5 Developing a Novel Health Interprofessional Education Curriculum: Strategies and Implementation

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5.1 Introduction

Evidence continues to emerge globally in favor of interprofessional education as the critical first step in developing the interprofessional collaborative competencies to graduate a collaborative practice-ready workforce [1, 2]. Today, the value placed on interprofessional practice permeates all facets of worldwide policy and practices in the delivery of health profession education and services [3]. Despite widespread acceptance, it has been challenging integrating IPE into curriculum for health profession education [3]. The mostly used definition for IPE is the one defined by the Centre for Advancement of Interprofessional Education (CAIPE) as "occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care" [4]. This chapter will apply Biggs' 3P model of learning and teaching in terms of presage, process, and product which provides a useful approach when considering developing and evaluating an interprofessional curriculum [5–8].

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5.2 PRESAGE: The Learning Context

Interprofessional education (IPE), alongside competency-based education and the integration of information technology facilitated education are among the transformative developments to health profession education in the last decade [9]. IPE is a necessary curricular component at the pre-licensure level to prepare a "collaborative practice-ready" future health workforce who are better able to address local health needs [1]. Needs assessments are required to understand the status of IPE in the institution, identify the drivers necessitating the inclusion of IPE in the curriculum, and to explore facilitators and barriers to be the basis for moving forward. Presage factors define the context in which the learning experience takes place and will have an impact on IPE design, delivery, and outcomes [10]. Freeth et al. in their self-help guidebook evaluating IPE suggested asking questions focused on presage concerning the drivers for IPE within a particular institution, learner and champion characteristics, facilitators and challenges affecting IPE planning and delivery that might have an impact on the learners [11]. These questions include:

- Why was IPE initiated in this particular organization?
- What learner characteristics allow them to benefit from this approach to learning?
- Who, if anyone, championed the IPE and how did this affect the planning and delivery of the education?
- What are the pressures that could/do inhibit effective delivery of the education?
- Where are the challenges to establishing IPE as an accepted part of mainstream provision in this organization and for these particular groups of learners?
- What tensions, if any, exist within the planning and delivery teams.

A "one size fits all" approach does not work for IPE and hence it is important to learn from others' experiences. It is important to appraise existing models of IPE to identify which model would work within respective programs and adapt it to the local context [1, 12]. The barriers to IPE implementations are widely documented in the literature, and have been categorized into three different levels: government and professional, institution, and individual [13]. The institutional barriers can be further categorized into structural, cultural, financial, and curricular issues [9]. The needs assessment must also identify future healthcare practice needs and demands taking into consideration the local context, global health, advancement in health technology, and educational reforms [14].

In a recent scoping review exploring models of IPE for health profession students, a popular starting point for integrating IPE within health profession curricula included:

- A benchmarking exercise to map competencies of the health profession curricula to international IPE competency frameworks and identify areas of strengths and weakness within their curricula [12].

- The establishment of IPE steering committee that includes various stakeholders that are IPE champions to advocate for IPE and guide the curriculum development of IPE [12, 14]. Advocates need to include representatives of the different health professions. Institutional support with dedicated structure, shared institutional vision, and funding are of crucial importance to ensure sustainability [14].

The IPE program must ensure learning outcomes and expectations are clearly defined and understood by learners. A number of interprofessional competency/capabilities frameworks exist that could serve as the basis for developing an IPE curriculum. In a recent scoping review, the most frequently used frameworks were the Canadian National Interprofessional Competency Framework followed by the Core Competencies for Interprofessional Collaborative Practice.

- The National Interprofessional Competency Framework developed in Canada in 2010 by the Canadian Interprofessional Health Collaborative required for effective interprofessional collaboration which is defined as: "A partnership between a team of health providers and a client in a participatory, collaborative and coordinated approach to shared decision-making around health and social issues" [15]. It includes six competency domains which are as follows:
  - Role clarification.
  - Team functioning.
  - Collaborative leadership.
  - Interprofessional conflict resolution.
  - Interprofessional communication.
  - Patient/client/family/community-centered care.

  Each domain contains a competency statement, descriptors, and explanation/rationale. The knowledge, skills, attitudes, and values that collectively shape the judgements necessary for interprofessional collaborative practice are highlighted by six competence domains [15]. Three factors can influence how the framework applied and these include the learning or practice context, the complexity of the situation and the need for quality improvement.
- The core competencies for interprofessional collaborative practice were developed originally in 2011 and updated in 2016 in the USA. Four competencies listed needed for effective collaborative practice:
  - Values/Ethics for Interprofessional Practice.
  - Roles/Responsibilities for Collaborative Practice.
  - Interprofessional Communication Practices.
  - Interprofessional Teamwork and Team-Based Practice.

  Each domain has a general competency statements and related sub-competencies. Competencies are intended to be patient and family centered, community and population oriented, integrated across the learning continuum from education to practice settings, and applicable to all health professions [16].

IPE tends to be integrated into health profession curriculum either as [12]:

- Extra-curricular or partially integrated curriculum designs that do not require major restructure of profession-specific curricula including elective Interprofessional Enrichment Activities, elective IPE courses, and IPE clinical placements.
- Integrated curriculum designs throughout the whole program based on a phased curriculum model that is continued beyond graduation in the form of continuing professional development.

However, it is important to ensure IPE is an integral and well-developed component of the health professions curricula and not optional.

5.3 PRESAGE: Teacher and Program Developer Characteristics

Two critical features of this presage element are essential for the success of IPE activities and these are: the quality of IPE facilitation experience and faculty development for facilitators [17]. IPE facilitators and champions are of great importance to the success of effective and high-quality IPE activities [18]. To ensure the effectiveness of IPE sessions, several attributes are needed including commitment to IPE concepts and values, preparedness and readiness for IPE facilitation, experiences in IPE facilitation, understanding of team functioning and group dynamics, ability to handle conflict resolution [18–21]. Furthermore, for IPE to be effective, educators must engage in, create, and ensure positive role modeling for interprofessional collaboration for students [9].

Regular faculty development sessions focused on the importance of IPE in teamwork and collaboration, IPE core principles, development of core facilitation skills for interprofessional teams, ensuring a balance between uniprofessional and interprofessional identity are all crucial faculty development topics to ensure facilitators are equipped with the needed skills to facilitate effectively [9, 18, 22].

5.4 PRESAGE: Learner Characteristics

The delivery of IPE may be impacted by a variety of learner characteristic-related factors, including attitudes towards IPE, desire to engage in IPE, perceived professional hierarchies and stereotypes, and health profession background [17]. Furthermore, gender, age, previous IPE experiences are considered as influential student characteristics impacting students' attitudes and perceptions of IPE [17]. Student-led IPE initiatives can also have an impact on students' willingness to participate in IPE activities and become IPE advocates [23].

