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Qualitative Evaluation of Interprofessional Education Experiential Learning: IPEEL for Health Professional Students

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ABSTRACT

Interprofessional education (IPE) is critical for health professional students to form professional identities and develop collaborative skills. Although accrediting bodies mandate incorporating IPE, the effects of IPE programming on health professional students and the best pedagogical approach for achieving desirable outcomes are still unclear. In addition, specific effects of IPE within the context of experiential learning are not fully understood. That is, the literature has not presented a clear framework for structuring IPE programs, nor have outcome measures for IPE utilizing experiential learning (IPEEL) been established. The purpose of this study was to complete a grounded theory qualitative analysis of survey data from three cohorts of health professional students participating in an IPEEL elective course where students worked directly with children and their families. Pre- and post-survey responses identified how students perceived growth related to IPE competencies as a result of the IPEEL curriculum, as well as helped to develop a refined model of IPE specifically for experiential learning. Results indicated that overall students reported positive perceptions of IPE-related outcomes and positive outcomes related to the children and families they worked with, while confirming enabling and interfering factors that contribute to the IPE process. Future applications of the IPEEL model for IPE programming are recommended.

Introduction

It is well established that use of interprofessional collaborative practice (IPCP), a concept historically referred to as multidisciplinary or interdisciplinary care, effectively stimulates continuity of care and teamwork between healthcare professionals (Bridges et al., 2011; Cox et al., 2016; Schwindt et al., 2017). Individual healthcare practitioners contribute specific and often unique professional expertise as a member of an interprofessional team to improve the quality of care delivered as well as enhance patient knowledge and satisfaction. IPCP also helps improve patient outcomes, reduce healthcare costs and decrease rates of clinical errors (Health Professions Accreditors Collaborative, 2019). Therefore, it is essential to implement interprofessional education (IPE) into health professional program curricula to teach students necessary skills for effectively engaging in team-based care.

While various pedagogical methods can be used to implement IPE, opportunities that include experiential learning may be advantageous in enabling health professional students to practice communication and teamwork skills (Liaw et al., 2014). The purpose of this qualitative study was to analyze student perceptions from three cohorts of health professional students describing how their interprofessional skills and behaviors were potentially shaped by an elective course utilizing interprofessional educational through experiential learning (IPEEL). In addition, we aim to assess how these perceptions might be reflected in an adapted version of the Interprofessional Learning Continuum Model (IPLC; Institute of Medicine, 2015), a commonly used framework for designing, implementing, and assessing IPE, in order to better reflect experiential learning.

Background

Interprofessional Education

When educating healthcare professional students, it is imperative that they learn to work collaboratively in a team (van Diggele et al., 2020). The World Health Organization (2010) defines IPE as “students from two or more professions learning about, from, and with each other to enable effective collaboration and improve health outcomes” (WHO, 2010, p. 10). The majority of organizations responsible for managing and accrediting health professional programs in higher education mandate (through established standards) the inclusion of IPE into the curriculum. The benefits of integrating IPE into health professional program curricula include enhancing students’ understanding of how other disciplines are trained, increasing the gratitude felt for the social interactions with students from different disciplines, and having students desire more frequent opportunities for interprofessional team collaboration (Dower et al., 2013). Thus, programs that aim to prepare healthcare professionals to enter the workforce as an effective team member are redesigning curricula to include educational experiences that involve multiple professions. Traditionally, education was completed in isolation, where healthcare students stayed with their single professional cohort. Now, programs are adding formal and informal mechanisms for IPE experiences. Formal learning experiences that are goal-oriented toward developing IPE knowledge, skills and behaviors are found to be more effective (Buring et al., 2009).

Interprofessional Skills and Behaviors

The Interprofessional Education Collaborative developed core competencies for interprofessional collaborative practice in 2011. These competencies were updated in 2016 (Interprofessional Education Collaborative, 2016). Currently, these core competencies are being further revised. The 2023 draft document (Interprofessional Education Collaborative, 2023) lists four competencies: values and ethics, roles and responsibilities, communication, teams and teamwork. Within these four competencies, 33 sub-competency statements are listed. Values and ethics include the ability to “work with team members to maintain a climate of shared values, ethical conduct and mutual respect” (p. 2). Roles and responsibilities use “the knowledge of one’s own role and team members’ expertise to address health outcomes” (p. 2). The communication competency stresses “responsive, responsible, respectful, and compassionate manner with team members” (p.2). Teams and teamwork applies “values and principles of team science to adapt one’s own role in a variety of team setting” (p.2). Many academic programs are using these competencies to shape their curricula.

Academic Standards for Interprofessional Education

The importance of developing collaborative, interprofessional skills continues to be emphasized in clinical practice. Similarly, accrediting bodies for academic health professional programs have recognized the importance of IPE and have embedded educational requirements within the academic standards for graduate curricula. For example, the Accreditation Council for Occupational Therapy (ACOTE) now includes five specific IPE standards (B 2.0, B 4.8, B 4.23, B 4.25, B 4.28; ACOTE, 2018) that must be addressed by accredited occupational therapy programs. Similarly, the Commission on Accreditation in Physical Therapy Education (CAPTE) lists three specific IPE standards (6F, 7D18, 7D23; CAPTE, 2023) and Speech Language Pathology programs outline four different IPE-related standards (3.1.1, 3.1.4A, 3.16A; ASHA, 2019). Designing effective IPE is both critical and required in health professional student training.

