Work-based assessment of teamwork: an interprofessional approach

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The iTOFT team

Ethical approval details

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Contents

Executive Summary

This report ***Work-based assessment of teamwork: an interprofessional approach*** describes the Office for Learning and Teaching (OLT) funded project of the same name. It focuses on the rationale for, the development of and the piloting of a tool for observing and giving feedback on an individual student's behavior in an interprofessional team based activity. The study was conducted during 2012–2014 with a project team initially led by the University of Queensland, and included team members from five Australian universities in three states (University of Queensland, University of Technology Sydney, The University of Sydney, Central Queensland University and Curtin University), as well as from the UK (University of Derby) and Canada (University of British Columbia).

This project builds on the work of the *Curriculum Renewal for Interprofessional Education in Health* (2014). Both in Australia (as evidenced by the Curriculum Renewal project) and globally there is a need for tools to assess the learning outcomes of interprofessional education (IPE) and whether these have been achieved by pre-qualification health professional students. The output of the project is the *iTOFT:* the individual teamwork observation and feedback tool.

Chapter 1 places the project in context and includes definitions of IPE. We discuss the rationale for an assessment/observation and feedback tool, and locate the project in relation to previous OLT funded work and reports, as well as global initiatives.

Chapter 2 reviews the accreditation standards of the Australian accredited health professions in relation to interprofessional and team-based learning outcomes and competencies. We highlight several interprofessional competency frameworks and how these relate to the Australian accreditation standards, as well as giving examples of observable behaviours listed in those standards.

Chapter 3 provides the rationale for work-based assessment of teamwork in the context of competency-based education. We discuss the challenges of team-based assessment and note the importance of aligning learning outcomes, learning activities and assessment. 'Assessment for learning' and 'assessment of learning' are compared and contrasted.

Chapter 4 reviews the literature for existing teamwork assessment tools and highlights the gap in relation to tools for the observation of behaviours of individual students working in teams. A comprehensive set of tables of existing measures is included. This chapter also provides a glossary of common terms used in the validation of measures and tools.

Chapter 5 describes the process by which the iSTAT (individual student teamwork assessment tool) was developed from the literature and through a Delphi approach. The version of the iSTAT after this process had 18 items in three categories: communication, cooperation and coordination. Each of the 18 observable behaviours would be described as being observed: rarely, sometimes, consistently or not applicable in this setting.

Chapter 6 describes the field testing of the iSTAT in terms of locations and activities.

Chapter 7 provides the quantitative data analysis of the iSTAT items and the process of validation of the prototype tool.

Chapter 8 focuses on the qualitative data obtained from users of the iSTAT – both observed students and assessors.

Chapter 9 pulls the data together and describes how the iTOFT (individual teamwork observation and feedback tool) emerged from the iSTAT taking all that data into account. The two versions of the iTOFT are described: the **BASIC** for junior students has 11 observable behaviours under two headings: 'shared decision making' (7 items) and 'working in a team' (4 items). The **ADVANCED** for senior students and junior health professionals has 10 observable behaviours under four headings: 'shared decision making' (3 items), 'working in a team' (3 items), 'leadership' (2 items) and 'patient safety' (2 items). Both versions have a similar observation scale: not applicable to this activity; inappropriate; appropriate; or responsive. There are scale and item descriptors.

Chapter 10 puts the iTOFT in perspective, makes recommendations for future work and discusses the limitations of the study.

Chapter 11 includes complete references for the whole report not included elsewhere in the chapters.

The standalone resource pack is for use by both observed students and observers. It includes sections on the conceptual framework for feedback, and best practice for observation and feedback processes. Note that as the resource pack is for use outside the full report there is content overlap between the pack and the overall report.

Appendices

1. A list of the accreditation standards and how they map to the iTOFT
2. Teamwork review references (for chapter 4)
3. Student group interviews – themes
4. Faculty group interviews – themes.

Chapter 1: Introduction

Rationale

Work-based assessment of teamwork in healthcare: an interprofessional approach is an ambitious study. It responds to local, national and global developments in the areas of health professional education, health workforce development and workplace learning. The need for more effective interprofessional, collaborative and team-based practice constitutes one of the consensus policy and practice directions in the delivery of high quality, safe, efficient and sustainable care.

> 'Globally, the past few decades have been times of immense change and challenge within higher education. During this period interprofessional practice (IPP) and interprofessional education (IPE) have been foregrounded in national change agendas in health and higher education' (The Interprofessional Curriculum Renewal Consortium Australia, 2013, p.9)

And,

> 'The preparedness of health professional graduates to engage in IPP has been identified as essential for designing and delivering health services that are patient responsive, effective, efficient and, as a consequence, sustainable' (The Interprofessional Curriculum Renewal Consortium Australia, 2013, p.2).