Application of the 12 steps and strategies for introducing IPE into pre-registration health profession education from Qatar are as demonstrated in Case Study 5.1 [24]. An additional step was added at the end related to sustainability.

Case Study 5.1 Application of Steps for Introducing Interprofessional Education into Health Profession Education: Case Study from Qatar [24–31]

Step 1: get started	• Driver: Accreditation was a key driver for integrating IPE with health profession curricula at Qatar University. It started at the College of Pharmacy where its Bachelor of Pharmacy degree program is fully accredited by the Canadian Council for Accreditation of Pharmacy Programs (CCAPP). As part of CCAPP accreditation standards, there was a need to demonstrate evidence for creating IPE opportunities within the pharmacy curriculum • Establishing a committee: An interprofessional education committee was established in 2014 at the College of Pharmacy and then moved to QU Health level in 2017. The committee included representatives from all the health professions programs in Qatar University and Qatar. Currently, representatives include members from QU Health which includes five health colleges: College of Pharmacy, College of Medicine, College of Dental Medicine, College of Nursing and College of Health sciences with its four programs: Biomedical Science, Public Health, Human Nutrition and physiotherapy. In addition to representatives from Weill Cornell Medicine in Qatar, University of Calgary—Qatar and University of Doha for Science and Technology • Needs assessment: Readiness and the perspectives of key stakeholders towards IPE and collaborative practice was assessed. These included: faculty members, students, and practicing health professionals. Findings from these studies were used as the basis for developing IPE initiatives • Faculty development: In 2015, IPEC hosted the First Interprofessional Education Symposium in Qatar for faculty members to equip them with the knowledge and skills needed to design and deliver IPE within the different curricula. This was followed by hosting the first Middle Eastern conference on Interprofessional Education
Step 2: Adopt a definition, values and principles	• Definition: IPEC adopted the Center for Advancement of Interprofessional Education (CAIPE) definition and core values and principles
Step 3: Formulate outcomes	• Learning outcomes: These were based on the IPE shared competency domains and statements adapted to the Qatar context. These included interprofessional communication; role clarification; patient-centered care; and shared decision-making
Step 4: Decide who is going to participate and select the students and faculty	• Initially, IPE was mandatory for pharmacy students and optional for all the other health professions. However, with the move of IPEC to QU Health level, gradually IPE became an integral and well-developed component of the health professions curricula at Qatar University
Step 5: Select themes	• IPE topics: In consultation with IPEC members, themes chosen based on overlapping curricular topics appropriate for the: Intended level, IPE event and professions involved

Step 7: Determine levels and stages	• IPE levels: These were based on the University of British Columbia model which takes into consideration the learning needs across their professional years. The model is based on three main categories: Exposure, Immersion, and Mastery • IPE program: – First professional year (exposure level): introducing IPE with first topic focused on roles and responsibilities for the fall semester and on mental Health and wellbeing for second semester – Second professional year (exposure level): smoking cessation and being an effective team player in the second semester – Third professional year (immersion level): case-based discussion on diabetes in the fall semester and case-based discussion on pneumonia and antibiotic stewardship for the spring semester – Fourth professional year (immersion/mastery level): vaccination and COVID-19 vaccine hesitancy in the spring semester and part of clinical placement across the year • IPE passport program: in 2020, IPEC established the IPE passport program. Benefits of the IPE Passport: – To motivate students to attend, participate and engage in the IPE activities as part of a structured program – To enables students to participate in IPE activities as part of their courses in a progressive level tailored to their professional year – To meet the IPE shared competencies and enhance learners understanding of IPE concepts and principles – To demonstrate that learners have met the IPE requirement
Step 6: Be collaborative in case and activity design and mix up learning methods	• IPE activity development: the content of each of the IPE activity is developed collaboratively. There is a lead for each activity that work with other representatives to ensures the activity is appropriate to the participating professions. Various learning methods are employed including case-based discussion, simulation and experiential learning
Step 8: Facilitate the learning Step 9: Strive to ensure a positive student experience and raise students' expectations	• IPE facilitation: Each IPE activity has a lead facilitator that oversees the planning and delivery for the IPE session. For each IPE session, students are divided into small groups of interprofessional teams (7–10 students) and each group is assigned a facilitator. Facilitators are usually faculty members, alumni and in some cases senior students. Prior to each IPE activity, an orientation takes place with all participating facilitator with tips to follow on best practices in facilitating an IPE session including the inclusion of an ice breaker and opportunity for interprofessional interactive learning

Step 10: Assess and utilize feedback	• Assessment: Though IPE was integrated in the different health profession curricula at Qatar University, the methods to assess the learning outcomes varied across the colleges such as reflective accounts in College of Pharmacy and College of Health Science, portfolio in College of Medicine and Dental Medicine and MCQs and short answers in midterm and final exams in College of Pharmacy for introductory IPE activities. Reflective accounts and portfolio were usually post reflection of the IPE activity they participated in or related to an IPE task within their clinical placement. The variation and absence of assessment of IPE learning outcomes across the different profession had an influence on student engagement for some of the participating profession affecting students' ability to write reflective account post the event. Therefore, discussion with IPE members took place to reflect on our assessment strategies and work towards unifying assessment across the different health colleges to ensure: – Similar IPE exposure to all QU Health students ensuring equal opportunities to all – Structured integration/ assessment of IPE – Graduating capable and competent collaborative practice ready workforce who are equipped with the skills to work interprofessionally • For the IPE passport program, we designed and implemented a comprehensive assessment plan that targets the goals and educational competencies of IPE in discussion with all the participating professions. All health profession students must now complete a minimum of four IPE activities with at least one at each level of exposure, immersion, and mastery. For each IPE activity, students must submit a reflective assignment as per their assigned course/ module to add the event to their passport. These assignments were graded by the respective colleges with a score assigned to the course/ module. The assessment was mapped to the University of British Columbia IPE model which is based on three key concepts: Exposure, Immersion, and Mastery. A rubric for each level was developed
Step 11: Evaluate the intervention	• A pre-post intervention quantitative research design including the use of validated instruments, qualitative studies and mixed method studies have been used to evaluate IPE initiatives. Currently, we are working on a plan to evaluate the IPE passport program and the comprehensive assessment plan introduced. In addition to assessing the impact of IPE program on learners and graduates
Step 12: Share your experience	• Since 2014, there has been significant scholarly output with peer-reviewed articles published, by IPEC members, regarding IPE in Qatar and the Middle East. In addition to presentations at national and international conferences