Experiential Learning

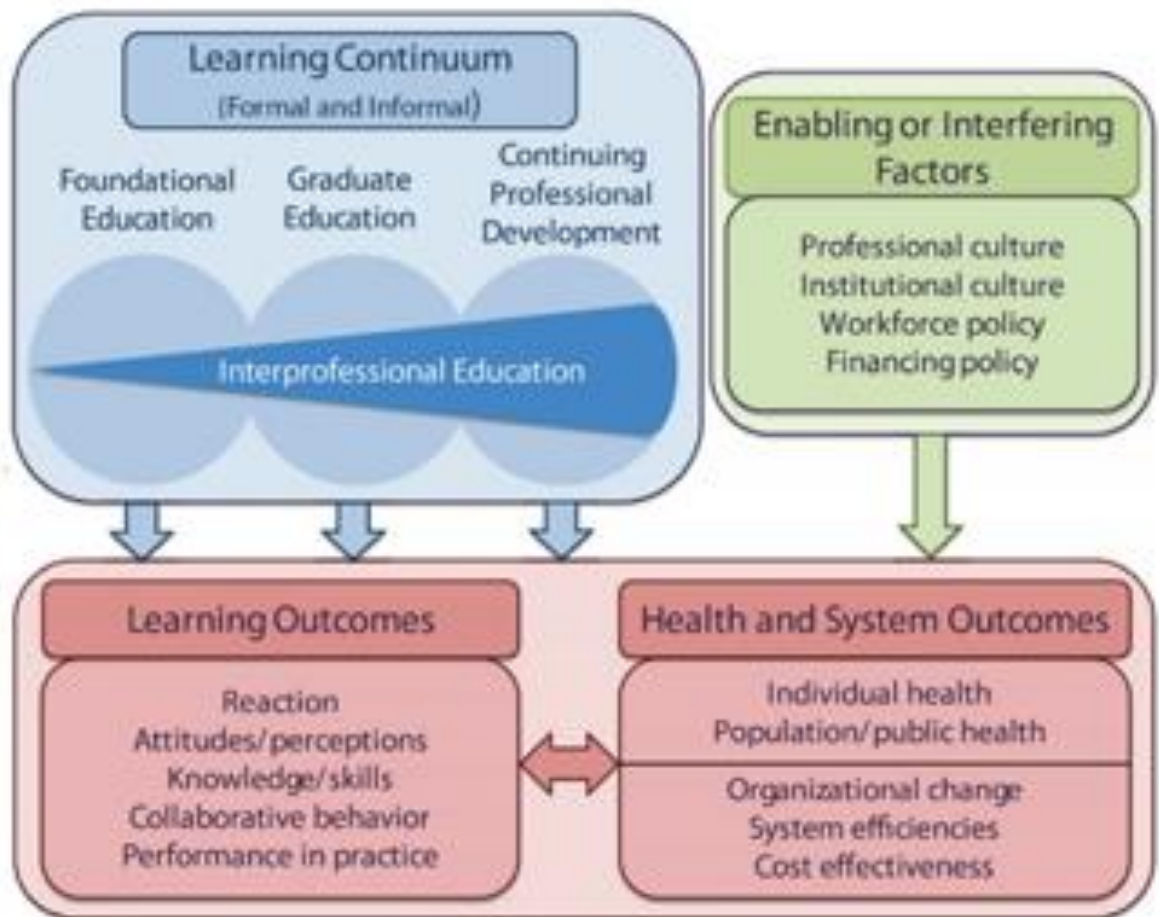
Utilizing experiential learning as a method for instruction can facilitate the acquisition of knowledge, skills and abilities that are required for IPE. Unlike traditional educational methods, where learning occurs within a classroom, experiential learning provides hands-on opportunities for health professional students to receive timely feedback about psychomotor and interpersonal skills while working with real people (Schreiber et al., 2015). Experiential learning executed early within a graduate program promotes application of discipline specific skills prior to being asked to perform these in a clinical setting. The implementation of experiential learning can also enhance a student’s understanding of content, improve problem solving/critical reasoning skills, optimize reflective practices, and assist with long-term retention of emphasized concepts (Richards et al., 2015; Schreiber et al., 2015). As such, experiential learning aligns with Kolb’s Learning Theory in that a student progresses through a cycle of concrete experiences, reflective observations, abstract conceptualizations, and active experimentation (Kolb, 2014). Thus, IPE that is accentuated by experiential learning (i.e., further referred to as “IPEEL”), has the potential to optimize how IPCP is taught.

An Existing Conceptual Model for IPE

The Interprofessional Learning Continuum Model (IPLC), designed by the National Academy of Sciences in 2015 (Institute of Medicine, 2015), depicts an education-to-practice framework with four distinct areas of emphasis: 1) the learning continuum, 2) expected learning outcomes, 3) health and system outcomes, and 4) interfering and enabling factors (see Figure 1; Institute of Medicine, 2015).

Figure 1

The Interprofessional Learning Continuum Model (IPLC)



Note. This figure was produced by the Institute of Medicine of the National Academies [now the National Academy of Medicine] to depict interprofessional learning and outcomes. Institute of Medicine. (2015). *Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes.* <https://doi.org/10.17226/21726>. Reproduced with permission from the National Academy of Sciences, Courtesy of the National Academies Press, Washington, D.C.

The IPLC model can be used to design systematic instruction (Institute of Medicine, 2015). For example, the learning continuum reflects both formal and informal experiences delineating a need for educators to scaffold lessons of IPCP while expanding the depth, breadth and complexity of content presented over a trajectory of time (i.e. from foundational [or undergraduate] to graduate and professional education). This model also highlights that learners, health and system outcomes are influenced not only by the type of instruction and how the instruction is delivered but also how personal and institutional factors may enable or interfere with successful implementation. Within the context of IPE, experiential learning is a specific type of learning format and pedagogy intended to enhance learning. Therefore, it is important to examine the IPLC within this specific context to understand if situational or site-specific enabling or interfering factors might optimize the impact of IPE. In addition, experiential learning may differentially affect health professional students compared to students in other programs. Those students selecting health professional careers, such as physical or occupational therapy, may in fact have unique situational factors, educational background, or personal histories that could influence IPE outcomes. Therefore, examining the IPLC framework within the unique constraints of health professional students engaging in IPEEL could help derive a better understanding of student learning and derive more specific outcomes.

