these applied to all healthcare disciplines.

One of the constructs which participants were asked to evaluate on the repertory grid read: "The role of a (nurse, dietitian, pharmacist, medical doctor) is to work independently and develop their own interventions for the patient." Interestingly, participants' level of agreement regarding this as a role for dietitians, pharmacists, and medical doctors decreased after completing the intervention. This suggests that participants learned through the intervention that an independent approach to patient care is not ideal and that the roles of each interprofessional team member are complementary to each other. This was echoed by the qualitative results where participants articulated the

synergistic nature of the interprofessional team. The level of agreement for nurses, however, did not change after the intervention. This could indicate that participants' stereotypical view of nurses as having less agency to make professional decisions (Hoeve et al., 2013) was too ingrained to be impacted by the intervention or there was inadequate exposure in the intervention to the nursing discipline. One previously published study found similar results where an IPE intervention did not significantly impact medical students' view of nurses (Lockeman et al., 2017).

Based on results of the qualitative data, the intervention helped participants appreciate the roles of the other healthcare disciplines and how those roles are complementary in providing quality patient care. Participants were able to articulate shared goals that exist between interprofessional team members that could enhance healthcare delivery. The intervention also provided an opportunity for participants to gain a better view of their own role as a dietitian and demonstrate the unique contributions of the dietitian to the interprofessional team. This is in line with other studies, where online IPE interventions enhanced dietetics students' understanding of their role and the role of other healthcare disciplines (Evans et al., 2016; Earland et al., 2011). For example, Earland et al. (2011) created virtual IPE modules that included patient scenarios to facilitate interprofessional collaboration. The scenarios were effective in increasing participants' awareness of different interprofessional roles. Although the authors indicated that the intervention had an overall positive impact, they noted that some dietetics participants felt as though the scenarios did not include significant nutrition-related issues to showcase the dietitian's role. In contrast, the current study included a team project which allowed each team member to share discipline-specific knowledge

and expertise in a non-prescriptive and creative way. This autonomy in producing the final deliverable likely contributed to an increased diversity of ideas and expertise shared among interprofessional team members.

There are several other possible explanations for why the intervention had a generally positive impact on participants with respect to interprofessional roles and practice. Experiential Learning Theory (ELT) and Transformational Learning (TL) were used as theoretical frameworks for the design of the intervention. Both ELT and TL emphasize the importance of reflection in growth and learning (Kolb, 1984; Taylor, 2007). The use of reflective journaling throughout the intervention likely assisted in participants gaining deeper insights into themselves and teammates. Similarly, threaded online discussions allowed for critical discourse, a core concept of TL where learners engage with each other to form new frames of reference (Snyder, 2008). Although the use of TL as a theoretical framework for IPE interventions is limited, results of this study suggest that incorporating TL concepts can facilitate interprofessional learning in a meaningful way.

The focus on "real world" experiences, a tenet of ELT (Kolb, 1984), is a possible contributing factor to the overall impact of the intervention. Participants were able to interact with and contribute to an interprofessional team similar to what they might encounter in a healthcare or public health setting. This provided the *concrete experience* described by Kolb (1984) that is the basis for the reflection process in the ELT model. The intervention design, which included the requirement that teams work together to reach a common goal, facilitates participants' appreciation of the unique contributions a dietitian makes to the interprofessional team, as well as their limitations, and the ways in

which other team members complemented and enhanced the interprofessional team dynamic.

One final aspect of the study worth discussing is the online mode of delivery as a promoter or distracter of learning. Challenges of online delivery of IPE have been reported in the literature (Evan et al., 2016; Jones et al., 2020, King et al., 2010; Miers et al., 2007). Most of these were not found in the current study, such as technology issues. Participants and other students completing the intervention were all upper level UA students who were familiar with the D2L platform, as it is used in most courses across the UA campus. The D2L site design was relatively basic and included easy to access information such as direct links to videos and reading materials. No additional software or technology was needed to complete the module and synchronous communication among teams was optional, although encouraged. During the intervention, participants did not report any technological challenges or other difficulties in completing the module. In this way, the online delivery of IPE was not found to be a barrier to student learning.

Study Limitations

There were several limitations of the study that may influence the impact of the intervention and overall results. The first limitation is the disproportionate number of certain non-dietetics disciplines who completed the module, which impacted the creation of diverse interprofessional teams. There was an unexpected over enrollment of public health students and an under enrollment of medicine, nursing, and pharmacy students. This meant that fewer diverse teams were created, limiting the total number of dietetics participants whose data were used in the final analysis. In addition, only data from

dietetics students were analyzed, so it is not known if students from other healthcare disciplines who volunteered to complete the module had similar experiences.

Second, some of the interprofessional team interactions were more successful than others. The intervention was somewhat self-paced and the module assignment deadlines could only be recommended since there was no way to hold students accountable for late submissions. This led to somewhat disjointed team work, as members submitted discussion posts and other deliverables at different intervals. Having the module embedded into a shared course with points or incentives associated for timely submissions may minimize the issues.

