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Article abstract

Objectives: To describe the development and evaluation of a university-wide competency and evaluation framework for intra- and interprofessional education (IPE) teamwork.

Methods: Development of the framework was based on existing literature and specific contexts of the schools within our university. Evaluation and program alignment regarding use of the framework were achieved through qualitative interviews with deans of the Schools of Medicine, Nursing, and Pharmacy, and focused on how they evaluated student progression towards the university-wide teamwork competency. Interview data were analyzed using classical content analysis.

Results: Despite efforts to carefully design the framework, interviews revealed that significant variation exists regarding when and how both IPE and team-based care are taught and evaluated across schools. Common barriers to interprofessional education included variations in teamwork practices across disciplines, scheduling challenges, and lack of resources for implementation. Recommendations for how to align teaching and evaluation activities with the framework are posed.

Conclusions: Longitudinally tracking the development of interprofessional competencies within/across health professions schools requires careful planning and collaboration among institutional leaders, interprofessional educators, program evaluators, and students. The information gained from this process provides insights toward implementing future high-quality IPE in teamwork and other inter- and intraprofessional competencies, which may be helpful to others.



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Development of a Longitudinal Curricular Evaluation Framework for Intra- and Interprofessional Teamwork

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Abstract

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Keywords: Interprofessional teamwork; Health professions education; Interprofessional education; Intraprofessional education

Introduction

As has been demonstrated time and again, the success of interprofessional education (IPE) is vital to the development of team-based collaborative practice models in healthcare [1-3]. Ensuring students are collaborative practice-ready upon completion of their respective programs is crucial, especially given growing evidence for the positive impact of IPE on patient and population health outcomes [4]. Understanding how students' progress in their professional development through interprofessional collaborative practice (ICP) core competencies—including values/ethics for interprofessional practice, roles and responsibilities, interprofessional communication, and teams and teamwork—is important for educators seeking to develop and evaluate IPE-specific curricula. In addition, team-based care

(TBC) (defined as the “provision of health services to individuals, families, and/or communities by at least two healthcare providers who work collaboratively with patients and their caregivers—to the extent preferred by each patient—to accomplish shared goals within and across settings to achieve coordinated high-quality care” [6], can occur among students and practicing clinicians during clinical education, which may benefit from additional curricular structures. For IPE curricula and TBC to be considered effective, students need to emerge with the ability to work collaboratively both within their own professions (intra-professional collaboration) and across diverse health professions (interprofessional collaboration) as part of their work to deliver patient-centered care [7].

The development of student competence in both intra- and interprofessional education requires ongoing exposure and scaffolding as students develop the knowledge, attitudes, and skills needed within their own profession, alongside those needed to work collaboratively with other team members [7-9]. Well-designed competency frameworks that align with educational theory, specific educational activities, student assessments, and program evaluation and outcomes, provide a conceptual structure for educational evidence [1,10]. However, to date, published work on applying IPE competency frameworks across multiple health professions in real world settings is limited. Given the recent release of *Guidance on Developing Quality Interprofessional Education for the Health Professions*, which is designed to be flexible while encouraging uniform high-quality features of IPE [10], there is a lot to be learned about how uniform IPE and TBC is implemented and evaluated across health professions schools.

In 2013, Zorek and Raehl [11] published findings from a comparative analysis of IPE accreditation standards in the United States. They found that while 85.7% ($N = 18$) of 21 accreditation documents applicable to dentistry, medicine, nursing, occupational therapy, pharmacy, physical therapy, physician assistant, psychology, public health, and social work contained IPE statements, the specific aspects of those statements varied [11,12]. Accordingly, the authors concluded that US health professions' graduates are not uniformly assessed and/or required to participate in IPE and, therefore, may not be collaborative practice-ready upon graduation [11]. Health profession educators need to create more robust IPE curriculum and work collaboratively to adopt a common framework for IPE incorporating an assessment for each of the core competencies. Furthermore, such a framework could be applicable within and across institutions and programs and would be especially useful for clinical experiences that are typically unpredictable and exist outside the classroom.