Sustainability	• Dedicated IPE unit: In 2017, Qatar University established a health cluster, referred to as QU Health which is an umbrella of the five health colleges at Qatar University. Colleges work together to maximize efficiencies prepare 'competent graduates capable of shaping the future of health care in Qatar' [32]. IPE is now part of QU Health strategy and in 2022 a dedicated office for IPE has been established. The office is led by a section head and two academic specialists (one for pre-clinical phase and the other to focus on IPE clinical placements). In addition to an administrative specialist • IPE passport program: Compulsory for all health profession students at Qatar University • Leading the establishment of Interprofessional collaborative Arab Network which is an emerging network part of the global Confederation for Interprofessional Education and Collaborative Practice • Will be hosting the 11th International Conference on Interprofessional Education and Collaborative Practice (IPECP), All Together Better Health (ATBH) XI in November 2023

5.5 PROCESS: Teaching and Learning Methodologies

Constructive alignment is required between defined learning outcomes, teaching and learning activities, and assessment methods [33]. Constructive alignment ensures that learning outcomes are directly matched with the activity and to pertinent assessment tasks when creating interprofessional activities. Designing teaching and learning activities aligned to learning outcomes for interprofessional learning, student interaction, and a mix of disciplines, begin with the adoption or development of a competency framework (Case Study 5.2).

Case Study 5.2 Development of the Collaborative Competency Curriculum Framework at Monash University

The Faculty of Medicine Nursing and Health Sciences at Monash University is large, with around 13,000 students across five campuses in Victoria, Australia, a campus in Malaysia, and numerous international partnerships and co-operative ventures. The health professions represented in the Faculty are Medicine, Midwifery, Nursing, Nutrition and Dietetics, Occupational Therapy, Paramedicine, Pharmacy, Physiotherapy, Psychology, Radiography, Radiation therapy, Sonography and Social Work. Despite multiple successful IPE initiatives, the Faculty did not have a structured IPE framework that afforded integration of these activities in the curriculum. In 2016 the process to develop a framework was initiated with the appointment of a faculty lead and formation of a Collaborative Care Curriculum Committee [34].

Appointment of a committed and knowledgeable interprofessional leader, with protected time, clear agendas and outcome-focused deliverables, facilitated the project—(Maddock et al. 2019 [35])

A six-stage process was undertaken (Maddock et al. [35]).

1. **Group formation**-nominated representatives from all programs, a patient advocate and student representatives.
2. **Review of existing literature.**
3. **Synthesis of accreditation documents**-multiple themes were inducted, and consensus reached on 4 themes through group discussion.
4. **Final themes and student learning outcomes**- additional outcomes added from student and consumer feedback.
5. **Working with multimedia**-design representation of framework, produce documents and facilitate communication across faculty.
6. **The Monash University FMHS Collaborative Competency Curriculum Framework**- academic overview briefing paper and an explanatory document for students and the wider community were approved for dissemination.

The objectives of the Collaborative Care Curriculum [34] are to:

- Establish an overarching education framework for collaborative practice, learning outcomes at novice, intermediate and entry to practice levels.
- Support the development and promotion of interprofessional learning opportunities within profession specific curricula.
- Support the pursuit of educational research in the design, delivery and evaluation of the Collaborative Care Curriculum.
- Advise on the development of educational resources to support the Collaborative Care Curriculum learning outcomes.

The curriculum is structured as a continuum rather than aligned to years of study. This enables the development of targeted learning programs, where the curriculum is used to plan in relation to learning needs, rather than assumed knowledge, skills or behaviors. Collaborative learning outcomes from accreditation documents for each profession formed the starting point for this curriculum framework. Existing interprofessional curriculum frameworks were sourced; the Canadian CIHC National Interprofessional Competency Framework and Curtin University Interprofessional Capability Framework were key references [34].

Student learning outcomes were devised in four themes: Person-centered care; role understanding; interprofessional communication; and collaboration with and across teams

Consumer representatives were not in agreement in their preference for the word 'client', 'patient' or 'person'. Ultimately, 'person' was agreed upon by the group because of the tendency to align the word 'patient' with illness and 'client' with consumer, rather than active participant—[35]

The achievement standards for the student learning outcomes are presented in three levels reflecting the emphasis in each theme within the stage of learning:

- Novice (first year of an undergraduate degree).
- Intermediate (second or third year of an undergraduate degree, or first year of a graduate entry).
- Entry to practice (final year).

Students felt that any new framework should replicate the structure of existing curriculum documents, and be uncomplicated for students to grasp the main concepts and skills required for graduation—[35]

Keys to the successful development of the framework included:

- reference to profession specific accreditation requirements,
- incorporating patient and student perspectives, and,
- working with multimedia to produce clear professional documents.

The outcome of the six-stage structured process was the establishment of an agreed framework for use across professions when planning an interprofessional curriculum. Shared language, vision and priorities were developed in this process [35]

Replicating the proposed framework development process at other universities, or in countries outside of Australia, would require additional consideration of the range of professions represented at the university, and the variations in professional groups and accreditation documents—[35]

IPE curricular frameworks support the development of appropriate teaching and learning (T&L) activities and assessment strategies to facilitate alignment with outcomes. They are often devised with three levels: beginning, intermediate, and the advanced. These levels are labeled according to the stage of the student program and the depth of the IPE teaching and learning process and expected outcomes.

1. Early/Exposure – an IPE learning activity that meets the minimum education requirements related to interprofessional education and collaborative practice concepts and is case-based or problem-based but does not need to involve patients/clients either simulated or actual. The exposure level provides students with an introduction to the principles of interprofessional collaborative practice.

2. Intermediate/ Engagement - an IPE learning activity that builds on previous learning about the concepts of interprofessional education and collaborative practice and involves patients/clients either simulated or actual, affording development of teamwork, collaboration, and communication skills. Activities may involve simulation, and this may be combined with early clinical exposure in community settings.
3. Later/ Immersion - an IPE learning activity that builds on previous learning about collaborative practice and is based in a clinical workplace where students participate in usual care; the term 'complex immersion activity' has been used to denote an extended clinically based module [36]. This level is also referred to other frameworks as Competency or Transition to Practice and students are supported to develop interprofessional communication and teamwork skills while working in clinical settings with patients and other health professionals.

To ensure that IPE competencies linked to communication, teams, and collaboration are attained, it is important to choose appropriate T&L methodology.

All IPE learning activities must have as a minimum prerequisite:

- Full involvement of students from two or more professions; and of facilitators from two or more professions wherever possible.
- At least one IP learning outcome must be explicit to students and staff at the outset.
- The learning must be predominantly interactive or experiential.
- There must be explicit assessment of at least one IP competency domain.

These requirements for T&L methods in IPE reflect the definition of IPE mentioned earlier [1].