The purpose of this qualitative study was to: 1) analyze student perceptions from three cohorts of health professional students describing how their interprofessional skills and behaviors were potentially shaped by an IPEEL course, and 2) describe how these perceptions might be reflected in an adapted version of the IPLC model for future application. This specific model could help to catalog relevant and desired outcomes for future programming.

Methods

IPEEL Curriculum

The IPEEL curriculum (developed by associate professors of physical therapy and occupational therapy) was comprised of four, one-hour in-person modules and four, one-hour online modules. Students were also required to attend a series of three community-based events (for up to six hours of direct contact time with children attendees). These events were held in collaboration between a public, urban university and community museum affiliates with programming designed to foster participation for children with mobility and sensory impairments. During these events, students and licensed clinicians helped children of all abilities overcome environmental or physical barriers through the provision of low-cost, high-impact assistive technology (e.g., portable, multi-directional, hands-free harness systems and modified ride-on cars) and augmented sensory activities, geared to optimize a child's independent exploration of museum exhibits. A description of the course assignments, how the assignments were derived from Kolb's theory of experiential learning, and how they align with IPEEL can be found in Table 1.

Table 1*Alignment of Course Assignments to Kolb Learning Theory and IPEEL*

Kolb's Learning Theory Constructs	Course Assignment	Relationship to IPEEL Constructs
<i>Concrete Experience</i>	<ul style="list-style-type: none"> • Develop a plan to engage child participants before attending the community-based event • Attend community based event • Complete team-based documentation after attending the community-based event 	IPEEL “intervention” (i.e., elective course offered) where students were able to enact disciplinary roles with children during community-based events
<i>Reflective Observation</i>	<ul style="list-style-type: none"> • Debrief after attending the community-based event • Complete four reflection assignments 	Identification of enabling or interfering factors (e.g., professional culture, previous experiences and/or an interprofessional desire to learn)
<i>Abstract Conceptualization</i>	<ul style="list-style-type: none"> • Deliver a presentation describing discipline specific roles and responsibilities when working with children with sensorimotor impairments 	Development of an interprofessional identity, understanding the unique and overlapping roles and responsibilities across disciplines
<i>Active Experimentation</i>	<ul style="list-style-type: none"> • Attend subsequent community events as both an active participant and an observer 	Adaptation in communication skills, attitudes and perceptions, clinical decision making, and knowledge and skills for interprofessional collaborative practice

Participants

All participants included in this qualitative analysis were students enrolled at a mid-sized (i.e., ~20,000 undergraduate and graduate students) university in the Midwest. Recruitment efforts targeted graduate students who had enrolled in the IPEEL elective course. Participant recruitment and participation were approved and governed by the university’s Institutional Review Board (#IRB-FY2017-30). Twenty-five of the twenty-six students who enrolled in the IPEEL elective (during the 2016, 2017 or 2018 academic year) completed both pre- and post-experience surveys in addition to the informed consent process. Largely, the participants were white, female, and pursuing a degree in the health science professions — specifically, physical therapy, occupational therapy, or speech and language pathology. Individual demographic information for the twenty-five participants is provided in Table 2.

Table 2*Participant Demographics*

	Age Range				Gender		Program of Study			Year In Program		
	<i>22-24</i>	<i>25-27</i>	<i>28-30</i>	<i>31-33</i>	<i>M</i>	<i>F</i>	<i>OT</i>	<i>PT</i>	<i>SLP</i>	<i>1st</i>	<i>2nd</i>	<i>3rd</i>
<i>n</i>	18	5	1	1	4	21	6	11	8	11	11	3
<i>(%)</i>	72	20	4	4	16	84	24	44	32	44	44	12

Note. OT: Occupational Therapy; PT: Physical Therapy; SLP: Speech Language Pathology

Data Collection

After participants consented to this study, they received a pre-experience survey that asked about motivation for enrolling in the IPEEL elective course and what they hoped to learn throughout the semester (see Table 3). After completing the course, participants received a post-experience survey that asked about the participants' learning experience and how this IPEEL elective course impacted their professional development (see Table 3). Questions included in the survey were based on the conceptual domains of the accepted framework of core competencies for interprofessional collaborative practice (developed by the Interprofessional Education Collaborative), an extensive literature review of key factors influencing interprofessional education and experiential learning, along with discussions with key health care professionals. The pool of questions was then refined by the course instructors and a member of the research team with formal training in qualitative methodology and survey construction. The final survey was a product of three iterations, with the initial survey piloted with the first cohort of 6 students, with two subsequent revisions based on data from the first and second versions of the survey which was reviewed by both the course instructors and the qualitative investigator (see Appendix A for survey questions and versions). The final pre-survey consisted of seven open ended questions while the post-survey consisted of nine open ended questions. All 25 students completed the pre- and post-surveys (100% response rate). After responses were collected, a student research-assistant de-identified each survey.

Table 3*Open-Ended Survey Questions*

Pre-Survey Questions	Post-Survey Questions
How much do you feel like you know about working in an interprofessional team based on previous experiences or information you have learned from other course work?	How much do you feel like you know about working in an interprofessional team based on previous experiences or information you have learned from other course work?
How much do you feel like you know about working with children with mobility impairments, based on previous experiences or information you have learned from other course work?	How much do you feel like you know about working with children with mobility impairments, based on previous experiences or information you have learned from other course work?
How comfortable do you feel working with children with disabilities and their families?	How comfortable do you feel working with children with disabilities and their families?
How well do you feel that the course goals and objectives are defined, including the outcomes to be achieved through this experiential-learning interprofessional educational opportunity?	How do you feel that the course goals and objectives were met, including the outcomes to be achieved through this experiential-learning, interprofessional educational opportunities?
How well do you feel your specific role and responsibilities for engaging with children with mobility impairments as part of an interprofessional team are outlined for this experiential-learning educational opportunity?	How well did you feel you were able to maintain your specific role and responsibilities for engaging with children with mobility impairments during this experiential-learning, interprofessional educational opportunities?
At what level have you previously participated as part of an interprofessional team?	How do you feel the structure of this hybrid, experiential-learning, interprofessional educational opportunities for you to learn something new?
At what level have you previously engaged with children with mobility and sensory impairments?	

