Introduction

Interprofessional education (IPE) is simply a special case of professional education. Thus everything we know about good practice in professional education, a broad sweep of which is set out in the other chapters of this book, also applies to IPE. IPE differs, however, in the conscious decision to amplify the heterogeneity of learners by including students or members of different professions, bringing their differing professional perspectives. We take a broad view of education and include formal and informal interprofessional learning (IPL), serendipitous learning (see Box 14.1) [1] and the effects of the hidden curriculum [2]. We view IPE and IPL as focused on improving professional practice, care, and services to support and enhance the lives of individuals, communities, and populations. We argue that IPE and IPL contribute to this through promoting high-quality interprofessional collaboration (IPC), founded on complementary professional contributions. We use the term ‘profession’ broadly, extending it to include occupations contributing to care and services that may lack regulated entry and licensure, for example managers, technicians, and health care assistants. For brevity and consistency, we will use the term ‘patient’ throughout the chapter, whilst acknowledging that client or service user would be more appropriate in some health contexts.

Bringing people from different groups together (physically or electronically) for IPE is logistically complex in terms of timetabling, space, facilitation, funding, and identifying or creating learning resources that suit all participants. Before investment in IPE, therefore, we need to examine its effectiveness in different contexts and with different approaches: we will summarise some key literature in Box 14.3, but first we will provide some definitions.

Defining Interprofessional Education: The Importance of Pronouns

The terminology relating to IPE is not standardised and can be confusing. Box 14.1 provides simple definitions of phrases used in this chapter. The most widely recognised definition of IPE is that of the UK Centre for the Advancement of Interprofessional Education (CAIPE): ‘Interprofessional education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care’ [3], later extended to include members or students of professions, and both care and services [4]. These definitions position IPE as that which prompts IPL, while its purpose is to improve care and services through collaboration; or as the World Health Organization (WHO) publication succinctly framed it, ‘Learning Together to Work Together’ [5].

The WHO’s Framework for Action on Interprofessional Education and Collaborative Practice reordered the pronouns to ‘about, from, and with’ [6]: both formulations appear in the literature. Bainbridge and Woods’ study with students and faculty elicited associations with each pronoun...
Interprofessional education (IPE)
Learning with, from, and about each other to improve collaboration and the quality of care and services [4]. In the North American literature, in particular, this is often termed: Interprofessional Education for Collaborative Practice (IPECP).

Interprofessional learning (IPL)
Learning arising from interaction between members (or students) of two or more professions. This may be a product of formal IPE or learning may happen serendipitously in the workplace or education settings [1]. (See the later section on ‘The Diversity of Interprofessional Education’ for more about serendipitous IPL.)

Multiprofessional education (MPE)
Members (or students) of two or more professions learn side by side for whatever reason, for example they may have a common need to master specific knowledge or skills.

Uniprofessional education
Uniprofessional education, with participants from a single profession, forms the bulk of each profession’s individual pre-licensure education and some profession-specific post-licensure education; consequently it is also an important venue for the development of knowledge, skills, and attitudes needed to underpin effective (and usually interprofessional) teamwork.

Interprofessional collaboration (IPC)
The process of developing and maintaining effective interprofessional working relationships with learners, practitioners, patients, families, and communities to enable optimal health outcomes [9].

BOX 14.1 FOCUS ON: Terminology
Prefixes (e.g. inter-, multi-, trans-) and adjectives (e.g. shared, common, professional, disciplinary), combined with organizational and educational nouns (e.g. agency, sector, provider and learning, education, training), create a confusing array of competing and inconsistently used phrases to describe IPE. Simple descriptions of commonly used terms are sufficient for this chapter. For a more elaborated exploration of terminology see the ‘Instructions to Authors’ in the Journal of Interprofessional Care [8].

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(Box 14.2) [7]. For us, the pronouns ‘with, from, and about’ highlight that IPL necessitates active and interactive learning. IPE is not about a mixed group of people acquiring the same knowledge or developing the same clinical skill.

The Rationale for Interprofessional Education for Collaborative Practice
The drivers for IPECP have been well elucidated during the past half-century and include the increasing incidence of complex and chronic conditions globally, the patient safety agenda, recruitment and retention of staff, and global workforce inequities [10–14]. In the USA a resurgence of interest in IPECP has focused on the ‘triple aim’ of:

- improving the quality of patients’ health care experiences and patient satisfaction
- improving the health of communities and populations
- reducing the cost of health care delivery [15].

In low- and middle-income countries, priorities focus more on building workforce capacity for primary health care because of mal-distribution of health professionals and a projected shortfall of 18 million health workers by 2030 [16].

The report, Health Professionals for a New Century: Transforming Education to Strengthen Health Systems in an Interdependent World [17], called for wide-ranging and fundamental changes in health professionals’ education, and in the relationships between health care providers, educational institutions, and the populations they serve. It suggested (p. 8) there is a ‘mismatch of professional competencies to patient and population priorities because of fragmentary, outdated and static curricula producing ill-equipped graduates’ [17]. The need for team-based care, and therefore team-based learning, was stressed and IPE advocated as part of a continuum of training.