In a systematic review investigating the T&L approaches for pre-registration programs, the most often reported teaching and learning strategies for IPE were simulation-based education (SBE), e-learning, and PBL [37]. There are multiple other T&L methods cited in the literature but in the following section, a sample of these will be included to illustrate the diversity of options for various levels of the curriculum. Although T&L methods are presented at different levels, none are bound to that level and educators are best placed in their own context to decide where a particular activity works best and is aligned to outcomes and assessment methods. It does seem that to prepare novice students or more experienced students with less clinical exposure to patients and other health professionals' practice, there is a need for didactic content to be delivered about person-centered care, drivers of collaborative practice, and roles and responsibilities of various health professions with a system focus. Case-based learning appears to be constructive at any level as is the opportunity for practice-based learning where there are explicit opportunities for reflection on interprofessional competencies.

5.5.1 Beginning/Exposure

At this stage of an interprofessional curriculum, the concepts, and drivers of interprofessional education and collaborative practice are introduced.

In this early phase, multiple programs are included which often cater to large cohorts of students. Technology assisted T&L methods may be useful at this stage. E-Learning IPE activities might include virtual games, discussion boards, live web-based seminars, web-based discussion forums, and virtual environment interactive exercises. At the University of Queensland in Australia, the blended format of a flipped classroom approach is used to deliver a core first year course in all programs. In the flipped classroom approach, there is directed self-learning assigned before the class comes together for discussion and interactive exploration. The multidisciplinary approach to the course's delivery seeks to provide students with a basic understanding of the variety of health professions' responsibilities within Australia's health system and how they contribute to individuals' and the community's health and well-being. By using a flipped format, the course is delivered to students in a way that allows them to independently engage with online learning resources while also meeting face-to-face with peers and teaching staff once a week in tutorials [38].

At the Université Laval in Canada, the first portion of each of the three courses in the curriculum is structured as self-study online learning, while the second portion adopts an action learning strategy where students work in small groups. This design is also inspired by the flipped classroom paradigm. As a result, students have the chance to collaborate while addressing real-world problems and considering their actions. Students are coached in the classroom by experienced clinicians from multiple participating disciplines who have participated in facilitator training to promote interprofessional learning [39]. The advantage of these online methodologies is their ability to be scaled up and to be used during situations, such as experienced during the pandemic, when face to face teaching may be suspended.

As students are introduced to various professions during IPE activities in the preclinical curriculum, they learn that there is a group of healthcare experts they will eventually collaborate with, each with their own set of skills. While gaining exposure to their distinctive skill sets, unique perspectives, it becomes clear to students, with facilitator and peer guidance, that there are numerous shared bodies of knowledge, abilities, and ideals throughout the various health professions. Various IPE exposure actions are possible even in the early stages of an IPE curriculum. For instance, one occupation (and related students) may consent to early career learners from other disciplines shadowing them in a community setting. Supporting medical students to work as a pharmacist's assistant alongside pharmacy students is one instance. As each profession's students learn side by side while participating in typical clinical activities, they can learn to collaborate with others.

5.5.2 Intermediate/Engagement

In the intermediate phase of an interprofessional curriculum, concepts of IPE and collaborative practice are further developed and the competencies of interprofessional communication and teamwork applied in practice.

SBE has been frequently employed as a transitional phase between basic learning components and clinical workplace learning. At Griffith University in Australia, SBE activities are designed to give students a realistic taste of working in an interprofessional team in a supervised and safer setting. Interprofessional student teams are formed, and these teams collaborate on the assessment and management of simulated patients. Student teams should ideally be able to collaborate for long enough to experience a variety of team dynamics and interactions. This is accomplished either through a single lengthy simulation or a string of shorter-duration regular simulations [40].

Simulation scenarios are designed to afford students the opportunity to demonstrate to their peers the knowledge and skills unique to their field of study. An interprofessional workgroup of faculty from Thomas Jefferson University in the USA with experience in geriatrics and collaboration dynamics devised a clinical skills scenario [41]. This learning exercise was designed to give students the chance to work in interprofessional teams and to highlight the crucial roles that all healthcare providers play in providing for a patient and family. The development of the clinical case scenario and the definition of the learning objectives were the first steps in constructing the activity. The activity's specific learning goals required students to show that they could communicate and work collaboratively with patients, family members, and co-workers, construct a care plan with others, and reflect on the experience. A patient chart and a film were made by the faculty workgroup to demonstrate the case of the fictitious patient. The case of a 76-year-old patient admitted with left-sided hemiparesis because of an acute stroke was recorded in the clinical scenario's simulated chart. A doctor, nurse, occupational therapist, physical therapist, pharmacist, and social worker were each seen evaluating the patient in the acute care setting in the 30-minute interprofessional movie [41]. Such an activity that is case-cased, person-centered with a need for multidisciplinary teamwork affords for students to learn with, from and about each other and for that learning to result in a collaborative plan.

Several universities also use structured IPE, which includes patient-centered case studies for student debate [42]. To maximize the learning opportunities for the students from these interactions, small groups were formed that included a representative from a real work environment. Discussions about various patient care strategies not only emphasized the value of interprofessional collaboration (IPC) but also improved the educational process. The idea of patient and caregiver partnership in care is one distinctive aspect of this IPE curriculum at the University of Montreal in Canada [42]. Patients were trained to co-facilitate interprofessional discussion workshops and patients' representatives were included in the course preparation process. They provided students with input on how to use and integrate the patient partnership idea from the perspective of the patient.

Case-based learning interventions can be used to develop interprofessional collaboration competencies across multiple domains and at all levels [43]. Case-based learning teaches students how to deal with the dynamics of interprofessional teams and to cultivate shared values and is also considered an effective teaching strategy to promote role identification, team communication, and team functioning. Problem-based learning (PBL) is the perfect vehicle for IPE case-based learning where a case that would be managed by a multidisciplinary team can enable discovery and discussion of roles and responsibilities with the patient at the center of the care team. The utilization of scenarios, or actual cases, as learning prompts and as facilitators of student interaction, significantly contributes to improving IPE program effectiveness.

A constructive way to ensure centrality of the patient or service user and prevent discipline division is to use a common framework to present a case such as the World Health Organization's International Classification of Functioning, Disability and Health (ICF) [44, 45]. The shared language and conceptual framework based on functional aspects of a case enhances a collaborative approach to a case presentation which transcends disciplinary boundaries. Students at the University of Stellenbosch in South Africa used the ICF in their approach and management of patients on clinical placements [46]. Students, preceptors, and patient have found that this framework has enabled patient-centered care. Moran et al. [45] proposed that the ICF framework can be introduced at any of the stages of an interprofessional curriculum and affords opportunities for educators to embed principles and values of collaborative practice in T&L activities to facilitate interprofessional learning. The MAGPIE model, informed by the ICF is also recommended for use as a process to support students to design and reflect on collaborative care and can be used in work-based learning activities. This model can guide case-based teaching as students follow the steps to **m**eet, **a**ssess, **g**oal-set, **p**lan, **i**mplement, and **e**valuate a person's presentation [45].