Data Analysis

Pre- and post-experience surveys were compiled for qualitative analysis using the grounded theory analytical procedure developed by Corbin and Strauss (2014). This approach seeks to develop a unified theory that explains a phenomenon or process by utilizing a three-stage systematic analysis that includes open coding, axial coding, and selective coding (Corbin & Strauss, 2014). Collaborative coding was done by the research team which consisted of associate professors of physical therapy (2), occupational therapy (1), public health (1), and special education (1). Three of the coders were directly involved with course implementation from which the data was collected. All three stages of coding for the pre-experience surveys were completed before repeating the iterative process with the post-experience surveys.

Open coding consisted of each coder reading responses from each survey in its entirety and then rereading line-by-line. While rereading, coders identified each individual piece of data and assigned it to a major domain category. Coders used the IPLC as an initial framework to assign domain categories, with liberty to add additional domains. After categorizing the data individually, coders met to compare results and reach consensus on domains. This stage, called axial coding, consisted of the coders meeting to sort and group data together, choosing major domains from the individual coders' open coding, developing descriptions of the domains, and then beginning to subcategorize data with primary and secondary codes. As domains and subcategories emerged, the research team continued to meet to develop and agree upon selective codes for each piece of text data. After completing the selective coding for both the pre- and post-experience surveys, the research team used the results to identify themes and develop a refined conceptual model specific to the IPEEL approach.

Trustworthiness

As recommended for qualitative analyses trustworthiness of the findings should be established to validate the results (Creswell & Poth, 2017; Morse, 2015; Nowell et al., 2017). The research team executed phases of a grounded theory thematic analyses while making efforts to establish trustworthiness during each step (see Table 4).

Table 4*Establishing Trustworthiness During Each Phase of Thematic Analysis*

Phases of Grounded Theory Thematic Analysis	Means of Establishing Trustworthiness
Phase 1: Familiarizing the team to the data	Discuss and document theoretical framework Review data collection, survey instruments
Phase 2: Open coding	Independent coding for major domains Investigator triangulation, for coding process and documentation
Phase 3: Axial coding	Investigator triangulation, domains agreed upon Independent coding for primary and secondary codes
Phase 4: Selective coding	Investigator triangulation, primary and secondary code consensus Consolidation of primary and secondary codes
Phase 5: Development of IPE model	Team meeting for model modifications and ideas Team review of multiple iterations Select model for member checking
Phase 6: Establishing trustworthiness	Member checking, audit trail Model Revisions, member checking
Phase 7: Writing and reporting the findings	Team debriefing Findings and model summarized Selection of exemplary quotes Description of audit trail and member checking

Note. This table was adapted from Nowell et al., 2017.

During early phases of the analysis, investigator triangulation derived credible inferences from the data that considered the perspectives and expertise of more than one researcher, in an effort to validate the selected domains and primary/secondary codes (Archibald, 2016). During in-depth discussions, the team reached consensus through review of current literature, examining applications of the IPLC Model, and examining how each piece of data fell within the context of the pre- and post-experience survey questions and overall responses.

Using an audit trail, three graduate students who participated in the IPEEL course reviewed and provided feedback on all versions of the codebooks, the original pre- and post-experience survey questions for reference, and an initial depiction of a conceptual model based on the qualitative analysis of pre- and post-experience surveys. Each of the students had suggestions for how to further clarify the model based on codebook

revisions and components that were either abstruse or they felt did not best reflect their experiences. Revisions were made based on this feedback and the model was returned for additional student review. All students reported that the final IPEEL Model was representative of the findings and their personal experiences.

Results

Overall, we addressed both aims of this study by analyzing outcomes from student survey responses and used thematic analysis to modify and expand the IPLC model. The revised model provides perceived outcomes that are relevant and specific to experiential learning.

Student Survey Responses

The data resulted in 1502 codes from the pre-surveys and 1241 codes from the post-surveys. Five major domains were used: outcomes, enabling factors, interfering factors, learning continuum, and professional identity development. The pre-test data contained reflections about 'expected' or 'anticipated' features of the IPEEL course, while post-test data reflected 'actual' perceived outcomes at the end of the course. Codes that were consistently identified on both pre- and post-data analysis were retained and highlighted. This included four domains, 14 primary codes and 9 secondary codes (see Table 4; not all domain codes had both primary and secondary coding, and the learning continuum domain did not reveal any additional new codes).

Table 5

New Domain and Code Combinations Derived from Analysis

Domain	Primary Code	Secondary Code
Enabling Factors	Personal Factors	Interprofessional Desire to Learn
Interfering Factors	Lack of Professional Socialization	
Outcomes	Communication	Child/Family Oriented
	Performance	Child/Family Oriented
	Dual Identity Development	Interprofessional Socialization
	Knowledge and Skills	Child/Family Oriented
	Team and Teamwork	Common Goals
	Collaborative Behaviors	Interprofessional Socialization
	Attitudes and Perceptions	Child/Family Oriented
	Knowledge and Skills	Interprofessional Desire to Learn
Professional Identity Development	Leadership in Discipline	
	Application of Knowledge and Skills	
	Knowledge and Skills	
	Recognition Of Deficits	

Each of the novel domain and coding combinations reflects elements that enabled or hindered interprofessional learning or were considered positive improvements in interprofessional learning as a result of the IPEEL course. In addition, how students described a transition from discipline-specific professional identity to interprofessional identity were considered to be positive changes. Interprofessional identity refers to an interprofessional identity, no longer exclusively professional and existing in a silo, that is created through IPE and interprofessional practice (Khalili et al., 2013).

The IPLC Model was used as a basis for categorizing domains and to derive new primary and secondary coding. A selection of extracted exemplary quotes best represent these distinct and novel codes (see Table 6). Overall, the selected quotes were felt to be representative of how students described how they anticipated interprofessional learning activities would be (pre-data) and contrasts those perceptions with what they actually observed or perceived to happen (post-data). Not all domains or codes are represented, and pre-post data are not necessarily from the same student.