IPE should help to develop insights, shared knowledge, and teamwork skills that promote effective collaboration to deliver high quality care efficiently. It can examine how health care ‘teams’ vary and collaborative practices may range from well-rehearsed task-focused teamwork, to the more fluid concept of ‘knotworking’: Building upon Engeström’s work [18], Bleakley (p. 140) describes knotworking as ‘expert work taking place in rapidly shifting contexts, where a number of ‘loose ends’ of activity are constantly being tied together or untied, to create the conditions for collaborative production of knowledge or new work practices’ [19]. More recently, Paradis and colleagues have examined the variety of ways in which IPC has been conceptualised in a leading medical education journal [20].

Traditional hierarchies, roles, and boundaries have the potential to inhibit effectiveness: IPE can contribute to challenging and renegotiating established ways of thinking and being. For example, it may help participants to appreciate the contributions of different members of the team; it can promote shared examination of multifaceted problems and the formation of team plans, rather than a tangle of criss-crossing separate responses; it may promote healing and
collaboration when external pressures have damaged collaborative practice.

Can IPE make a Difference? Does it Work?

The rationale for IPE is multifaceted and strongly argued. However, delivering IPE requires effort outside (and mostly in addition to) usual work and processes: leadership, collaborative effort, overcoming constraints and barriers, and nurturing enabling factors. Summaries in reviews by Lawlis and colleagues [21] and Reeves and colleagues [22] underline this.

Questions such as ‘Can IPE make a difference?’ and ‘Does it work?’ are often asked. The answer is the same as for any type of education: well-focused, well-designed, well-delivered, contextually appropriate IPE makes a range of positive differences (see Box 14.3). There are hundreds of peer-reviewed studies of IPE, and a growing body of evidence of effectiveness, although few studies relate to developing countries [23]. As with other topics in health professional education, the quality of studies varies. IPE, as

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**BOX 14.3 WHERE’S THE EVIDENCE: Interprofessional education**

**Systematic reviews**

There have been many systematic and scoping reviews of IPE studies and, increasingly, syntheses of reviews [27, 35–42]. In one example, Reeves and colleagues appraised reviews reporting IPE study outcomes relating to learner gains, collaborative practice, and patient care [43]. They synthesised eight reviews (range 10–133 studies) and noted:

- the variable quality of reviews and the IPE studies they included, and signs of improvement as the IPE literature matures
- the diverse range of activities within IPE, involving various health professions over different time periods in different settings
- most studies were conducted at a single site, and examined only short-term impact
- most studies reported positive findings in relation to the learner-focused outcomes of satisfaction, changes in attitudes, and/or change in knowledge and skills; fewer reported changes in individual behaviour; a small number found positive changes in organisational practice and some found changes in clinical outcomes.

They concluded (p. 66): ‘this updated review-of-reviews revealed that IPE can nurture collaborative knowledge, skills, and attitudes. It also found more limited, but growing, evidence that IPE can help enhance collaborative practice and improve patient care.’ [43]

It is more common for studies to report positive outcomes than mixed, neutral, or negative outcomes [22]. This may be a symptom of publication bias [44].

**Post-licensure IPE**

For post-licensure learners there is evidence that IPE (mostly embedded in quality improvement initiatives) can improve the quality of care and the quality of working lives. Here are just a few examples:

- improved preventative care, including increased screening and immunisation rates [45–47]
- improved teamwork, fewer errors, and swifter life-saving treatment observed in emergency departments [48, 49]
- more regular briefing and better teamwork in operating theatres [50]
- increased interprofessional participation in planning and reviewing care [51]
- more patient-centred communication [52]
- increased and self-sustaining networking among primary mental health care professionals, particularly in rural areas, which increased knowledge about other practitioners and confidence about referrals [53].

**Pre-licensure IPE**

Studies of pre-licensure IPE have provided a wide range of insights. The list below is illustrative and the examples are just a small selection from an ever-increasing pool:

- sustainable models of delivery that, over time, can accommodate large numbers of students [54–59]
- variable responses from students from different professions [56, 60, 61]
- IPE can develop more positive perceptions of members of other professions, constructive ‘mutual inter-group differentiation’, a more sophisticated understanding of roles within teams [62–64], and significantly higher scores on a scale measuring perceived need for professional cooperation [65]
- IPE can increase interest in working in places or specialties where there are recruitment shortfalls [66, 67]
- patients are pleased with care and advice provided by interprofessional student teams [68, 69], and improved patient outcomes have been recorded [70]
- interprofessional student teams can identify gaps or alternative approaches that enable qualified practitioners to improve care and patient outcomes [69].
a complex intervention in complex dynamic systems, presents research challenges. To support better studies and evidence syntheses, a conceptual model has been developed comprising an ‘interprofessional learning continuum’, ‘enabling or interfering factors’, and a range of outcome categories [24]. Theoretical contributions to the IPE research literature are increasing [25–27] and there are practical guides for those wishing to evaluate IPE [1, 28, 29].