A third limitation is the short duration of the intervention. The Health Professions Accreditors Collaborative (HPAC) recommends that IPE curriculum be delivered throughout students' several years of training (HPAC, 2019), which was not feasible due to the structure of the intervention. However, there is evidence that shorter IPE interventions of two weeks or less can still produce positive outcomes (Boyle et al., 2013; Darlow et al., 2015, Liller et al., 2020). The current study's three-week intervention was designed to maximize participation of students from different healthcare disciplines who had program-specific demands and scheduling challenges. Even so, the implication of a shorter intervention is that it is more difficult to see significant changes within the given timeframe. While results indicated that the intervention had a generally positive impact, a longer intervention may provide more nuanced insights regarding participants' awareness of interprofessional teams and discipline-specific roles.

A final limitation is the possibility that the PCT process contributed to participant fatigue, resulting in lower response rates on the pre- and post-repertory grids. For

example, data from two participants had to be eliminated from the final analysis because responses were identical for some or all items on the repertory grids, indicating that participants likely did not take the time to read each statement and thoughtfully answer. Other participants simply did not complete the process. The small number of participants is far from ideal. Overall, the multi-step pre- and post-PCT process is likely too cumbersome for a three-week intervention.

Implications for Practice

The results of this study suggest that IPE can be successfully delivered through an online environment. Students were able to learn from, with, and about each other through various activities that incorporated social learning with direct experiences working in interprofessional teams. In my local context, this is encouraging given the expansion of online offerings and degree programs which necessitate availability of online options, especially considering dietetics accreditation requirements around IPE. Based on the positive outcomes of the study, the plan is to continue to offer the online IPE module as part of the suite of IPE options offered through the UA Center for Transformative Interprofessional Healthcare (CTIPH).

The implications of the results also have the potential to extend beyond my local context to other online dietetics and healthcare training programs or settings in which there is a need for flexible, virtual delivery of IPE to address logistical challenges. Online IPE has been shown to help alleviate some of the challenges faced through in-person delivery of IPE, while still demonstrating positive outcomes (Brooks et al., 2019; Evans et al., 2016; Jones et al., 2020; King et al., 2010; Miers et al., 2007). It is important at this stage in the research process to share results with colleagues in my dietetics program to

inform possible changes to the dietetics curriculum, as well as disseminate findings to other practitioners for whom the research is transferrable.

Based on the findings of this study, dietetics and other healthcare training programs might consider incorporating opportunities to engage in IPE throughout students' training, as suggested by HPAC (2019). Several participants noted that they had no previous exposure to other healthcare disciplines, and one stated they had not heard of the concept of interprofessional teams prior to participating in the study. All participants were senior dietetics students in their last year of didactic training, which suggests that this was likely the only exposure to interprofessional practice they received in the program. Relying on a single, three-week IPE experience is likely inadequate preparation for students who will need critical interprofessional skills to navigate a complex and ever evolving healthcare system (HPAC, 2019; IOM, 2013; WHO, 2010). Furthermore, introducing IPE earlier might enhance students' interprofessional growth and development. Early shared learning opportunities with students of different healthcare programs have the potential to increase collaboration skills (Ruebling et al., 2014) and decrease biases towards other healthcare disciplines (Anderson & Thorpe, 2008; Oandasan & Reeves, 2005).

In addition to offering IPE throughout the dietetics curriculum, programs should investigate the feasibility of increasing interactions between dietetics and public health students. Because of the large number of public health students who volunteered to complete the IPE intervention, interprofessional teams typically included two public health students. This provided participants significant exposure to the field. Most participants acknowledged little understanding of the public health discipline prior to the

study, but after working together, they found their public health team members to have specific knowledge and skills that were indispensable to the team. Participants articulated the need for dietitians and public health professionals to work together in order to provide optimal patient care.

Another important consideration, specifically when designing IPE curricula, is that the topic framing IPE should be engaging and applicable to all disciplines. For example, some UA IPE offerings focus on pandemic responses or emergency room coordination. While the concepts of teamwork and collaboration can be practiced, professional expertise is limited for some disciplines, such as dietetics. In the current study, it was helpful that the weight bias topic of the IPE intervention was a popular area of discussion in healthcare and society in general. The different participating disciplines had at least some professional touchpoint to the topic. However, pharmacy students may not have had the opportunity to share as much expertise since there are limited pharmacological interventions for weight loss (Khera et al., 2016) and promoting weight loss was not necessarily the goal for interprofessional teams. Incorporating multiple and diverse IPE offerings, and requiring students to participate in several of them, would maximize the sharing of unique perspectives and insights as students grapple with different healthcare issues and dilemmas. Working as part of interprofessional teams to address healthcare issues has been found to promote a collaborative mindset (Eccott et al., 2012; Eliot et al., 2018; Evans et al., 2016; Ruebling et al., 2014), which students can carry with them into their professional practice.

Finally, my intervention was designed by a dietitian with dietetics students in mind. While various stakeholders were involved in developing the IPE module, the

curriculum undoubtedly had a dietetics slant. In addition, I was the sole facilitator of the intervention which further amplified the dietetics perspective, even though my interaction with participants and students of other disciplines was limited to answering technical questions regarding the IPE module. A more coordinated interprofessional approach to development and delivery of IPE has the potential to further enrich the student experience. To make such an approach sustainable, funding from program administrators and training for facilitators should be a priority (Lawlis et al., 2014).