To begin to address these issues, leaders at our institution collaborated across programs and schools to develop a shared framework to guide curricular development and evaluation of IPE, specifically focusing on our institutionally defined core competency of teamwork [13]. The purpose of this article is to present our university-wide framework and describe its participatory development and how we fostered alignment with educational and assessment activities with input from program leaders and deans. We then conducted key informant interviews in the

Schools of Medicine, Nursing, and Pharmacy and asked leaders about integration of IPE and TBCE as well as how best to align these with a developmental framework, the findings of which are reported here.

Methods

Study Design and Ethical Consideration

Below, we describe the development of the framework. To evaluate its application, we conducted formal interviews of deans at three of the four schools at Oregon Health & Science University (OHSU). Data from the qualitative interviews was subsequently analyzed using classical content analysis [14]. Oregon Health & Science University Institutional Review Board approved this work as a part of ongoing program evaluation (IRB #10495).

Setting and Framework Development

Oregon Health & Science University is a medium-sized health sciences university located across Oregon and southwest Washington. In 2015, 10 core university-wide competencies [13] were identified through ongoing discussion and collaboration across all 89 health- and science-related programs in the Schools of Dentistry, Medicine, Nursing, Pharmacy, and Public Health. After the development of the university-wide competencies, it was decided that for our university to truly take a step towards collaborative practice and not return to silos, we needed to continue our interprofessional collaborative efforts and develop a unified approach for both formative and summative assessment of the teamwork competency. Teamwork was selected as the first competency to explore using our newly developed unified approach to assessment, primarily because teamwork is identified as an interprofessional priority and requirement for all clinicians to be successful in collaborative team-based practice. The Interprofessional Initiative Steering Committee (IPI-SC) was tasked with developing a university-wide developmental framework to communicate expectations of high-quality teamwork that could be applied across all schools at the university.

A full-day retreat was held in the fall of 2015 as an initial step to develop a unified framework to approach developmental assessment. In preparation for the retreat, a literature review was conducted to identify key papers that analyzed numerous competencies and frameworks within and across different health-professions programs that best fit the needs of our institution [15-18]. Stakeholders attending this retreat included the provost, deans from all the major schools, and members of the OHSU IPI-SC. These individuals were included to ensure the framework would be applicable university-wide and aligned to educational activities from admission to graduation.

The retreat began with a presentation of the literature review and a brainstorming activity designed to stimulate discussion pertaining to the qualities collaborative practice-ready students must possess. These qualities were organized into three sections: knowledge, skills (critical activities), and attitudes, which served as the organizing framework. Assessment points, both formative and summative, were then integrated into the model. The outcome from the retreat was a visual model with

embedded formative and summative points of competency assessment along a continuum, from introduction to full integration of the desired competency. This framework created the foundation and scaffolding for deeper dives into competency-specific applications.