The breadth of health professionals’ education and continuing professional development aims to improve health outcomes and the quality of care. However, it is difficult to demonstrate that any specific facets of the pre-licensure curriculum do this (including IPE), because there are multiple confounding factors and varying amounts of time between learning activities and a professional subsequently being able to provide unsupervised care [30]. Correlation is easier to show than causation. Nevertheless, it is possible to evaluate pre- and post-licensure IPE to explore whether it helps learners achieve the learning outcomes (or competencies) relevant to interprofessional practice that have been defined by professional accreditation bodies, such as CanMEDS [31], and means of doing this are being developed and refined [32, 33]. At post-licensure level the causal chain from IPE to patient and service outcomes can be shorter, although the contexts for IPE and its intended outcomes remain complex and challenging, particularly when health systems are changing rapidly [34]. Nevertheless, in a range of contexts interprofessional continuing professional development or workplace learning has achieved contextually important outcomes for patients, professionals, or services (Box 14.3).

The Diversity of Interprofessional Education

IPE may be described with two dimensions: first, variation in emphasis; and second, variation in the degree of planning and formalisation [1]. The emphasis dimension runs from a primary focus on interprofessional collaboration as the subject matter for the IPE [71, 72] to a secondary focus on interprofessional collaboration and a primary focus elsewhere (e.g. specific patient or client group [73, 74] or professional skills, [75] and policy innovation [76]). Many IPE initiatives seek to pay balanced attention to interprofessional collaboration and some other substantive content, for example, pain [77].

The planning and formalisation dimension recognises that serendipitous IPL is influential and should be acknowledged. Serendipitous IPL often happens in daily practice when members of different professions review their work together, or encounter something unusual, causing them to pause and more closely observe some aspect of overlapping concern or seek information from one another. It is axiomatic that we cannot plan serendipitous learning. However, we can pay more attention to creating the right conditions for positive unplanned IPL, such as promoting recognition of complementary expertise and willingness to share ideas [78].

More predictable than serendipitous IPL, informal IPL/ IPE occurs because of work systems or the structure of educational programmes. Multidisciplinary team reviews of patients or processes can be good examples of informal IPL/IPE. These may be labelled as team meetings [79], action learning, audit, or external inspection, each with a different emphasis and potential for informal and formally recognised IPL. Nisbet and colleagues advocate valuing more highly workplace IPL arising informally from daily work and improvements, and making it more explicit [80]. Furthermore, students from different professions are often in the same clinical areas at the same time, providing opportunities for informal IPE.

**Formal** pre- and post-licensure IPE comprises planned activities to promote learning *with, from, and about* members of other professions, and is the main focus of the IPE literature. Formal IPE normally supports serendipitous and informal IPL during less structured periods, such as refreshment breaks; it is worth structuring formal IPE to leverage these by-products.

**Designing Effective Interprofessional Education**

Effective IPE is effective education with the added value of harnessing the knowledge, learning needs, and dynamics of an interprofessional group purposefully. This book, with adjustment for interprofessionality, provides a wealth of advice to underpin the design of IPE. It is also important to consider theories of learning and change that will inform the design of IPE (Box 14.4). Learning experiences evoke emotions such as excitement, satisfaction, empathy, anxiety, boredom, fatigue, and disaffection so IPE developers and facilitators need to plan and manage IPL in ways that create positive emotions and, if necessary, acknowledge and work with negative emotions. Poor-quality IPE may be particularly damaging if it creates increased reluctance to engage in subsequent interprofessional collaboration or reinforces negative stereotypes.

Activities that do not allow each participating group to contribute to more or less the same extent are unlikely to be a good foundation for sound IPE. The aim is for everyone to learn something productive through balanced exchanges, not for one group to plunder the expertise of another.

**The Perceived Relevance of the Learning Opportunity**

Learners are life-centred and problem-centred and are motivated to develop their knowledge and skills when they encounter an idea, a task, or a problem that matters to them in their current context. It is difficult to engage with things that are not interesting and seem to have little relevance.

During IPL participants are likely to want to develop their knowledge and practice from multiple perspectives (as individuals, as members of a particular profession, and as members of diverse teams and collaborations). Furthermore, their primary focus will vary over time and in response to external demands. IPE normally addresses this personal, professional, and team development by
appealing to shared interest in delivering good and safe care to patients (the ‘object’ of ‘activity’ [108]). This is most obvious within post-licensure IPE, particularly in relation to quality improvement. People may not even notice they are engaged in IPE. Participants from diverse backgrounds are focused on and motivated by their shared practice-based problem.

At the pre-licensure level, where students are highly focused on their specific professional knowledge, establishing relevance and authenticity requires active attention from curriculum developers and facilitators. Learning opportunities should be aligned with the participants’ concerns, interests, and levels of expertise. This can be particularly challenging for IPE because the diversity of concerns, interests, and expertise is normally greater within an interprofessional group. Students have been shown to engage more fully with IPE when they perceive it as supportive of their own, profession-specific, development [89].