Implications for Research

There are several potential areas of interest that could expand on the current study. As mentioned previously, there are limited published reports of IPE delivered in the online environment, especially studies that include dietetics students (Eliot & Kolasa, 2015). This research will add to the small, but important work in this area. A key factor in delivery of online IPE is utilizing the most effective approaches to meaningfully connect students across the digital divide. Different approaches should be investigated to ensure that meaningful shared learning opportunities are available.

My study incorporated relatively low-tech methods to engage students in the online environment, primarily through online discussion boards provided in D2L. Other types of engagement activities could be investigated to determine which produce the highest level of team interactions and shared learning. These could include other low-tech options such as synchronous team Zoom meetings, Wikis, Google docs, and instant messaging through apps such as GroupMe. As online learning becomes more sophisticated, so has the rise of more high-tech tools that could be utilized in online IPE such as medical simulations and virtual reality programs (McCutcheon et al., 2017).

Experimenting with these different modes of engagement might be conducted using a participatory action research model, where students are directly involved in the research process (Jordan, 2012). This would allow for real-time feedback with regard to the efficacy of and preference for each mode of engagement.

Another potential area of inquiry would be whether the changes in interprofessional attitudes and thinking are maintained over time and have an impact on participants' future practice. The current study measured changes immediately after the intervention and while participants were still completing their undergraduate didactic training and education. Although results indicated positive impacts of the intervention, it is unknown whether this will translate to increased interprofessional practice when participants graduate and begin their work in the healthcare setting. A potential research area of inquiry investigating how participation in an online IPE module impacts dietetics students interprofessional practice once they enter the workforce. Employing a longitudinal study design would be appropriate to answer this research question. There are few published reports of longitudinal studies of IPE (Ateah et al., 2011; Darlow et al., 2018; Pollard & Miers, 2008), perhaps because of the logistical challenges involved with tracking students over long periods of time and controlling for different worksite-related factors. However, future research should emphasize a longitudinal study design to see how IPE directly impacts patients.

Previous cycles of research also pointed to other potential areas of inquiry but were out of the scope of the current study. First, there was dichotomous support for either including IPE throughout dietetics training or providing IPE only to dietetics students who are advanced in their training, the former is broadly supported and encouraged

(HPAC, 2019). A graduated structure for IPE delivery across dietetics curriculum could be investigated, where IPE topics become more complex over time to correspond with the knowledge and skills students develop as they progress in their training. Second, the idea that any IPE endeavor must an interprofessional effort was emphasized, although it was acknowledged that recruiting faculty to serve as developers and facilitators of IPE could be challenging. This has been cited as particularly relevant when recruiting facilitators for online IPE (Evans et al., 2020). An IPE study that focuses on faculty experiences could help address some of the barriers faced in online IPE development and facilitation.

Strengths of the current research include the mixed methods design and theoretical frameworks that underpinned the intervention. Both are relatively rare in research related to IPE, especially the use of the relevant theories that inform how and why the intervention was delivered (Hean et al., 2012; Lackie et al., 2020). Intervention activities were intentionally designed to incorporate aspects of ELT and TL, the theoretical frameworks guiding the current research. In addition, in creating the intervention, a backward design approach (Wiggins & McTighe, 1998) was utilized to ensure that the IPEC (2016) competencies identified for the intervention aligned with the activities that the participants were asked to complete (see IPE module outline in Appendix D). The backward design approach has been suggested as a measure to ensure high quality IPE (Spaulding et al., 2021).

Related to research design, it is common for researchers to utilize primarily quantitative approaches such as IPE-specific surveys to assess intervention impacts (Ateah et al., 2011; Boyle et al., 2013; Evans et al., 2016; Darlow et al., 2015; Liller et al., 2020; Ruebling et al., 2014). In some cases, a mixed methods design incorporating

quantitative surveys and one qualitative data source has been used (Earland et al., 2011; Jones et al., 2020; Singh & Matthees, 2021). In the current study, multiple data sources were used, such as the IPAS survey, reflective journal entries, and threaded online discussions, to elicit diverse and rich data. Having several different quantitative and qualitative data points allow for the impact of the intervention to be evaluated from several diverse perspectives, thus facilitating convergence of the evidence (Ivankova, 2015).

Conclusion

Online learning has become more prevalent, especially in 2020 due to the COVID-19 pandemic forcing most educational efforts to move into the online space out of necessity (Jones et al., 2020; Khalili, 2020; Lackie et al., 2020). The current study confirms findings from other studies that suggest in-person interactions are not a necessary requirement to facilitate quality interprofessional learning (Eccott et al., 2012; Evans et al., 2016; McKenna, 2014). In fact, online IPE can promote more time for student reflection (McKenna et al., 2014) and provides flexibility for students of different healthcare training programs to participate (Evans et al., 2016; King et al., 2010; Miers et al., 2007, Singh & Matthees, 2021). While the online learning environment has traditionally been viewed as a way to address logistical challenges of connecting students across time and space, it can perhaps now be viewed as having some distinct pedagogical advantages compared to in-person delivery.