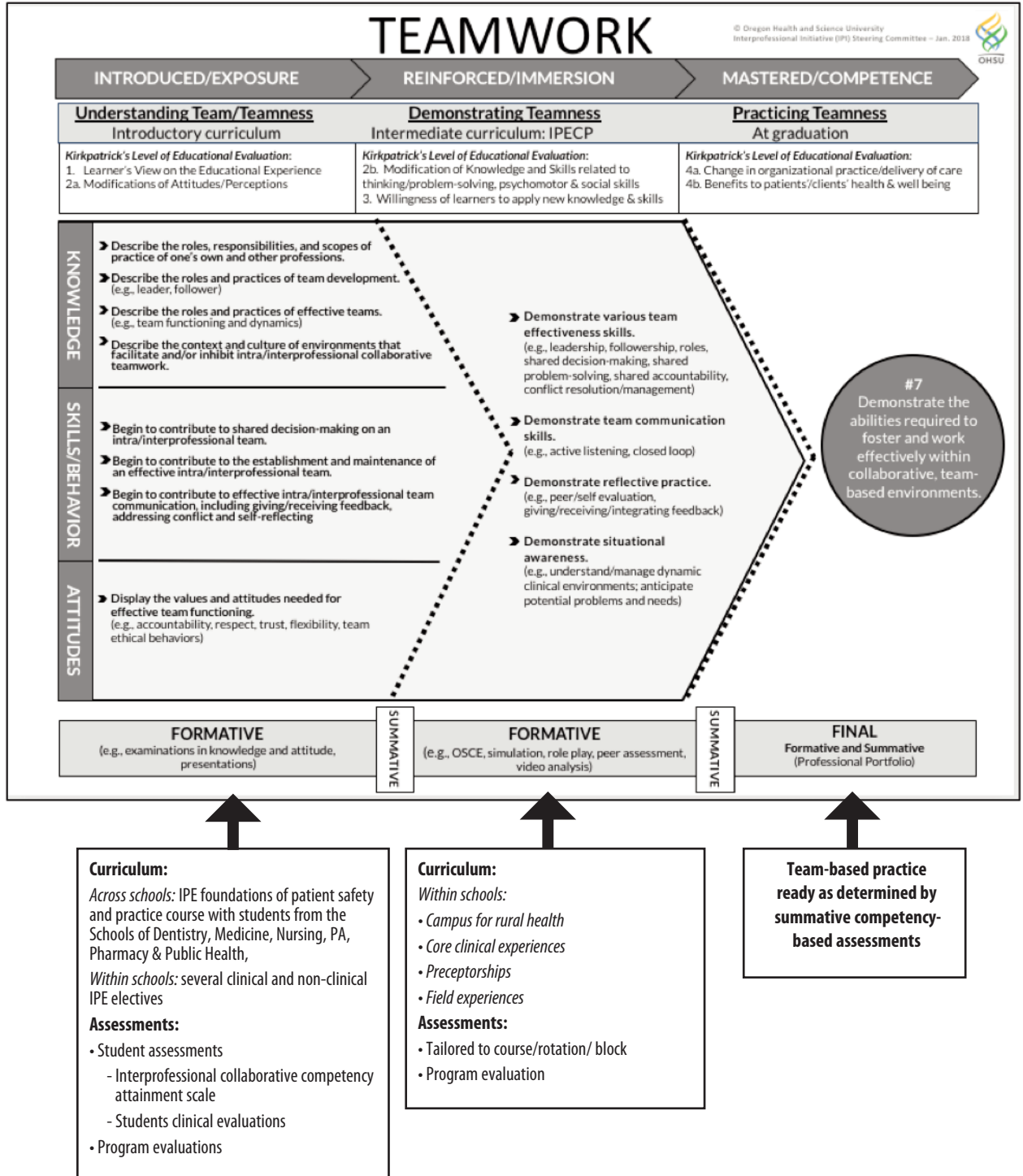


Figure 1. Theory-guided framework for evaluating the developmental stages of inter- and intraprofessional education in teamwork

The qualities identified at the retreat were converted into categories, which informed the development of specific student learning objectives. These objectives were then dispersed across a continuum beginning with *Introduced/Exposure* (Understanding Teamness) moving into *Reinforced/Immersion* (Demonstrating Teamness) and then ending with *Mastered/Competence* (Practicing Teamness) (Figure 1). Our use of the term “Teamness” is derived from the work of Tilden et al [16], who defined effective teams as those with core interrelated qualities that together embody the notion of “Teamness,” including having shared goals that reflect patient/family priorities, clear roles, mutual trust, effective communication, measurable processes and outcomes used to track and improve performance, and organizational support [19].

The primary focus of the framework was on clinical programs (i.e., programs in which students would be engaged in patient care, such as nursing, dentistry, medicine, pharmacy), though applicability to non-clinical programs and settings could occur with minimal adaptation. This framework was also designed to be used longitudinally throughout a student’s course of study within their respective program.