**The Perceived Demands of the Learning Context**

Learners’ perceptions of the learning environment and what is expected from them affect what and how they learn [109, 110]. Overloading learners is known to encourage a reproducing (surface) approach to learning, faulty learning, disengagement or a strategic approach to studying [111]. Thus, for example, it is not helpful to place an optional, experiential IPL opportunity shortly before a high-stakes summative assessment. While this may seem too obvious to mention, it is surprisingly easy to overlook important conflicting demands faced by one or more of the groups from whom participation is desired. Such oversights are more easily avoided when care is taken to include a member of each participating group in the planning process.

Learners’ perceptions are shaped by explicit and implicit messages. Explicit messages include the following:

- the course description (as published and as spoken by facilitators)
- the intended learning outcomes (normally stated in a course handbook or webpage)
- learning materials and assessment requirements.

These all convey the ‘target understanding’ [112] that curriculum developers, tutors, and examiners have in mind (with any lack of alignment creating confusion). Implicit messages, the ‘hidden curriculum’ [2], include the following:

- perceptions of the importance of a learning opportunity based on, for example, who chooses to attend or otherwise contribute and the attitudes they display
- attendance or assessment requirements
- the physical space (e.g. located in a bright and airy room; configured so participants can face one another rather than sitting in rows all facing a facilitator or presenter)
- access to adequate technology and refreshments
- timing of events (e.g. the event is pushed to the fringes of working time, such as late on Friday afternoon)
- absence of particular professional groups
- many other subtle ways of reinforcing or undermining the official explicit messages.

IPE can be enhanced or undermined by explicit and implicit messages delivered and perceived about its relationship to the dominant activities of uniprofessional education and practice. Interestingly, the connection between individual learning and IPE is complex. Work linking threshold...
Learning Spaces

There is increasing interest in the notion of space. Interest in the use and design of physical space (and virtual worlds [VWs], discussed in the section Simulation: ‘Real-world’ and Virtual below) is consistent with increased attention to socio-material perspectives on learning (Box 14.4). For example, Temple [114, 115] reviewed research into the built environment of universities, linking this to the organisational nature of higher education in terms of how universities are governed and managed including: changing relations with their students; research relating to how students learn; and factors influencing the learning process. He developed a useful agenda for future research, much of which remains to be done. More recent contributions to this discourse have emphasised evolving space usage, the importance of spaces that can be used flexibly, and alignment between space and the curriculum [116–118]. As a counter-balance, Thomas challenges the dominance of physical spaces in the discourse about space and learning [119]. He argues that there is little recognition that our conceptions of learning are bounded by the ‘physical situatedness’ of learning itself, creating unhelpful and inadequately challenged distinctions between conceptions on learning in different types of space (e.g. classrooms, libraries, cafés, clinical areas, and online).

There has been relatively little consideration of space as a site of learning and more particularly as a site of power in IPE. Kitto and colleagues [120] argued that space and place are under-conceptualised in the health professions’ literature suggesting that:

- There is a need to examine how the notion of space is utilised for learning, and the impact that place has on expectations, types, and evaluations of learning.
- Health sector research into space and place has predominantly focused on patient and family experiences of care; interest in space, place, and professional practice has grown slightly, but research is developing within, rather than across, professions. There is little research that explores space, place, and learning together.
- Research using a broader range of methodologies would enable greater understanding of how students and practitioners learn in clinical settings, and how both people and places affect one another.

Nordquist and colleagues [121], alongside providing a commentary on a collection of papers addressing the impact of space on learning in professional education and IPE, discourage designing physical learning spaces based on specific educational methods (potential ‘living museums’ p. 81), but instead encourage the design of flexible hybrid spaces for learning that can remain relevant as learning and teaching changes. They advocate strengthening alignment between the curriculum and space provision through sequential consideration of:

- the vision of the curriculum: an exploration of the need for and type of formal and informal spaces
- existing spaces and an analysis of how these might be classified
- the gap between the vision and what existing spaces provide, to guide redevelopment or creation of new learning spaces.

This is less radical than Thomas’s vision of blurred distinction between physical and online spaces for learning, since these increasingly meld together in a learner’s multifaceted learning experiences and it is difficult to articulate ‘where’ particular learning occurs [119]. Thomas also calls for learning spaces to be designed as adaptive, malleable, and enchanting spaces which provide opportunities for emergent types of learning. Moving beyond the discourses of physical and virtual learning spaces, Savin-Baden [122, 123] argues for the need to see spaces between people and places in terms of:

- Territorial spaces between the tribes of academia, whether disciplinary, professional, or departmental.
- These are places in which understandings about issues of power, status, and emphasis are important.
- Space between learner and teacher: the concerns and agendas of learners and teachers are different spaces with diverse emphases, and such spaces are often complex and difficult to manage. Often, these spaces are not just different in territory but also in language and social practices.

The notion of translation is useful in understanding the complexity of these forms of space. Translation is normally seen as finding parallels between languages or as a means of mediation between ‘professional languages. Yet – in the process of translation – words, discourse, and practices change and their meanings are often mislaid and misunderstood. The difficulty with attempting to translate different professionals’ ideas into something simplified and accessible to all IPE participants can make matters worse. Perhaps these spaces between learners, and between learners and teachers, should not be managed through translation, but by acknowledging the differences and the complexity of bridging these. IPE participants should be given opportunities and encouragement to ask for clarification when they are uncertain, or when ideas and language are unclear.