In an effort to further this line of inquiry, there is a plan to continue the cycles of action research to improve my practice and add to the limited literature around online IPE and dietetics. The goal of future cycles are to refine the intervention and investigate

different online engagement activities and approaches. Finding additional IPE champions across the UA campus and beyond will help to support a sustained effort in the online IPE arena. Through collaborations with other practitioners, new online IPE experiences can be created with diverse foci that can provide students with a variety of lenses to view complex health issues. Ultimately, I hope this work leads to more confident and collaborative healthcare providers who deliver the highest quality patient care with the best outcomes.

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APPENDIX A

CYCLE 0 INTERVIEW QUESTIONS

Interview Questions for Dietetics Faculty:

1. How important is interprofessional education for students in the online dietetics program?
2. How do you see interprofessional education fitting into the current dietetics curriculum?
3. What are the needs of online dietetics students regarding interprofessional education?
4. What are important components of interprofessional education?
5. How might interprofessional education be delivered online?
6. What considerations are required when delivering interprofessional education in the online environment?
7. How might competence in interprofessional practice be measured among online students?
8. What other comments do you have?

APPENDIX B

READINESS FOR INTERPROFESSIONAL LEARNING SCALE (RIPLS)

Adapted from McFadyen et al., 2005

Thank you for time and participation in this study. The benefit to participation is the opportunity to contribute your reflections and ideas regarding delivery of IPE to students in the online dietetics program as well as across the University. Data collected as part of this study will also inform future iterations of the study and development of dietetics-specific IPE curriculum. Thus, there is potential to enhance the experiences of online students as well as faculty.

Question 1

What is your current major or intended major if you are "no major selected"?

- Nutritional Sciences, Dietetics option
- Nutritional Sciences, Nutrition option
- Other
- Not pursuing a major

Question 2

Please indicate your intended career path (i.e registered dietitian nutritionist, pharmacist, physician's assistant)

Question 3

Please indicate your age.

Question 4

Please indicate your gender.

- Female
- Male
- Other

Question 5

Have you completed the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire before?

- Yes
- No
- Unsure

Question 6

If you answered yes to the previous question please indicate how long ago you last completed the questionnaire.

- 0-3 months ago
- 4-6 months ago
- 7-12 months ago
- 1-2 years ago
- 3+ years ago

Question 7

Have you had previous experience with interprofessional education (IPE)?

- Yes
- No
- Unsure

Question 8

If you answered yes to the previous question please give a very brief statement of what this IPE teaching was and any impact it may have had.

Question 9

Please complete the following.

	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A	Learning with other students/professionals will make me a more effective member of a health and social care team	○	○	○	○	○
B	Patients would ultimately benefit if health and social care students/ professionals worked together	○	○	○	○	○
C	Shared learning with other health and social care students students/professionals will increase my ability to understand clinical problems	○	○	○	○	○
D	Communications skills should be learned with other health and social care students students/ professionals	○	○	○	○	○
E	Team-working skills are vital for all health and social care students students/professionals to learn	○	○	○	○	○
F	Shared learning will help me to understand my own professional limitations	○	○	○	○	○
G	Shared learning will help me think positively about other health and social care professionals	○	○	○	○	○
G	For small-group learning to work, students/professionals need to respect and trust each other	○	○	○	○	○
H	I don't want to waste time learning with other health and social care students/professionals	○	○	○	○	○
I	It is not necessary for undergraduate/postgraduate health and social care students/ professionals to learn together	○	○	○	○	○
J	Clinical problem solving can only be learned effectively with students/professionals from my own discipline	○	○	○	○	○

K	Shared learning with other health and social care professionals will help me to communicate better with patients and other professionals					
L	I would welcome the opportunity to work on small group projects with other health and social care students/professionals					
M	I would welcome the opportunity to attend lectures, tutorials or workshops with other health and social care students/ professionals					
N	Shared learning and practice will help me clarify the nature of patients' or clients' problems					
O	Shared learning before and after registration (i.e. becoming an RDN) will help me become a better team player					
P	I am not sure what my professional role will be/is					

Question 10

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

APPENDIX C

INSTITUTIONAL REVIEW BOARD DOCUMENTATION

ASU Knowledge Enterprise Development

APPROVAL: EXPEDITED REVIEW

Terri Kurz
Division of Teacher Preparation - Polytechnic Campus
-
Terri.Kurz@asu.edu

Dear Terri Kurz:

On 12/3/2020 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Delivering Interprofessional Education (IPE) in the Online Environment
Investigator:	Terri Kurz
IRB ID:	STUDY00012962
Category of review:	
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• IRB Online IPE 11-30-20, Category: IRB Protocol; • Recruitment/Consent Methods, Category: Consent Form; • Supporting Documents, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB approved the protocol from 12/3/2020 to 12/2/2021 inclusive. Three weeks before 12/2/2021 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 12/2/2021 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Kelly Jackson
Kelly Jackson

THE UNIVERSITY OF ARIZONA
Research, Discovery & Innovation

Human Subjects Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://rgw.arizona.edu/compliance/home