Team-based learning (TBL) has been used to support interprofessional learning, used to build collaborative capability in students [47]. During the process of TBL, health professions educators from different disciplines, clinicians, and scientists can role model interprofessional teamwork. The small group and task-focused characteristics of TBL provide an opportunity to develop collegiality and collaboration among health professional students at an early stage in healthcare curricula. Early years medical and physiotherapy students at the University of Sydney in Australia participated in a musculoskeletal system focused TBL activity. Students appreciated the opportunity to learn about the curriculum of another healthcare discipline, and their scope of practice; gain multiple perspectives on a patient case from different disciplines; and recognized the importance of multidisciplinary teams in patient care. The important elements of across discipline interactive problem solving, and relevance to patient-centered care for participant groups, along with skilled content design and interprofessional facilitation, are demonstrated in appropriate choice of T&L activities for interprofessional learning.

Existing curriculum materials can be accessed to supplement locally developed IPE curricula. TeamSTEPPS is an evidenced based initiative developed by the Agency for Healthcare Research and Quality (AHRQ) in the USA. Based on

teamwork principles, the materials can be accessed freely and support understanding of team roles, effective interprofessional communication, and conflict management. Three educational institutions in the USA used TeamSTEPPS alongside the IPEC Competency framework to inform IPE curricula and to support faculty development [48]. Although the materials are implemented at each institution in slightly different ways, T&L methods of active small group learning with debriefing and reflection, facilitating constructive discussion across disciplines, are commonly used. Students participate in these activities using scenarios related to interprofessional relations with a patient-centered focus based on developing collaborative practice-ready health professionals [48].

5.5.3 Later/Transition to Practice/Competency

At this stage of the interprofessional curriculum, students will be expected to demonstrate developing competencies in IPE and collaborative practice.

5.5.3.1 Practice Placements

Practice placements offer work-integrated learning and support the application of theory learned to practice. A placement is any period where a student is in a practice setting. Students must be active members of the clinical team to experience team processes and to develop an understanding of how the needs of the patient are met collaboratively. It is possible that students may be placed in multidisciplinary teams and further develop disciplinary competencies without developing collaborative competencies. It is essential to the effectiveness of a placement which includes an interprofessional learning objective that there is explicit reflection on team roles and processes so that collaborative competence is recognized and participated in.

A team-based interprofessional learning practice placement (TIPP) has been defined as "a dedicated and prearranged opportunity for several students from health, social care and related professions to learn together for a period of time in the same setting as they perform typical activities of their profession as a team focused on a client-centered approach" [49]. Students from different disciplines and programs who are present at the same time and site can collaborate on various activities including ward rounds, patient admission and assessment, management planning, and case conferences. Students who are co-located in the health service may conduct service improvement projects and review and revise placement resources while learning and working together. Elements to consider when planning a TIPP are the learning and collaboration culture of the placement site partner, support for the placement from all stakeholders, ways that students will consolidate their learning and inclusion of a quality improvement process [49]. Essential to success of interprofessional learning on practice placements are opportunities for students to learn and work together that reflect authentic practice. Affording specific activities to ensure reflection on interprofessional practice experiences is also essential to building the student's identity as a health professional team member as well as their uniprofessional identity.

5.5.4 Interprofessional Training Wards and Student-Led Clinics

Whole wards and clinics may be serviced by a multidisciplinary group of students supervised by health professionals. Managing patients in these settings affords students from multiple disciplines the opportunity to learn and work together but also in many cases to offer healthcare to those who may not have service access otherwise. The details of the teaching and learning methodologies in these settings has not been clear in the published studies ([50]. In a systematic review of student-led clinics, studies reported on the students' experiences and perceptions of interprofessional learning. It was found that students gained better understanding of their own role and of others, positively perceiving the opportunity to work together [50].

Interprofessional training wards (ITWs) have been established in Sweden, United Kingdom, Australia, and Canada. The composition of ITWs was found in most countries to be informed by the original Swedish model and including medical and nursing students with various combinations of allied health disciplines [51]. There was again, positive reception of interprofessional education and practice reported in evaluations of ITWs but issues have been raised about the limited length of time and unclear goals being constraints that require consideration [51].

5.5.5 Managing Challenges: Intense and Distributed Methods

For interprofessional T&L to be included regularly and sustainably in multiple programs, it is necessary for approaches to curricula inclusion to be varied and nimble. One solution is to have a regular intense program. At the University of Maryland Baltimore (UMB) in the USA, IPE Day is hosted annually by the UMB Center for Interprofessional Education. The IPE Day brings together students from Health, Law, and Social Services to learn and work together on a complex case. The case is presented by a community member with lived experience or a simulated patient (an actor). In 2022, students attended a panel of faculty and students who presented on their experience of working in an interprofessional clinic sharing components of collaborative care. The case is then presented, and students are divided into smaller multidisciplinary groups. They interact with the simulated patient and consider not just the health of the person but how that impacts on all aspects of life. Learning and working together across disciplines and professions improves their understanding of collaborative person-centered problem solving [52].

In larger institutions, campuses may be distributed. Regional and rural campuses offer excellent opportunities for facilitators and students to develop interprofessional rapport, particularly if they are collocated in a smaller health service [53]. This does pose challenges with participating in IPE T&L activities organized and delivered on the main campus. Technology assisted solutions are possible [54] but there are also multiple practice and project-based activities that can be done locally [55, 56].

Table 5.1 Constructive alignment examples in an interprofessional curriculum

Learning objective	Teaching and learning approach	Assessment task
Describe role, responsibilities, and practices of own and other professions	Flipped classroom introductory lecture followed by small group learning	Reflection and short answer
Recognize own limitations and seek interprofessional involvement as indicated	Interprofessional case-based simulation scenario (e.g., Family meeting with Multidisciplinary Team)	Mock referral requests to appropriate health professionals
Synthesize the input of other professionals and devise a shared care plan	Joint patient assessment on practice placement	Collaborative case management plan

5.5.6 Opportunistic or Informal Learning on Practice Placement

When a discipline specific placement is taking place in a multidisciplinary team, there is value in the placement manual containing suggestions and templates for interprofessional learning activities. For example at the University of Toronto, "flexible" IPE activity guidelines can be accessed by students from their website [57]. Students from different professions may work together to jointly assess a patient and to collaboratively devise a management plan. With the supervisor facilitating reflection on this activity, the collaboration experience can be unpacked and interprofessional learning reinforced.

The structure of such an interprofessional activity can be taken from a template in the university's IPE resource pack or practice placement guideline. Sharing knowledge about each profession, aspects of person-centered care, negotiating, and commenting on what was learned about collaborating with other professions are constructive aspects of such a template. Essential to the success of IPE activities on placement is the explicit linking of the performance of the student with their competency assessment document [58].