Initial and Final Framework Evaluation

Since its initial development, the framework underwent several evaluations, with the initial evaluation done shortly after development. Members of the IPI-SC conducted informal interviews with individuals identified by the deans as key curricular persons for the various programs (e.g., curriculum chairs, program directors). The IPI-SC members shared the detailed framework for teamwork, engaging with curricular experts to ensure involvement of individual programs, and facilitated a ground-up approach to wholesale adaptation and acceptance before implementation. The intent of this initial evaluation was to target all programs and help to tailor the framework so that it could fit within the already existing curriculum. The result was a co-discovery of how to thread this teamwork framework within already existing curriculum. Informal interviewers involved sharing the framework with key stakeholders, and no resulting changes were made to the framework itself.

The second revision involved integrating a modified version of Kirkpatrick’s Levels of Educational Evaluation [20]. *Introduced/Exposure* (Understanding Teamness) would involve students’ views of the educational experience (Level 1) and a modification of their attitudes and perception (Level 2a). *Reinforced/Immersion* (Demonstrating Teamness) would involve modification of knowledge and skills toward problem solving (Level 2b) and willingness of students to apply new skills (Level 3). *Mastered/Competence* (Practicing Teamness) would involve change in organizational practice and delivery of care (Level 4a) and benefits to patients/clients health & wellbeing (Level 4b).

As a final follow-up evaluation, we conducted a more rigorous qualitative study by conducting qualitative interviews with either primary or education deans of three of the four schools at OHSU (Schools of Medicine, Pharmacy, Nursing). Within each of these schools are several clinical programs, and we wanted to gain institutional leaders’ perspectives on how the framework would work across these programs.

Students initially learn about teamwork at our institution through our flagship IPE course, Foundations of Patient Safety and Interprofessional Practice (IPE

Foundations), which is required for all 4 schools and colleges and their respective clinical programs in dentistry, medicine, pharmacy, physician assistant, nutrition/dietetics, radiation therapy, medical physics, and nursing. Students also learn about teamwork in the clinical learning environment, which we perceived may be challenging to assess using our developed teamwork framework, as interactions among students and between students and faculty and staff are highly variable. Further, we may be making assumptions about students as active versus passive learners in the clinical setting, and how they understand their roles as members of the healthcare team. To address this complex issue in a subsequent revision of the framework, we created an interview guide that contained a standard set of questions to use about IPE and team-based care (TBC) during the key informant interviews.

The interview guide was designed to determine: 1) where in their school's experiential or clinical courses IPE and TBCE concepts or content are taught; 2) what student assessments and program evaluation activities are undertaken; 3) what barriers and facilitators exist to integrating IPE and TBC into their programs; and 4) their plans for future IPE and TBC that align with teamwork exposure, immersion, and competence development. Members of the IPI-SC conducted interviews in pairs with the education deans of the Schools of Medicine, Nursing, and Pharmacy, representing 14 programs in total. Data were collected by two interviewers using field notes, which were compiled and underwent classical content analysis [14] conducted by two authors (PAC and CT), and data were summarized.

Results

Table 1 summarizes the results of our content analysis from our key informant interviews regarding common educational themes according to OHSU's framework components, common barriers or challenges, and possible solutions regarding alignment with the developmental framework. A common educational theme for Understanding Teamness was found in relation to participation in the required IPE Foundations course. Generally, deans viewed IPE Foundations as an introductory course for concepts such as teamwork and communication. For Demonstrating Teamness, common educational themes included simulation exercises and assessments, and clinical immersion experiences. Educational themes in Practicing Teamness were centered in rural campus clinical and social experiences, where autonomy tends to be greater, and during group projects, many of which are quality improvement projects. Similar findings emerged for TBC.

Common assessment themes for IPE included validated instruments, such as the Interprofessional Collaborative Competency Scale (ICCS) [21], as well as clinical skills exams, clinical reflection papers, and group assessments. Pertaining to IPE, there was a notable lack of assessments related to patient outcomes. Barriers and challenges included variations in team-based care that exist in clinical training sites, which provide important role modeling for students. The deans are considering these findings and establishing plans to address variability, including implementing tailored faculty development to strengthen how team-based care is delivered. Other challenges were that many programs, such as dentistry, physician assistant, and radi-

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Table 1. Summary findings from interviews with program directors in Schools of Dentistry, Medicine, Nursing, and Pharmacy on interprofessional education in teamwork, team-based care education, and their assessments