Date:	December 22, 2020
Principal Investigator:	Kelly A Jackson
Protocol Number:	2012308209
Protocol Title:	Delivering Interprofessional Education (IPE) in the Online Environment
Level of Review:	Administrative Review
Determination:	Approved
IRB of Record:	Arizona State University
Investigator at Site:	Terri Kurz
IRB of Record Protocol Number:	STUDY00012962

Documents Reviewed Concurrently:

HSPP Forms/Correspondence: *UA Application for Human Research_2.pdf*
Informed Consent/PHI Forms: *recruitment_consent_methods_qualtrics_11-30-20.docx*
Other Approvals and Authorizations: *COI Certification Complete for 2012308209.msg*
Regulatory Documentation: *IRB letter_ASU 12-4-20.pdf*

Regulatory Determinations/Comments:

- ASU Designated IRB of Record: When an institution is designated IRB of record, the UA IRB will not review the project. The University of Arizona agrees that it will rely on the review, approval, and continuing oversight of the institution's IRB pursuant to the terms of the Institutional Review Board Authorization Agreement.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All documents referenced in this submission have been reviewed and are filed with the HSPP. The Principal Investigator should notify the IRB immediately of any proposed changes that affect the LOCAL protocol and report any LOCAL unanticipated problems involving risks to participants or others. Please refer to Guidance's *Investigators Responsibility after IRB Approval* and *Reporting Local Information*.
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB of record.

APPENDIX D

ONLINE INTERPROFESSIONAL EDUCATION MODULE OUTLINE

IPE Module Purpose: To bring together students virtually across the University of Arizona health professions community of programs to (1) explore concepts related to the public health issue of obesity in the context of a weight-inclusive model, and (2) participate in shared learning regarding the value of collaborative, interprofessional practice.

Table D1

IPE Module Student Learning Outcomes

By the end of the online IPE module students will be able to…		
	IPEC Core Competencies	IPEC Sub-Competencies
1. Describe the healthcare experience from the perspective of an individual who is overweight or obese.	Values/Ethics	VE2, VE3, VE4
2. Articulate the ways in which an interprofessional teams can promote a patient-centered, weight-inclusive model in practice.	Values/Ethics Roles/Responsibilities Interprofessional Communication	VE2, VE3 RR3 RR9 CC6, CC8
3. Reflect on the value of interprofessional teamwork as a means to address public health issues such as obesity.	Roles/Responsibilities	RR4
4. Collaborate as part of an interprofessional team to develop a resource material that addresses weight management using a weight-inclusive model.	Roles/Responsibilities Interprofessional Communication Teams and Teamwork	RR9, RR10 CC2, CC4 TT4, TT5, TT8

Table D2

IPE Module Learning Activities and Deliverables

Activity or Deliverable	Description
Team discussions	Students participated in two online written team discussions focused on interprofessional (IP) teams and weight bias in healthcare. Discussions were posted to discussion forums in D2L, allowing for student teams to engage on their own time.
Reflective journal entries	Three individual journal entries allowed students to reflect in a safe space regarding their experiences in the online IPE module and working with their interdisciplinary team.
Digital resource for interprofessional providers	The final deliverable for the online IPE module was a digital resource for IP providers treating patients with overweight and obesity. The resource reflected an interprofessional team effort and incorporated expertise specific to the different healthcare disciplines represented on the IP team. A template was provided in D2L for teams to use as a guide.