At each stage of an IPE curriculum, alignment of learning objectives, T&L methods, and assessment tasks is essential to support effective development of the collaborative practice-ready health professional (see Table 5.1).

5.6 Process: Assessment

Best practice in assessing interprofessional learning requires constructive alignment between desired learning outcomes, learning activities, and how they are assessed [30, 33]. Both formative assessment, assessment *for* learning and summative assessment, assessment *of* learning are important processes in an interprofessional curriculum. A call to "raise the bar for innovative IPE assessment approaches" [59] followed several major initiatives to strengthen summative assessment of interprofessional learning [60–62]. Most published studies describe formative assessment

procedures (feedback) without reference to measurement or grading of knowledge, skills, or performance [59]. In an IPE curriculum there is a need for a combination of various types of assessments to capture the complex competencies that represent interprofessional learning for future effective collaborative practice [30]. Evidence informed assessment techniques, standardized usage of common tools, and longitudinal assessment from a variety of data streams are required for inclusion in an IPE curriculum for the field to advance and to be in line with the requirements of evolving clinical care systems [60–62].

Assessment drives learning and historically summative assessment of IPE has not always been regularly included or well aligned to learning outcomes and T&L activities. An international group of expert IPE educators reached consensus that role understanding, interprofessional communication and values and coordination and collaborative decision-making, reflexivity, and teamwork require assessment in an interprofessional curriculum [61]. It is also recommended that the assessment must be matched to the environment in which the student experiences the IPE activity and measures what is planned; that it is constructively aligned. [61].

5.6.1 Formative Assessment for Learning

Programs for health professional education must include the accurate and prompt feedback of learners on their progress towards achieving IPE outcomes. Feedback should be viewed as a proactive process that highlights the learner's agency as a proactive seeker of feedback so they can enhance their performance. Peer feedback exchanges in an interprofessional setting can be quite effective to build insight in understanding of one's own role and that of others. One's ability to reflect on oneself is frequently enhanced by constructive feedback of healthcare professionals from different specialties and from patients; actual or simulated. Effective interprofessional facilitation includes constructive feedback and a tool such as the Individual Teamwork Observation and Feedback Tool (iTOFT) offers excellent criteria to inform feedback on an individual's performance in a team [63]. At the University of Kansas in the Doctor of Pharmacy program, iTOFT was used to assess the student's ability to work effectively in an interprofessional team and preceptors reported that use of the tool led to improved feedback [64].

Constructive multidisciplinary feedback encourages reflection on communication styles and terminology use. Utilizing an interprofessional competency framework or the interprofessional practice standards of a health professional body can support educators and students with assessment for learning. By comparing performance in written assessments, oral presentations, team projects or clinical placement performance, to these resources, learning or skills gaps can be identified, and remediation plans made.

5.6.2 Summative Assessment of Learning

Students are generally assessed as individuals although many programs, even in courses which include group projects and assignments. These collaborative activities require rubrics which include assessment of the individual's ability to work with others but may also include criteria describing expected levels of group performance which are judged collectively. Assessments geared towards assessing competence may not address that important outcome of collective competence. A holistic, person-centered approach to healthcare management necessitates collective competency which is dependent on the complex interaction between practitioners, the patients/community and the health service [65]. This need to summatively assess for both individual and team-based competence requires a different view of assessment.

Interprofessional learning may be assessed using multiple tools including multiple choice questions or short answer questions on professional roles and responsibilities, team projects rubrics of a quality improvement activities, review of a service information document, community visits or direct observation in interprofessional simulations and practice settings. Reflective journaling with appropriate rubrics may be used to demonstrate the development of collaborative competencies. ePortfolios are a portal for the recording and assessment of interprofessional learning including reflection. The challenge with reflection that is summative is that students may chose not to share openly and explore areas of doubt and therefore negate the value of looking back on experiences to reinforce learning.

Design guidelines have been published that were developed by a qualitative consensus study using nominal group technique [62]. IP assessment development requires balance across a curriculum, with different IP assessment tasks focusing on distinct but overlapping clusters of IP competencies and ensuring that IPE assessment is focused on the individual but also on the IPE team performance. Equally necessary is consideration of the experience and expertise if the assessors as IPE assessment is more complex and requires clear guidelines as to how a student's performance is graded [62].

To describe that elusive readiness to collaborate, The American Association of Medical Colleges (AAMC) has included in a set of 13 core entrustable professional activities (EPAs) which pre-registration medical students must demonstrate in learning and assessment, EPA 9, to "Collaborate as a member of an interprofessional team." Educators and researchers from three US medical schools worked together to devise a tool to deconstruct the EPA and align it with collaborative competencies for education and assessment [66]. It was found that this EPA could be best assessed in the practice setting, however, funding and supervision regulation must be considered when assessing entrustment to collaborate which basically equates to unsupervised practice. A review of tools to assess teamworking as an indicator of the competency of interprofessional collaboration was undertaken. It was noted that the AAMC expects students "to demonstrate collaboration in interprofessional teams so as to provide patient and population-centered care" [67]. The reviewers found that a deficit existed in tools that would assess change is behavior and improved patient outcomes as expected by the AAMC.

Finding a tool to assess both individual and team performance is challenging, and it is more feasible that a combination of tools is necessary. Examples of such assessments might be MCQs to assess role and responsibilities of health professionals, presentation of a project which demonstrates collaborative practice, direct observation in simulation and practice, and reflective journaling with clear rubrics for performance aligned to learning outcomes.

The Individual Teamwork Observation and Feedback Tool (iTOFT), devised by a consortium of seven universities, is a validated tool designed to assess an individual's performance on a team rather than the performance of the entire team; it employs a consistent evaluation scale; and it is relatively brief (11 items) [63]. Pharmacy students at University of Wisconsin-Madison School of Pharmacy in the USA were assessed using the iTOFT during advanced pharmacy practice experiences to assess and give feedback on performance in the interprofessional team. Although not used summatively, preceptors were encouraged to use the iTOFT score to inform an IPE item on the student's final placement performance assessment [68].

When selecting or creating an assessment tool, Crowl et al. [64] recommend that the following should be considered:

1. Alignment with interprofessional competencies,
2. Clear descriptors or examples and ease of utilization.
3. Applicable to all health professions.
4. Training of assessors is imperative on how to complete the assessment tool as recommended by the IPE experts.
5. Consider expanding the assessor pool to include non-discipline specific supervisors/ preceptors in the assessment of team-ready behaviors to provide a 360-degree evaluation to students [64]. The behaviors needed for collaborative practice by health professionals must be learnt and demonstrated in the context of tasks practiced in the healthcare system. A practice-based, authentic, integrated assessment that can evaluate many different aspects of emerging abilities compared to criterion referenced standards is required [30].