Table 6

Exemplary Quotes by Domain and Code

Domain	Primary/Secondary Code	Pre-Data Exemplary Quote	Post-Data Exemplary Quote
Enabling Factors	Personal Factors/ Interprofessional desire to learn	<i>“I expect to learn about teamwork collaboration in a community-based program centered around mobility and sensory play. Additionally, I expect to learn more in depth about the different disciplines, their specific goals and treatments, and strategies utilized when working with those with mobility and sensory impairments.”</i>	<i>“After this final session, I feel much more comfortable working with students from other disciplines compared to the first session. I’m not scared to approach them and ask them their opinions about a certain client or how they’d start treatment. I do believe I will still be a little hesitant to reach out to other disciplines when first starting in the workforce, however, I will keep this experience in the back of my mind as a positive one in which I can expand upon.”</i>

Interfering Factors	Lack of Professional Socialization	<i>“With OTs especially, incorporating sensory stimulation alongside the mobility will optimize the treatment for the child with motor and sensory impairments. To be honest, I am not quite sure how I will interact with speech therapists, other than verbalizing tasks to the child.”</i>	<i>“A challenge that I experienced when working with other disciplines ...was that I did not know certain vocabulary ... For example, when I treated a young child in a harness together with a PT student, she requested I help her put the child in “quadruped” position. At the time, I had no idea what that meant and I initially felt nervous but ... I am here to learn from other disciplines and if I do not ask questions, I will not learn ... The PT student I worked with was extremely open and non-judgmental and I immediately became comfortable with working as a team...”</i>
Professional Identity Development	Leadership in discipline	<i>“Because occupational therapy is often play-based and very versatile, I could see the OTs working well with the other disciplines during our events by keeping play and the child’s enjoyment as the focus. We will especially be needed regarding the sensory activities by educating the other disciples as well as the children’s parents.”</i>	<i>“The first way I interacted with others was by explaining how we can adapt different activities to make them more sensory-friendly. Occupational therapy looks at the sensory environment more than the other disciplines so I was able to explain it to others.”</i>
Professional Identity Development	Application of Knowledge and skills	<i>“If there seems to be a communication problem where the child isn’t communicating ... [one] strategy is identifying that while they may not be</i>	<i>“One way I interacted with students from other disciplines to demonstrate my own disciplines’ roles and responsibilities when working with children with</i>

		<p><i>communicating verbally, they can use gestures and pointing or use other methods of communicating that may be sufficient. The first step is identifying how this child communicates. Once we figure out how they communicate, we need to understand the content of their communication."</i></p>	<p><i>mobility impairments was by modeling simple one-step directions that the child was able to understand."</i></p>
Outcomes	Communication/ child & family oriented	<p><i>"One strategy to use when faced with communication challenges with children with mobility impairments is to involve other team members in order to promote the best understanding of each child's wants and needs."</i></p>	<p><i>"I first asked dad how the treatment team can best communicate with his daughter, and I also sought advice to my fellow classmates who are SLP's on how to best communicate with the child."</i></p>
Outcomes	Performance/child & family oriented	<p><i>"I think it will be very interesting to work with a child with mobility impairments while on a team. It may be challenging at times if members of the team don't agree on something but can also be fun while we interact and play with a child."</i></p>	<p><i>"Two things that I learned about interacting in an interprofessional team were to have an open mind and integrate treatment in order to address the child's needs as a whole."</i></p>
Outcomes	Knowledge and skills/child & family oriented	<p><i>"Taking time to let the child try to communicate to their ability can help. Not forcing the child to do something they do not want to do or talk about may help with the communication process. Another way is to ask one of the other team members if they can help</i></p>	<p><i>"Discussing situations like this with the SLPs really helped me to understand and become more aware of other forms of communication. I became more in tune with reading the children's body language and listening for small vocal sounds such as grunting to gain better</i></p>