The World Health Organization (WHO) in maintaining its strong leadership role in this area discusses a 'collaborative practice-ready workforce' in the following terms:

> '(this) is a specific way of describing health workers who have received effective training in interprofessional education … This is a key step in moving health systems from fragmentation to a position of strength … The resulting strengthened health system leads to improved health outcomes' (WHO 2010, p.10).

As a response to the WHO call to global action, participants at the *All Together Better Health 5 conference* held in Sydney, Australia in 2010, ratified the *Sydney Interprofessional Education Declaration* (www.aippen.net/docs/The Sydney Interprofessional Declaration.pdf)

The implication of this policy and practice direction for the higher education sector can be seen in an increasing number of initiatives in Australia and globally aimed at embedding and delivering IPE as a core element of the curriculum across all health professions. It can also be seen in the increasing identification of interprofessional and collaborative competencies as core learning outcomes in curriculum documents and accreditation requirements. We have published a comparative review of competency frameworks in IPE based on the work in the curriculum renewal project (Thistlethwaite et al., 2014).

Focus

This study addressed one important element of this requirement. In broad terms the study focused on the development of interprofessional education, interprofessional or collaborative practice, often referred to as teamwork, and the 'nationally recognized need to develop and deliver a robust package of work-based assessment (WBA) tools for health professionals in diverse clinical settings as a means of testing their performance and readiness for practice' (quotation from the study proposal submitted to the OLT in 2011). More specifically, the study targeted two complex, contested and interrelated issues. Firstly, how best to assess student learning in the area of interprofessional collaboration and teamwork. Secondly, how to design a structure and process that provides information about learning whilst at the same time enabling and resourcing reflection, learning and competency development. We discuss this in terms of assessment **for** and assessment **of** learning.

In support of these two foci, in particular the focus on assessment for learning, the project aimed, as stated in the proposal, to 'explore the potential for involving recipients of teamwork in assessment of team performance: in health these are patients/clients, who have been described as being at the centre of care (and hence the team).' The study also aimed to break new ground by providing an assessment framework that assesses students individually as team members, with an additional purpose of enhancing team performance as a whole. Whilst the study took a particular focus on health professional education, its outcomes are generalizable to workplace settings other than those of clinical practice in health.

Locating the study

Whilst the study exists as a stand-alone initiative addressing assessment in the area of interprofessional education and competency development, it draws from and contributes to a larger process of IPE development in Australia and globally (see O'Keefe et al, 2011; 2014). In particular it utilises the IPE curriculum development framework (the four dimensional framework 4DF (Lee et al., 2013) developed as part of the *Curriculum Renewal Studies* (CRS) programme. It also draws extensively from the study and report *Interprofessional Education: a National Audit* (NAS) study. In summarising its findings in relation to student assessment of learning in IPE across 23 Australian universities, the NAS notes:

> 'The survey results indicate that just over half of the IPE activities documented were assessed …most were reported as having their learning outcomes summatively assessed. The survey data suggests that the Australian experience reflects the broader international experience, with many, but not all evaluation (read assessment) being focussed on student satisfaction, short-term knowledge acquisition and impact on attitudes to other professions' (The Interprofessional Curriculum Renewal Consortium, Australia 2013, p.59).

And,

> 'Where assessment did occur 'written assessment', participation/attendance', and presentation' were the predominant methodologies (The Interprofessional Curriculum Renewal Consortium 2013, p.8). (See this reference for a more detailed discussion of assessment and evaluation in the Australian and global contexts.)

A consistent message from the NAS, the CRS and other national and international studies in relation to assessment identifies the need for further conceptual, practical and research informed development in assessing student learning in this area. Concerns are consistently expressed as to the problematic implications of the degree of diversity, the degree of informality and the self-report focus of many current assessment practices. We argue that such developments should address the complexity of IPP and IPE pedagogy and the context of IPP – the interdependency between the individual and the team. In providing guidance in this area we merge two streams of assessment activity: the pedagogical trend towards the use of WBA, in general, together with a focus on health service delivery, as a specific example.

Study Aims

In responding to the above, the current study aimed to:

1. Review and evaluate existing prequalification work-based assessment across the health professions with a focus on assessment for teamwork competencies. Within this review we will also explore the concept and definitions of these competencies, considering teamwork as both a set of linked attributes and a global construct.
2. Develop a framework for the work-based assessment of teamwork. Exemplary instruments will be piloted to explore the application of this framework in a variety of circumstances. These instruments will be for formative assessment, with an educational impact arising from its usefulness as a means of giving timely and constructive feedback.