Interprofessional Education and the Curriculum

We argue that there is no ideal or essential location for IPE within a curriculum, rather that there are many opportunities for enhancing learning through IPE. One useful model to consider what, when, and how, is the taxonomy developed by Bainbridge and Wood [124] who argue for three levels of IPE based on stages of becoming a professional:

1 Exposure: junior students engage in learning experiences with peers from other professions. The intention here is mainly ‘learning about’, gaining an understanding
of other professions, whilst making sense of their own. Learning tends to be through simulation, case-based learning (including e-learning), group work, discussion, and reflection.

2 Immersion: senior students have practice-based collaborative learning experiences to examine the strengths and boundaries of their profession whilst beginning to develop an interprofessional worldview. Challenging learning activities include appreciative inquiry, problem-based learning (PBL), team projects, and group activities in clinical settings.

3 Mastery: pre- and post-licensure learners are prompted to use critical thinking to develop a deep sense of their own context, profession, and values in relation to other professions. At this stage students have useful profession-specific knowledge and experiences that they can share, and they tend to be hungry for new experiences [66]. Learning may include involvement in cutting-edge practices, emerging technologies, activities such as student run (or guided) clinics, and workplace learning.

Curriculum Alignment in an Era of Competency-based Education

The argument for ‘constructive alignment’ [125] highlights the connection, and impacts of disconnection or misalignment, between intended learning outcomes, the learning opportunities provided, and assessment (both what and how). In the field of medical education we are in a time of competency-based education (CBE) and a number of interprofessional competency frameworks have been published [126] with competence being defined as what graduates should be able to do in practice [127]. Two influential examples are: the National Interprofessional Competency Framework published by the Canadian Interprofessional Health Collaborative (CIHC) in 2010 [128] and the 2011 Interprofessional Education Collaborative’s (IPEC) list of core competencies for interprofessional collaborative practice from the USA [129], updated in 2016 [130].

Learning outcomes or competencies are defined within each health profession’s accreditation standards. In many countries these now include interprofessional standards. However, within a given country professions may use different language to capture interprofessional competencies (or outcomes, or capabilities, etc.) – this opens up spaces for misalignment, gaps, or irresolvable profession-specific constraints. Until professions jointly agree and adopt national interprofessional competencies, the design and assessment of IPE will present difficulties related to differing uniprofessional requirements for accreditation.

Delivering Effective Interprofessional Education

Most modes of educational delivery potentially have some application in IPE, but some are more naturally suited to the task; we will discuss case-based and PBL, simulation, shadowing, and clinical work, before discussing online IPE (see also Chapters 10–12). Of course, these modes of delivery overlap.

Subsequently, we will consider the roles of facilitation and assessment (see also Chapters 9, 13, and 21–25).

Case-based Learning (CBL) and Problem-based Learning (PBL)

CBL and PBL trigger learning by adapting real cases and incidents. Patient cases and narratives help link theory to practice [131]. All the participating professions are likely to be familiar with learning in this way and scenarios can be tailored to be relevant to all learners. Well-selected or well-crafted triggers are vital to ensure that each profession can make a valued contribution. One study has shown that augmenting case triggers with an interprofessional team reasoning framework and video examples of interprofessional interactions improved students’ perceptions of team skills and their case presentations [132].

It is important to clarify what CBL or PBL means to each professional group as there may be different conceptions, based on different prior experiences of CBL/PBL processes adapted to suit profession-specific needs or traditions. Different expectations may underpin unanticipated difficulties in PBL processes during IPE [133]. There is a broad range of PBL approaches and practices worldwide and the diversity is growing. Differences occur in respect of constituent dimensions, such as problem type, form of interaction, knowledge focus, form of facilitation, focus of assessment, and learning emphasis. Within a particular IPE experience, the conceptions of PBL brought by participants form a particular ‘constellation’ [134] of overlapping expectations, both harmonious and clashing. To date, there is relatively little understanding of the impact of different PBL constellations on IPE.

Simulation: ‘Real-world’ and Virtual

The term simulation covers everything from table-top exercises and simple role play (e.g. telephone call) to medium-fidelity simulation in clinical skills centres, and on to high-fidelity clinical simulations supported by sophisticated technology and/or highly skilled simulated patients (see also Chapter 11). Palaganas and colleagues [135] argue that simulation and IPE are natural partners, helping to overcome some of the logistical challenges of IPE in other contexts – providing a motivating, engaging learning environment and providing a safe environment (removing risks to patients and facilitating a psychologically safe environment to explore challenging issues such as social hierarchy, diversity, and divisions). Examples of simulation for IPL include extending earlier uniprofessional learning through the development of interprofessional scenarios for rehearsing aspects of communication with simulated patients [62]. This is a good example of a spiral curriculum in action (Chapter 5). Many other examples of simulation-based IPE centre on managing complex cases or deteriorating patients (represented by manikins or actors in physical simulations, and variously portrayed in online simulations) in order to rehearse and reflect upon clinical skills, interprofessional teamwork, leadership, and effective workload management [54, 136–138]. Simulation-based learning generally
includes an element of role play – learning and teaching processes linked to an IPE example are explored by van Soeren and colleagues [139], whose findings resonate with the wider role play literature (see also Chapter 11).