Table D3

Student Learning Outcome Mapping

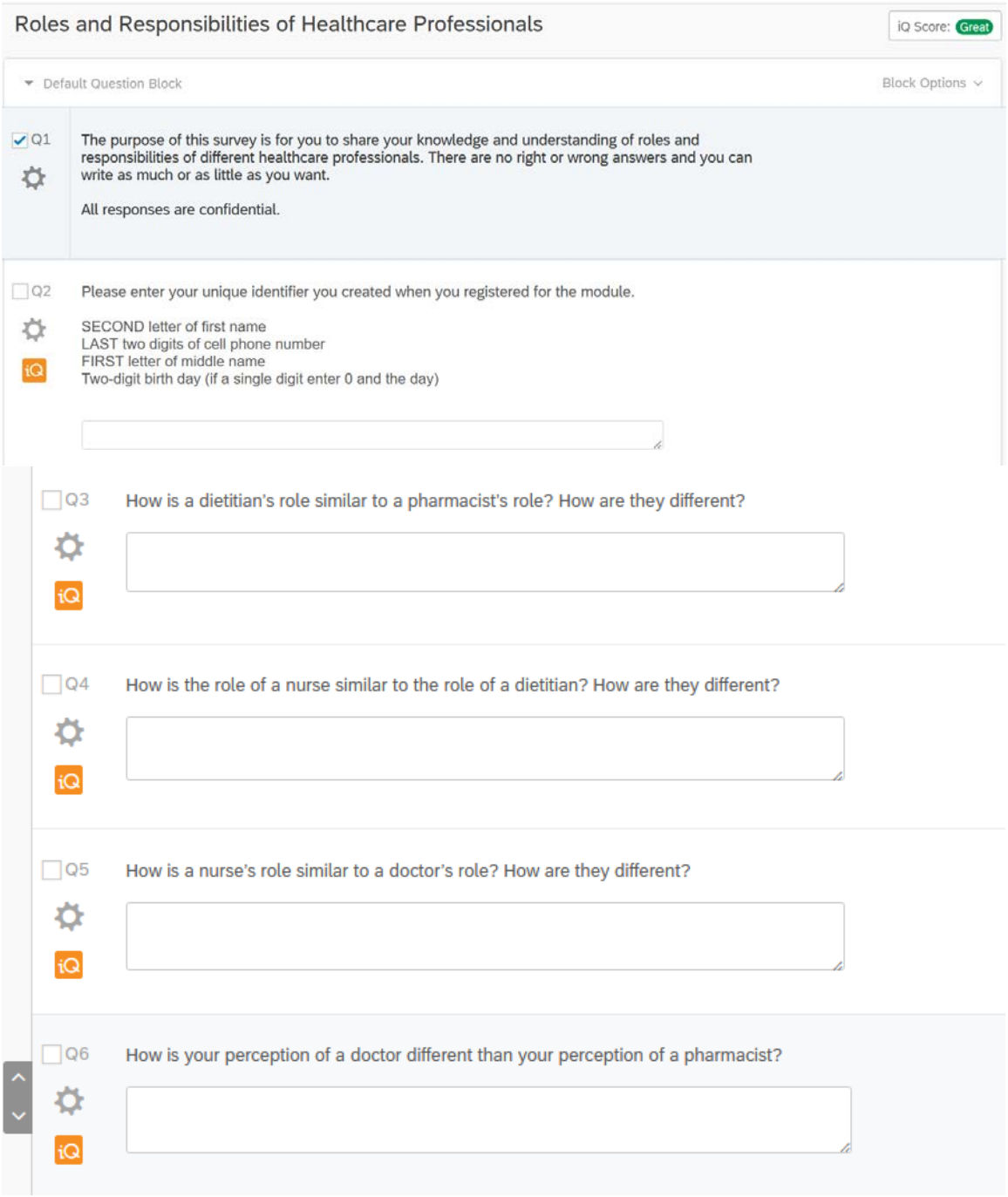
Student learning outcome…	Exposure through…	Assessed using…
1. Describe the healthcare experience from the perspective of an individual who is overweight or obese.	Videos Readings Digital resource development	Team discussion #2
2. Reflect on the value of interprofessional teamwork as a means to address public health issues such as obesity.	Readings Digital resource development	Team discussion #1 Reflective journal entry #2
3. Articulate the ways in which an interprofessional teams can promote a patient-centered, weight-inclusive model in practice.	Videos Readings Digital resource development	Team discussion #2 Reflective journal entry #3
4. Collaborate as part of an interprofessional team to develop a resource material that addresses weight management using a weight-inclusive model.	Synchronous or asynchronous team interactions Digital resource development	Digital resource (final deliverable)

Note. Reflective journal entries helped answer research study questions and did not necessarily map onto IPE module student learning outcomes in all aspects.