Study team

To resource the specific area of health professional education and the broader area of professional and workplace learning the study team included expertise from a range of areas and institutions. Project partners came from six universities (including one international) and included specialists in education, professional learning and workplace learning, as well as specialists from the areas of medicine, nursing and the allied health professions. Many of the team members had worked in the area of IPE with some having worked together on a number of previous IPE studies. As noted above, we also sought the inclusion and active participation of those involved in trialling the assessment instrument and process.

Study design

Conceptually and theoretically our approach was underpinned by a range of ideas about professional learning, education, pedagogy and the importance of authentic workplace learning articulated in the important document *Assessment 2020* (Boud and Associates, 2010), which was funded by the then Australian Learning and Teaching Council (now the Office for Learning and Teaching). *Assessment 2020* is a guidance framework aimed at supporting assessment and learning through assessment across the higher education sector. The framework document notes that in addition to assisting in the 'making of judgements about how students' work meets appropriate standards:

> 'Assessment is a central feature of teaching and the curriculum. It powerfully frames how students learn and what students achieve. It is one of the most significant influences on students' experience of higher education and all that they gain from it. The reason for an explicit focus on improving assessment practice is the huge impact it has on the quality of learning agenda' (Boud and Associates 2012, p.1).

Three additional design characteristics of the study were:

- Its inclusivity and participatory nature. We have been concerned to engage with and seek the active participation of all relevant stakeholders in higher education and health. Importantly we have sought participation from students.
- A learning approach. As a team and as a study we have sought to demonstrate a learning approach to the design of the instrument and resources. We have invited and received much valuable comment.
- Avoidance of duplication. Our engagement and review of existing resources and the broader literature has been extensive. We have been committed to utilising and building on what exists rather than duplicating.

As the study involved the use of a number of very different methods, for example, surveys, documentary analysis, extensive user sampling, focus groups and individual interviews, we have discussed issues and challenges in method in each relevant section.