Recommendations to both formatively and summatively assess IPE particularly in the later stages of a curriculum are that there is regular and continuous direct observation and assessment of collaborative behavior linked to improved patient experience and healthcare outcomes, that there are multiple data points and multiple raters, over time and multiple contexts, a programmatic approach to IPE assessment.

5.7 PRODUCT: Evaluation

In contrast to evaluations of complete interprofessional curricula, published IPE evaluations typically focus on specific initiatives that are a part of a curriculum. This incomplete approach disregards the entirety of the program, which would provide a better grasp of how to constructively align IPE inside core profession-specific

curricula [69, 70]. Students may positively experience multiple IPE activities but without constructive alignment, it will be challenging to understand a clear pathway to the collaborative practice ready graduate. Curricular evaluation affords an understanding of the staged development required to build collaborative competency and meet IPE outcomes and should support identification of gaps and areas of strength in that educational pathway.

Although often written as the last step in any model of curricular development, evaluation must be considered from the beginning of curriculum development. Certainly, most curricular development models begin with a needs assessment such as that referred to earlier in the section on presage. To make sure that the curriculum or course is operating as intended and to pinpoint areas for improvement, it must be continuously monitored and evaluated with the results used to guide further development.

Observation, feedback surveys, focus groups, interviews, student assessment results, and reports that the institution is required to produce for internal use (such as absence data) or external organizations such as accreditation bodies, are some of the monitoring and evaluation approaches that can be used to evaluate an interprofessional curriculum.

Why evaluate interprofessional education curricula? There are several important uses for it:

- To determine which elements of a curriculum, need to be changed and which are effective.
- To evaluate the success of the modifications that have previously been made.
- To show that the current program is effective.
- To fulfill regular program review obligations.
- To fulfill professional accreditation requirements.

The Kirkpatrick Model has been the most widely used and referenced approach for evaluating learning and change because of an IPE intervention and in fact, is its use is increasing in all educational evaluations [71]. Originally designed to evaluate business activities, it is now frequently used as an evaluation model in higher education or health professional learning activities. The Kirkpatrick model is a 4-step outcome-based approach that is widely used to evaluate training programs. Often used to evaluate pilot and one-time IPE activities, the model has been adapted for IPE outcome evaluation to 6 levels, Reaction, Modification of perceptions and outcomes, Acquisition of knowledge and skills, Behavioral change, Change in organizational practice and Benefits to Patients or Clients [72, 73].

To understand how and why outcomes occur from an interprofessional curriculum, it is necessary to use a more comprehensive program evaluation rather than an exclusively outcomes focused model [71]. If evaluation of a complex intervention is focused only on outcomes, evaluators may overlook unintended positive or negative consequences of curricular implementation [70, 71]. It is necessary to consider evaluation methods that investigate the environment, the context into which the interprofessional curriculum is implemented (presage) and the processes that operationalize the curriculum.

The Indiana University Interprofessional Practice and Education Center in the US devised an interprofessional curriculum, Team Education Advancing Collaboration in Health (TEACH) for 8,000 students in 20 health professions programs at multiple institutions. Following 5 years of this curriculum and regular collection of student and faculty data for continuous quality improvement, a recent review was conducted utilizing the Modified Kirkpatrick Model to represent educational outcomes. Following completion of the external evaluation, interviews and focus groups were conducted with evaluators and stakeholders from the multiple institutions and programs to discuss evaluation outcomes and development improvement strategies [74]. Resembling an action research approach, all stakeholders were engaged in regular meetings to review recommendations and development improvement strategies. Changes to the curriculum included efficiencies of delivery, additional use of online learning, new content to support flexibility, and fidelity and establishment of new committees to increase student and faculty engagement. The challenging issue of assessment was also addressed with measures to approve new approaches. A further recommendation was also made to evaluate the costs of IPE [74]. Although an outcome focus framed the beginning of this evaluation, a comprehensive review and investigation with all stakeholders followed and produced data that informed the quality improvement strategies developed for the interprofessional education curriculum.

An interprofessional curriculum's quality is best continuously monitored by structured feedback processes that are ongoing and geared at acquiring timely data. It is crucial to incorporate evaluation activities to determine the curriculum's successes and failures with a view to addressing deficiencies, to gauge whether stated goals have been met, to determine whether the curriculum is meeting the needs of students and the community, and to assess the cost effectiveness of the curriculum.

One method that have been used effectively is a realist approach. A realist approach enables evaluation which investigates what works for whom in what context and why and is appropriate for complex interventions such as an interprofessional curriculum. Mechanisms are identified that impact on the intervention and lead to various outcomes so that evaluation with this approach can identify the "why" and the "how," affording greater guidance for improvement. Researchers used this approach to evaluate interprofessional practice placements and discovered that interaction and reflection helped students better comprehend the roles and responsibilities of the healthcare team. Patients were integral to interprofessional learning on placement and helped students understand their experience as service users. This study further underlined the value of strong interprofessional facilitation [75]. Such findings may have been hidden in a solely outcomes-based evaluation and would therefore not be available for informing improvement in these areas.

Three institutions in the USA participated in an interprofessional initiative where a multidisciplinary group of students were assigned a community member as a mentor to better understand their experience of a chronic health condition. The Dalhousie Health Mentors Program (DHMP) aimed to evaluate the students intended and unintended learning experiences [76]. Using a mixed methods approach to program evaluation, researchers found three curriculum issues that limited learning, team

composition, DHMP integration into discipline programs, and variability in team effectiveness. These findings will afford process improvement which could not result from an outcome only evaluation model. Educational benefits in the areas of patient centeredness, interprofessional skills, and collaborative attitudes were reported by students and can potentially be strengthened with attention to the context and process issues uncovered in the evaluation [76].

Longitudinal follow-up across the university and the health service offers rich data to evaluate collaborative ready practitioners. Researchers in New Zealand conducted a longitudinal evaluation of students who participated in an interprofessional practice placement using validated tools and free text comments [77]. Learner attitudes and self-perceived teamwork skills were assessed over their first 3 years as health professions. Students who had participated in an interprofessional practice placement had higher positive attitudes to healthcare teams than those who had not according to the quantitative and qualitative data collected [77]. They reported a readiness to work in teams and this evaluation enables an understanding of the sustained potential of interprofessional learning to positively influence collaborative practice.

As in the preceding study, the focus of evaluation needs to be expanded from short-term pre- and post-single activity measurement points to longer term measurement points. There is also a need to use tools and methods which evaluate the whole system of an interprofessional education curriculum.