Type of learning	Common educational themes	Common assessment themes	Common barriers/Challenges	Possible solutions for alignment with proposed framework
Interprofessional education	<p><i>Introduced/exposed to understand teaminess</i></p> <ul style="list-style-type: none"> • Foundations of ipe and patient safety course <p><i>Reinforced/immersion to demonstrate teaminess</i></p> <ul style="list-style-type: none"> • Simulation (pharmacy & nursing) • Clinical immersion experiences <p><i>Mastered/competence to practice teaminess</i></p> <ul style="list-style-type: none"> • Rural campus IPE experiences • Group projects 	<ul style="list-style-type: none"> • ICCAS† <ul style="list-style-type: none"> • Clinical skills exams • End of rotation assessments • Clinical reflection papers • Group assessments • Lacking assessment of benefits to patients 	<ul style="list-style-type: none"> • Significant variation in “teaminess” across clinical sites • IPE lacking across all training years (missing in dentistry, medical physics, & dietary) • Lack of elective time to take IPE courses (occurs in dentistry, radiation therapy, medical physics) • Variation in formal rigorous assessment approaches (medicine and pharmacy does more; dentistry, radiation therapy, medical physics do less. • Variation in schools’ commitment to IPE • Lack of resources for IPE • Scheduling challenges 	<p><i>Introduced/exposed to understand teaminess and reinforced/immersion to demonstrate teaminess</i></p> <ul style="list-style-type: none"> • Integrate IPE into core courses/clinical experiences <p><i>Reinforced/immersion to demonstrate teaminess</i></p> <ul style="list-style-type: none"> • Assess clinical sites using the ace-15* & tailor faculty development to strengthen how team-based care is delivered <p><i>Other</i></p> <ul style="list-style-type: none"> • Centralize administration of common assessment tools • Create IPE enrichment week • Revise economic model for IPE support • centralize scheduling
Team-Based Care Education (TBCE)	<p><i>Reinforced/immersion to demonstrate teaminess</i></p> <ul style="list-style-type: none"> • Clinical immersion experiences <p><i>Mastered/competence to practice teaminess</i></p> <ul style="list-style-type: none"> • Management/leadership or quality improvement courses 	<ul style="list-style-type: none"> • End of rotation assessments • Clinical reflection papers • Quality improvement exercises helps assess benefits to patients 	<ul style="list-style-type: none"> • Lack of elective time for tbce courses (occurs in dentistry, radiation therapy, medical physics) • Lack of resources for TBCE • Lack of time/burnout 	<p><i>Introduced/exposed to understand teaminess and reinforced/immersion to demonstrate teaminess</i></p> <ul style="list-style-type: none"> • Integrate TBCE into core courses/clinical experiences <p><i>Other</i></p> <ul style="list-style-type: none"> • Revise economic model for TBCE support

Notes: †ICCAS: Interprofessional Collaborative Competency Attainment Scale; *ACE-15: Assessment of Collaborative Environment.

ation therapy have curricula that do not include the necessary elective time that would allow students to take IPE courses, which means it is even more important to embed IPE into core clinical courses, as indicated in Table 1.

Significant variation existed in assessment approaches for team function. For example, the School of Medicine conducts ongoing assessments in real time as part of its workplace-based assessment program, while other programs do comparatively little or less rigorous formal assessment of team-based care or IPE. The deans admitted that variation in commitment to IPE exists across schools, in part due to lack of time/resources and scheduling complexities that could put students from different disciplines on the same clinical education schedules, so they could work together as students.

Discussion

In this study, we elected to focus on intra- and interprofessional teamwork because teamwork is both an IPE and core university-wide competency required of all clinical graduates. By focusing on this, we were able to unite key stakeholders, namely education deans and program directors, from our institution who may not have otherwise elected to participate in such a rigorous and time-consuming process. When developing this framework on interprofessional teamwork, we were operating, in part, by an expectation that accreditation requirements for IPE among all health professions education programs were on the horizon. However, since beginning this work over six years ago, we have learned that successful IPE need not necessarily be standardized to be effective. Our institution, like all others, has a unique set of contexts that surround the didactic and clinical learning environments. What works for us may not work for others. However, the process we engaged in can be applied in other settings and our framework can be used to inform the development of other frameworks while meeting the specific needs of the respective institutions.