Teaching and learning through the use of technologies such as VWs has expanded rapidly in recent years [123, 140, 141]. VWs are virtual learning spaces such as Second Life, Blue Mars, and Kaneva, comprising open computer-based simulations populated and built by online communities in which people can create a personal avatar. For example, an IPE pilot [142] used an existing virtual hospital in Second Life, augmented with documents in Wikispaces, to enable health care students from four professional groups and two universities to make profession-specific clinical assessments of a simulated elderly patient whose care needs had increased. They then meet in the virtual environment to develop a collaborative care plan. The pilot was generally well received. It partly mitigated lack of opportunity for collaborative learning in real clinical placements, and raised students’ awareness of the roles of other health care professionals.

Many designers and tutors, especially those working in distance-learning contexts, describe VWs as supporting social interaction and learners’ motivation [143, 144], dialogic learning [145], action learning [146], communal constructivism [147], experiential learning [148], role-playing [149], and PBL [150]. Attempts have been made to map these pedagogical practices across VWs. Literature synthesises examining VW usage highlighted the prevalence of ‘simulation of space’ [151] and ‘collaborative simulation activities’ [152]. Thus, returning to our earlier discussion of spaces, VWs could be seen as offering IPE a means to develop and use teaching spaces in different ways.

**Shadowing**

Reciprocated shadowing, in which health care students or practitioners from different professions observe each other at work in clinical settings, when complemented by associated discussion and reflection, can make an excellent contribution to interprofessional understanding of roles, responsibilities, constraints, expertise, and models of practice. Concentration wanes during passive observation and therefore observations need to be actively processed to become integrated with wider professional learning. An interprofessional shadowing experience needs both structure and follow-up activities to promote IPL and increase the chance that that learning will be integrated in subsequent professional practice. Some wider IPE initiatives include shadowing elements [153–155].

**Clinical Work in Interprofessional Student Teams**

Several IPE initiatives, in a variety of clinical contexts, have involved interprofessional student teams providing care under the supervision of qualified practitioners [54, 56, 68]. Two main models are interprofessional training wards (IPTW) and student-run clinics (SRC). These models show how a rolling programme of IPE in a service delivery setting can, over time, allow large numbers of students to rehearse and reflect on interprofessional teamwork. Follow-up studies show that students retain strong and largely positive memories of these types of IPE [156, 157]. However, these models can be vulnerable to sudden changes in the clinical area, resulting in loss of staff to provide the level of supervision students require, or a change in the caseload rendering a clinical area too demanding for student teams.

Training wards originated in Sweden in 1996 and much has been written about them since their inception. Many studies have shown that students find IPTW experiences meaningful (see for example evaluations from Sweden [54], the UK [68], and Australia [158]). Patients tend to be highly satisfied with care provided by interprofessional student teams [68,159]. However, such wards are not easy to implement: careful planning and attention to legal and bureaucratic requirements within a country’s health system are required, they are resource intensive, and with large student numbers across the health professions it is difficult to provide adequate time on the ward for each student and team. Studies have also noted that supervising student teams and facilitating effortful reflection can be a draining role for clinicians and faculty [156].

In the United States SRCs are becoming more widespread and were originally implemented to provide free access to health care for uninsured and socially deprived or underserved populations [159]. They are also referred to as student-led or student-assisted clinics, and involve students from a wide range of health professions under appropriate supervision. A systematic review suggested that SRCs give students ‘the optimal and most realistic form of learning by doing’ [160, p. 250]. However, interprofessional student clinics may cost more than conventional clinical placements for students [161] and, as with much health professional education, evaluation through longer-term follow up of impact is still required.

A related model of IPE includes direct contact with patients but stops short of providing care; this involves interprofessional student team members assessing patients with complex needs and conducting an interdisciplinary case conference to integrate their findings and develop a care plan [70]. This model of IPE forms the basis of the health care team challenge (HCTC) – a student team competition held annually at many universities worldwide [162].

**Online IPE**

With its emphasis on the contact hypothesis [105], IPE has tended to emphasise face-to-face synchronous learning and has encountered well-documented challenges [21–23]. Online IPE may help solve some of the logistical issues of face-to-face activities [163]. At pre-licensure level, online interprofessional modules may be woven into the wider profession-specific curriculum for several professions; this allows large numbers of students across different faculties, and even different institutions, to undertake IPL activities asynchronously and simultaneously [164]. At post-licensure level, examination of computer-mediated communication (CMC) among dispersed members of a rural interdisciplinary health care team illuminated group dynamics in virtual interprofessional teams, providing valuable insights for planners and facilitators of e-IPL [165].
Online IPE has been shown to be effective and a sustainable solution to help learn foundational teamwork knowledge [166] and promote self-directed IPL [167]. It is, however, important to remember that online IPE also requires interaction, which might be achieved through moderated or unmoderated electronic discussion forums within a virtual learning environment (VLE), or through social media [168], in addition to blended learning formats that combine, for example, online and face-to-face learning [169]. A study of online IPE groups of students from six professions working through a social networking site, compared three levels of facilitation and task-structuring. It found that a facilitated group with moderate task-structuring was more successful than both an unfacilitated minimally structured group and a highly facilitator-structured group [170]. This highlights the careful balancing act between too much and too little intervention by curriculum developers and learning facilitators. Blending e-learning with informal self-directed IPL activities, such that learners are encouraged to meet online team members face-to-face when possible, demonstrates that e-learning does not have to be an all or nothing approach [171].