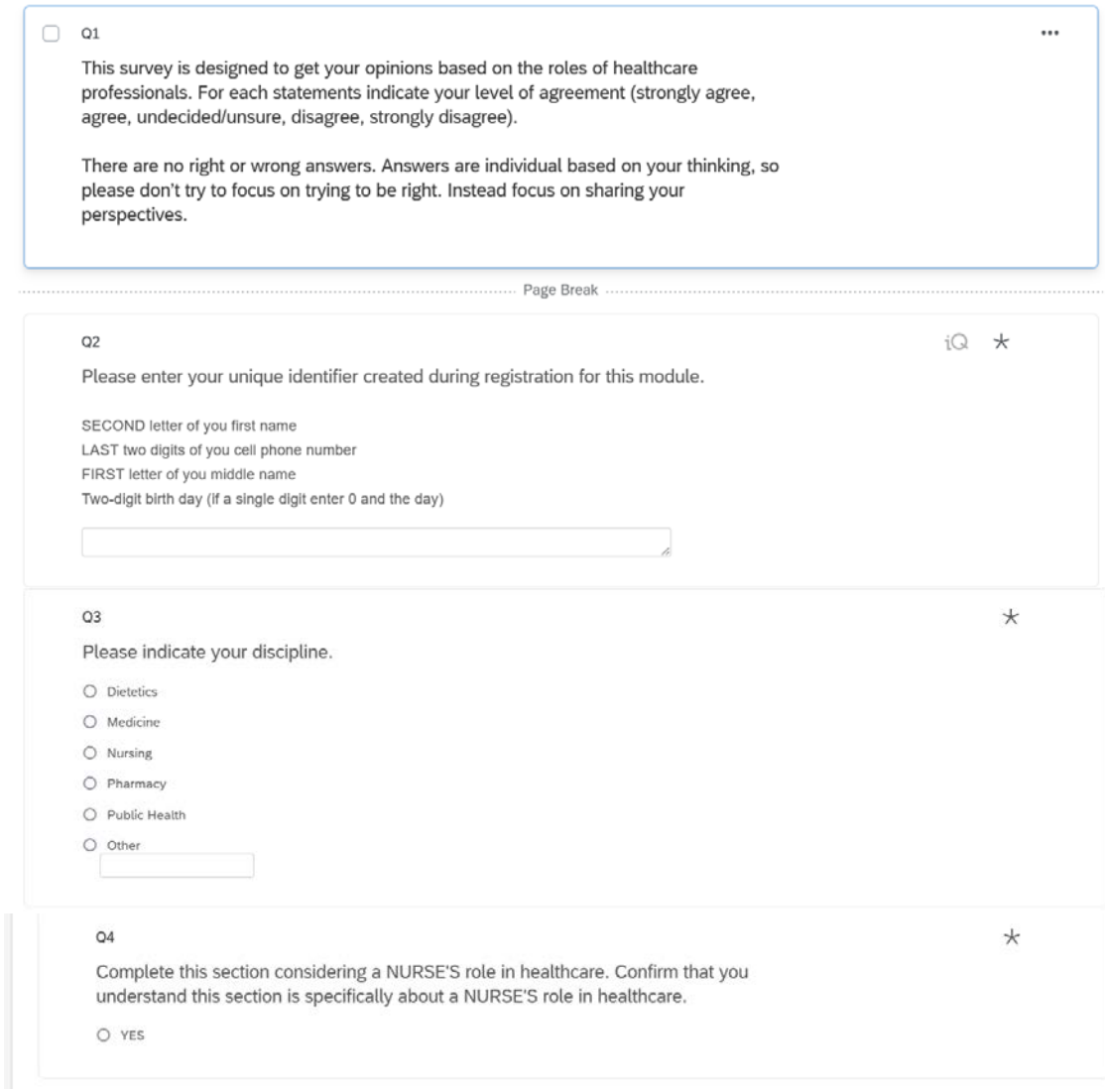
APPENDIX E

PERSONAL CONSTRUCT THEORY

Construct Elicitation Questions with Pairwise Comparisons (pre- & post-exposure)



Repertory Grid (pre- & post-exposure)



Q5

Complete this section considering a NURSE'S role in healthcare.

The role of a NURSE is to...

	Strongly agree	Agree	Undecided/Unsure	Disagree	Strongly disagree
suggest food and nutrition supplements.	○	○	○	○	○
evaluate patients' progress.	○	○	○	○	○
understand drug-nutrient interactions.	○	○	○	○	○
recommend drugs to help the patient.	○	○	○	○	○
determine underlying issues (diagnosing the issue).	○	○	○	○	○
provide guidance to other healthcare providers.	○	○	○	○	○
follow guidance from other healthcare providers.	○	○	○	○	○
work independently and develop their own interventions for the patient.	○	○	○	○	○
understand and build rapport/trust with patients.	○	○	○	○	○
provide care that meets the needs of the patient.	○	○	○	○	○
interact with the patient in more of a direct way (1:1).	○	○	○	○	○

Q6

Complete this section considering a DIETITIAN'S role in healthcare. Confirm that you understand this section is specifically about a DIETITIAN'S role in healthcare.

○ YES

Q7

Complete this section considering a DIETITIAN'S role in healthcare.

The role of a DIETITIAN is to...

	Strongly agree	Agree	Undecided/Unsure	Disagree	Strongly disagree
suggest food and nutrition supplements.	○	○	○	○	○
evaluate patients' progress.	○	○	○	○	○
understand drug-nutrient interactions.	○	○	○	○	○
recommend drugs to help the patient.	○	○	○	○	○
determine underlying issues (diagnosing the issue).	○	○	○	○	○
provide guidance to other healthcare providers.	○	○	○	○	○
follow guidance from other healthcare providers.	○	○	○	○	○
work independently and develop their own interventions for the patient.	○	○	○	○	○
understand and build rapport/trust with patients.	○	○	○	○	○
provide care that meets the needs of the patient.	○	○	○	○	○
interact with the patient in more of a direct way (1:1).	○	○	○	○	○

Block 3

Q8

Complete this section considering a PHARMACIST'S role in healthcare. Confirm that you understand this section is specifically about a PHARMACIST'S role in healthcare.

○ YES

The role of a PHARMACIST is to...

	Strongly agree	Agree	Undecided/Unsure	Disagree	Strongly disagree
suggest food and nutrition supplements.	○	○	○	○	○
evaluate patients' progress.	○	○	○	○	○
understand drug-nutrient interactions.	○	○	○	○	○
recommend drugs to help the patient.	○	○	○	○	○
determine underlying issues (diagnosing the issue).	○	○	○	○	○
provide guidance to other healthcare providers.	○	○	○	○	○
follow guidance from other healthcare providers.	○	○	○	○	○
work independently and develop their own interventions for the patient.	○	○	○	○	○
understand and build rapport/trust with patients.	○	○	○	○	○
provide care that meets the needs of the patient.	○	○	○	○	○
interact with the patient in more of a direct way (1:1).	○	○	○	○	○

Q10

Complete this section considering a DOCTOR'S role in healthcare. Confirm that you understand this section is specifically about a DOCTOR'S role in healthcare.

○ YES

APPENDIX F

INTERPROFESSIONAL ATTITUDES SCALE

Introduction

Q0.1

Online IPE Module: Addressing Obesity Using a Weight-Inclusive Model

We appreciate your feedback on this IPE module.