A meta-analysis of an IPE curriculum for ten programs in the UK combined the Biggs' 3P Framework and the Kirkpatrick model [7]. An external evaluator was employed, funded by the health service, reflecting the value placed by the health service on the IPE curriculum to be evaluated. Mixed methods were used to evaluate all elements of the curriculum and were inclusive of all stakeholders, students, educators, health service, and patients. Although a theory-based curriculum, researchers missed the opportunity for that theory to initially inform the evaluation but were able to retrospectively apply the Biggs' 3P framework to better understand factors of presage, process, and product (outcome) and how these impacted on the effectiveness of the curriculum and the student experience. The evaluation enabled the identification of early classroom learning as a positive scaffold for later interprofessional inaction in practice placements [7]. Such models which use both quantitative and qualitative approaches afford an evaluation that not only investigates the planned learning outcomes of the curriculum but can also uncover unintended outcomes, explain why these occurred, understand the environment in which they occurred, and how the processes delivered, enabled, or constrained this.

Although often considered a value adding curricular measure, costs associated with an IPE curriculum have been questioned. Researchers in Australia conducted a cost–benefit analysis (CBA) of an IPE program in a residential aged care facility. Although there were significant collaborative learning outcomes for students and social and emotional benefits identified for aged care residents, the cost of the program was mostly borne by the aged care facility and the sustainability of this was questioned without that external funding [78]. Including an economic analysis across a whole curriculum would be more challenging but would significantly

support implementation by exploring budgeting methods to ensure return on investment in an interprofessional curriculum [79].

To plan a comprehensive evaluation early on in IPE curriculum development, the following ought to be considered:

- Decide who are the stakeholders and how will they be included in the evaluation?
- Agree as to why the evaluation is being done and what is it measuring.
- Consider what is the learning environment, the T&L process, and the learning and organizational elements of the curriculum?
- Use an evaluation model that adopts a comprehensive approach, and will investigate the presage, the processes, and products of an interprofessional curriculum.
- Consider the use of a theoretical perspective to underpin the evaluation.
- Use an evaluation design that reflects the research question, considering whether quantitative or qualitative data is collected, or a mixed methods evaluation is required and how to do this with a longitudinal approach [69, 80].

Key elements of an interprofessional education curriculum are missed by an outcome focused evaluation with subsequent missed opportunities for improvement. Short term or pre-post initiative evaluation in isolation do not afford an understanding of the effectiveness or impact of an interprofessional education curriculum. A system focused, longitudinal and mixed methods approach is recommended to capture a deeper and constructive evaluation of an interprofessional education curriculum.

5.8 PRODUCT: Sustainability

IPE program sustainability and viability are acknowledged as global challenges that depend on a variety of circumstances related to competing program demands, faculty resources and administrative support and the value placed on an IPE curriculum. Now that collaboration is considered integral to better experience and outcomes for health service users, curricula that prepare collaborative ready graduates must be sustained [81]. At The University of Manitoba in Canada, a systems-based approach to sustainability of the interprofessional curriculum was adopted [82].

Elements for sustainability were considered at the micro, meso, and macro levels. At the micro-level, student engagement and faculty development need to be strengthened along with the development of continuous improvement of the interprofessional T&L resources, informed by theory and a spiral structure of agreed competency development.

Faculty development is so important in the sustainability of an interprofessional curriculum. Just as students require support to learn about, from and with each other, so too faculty require support to build consensus on concepts and behaviors that demonstrate collaborative practice. A qualitative survey study conducted at the University of Otago in New Zealand examined IPE instructors' opinions of the IPE facilitation, what assistance they need, and what variables affected their capacity to continue participating in the program and, consequently, the sustainability of the program. Having provided pre-registration IPE for about 10 years, findings shared that to sustain protected time for participation in IPE delivery, IPE facilitators need both official acknowledgement of their facilitation skills and workload modeling [83].

Essential to sustainability is student and faculty engagement in an IPE curriculum and this requires consensus on purpose and value of interprofessional learning. Sometimes mitigating that consensus, interprofessional competencies found in all uniprofessional frameworks present issues with the standardization of terminology. Mapping of competencies from uniprofessional frameworks to widely adopted or locally developed interprofessional competency frameworks can assist in building consensus of understanding. Development of shared language and definitions of interprofessional competencies would support sustainability by facilitating strengthening of curricula with shared understanding of processes and outcomes across health professions education programs for students and faculty. At the meso level, IPE activities must be fully integrated in curricula and there must be institutional recognition and support either by establishing a funded IPE center or at least the appointment of an IPE faculty lead. Establishing an interprofessional program leadership with dedicated resources and a strategic plan that is reflected in the university's mission and vision is integral to sustainability (Case Study 3). Associated with that institutional commitment to an interprofessional curriculum, funding issues can be a significant hindrance to the sustainability of IPE curricula. Where programs are individually accountable for their budgets there may be challenges with sustaining collaborative learning activities. Three funding models have been suggested for consideration: centralized, blended, and decentralized [79]. Each institution must explore such models to understand which works best and support sustainability of resources while ensuring a return on investment in the IPE curriculum.

At the macro-level, accreditation standards, a dedicated research agenda informed by a continuous improvement evaluation cycle and valued relationships with community partners are all factors upon which the sustainability of an interprofessional curriculum are predicated. In Case Study 5.3 below, an example of strategic steps taken by the University of Maryland Baltimore in the USA to sustain an interprofessional curriculum are illustrated.

Case Study 5.3 University of Maryland Baltimore (UMB) USA
Strong steps for sustainability:

Preparing all University students to provide high-quality, affordable health care and human services with a team-based model

1. Establishment of the Center for Interprofessional Education (CIPE) 2013.
2. University endorsed, vision and Mission statements to provide IPE to prepare collaborative graduates across Health, Law and Human Services programs.
3. Annual funding opportunities for IPE curriculum content development.
4. Faculty awards in support of IPE to build community across university programs.
5. IPE faculty scholars program to expand expertise and experience in IPE development and delivery at UMB.
6. Faculty funding to attend the Interprofessional Education Collaborative (IPEC) Institute (National IPE Center) and support for associated IPE project.
7. CIPE supported annual IPE student activities such as IPE Day and the Interprofessional Patient Management Competition.
8. UMB Faculty Development-Foundation of IPEP course.
9. Annual IPE sustaining funds affording further resourcing to ongoing activities [52].

5.9 Conclusion

Implementation of a novice IPE curriculum is a complex process but an integral component of most modern health profession education programs. To develop collaborative practice ready graduates, students need to develop those competencies that will enable teamwork and effective communication. Constructive alignment of interprofessional learning objectives, teaching and learning activities, and assessment is supported by adoption or development of an interprofessional competency framework. Utilizing an approach such as the modified Biggs' 3P model as presented in this chapter will afford IPE curriculum implementation that considers all stakeholders and elements, includes a comprehensive evaluation to inform continuous quality improvement and sustainability measures.

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