**The Role of Facilitation**

While many principles of good small group facilitation apply to IPE, some additional dimensions warranting attention include the deliberate heterogeneity of groups, and the aim of harnessing diverse perspectives, skills, and insights of participants from different professions. This is challenging, even for those with considerable uniprofessional facilitation experience [172]. There is a considerable body of literature on facilitation and IPE [173-176] and there continues to be a wide range of staff development programmes in IPE [177]. Unique demands of facilitating online IPE have also been identified. For example, Dalley-Hewer and colleagues highlighted the phenomenon of 'polite agreement' in interprofessional online discussion forums and were concerned that exploring ‘meaningful disagreement’ respectfully should be a defining feature of IPL. Restructuring ‘e-tivities’ and scenarios resulted in a more critical discourse which can help learners to reach new and shared conclusions [178].

Recently, Evans and colleagues [179] examined the impact of facilitating IPE on facilitators themselves - currently a relatively under-explored area. The findings indicate undertaking interprofessional facilitation affected facilitators' own interprofessional workplace behaviour, such as working more collaboratively when planning care, treating patients, and supervising students. A recent qualitative synthesis of 12 articles [180] examined the nature of interprofessional facilitation and found that it was influenced by contextual factors, such as the need for good organisational and e-learning support. Facilitator experiences and the use of different facilitation strategies were also found to be important, as were initial preparation, ongoing support, the opportunity for co-facilitation, and the ability to be flexible in terms of adopting a variety of approaches to facilitation. This synthesis helpfully provides guidance on both staff development for interprofessional facilitation and curriculum design, as well as suggestions about how facilitators may best be supported in this challenging role.

Interprofessional co-facilitation is one way to mitigate facilitators’ inadequate knowledge of all participating professions and their usual approaches to learning and teaching. The extra cost of additional facilitators may need to be offset by larger groups or reduced contact time. In addition, co-facilitators can feel that their own professional expertise is under the spotlight to a greater extent than in their routine work – an experience that may be enjoyable or nerve-wracking. Co-facilitators need to role model high-quality interprofessional collaboration, otherwise the credibility of the learning experience may be damaged.

IPE researchers have reported that gender balance and the balance of professional membership can affect group dynamics [181]. There may be opportunities for facilitators to allocate group membership in ways that maintain sufficient balance to safeguard productive interprofessional discussion.

Discomfort generated by lack of familiarity with IPE may cause some participants to try to change the nature of the learning experience so that it becomes more familiar. Conflict may be more likely in a group where firmly held professional positions are scrutinised. Facilitators need to develop skills to productively harness the energy of conflict, reflecting it back to participants, and set clear limits on acceptable behaviour [182]. The contact hypothesis suggests how prejudice and its associated conflict might be reduced [106]. It highlights the importance of facilitators drawing out both similarities and differences between participating groups. Most interprofessional facilitators find that conflict remains productive and manageable if there is a central focus on patients and improving the quality of services. Improving the quality of working lives by improving team communication and local processes is also an effective focus at the post-qualification level.

**Assessment and Interprofessional Education**

The importance of the assessment of interprofessional learning outcomes should be no different from that of uniprofessional or generic outcomes. However, a 2015 review suggested that few IPL activities are assessed and that if they are it is rarely through assessment of performance [183]. An Australian audit indicated that IPL is most frequently assessed through attendance followed by essays and group presentations [184]. Assessment is important to ensure that students do not consider IPE different from their uniprofessional learning – it is not optional or peripheral but important: 'an integral and necessary component in the education of health and human service professionals, regardless of discipline' [185, p. 101].

In 2016, in response to an invitation from the programme committee of the 17th International Ottawa conference on the Assessment of Competence in Medicine and the Healthcare Professions, an international working group
organised several meetings and discussions with colleagues around the globe on the topic of the assessment of IPL. This process, which involved 75 contributors from 15 countries, resulted in the ‘International consensus statement on the assessment of interprofessional learning outcomes’ [33]. Box 14.5 summarises this statement.

The statement includes a rationale for assessment, similar to that of assessment in health professional education in general with the addition of showing that health professionals are able: ‘to meet the needs and expectations of patients, clients and communities, as well as carers and families, for effective cooperation and interprofessional communication between health and social care workers’ [33, p. 4].

For qualification and licensure purposes, students’ and trainees’ competence is assessed at the individual level, although teamwork and group activities may be assessed.