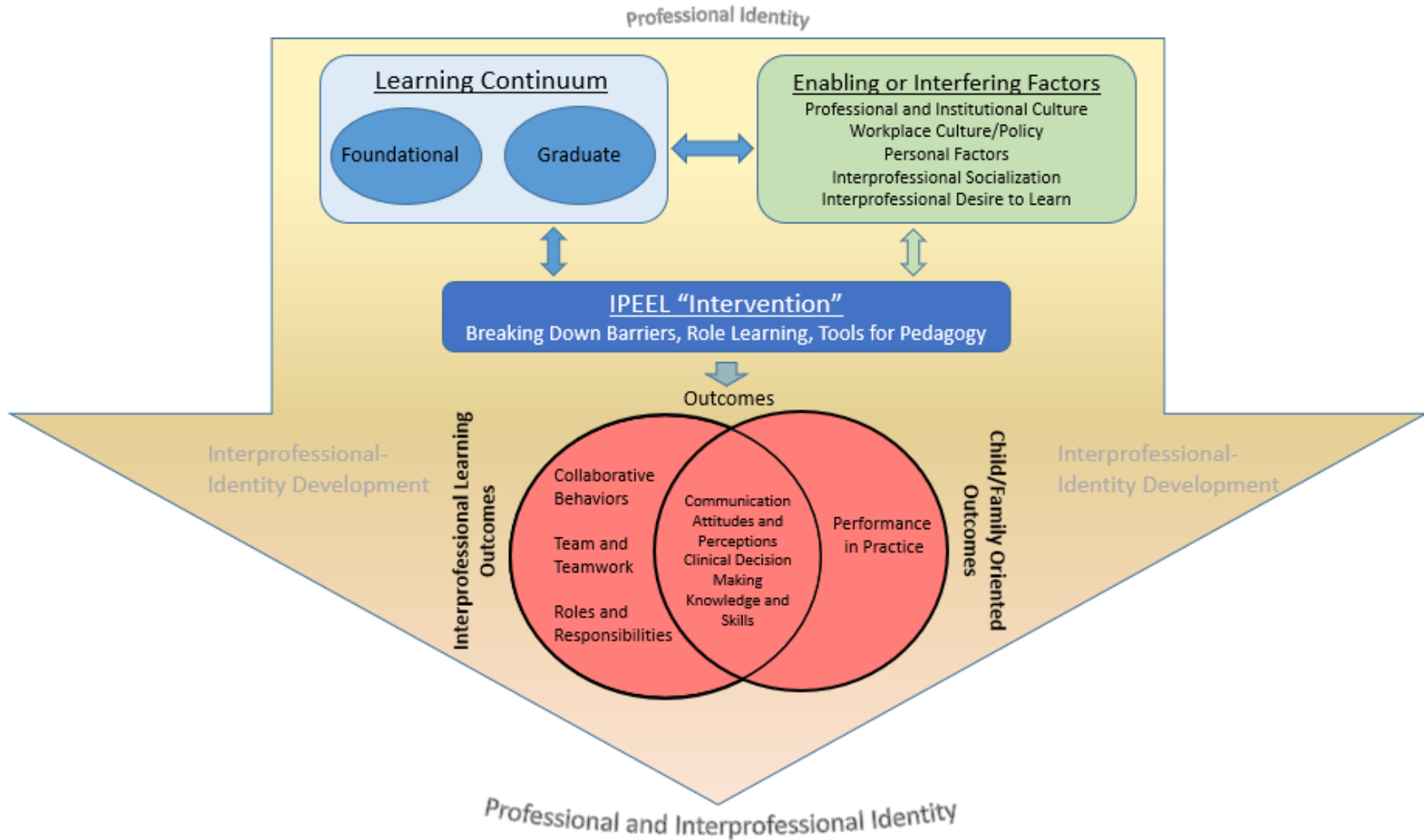
		<i>facilitate the process or if they understand.”</i>	<i>understanding of their current state.”</i>
Outcomes	Collaborative behaviors/ interprofessional socialization	<i>“I anticipate that I will learn about PT’s specific roles and responsibilities in working with children with mobility and sensory impairments. I will learn what they do for the children, as well as how to coordinate what they are doing with what an OT would do. I also hope to learn about SLP’s role in children with sensory and mobility impairments and how all 3 disciplines can work together to provide care to the same child.”</i>	<i>I learned “how to successfully interact with other disciplines without “pause” or loss of time during a child’s session. How to properly understand when to lead certain parts of a session and when to ask for help from other disciplines.”</i>
Outcomes	Interprofessional identity/ Interprofessional socialization	<i>“When working with other disciplines I hope to learn more about their thought processes and how they think. I may never be able to grasp all of the content they cover, but I want to be able to understand some of their clinical reasoning.”</i>	<i>“One thing I learned was that even those in other disciplines can help you in your own discipline. By that, I mean that other students would point out PT related observations that I missed myself. Another thing that I learned was that usually children present with more than just one issue and those multiple issues can usually be helped by therapy from different areas.”</i>

The Interprofessional Education Experiential Learning (IPEEL) Model

Thematic results from the student survey analysis were reincorporated back into a visual model representing the novel IPEEL Model (see Figure 2). The IPEEL Model, which is a modified version of the IPLC Model (Institute of Medicine, 2015), reflects critical areas to consider and incorporate into an IPEEL curriculum for health professional students. Although many elements of the original model were retained, several components were adapted to more precisely reflect the implementation of experiential learning within graduate health professional IPE.

Figure 2

Model of Interprofessional Education using Experiential Learning (IPEEL)



Note: Figure 2 is adapted from the IPLC Model (Institute of Medicine, 2015).

Similar to the IPLC Model (Institute of Medicine, 2015), the IPEEL Model emphasizes the influence of the point in time instruction is provided (i.e. foundational or graduate education labeled as the “learning continuum”) as well as factors that could impact eventual outcomes (labeled as “enabling or interfering”). Post-professional continuing education is not a contributor to the IPEEL approach (as IPEEL is solely implemented with graduate students), and therefore was not retained from the IPLC Model. Enabling and interfering factors such as professional culture, institutional culture, and workplace culture/policy were also included in the IPEEL Model. Additions to the IPEEL Model call out personal factors (e.g., having a family member or close friend with a significant disability, level of comfort working with varying levels of disability), previous experience (or lack of experience) with working with individuals from different disciplines (interprofessional socialization), and an interprofessional desire to learn. These factors can enable or interfere with IPE outcomes and interprofessional identity formation (Lawlis et al., 2014). A Venn diagram demonstrates the unique and overlapping outcomes of interprofessional learning and child/family-oriented outcomes when using an IPEEL approach. Outcomes for the health professional students included learning collaborative behaviors, teamwork skills, and better understanding their own role as a professional and team member. Child/family-oriented outcomes consisted of performance in practice (e.g., how services are delivered, confidence in this delivery, and interactions with the child and family). The most prevalent outcomes connected to both interprofessional learning and the child/family included communication skills, attitudes and perceptions, clinical decision making, and knowledge and skills of specific interventions used with the children being served. Due to an inability to measure the broader health and system outcomes impacted through this IPEEL elective course, the area for health and system outcomes that is in the original IPLC model was omitted.

Our most salient finding was that throughout the process of engaging in this IPEEL elective course, students noted changes in their professional identity and the development of an interprofessional identity (Khalili et al., 2013). This is depicted by the large arrow that forms that background of the IPEEL Model, showing a student’s progress in developing a basic professional identity and moving toward that of an even stronger professional identity while simultaneously developing an interprofessional identity as a member of an interprofessional team.