Curricular frameworks are needed to consistently convey definitions of quality educational activities and their related assessments across programs to ensure the students can achieve the required competencies. While we feel that our approach to curriculum assessment and tracking is strong with our in-depth reviews of the IPE curriculum across schools, we emphasize that it is in the clinical rotations where greatest variation exists in providing and assessing team-based care for students to observe and experience. How to assess the continuum of IPE and TBC, as students' progress to greater levels of development, when the clinical environments vary so widely remains our greatest challenge. Further, formal clinical interactions may not be where true IPE takes place, but instead, informal social interactions/experiences across health profession students may have more impact, making the assessment of IPE even more challenging, as we discovered in prior work [22]. To address this particular challenge, we developed a tool to capture IPE that occurs among learners on clinical rotations, which we have described elsewhere [23]. Not surprisingly, we found significant variability exists in integrating IPE/TBCE into the clinical courses/rotations and that program evaluations and assessments of students need enhancement. These insights are especially true with regards to determining the *direct* benefit team-based care edu-

cation and IPE have on patients and population health, which is a crucial focus of our current work.

The framework created and presented here provided guidance for a consensus-based approach to interprofessional education in our institution. Our schools and programs are now closer to working with a shared mental model with which to flexibly assess and track student progression along a continuum. As previously noted, our first important step was getting all 89 programs at OHSU to settle on one set of 10 core competencies for all graduates, of which teamwork was just one. Creating a framework to prioritize and then assess even just one of those competencies was an important step.

Future recommendations

The interviews were most helpful in looking at programmatic attainment of teamwork and where concepts were taught and applied; however, the study did not address how to assess individuals versus cohorts within this framework. Individual assessments remain challenging in that paired or group interactions are typically linked to the performance of all team members and it can be difficult to isolate individual skills, attitudes, and performance. Assessments of individuals throughout the framework will require the creation or adoption of multiple tools across learning environments to ensure that IPE goals can be attained across the exposure and immersion concepts, and final assessments of graduation competency will need refinement.

Taking the next step toward developing a common framework for tracking student progress on each of the other nine competencies is already underway. The uniqueness of each health profession represented in our 89 programs necessitates embedding flexibility in how students are assessed and monitored. For instance, how shared decision making is assessed for a dental student in the outpatient clinical setting might look different for an undergraduate nursing student completing a clinical rotation in the inpatient hospital setting. In the end, our initial effort to develop, evaluate, and refine a common framework to assess teamwork is a necessary leap forward in the development of a shared and comprehensive interprofessional approach to assessment called for by many emerging health professional education standards [24,25].

Limitations

Though we feel this article makes important contributions to the IPE literature, there are some notable limitations. The environment where IPE principles are taught is difficult to standardize content received, and thus learned by students. For example, while course directors do their best to ensure IPE Foundations is taught in a uniform manner, the actual content delivery may vary significantly among the multiple small groups due to the variation of interprofessional faculty facilitators and student group interactions/experiences. To address this limitation, we now provide faculty development through in-person or on-line trainings on IPE concepts, communication, and small group facilitation in preparation of the IPE Foundations course.

Conclusions

As health professions training is moving away from silo-based education, new opportunities exist to study IPE competencies in novel ways within and across programs over time. Additionally, while IPE in the clinical setting can be challenging to control and/or assess, the benefits of training students in real-world team-based settings are desired. The development and implementation of an assessment framework to help guide interprofessional educators in the creation and alignment of new interprofessional curricula to meet the needs of a health profession student as they step into collaborative, team-based care. As the landscape of healthcare relies more and more on teams to provide high quality cost-effective care, healthcare educators need to ensure their graduates have the developmental interprofessional competencies necessary to be leaders in the transforming healthcare system and ensuring optimal patient outcomes.

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