Q49

Please enter your unique identifier created when you registered for the IPE module...

SECOND letter of first name
LAST two digits of cell phone number
FIRST letter of middle name
Two-digit birth day (if a single digit enter 0 and the day)

We appreciate your honest answers, which are made anonymous.

INSTRUCTIONS: For each item in this section, please indicate what you thought BEFORE you participated in the online IPE module and what you think now, AFTER completing the module.

Q4.1

Learning with other health care trainees will help me become a more effective member of a health care team.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.2

Patients ultimately benefit if health care professionals worked together to solve patient problems.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.3

Shared learning experiences with other health care trainees will increase my ability to understand clinical problems.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.6

Shared learning experiences with other health care trainees will help me think positively about other health care professionals.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.9

Shared learning experiences will help me understand my own limitations.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	○	○	○	○	○
AFTER the module	○	○	○	○	○

Q4.11

It is not necessary for health care trainees to learn together.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	○	○	○	○	○
AFTER the module	○	○	○	○	○

Q4.13

Shared learning experiences with other health care trainees will help me communicate better with patients and other professionals.

	Strongly disagree	Disagree	Neutral	Agree	Strongly
BEFORE the module	○	○	○	○	○
AFTER the module	○	○	○	○	○

Q4.14

I welcome the opportunity to work on small-group projects with other health care professions.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	○	○	○	○	○
AFTER the module	○	○	○	○	○

Q4.16

Shared learning before graduation will help me become a better team player.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	○	○	○	○	○
AFTER the module	○	○	○	○	○

Q4.22

It is important for me to understand the patient's side of the problem.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.23

Establishing trust with my patients is important to me.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.24

It is important for me to communicate compassion to my patients.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.25

Thinking about the patient as a person is important in getting treatment right.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q4.26

In my profession one needs skills in interacting and co-operating with patients.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q5.1

Health professionals/students from other disciplines have prejudices or make assumptions about me because of the discipline I am studying.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q5.2

I have prejudices or make assumptions about health professionals/students from other disciplines.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q5.3

Prejudices and assumptions about health professionals from other disciplines get in the way of delivery of health care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q6.1

It is important for health professionals to respect the dignity and privacy of patients while maintaining confidentiality in the delivery of team-based care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module>	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q6.2

It is important for health professionals to provide excellent treatment to patients regardless of their background, e.g., race, ethnicity, gender, sexual orientation, religion, class, national origin, immigration status, or ability.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q6.3

It is important for health professionals to respect the unique cultures, values, roles/responsibilities, and expertise of other health professions.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q6.4

It is important for health professionals to understand what it takes to effectively communicate across cultures.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.1

It is important for health professionals to work with public health administrators and policy makers to improve delivery of health care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.2

It is important for health professionals to work with non-clinicians to deliver more effective health care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.3

It is important for health professionals to work on projects to promote community and public health.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.4

It is important for health professionals to be advocates for the health of patients and communities.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.5

It is important for health professionals to work with legislators to develop laws, regulations, and policies that improve health care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module>	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

Q7.6

It is important for health professionals to focus on populations and communities, in addition to individual patients, to deliver effective health care.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
BEFORE the module	◯	◯	◯	◯	◯
AFTER the module	◯	◯	◯	◯	◯

APPENDIX G

REFLECTIVE JOURNAL ENTRY PROMPTS

1. Based on your knowledge thus far, what is the purpose of interprofessional education? Share your thoughts on the importance of professionals in your discipline participating as part of interprofessional teams. What do you hope to learn from your interprofessional team members? Your entry should be approximately 200-300 words.
2. Reflect on the work your interprofessional team is doing to collaborate during this IPE experience. Describe the ways in which your team has been successful in collaborating as part of an interprofessional team? Your entry should be approximately 200-300 words.
3. In this journal entry describe what you learned through this IPE experience regarding interprofessional teams. What did you learn about yourself and your discipline's roles as part of an interprofessional teams? What did you learn about your teammates and their disciplines' roles as part of an interprofessional team? Your entry should be approximately 200-300 words.

APPENDIX H

TEAM DISCUSSION PROMPTS

1. Describe to your other team members your role on the interprofessional team. What unique *personal* knowledge and skills can you contribute? What unique *professional* knowledge and skills can you contribute that differs from other professions? How has your professional training thus far prepared you to work as part of an interprofessional team? Complete a post that is about 200 words. Respond to at least two team members.
2. After completing the Harvard Implicit Association Test and the weight bias readings, reflect on your own potential weight bias and share your thoughts if you feel comfortable. What is your professional role and role of the interprofessional team in creating a weight-inclusive environment for patients? Complete a post that is about 200 words. Respond to at least two team members.

APPENDIX I

FOCUS GROUP INTERVIEW QUESTIONS

1. How did participating in this online IPE module impact your attitudes of interprofessional practice/interprofessional teams?
2. How did participating in the online IPE module change the way you think about the roles of different healthcare professionals?
3. How have your assumptions about other healthcare professions changed after completing the online IPE module?
4. What are the impacts of interprofessional education/shared learning for students in healthcare training programs?
5. Do you have any questions or additional comments?