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**BOX 14.5 FOCUS ON: Assessment: summary of the International Consensus Statement on the Assessment of Interprofessional Learning Outcomes [33]**

**What to assess:**
The defined learning outcomes for the particular university and health profession – which will include the broad areas of role understanding, interprofessional communication, interprofessional values, coordination and collaborative decision-making, reflexivity, and teamwork.

**How to assess:**
Methods should draw on best practice in assessment, which may need to be ‘situated and contextualised’. Students should be assessed both individually and within a group or team setting. Suggested approaches include scenario-based MCQs, team-based projects, simulation with observation, practice-based activities, reflective journaling, and oral or written critique of teams that students observe or ‘join’. In addition there are numerous tools for the assessment of teamwork and collaborative practice (see for example the collection on the National Center for Interprofessional Practice and Education’s website [189]). Assessments may form the basis of an interprofessional portfolio in which students provide evidence of meeting the defined learning outcomes over the course of their programme of study.

**Who should assess?**
Many jurisdictions require that students should be assessed summatively by a member of their own health profession. However, if interprofessional assessment is part of a programmatic assessment process, this becomes less of an issue as there is not one final examination but rather on-going assessment throughout the programme by different health care professionals, including from their own profession (see Chapter 25 for more on formative and programmatic assessment processes). Evidence of learning may also be shown by peer assessment and multisource feedback, including patient opinion.

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**BOX 14.6 FOCUS ON: Global developments in IPE**

**The World Health Organization**
The WHO continues to support the need for IPE. In recent documents it has called for health professional education accreditation at a national level to include IPE for collaborative practice [16]. Its five-year action plan for 2017–2021 calls for ‘provision of interprofessional education and organization of multidisciplinary care, including recommendations on skills mix and competencies to achieve integrated people-centred care’ [191, p. 11].

**Japan**
The Japan Association for Interprofessional Education (JAIPE) was founded in 2008 by 46 representatives from health care, welfare, universities, hospitals, and other institutions. Health and social care in Japan recognises the need for interprofessional collaborative practice as the country becomes a super-aging society. IPE is being implemented across academic disciplines and aims to help learners master team-working competencies [192]. It is still a developing field within higher education.

**USA**
- The IPEC, which includes representatives from professional associations of dentistry, pharmacy, nursing, public health, osteopathic medicine, and allopathic medicine, has published an influential report on core competencies for interprofessional collaborative practice [129]. The number of US medical schools mandating IPE increased from 56 in 2007–2008 to 130 in 2014–2015 [193].
- The National Center for Interprofessional Practice and Education in Minneapolis, Minnesota, was developed through cooperative agreement with the Health Resources and Services Administration (HRSA), the primary federal agency of the US Department of Health and Human Services with the mandate of improving access to health care and also has funding through three private foundations. Part of its mission is to conduct rigorous evaluation of IPECP. Its work began in October 2012 [194].

**Australia**
The standards of all health professions accredited with AHPRA (the Australian Health Practitioner Regulation Agency) include items relating to interprofessional practice. However, there is wide diversity in how, when, and what is included in health professional curricula at the individual institutional level [184].

**Africa**
IPE has a new network in Africa (http://afriPEN.org) and is being implemented in developing countries with similar challenges to those in developed countries [23]. Examples are Indonesia [195] and Malaysia [196].
as part of wider in-course assessments. Lingard has contrasted the individual emphasis to a collectivist approach to competence [186]. She suggests three key premises underpinning a collectivist approach (p. 55):

1. Competence is achieved through participation in authentic situations.
2. Competence is distributed across a network of persons and artefacts.
3. Competence is a constantly evolving set of multiple, interconnected behaviours enacted in time and space. The collectivist discourse takes a systems approach and acknowledges the intricacies of collaborative practice. It will necessitate a rethink of the current assessment infrastructure in order to measure team performance and a move from thinking about 'competent practitioners' to talking also about 'competent performances' of teams' [186, p. 67, italics in the original]. This will not be easy and is likely to be more feasible and acceptable post-licensure. Orchard, drawing on the work of Kvarnström [187], advocates post-licensure assessment to focus on team dynamics and the knowledge contribution from each team member, taking into account the organisational environment [188]. Of course, health professionals may work in different teams and wider collaborations depending on their role and location within a health service, adding to the complexity of deciding when, where, and what to assess. Some 'teams' come together for very specific tasks such as the management of a cardiac arrest – there the importance is the role and not the person. Other teams work together over much longer periods of time.

### Conclusion

Whichever beach you are sitting on, it is likely to feel as if interest in IPE comes and goes like the tide. This applies to areas of practice as well as geographical locations, and beaches differ with respect to the amount of variation between high and low tide. At the time of writing there are exciting developments in IPE worldwide [190], a few of which are described in Box 14.6.

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Further Reading

Many of the other chapters in this book are valuable sources of additional reading to inform the development and delivery of IPE. Good studies of IPE are dispersed across many journals, their location often reflecting the clinical setting for the IPE or the professional backgrounds of the authors. However, the most extensive single collection of papers about IPE – descriptions, evaluations, and theoretical debate – can be found in the Journal of Interprofessional Care (http://www.informaworld.com/jic).