Discussion

Student Survey Responses

Analysis suggests that both the learning continuum and enabling and interfering factors, as depicted in the IPLC, can influence a range of outcomes using an IPEEL approach. The IPEEL elective course was considered a type of “intervention” for developing interprofessional outcomes of interest, creating a stronger professional identity and forming an interprofessional identity as a member of an interprofessional team (Khalili et al., 2013). This aligns with Kolb’s ‘concrete experience’ and that the interprofessional identity was partially formed through ‘reflective observation’ (Kolb, 2014). Educational background and enabling or interfering factors that individuals bring into the elective

course, combined with the knowledge, practice and experience gained through the course objectives and learning opportunities led to both interprofessional as well as child/family-oriented outcomes. Moreover, use of an IPEEL approach incorporates hands-on application of team-based skills with actual children. Therefore, outcomes included in the IPEEL Model reflect both interprofessional learning outcomes experienced by student participants as well as more specific child/family-oriented outcomes.

We found that enabling and interfering factors as presented in the original IPLC model (Institute of Medicine, 2015) continued to play a role in IPEEL. However, in the experiential learning context for health professional students, these concepts needed to be reconceptualized. Professional and institutional culture is applicable for graduate students; however, financing policy is not. Instead, several specific factors appeared to influence student learning and expectations for an IPE course including: personal factors (i.e., interpersonal characteristics, personal histories and family experiences), prior exposure to working with other disciplines (interprofessional socialization) and desire to learn with, about and from other disciplines (interprofessional desire to learn). Learning outcomes were also found to overlap with contextual outcomes from the experience (i.e., working with children and their families). This results in a model that was uniquely tailored to a child and family oriented experiential learning opportunity. Although narrow in focus, these findings align with the accreditation standards for the disciplines participating as well as professional expectations in future employment when involved in direct patient care. Finally, responses from pre- and post-data suggest that the development of a professional identity spans beyond a discipline-specific lens. Meaning, as students were able to utilize hands-on experiences to hone their own discipline-specific identities, they also curated an interprofessional identity by working collaboratively with the other professions.

Professional identity is procured through the acquisition of knowledge of and affiliation to their own profession. As students engaged in the IPEEL activities, they began to move toward a more complex understanding of the nuances of team-based care. Students reflected on how different professions fit and work together, leading to the development of an interprofessional identity that places their professional identity within the context of others. This transition is an iterative process, with professional and interprofessional identity development often reinforcing the other and encompasses all of the outcomes achieved.

The Interprofessional Education Experiential Learning (IPEEL) Model

The proposed adaptation of the IPLC Model as reflected in the IPEEL Model depicts a unique focus on both graduate health professional IPE and an experiential context with children and families. IPEEL specifies interprofessional learning outcomes (collaborative behaviors, team and teamwork, roles and responsibilities) and client or child/family related outcomes (performance in practice), in addition to outcomes that overlap both domains (communication, attitudes and perceptions, clinical decision making, knowledge and skills). Students identified these as important constructs of an IPE program utilizing experiential learning, and therefore help identify related measures

(questionnaires, surveys, structured observation) that can be created to determine program effectiveness of future curricula. One of the primary findings was that students could recognize the strengthening of both their own professional identity as well as the formation of an interprofessional identity simultaneously. This is represented by the background gradient in the model, indicating that this process underlies the transition throughout an IPEEL experience. In contrast to the IPLCL, the IPEEL more clearly identifies measurement constructs associated with meaningful outcomes for interprofessional *experiential* learning, in particular when working with clients such as children and their families. Future programs that utilize IPEEL to frame activities and target the development of interprofessional identity can also use the model to assess efficacy and outcomes.

Based on this qualitative analysis, use of an IPEEL approach can meaningfully support the development of IPE competencies for health professional students. In fact, exposing students to an experiential learning model of IPE helped to strengthen their appreciation of unique roles and responsibilities within their discipline, as well as how these overlapped with other disciplines and their scope of practice (Dower et al., 2013; Institute of Medicine, 2015; VanKuiken et al., 2016; WHO, 2010). As team members, the health professional students involved in this IPEEL elective course came to believe that they can learn from and contribute to other team members in equal measure. Students reported that practicing collaboratively may even be more effective than practicing in isolation. In addition, a more solidified professional identity in addition to an interprofessional identity allows students to feel more comfortable with grey areas and overlapping roles, providing the tools for cohesive teamwork to support rather than hinder relationships between disciplines.

For institutes of higher education, the IPEEL Model (which embodies the entire IPEEL experience) can be used as a framework to design and implement IPE accentuated by experiential learning and evaluate if desired outcomes are met. Educators must be intentional and deliberate when planning IPEEL activities, which are ideally threaded throughout a students' curriculum. These activities should encourage blended, practice-based opportunities where students and professionals from multiple disciplines can truly "...learn about, from and with each other" (Abu-Rish et al., 2012; American Hospital Association, 2019; WHO, 2010). As health professional students engage in IPEEL, they are exposed to a process of professional socialization or development of an interprofessional identity, wherein they begin to identify themselves as a member of an interprofessional team. Promoting development of an interprofessional identity (while solidifying one's professional identity) can enhance one's ability to effectively engage in IPCP in order to solve problems holistically, taking into account the strengths and skills of individual contributors (Institute of Medicine, 2015; VanKuiken et al., 2016; WHO 2010).

There were several limitations that may have influenced the outcomes from this study. First, the sample size (n=25) was relatively small, however, we were able to sample until saturation and no new codes were derived. It is possible that the small size of each of the cohorts resulted in fears of anonymity and could have biased the results. Some

members of the research team were also instructors in the course, and therefore it is possible that a subconscious bias toward favorable comments emerged although three members of the research team were not instructors and data were triangulated. It is also possible gender bias affected the survey responses, as both of the course instructors were female. There was also more representation from the physical therapy students over time, and their experiences and perceptions could differ from students in other programs.

This study found that both interprofessional learning outcomes and child-/family-oriented outcomes can be met when IPE is combined with experiential learning opportunities. By having desired outcomes in mind, educators can tailor implementation of IPEEL to ensure the imposed curriculum allows for practice-based opportunities that lead to skill competence. The ultimate goal of IPEEL is to produce “collaborative practice-ready” practitioners that have the essential knowledge, skills and abilities for team-based care (American Hospital Association, 2017; Institute of Medicine, 2015; WHO, 2010).

Implications for Occupational Therapy Education

IPE programs and activities are highly desired and requisite in health professional education programs. However, guidelines and models to assist with designing, implementing, and assessing the success of IPE programs, specifically for graduate programs in the health professions, have not been widely adopted. Findings from this study suggest that experiential learning can enhance IPE programs and student learning. The proposed IPEEL model provides structure for those responsible for designing and implementing IPE experiential learning activities and programs at the graduate student level. This model may also be relevant for undergraduate programs educating students in preparation for graduate school in the health professions. IPE program coordinators can use IPEEL to create interprofessional, experiential educational opportunities working directly with different client populations. IPEEL also identifies specific outcomes of interest that can be used to measure perceived efficacy of participation. This is particularly important for occupational therapy and other health professional students who will be entering future practice and working directly with clients and their caregivers. Educators want to feel confident that the IPE activities incorporated into the curriculum have positive outcomes that are applicable for future practitioners. Successful IPE helps students transition into clinical practice environments that require successful interactions with interprofessional teams including clients and their caregivers. The IPEEL model highlights that it is important for students to develop their own individual professional identities. Moreover, the IPEEL model emphasizes that engaging in learning opportunities developing students’ interprofessional identity will simultaneously strengthen their professional roles, knowledge, clinical decision making, and performance skills. Framing interprofessional identity development as reciprocally valuable may help to gain student buy-in on the benefits of IPE as a critical part of their graduate education.

Conclusion

Overall, student perceptions of the elective course using the IPEEL approach indicate that interprofessional behaviors and both professional and interprofessional identity development could be strengthened. Qualitative analysis revealed specific IPEEL outcomes, including collaborative learning and knowledge regarding the roles and scope of different professions. Students also described a positive perception of their performance and fulfilling professional roles as part of a cohesive team while working with children and families. This suggests that future efforts to develop effective IPE curriculum using experiential learning can align programming and select effective outcome measures in both of these areas.

Student feedback provided rich information for modifying the original IPLC model to better fit the parameters of the IPEEL course and approach. Many elements of the original framework were retained and were found to be applicable for experiential learning. However, several components were eliminated, and new constructs were added to the current representation of the IPEEL Model. This new IPEEL Model presents a framework for designing pre-professional IPE curriculum, taking relevant background and personal factors into consideration that may differ between academic institutions, describing how students begin to form an interprofessional identity as part of a team prior to entry-level practice, and how outcomes between interprofessional learning and child-centered practice overlap.

Future directions should include more objective assessment of the IPEEL curriculum and relevant outcomes. For example, educators should consider creating quantitative metrics that can objectively measure outcomes, such as roles and responsibilities or knowledge and skills, and map these directly back to the model. The current model is formulated around subjective student perceptions, while objective measures of interprofessional learning outcomes and child-/family- oriented outcomes would enhance the model's generalizability and possibly lead to novel iterations. Finally, the elective course used for this study and the IPEEL model demonstrate change over a relatively short period of graduate education. It is not yet understood how these improvements translate to effective changes in clinical practice and long-term outcomes for interprofessional teamwork in the larger healthcare system. Analyzing the effects of an IPEEL program during professional practice could also help create training programs and influence practice patterns for those health professionals who are already an integral part of team-based service delivery.

Embedding IPEEL into professional education programs to promote development of IPCP can dramatically impact the effectiveness and quality of how health care is delivered and is an opportunity for change that can help impose a culture that embraces collaboration while improving the health of populations, enhancing the care experience for patients, reducing per capita cost of health care, and enriching the joy practitioners feel in the workplace.

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Appendix A

Question- Pre	1 st cohort (participants 1-6)	2 nd cohort (participants 7-19)	3 rd cohort (participants 20-26)
How much do you feel like you know about working in an interprofessional team based on previous experiences or information you have learned from other course work?	Question 1	Question 2	Question 9 (similar, not exact)
How much do you feel like you know about working with children with mobility impairments, based on previous experiences or information you have learned from other course work?	Question 2	Question 4	Question 13 (similar, not exact)
How well do you feel that the course goals and objectives are defined, including the outcomes to be achieved through this experiential-learning interprofessional educational opportunity?	X	Question 5	Question 10
At what level have you previously participated as part of an interprofessional team?	X	Question 1	Question 8
How comfortable do you feel working with children with disabilities and their families?	X	Question 3	Question 12 (minus "families")
How well do you feel your specific role and responsibilities for engaging with children with mobility impairments as part of an interprofessional team were outlined for this experiential-learning educational opportunity?	X	Question 6	Question 14 on Post-test only
At what level have you previously engaged with children with mobility and sensory impairments?	X	X	Question 11

Questions – Post	1st cohort (participants 1-6)	2nd cohort (participants 7-19)	3rd cohort (participants 20-26)
How much do you feel like you know about working in an interprofessional team based on previous experiences or information you have learned from other course work?	Question 2	Question 1 (similar, not exact)	Question 10 (similar, not exact)
How much do you feel like you know about working with children with mobility impairments, based on previous experiences or information you have learned from other course work?	Question 3	Question 3 (similar, not exact)	Question 12 (similar, not exact)
How comfortable do you feel working with children with disabilities and their families?	X	Question 2	Question 13 (minus families)
How do you feel that the course goals and objectives were met, including the outcomes to be achieved through this experiential-learning, interprofessional educational opportunities?	X	Question 4	Question 11 (similar, not exact)
How well you did feel you were able to maintain your specific role and responsibilities for engaging with children with mobility impairments during this experiential-learning, interprofessional educational opportunities?	X	Question 5	Question 14 (similar, not exact)
How do you feel the structure of this hybrid, experiential-learning, interprofessional educational opportunities for you to learn something new?	X	Question 6	Question 15 (similar, not exact)