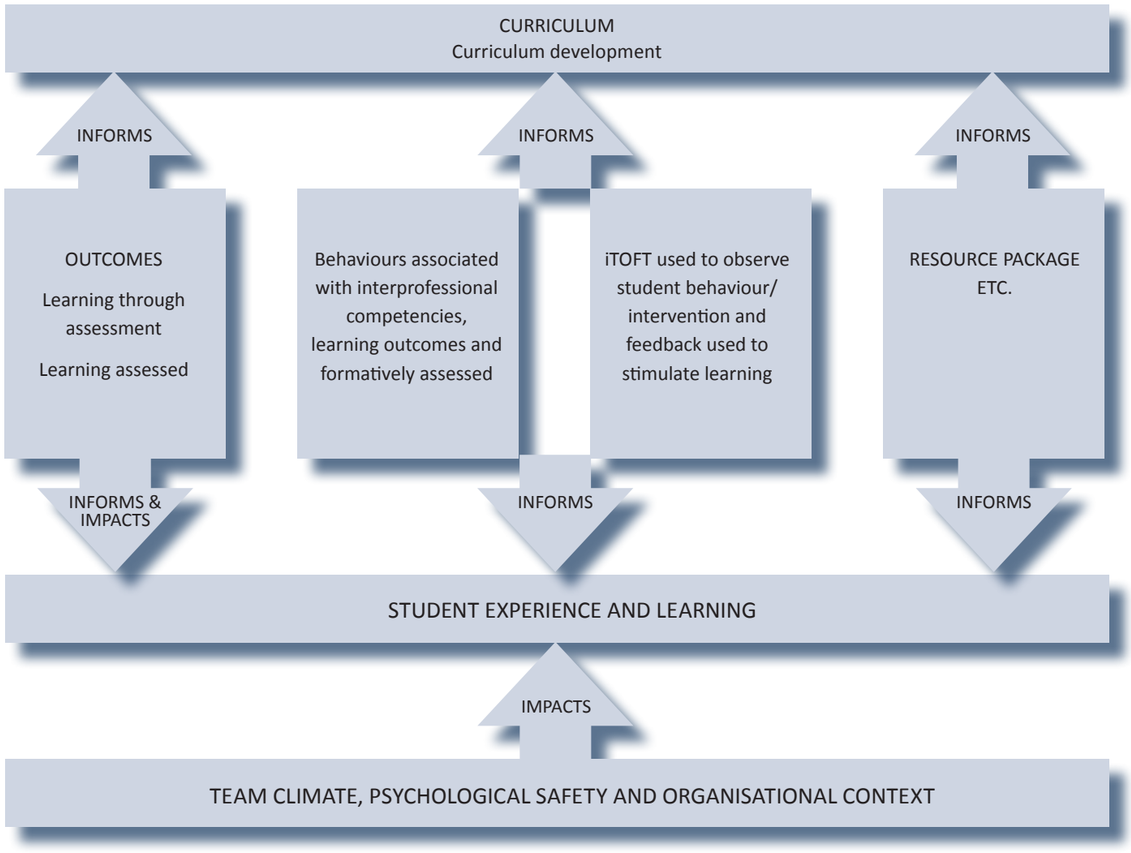
Navigating the report – what follows

In what follows we tell the story of the design, development and testing of the tool which we have called the iTOFT (the individual teamwork observation and feedback tool) and the resource package that supports and contributes to its use. Figure 1.1 provides a diagrammatic view of how we have come to see the place and contribution of the iTOFT and resource package. Rather than provide a stand-alone assessment tool, we have designed the iTOFT and resource package as an integrated whole for observation and feedback rather than summative assessment. A package that enables users – educators, clinicians, students and others – to gain the most from the observation and feedback activity.

We see the use and value of iTOFT and the resource package as preparing faculty, educators, clinicians and students for the activity of assessment and for the learning opportunities – 'about learning' and 'for learning'. These learning opportunities potentially:

- Identify a number of observed behaviours associated with effective interprofessional and collaborative competencies or graduate attributes. Descriptors of each behaviour are provided
- Prepare observers and learners for the learning activity and the observation and feedback process
- Has been developed as a resource to guide curriculum development and educational practice, leading up to and including formative assessment and evidence of learning
- Guide users to maximise the learning benefit from the activity
- Recognise the importance of psychological safety and team climate to the functioning of teams and to the process of assessment. While we have not elaborated on the issue of psychological safety and its positive relationship to learning and team performance, the assessment for learning and structured feedback approach of the iTOFT seeks to maximise student participation and psychological safety (Edmondson 1999; Aschauer & Macan 2013).

Figure 1.1: Model representing the role of the iTOFT and the resource pack



Chapter 2: Accreditation standards

There is global interest in incorporating specific standards and criteria related to interprofessional education into national accreditation standards for health professional education. Accreditation of education programs is designed to assure a level of quality by measuring a program's compliance with a set of nationally accepted standards that typically address both classroom and work-based learning contexts. A measurement instrument for work-based collaboration adds to the authentic evidence related to interprofessional education for any given education program and is therefore aligned closely to the domain of accreditation. Two specific examples of emerging attention to interprofessional education and collaborative practice in the accreditation world are provided in this chapter from Australia and Canada.

Australia

The Interprofessional Curriculum Renewal Consortium, Australia (2013), *Curriculum Renewal for Interprofessional Education in Health*, Sydney, Centre for Research in Learning and Change, University of Technology, Sydney project in its recommendations includes the following:

Recommendation 3

Incorporate IPP standards and interprofessional learning outcomes into the accreditation standards of all Australian health professions and recognise that meeting these learning outcomes will require the application of IPE pedagogies (p.83).

The report goes on to state: 'The importance of this issue, and its link to the uptake and development of IPE as a systematic part of health professional education was a constant and strong recommendation from many of the stakeholders with whom we spoke. Their view was that embracing such standards would provide the greatest impetus for the systematic adoption and development of IPE and IPP as part of Australian health professional education. This view was also expressed by our international reference group and is identified in the IPE development literature' (p.83).

The national boards of the health professions and their accreditation authorities under the regulation of AHPRA (Australian Health Practitioner Regulation Authority) are shown in Table 2.1.

The accreditation authorities have the following two functions of relevance to this project, under the Health Practitioner Regulation National Law Act (www.ahpra.gov.au/Education/Accreditation-Authorities.aspx):

- Development and review of accreditation standards
- Assessing programs of study and education providers against the standards.

In educational terms, the accreditation standards need to include learning outcomes (or competencies depending on their framing), which are incorporated into a higher education provider's curriculum for learners to achieve them. Learners must then be assessed in some way to prove achievement. The curriculum, learning outcomes and assessment processes are then reviewed by the relevant accreditation body and the program of study accredited for each health profession.

As this project aimed to develop an assessment process for outcomes/competencies related to teamwork, we needed to check the accreditation standards for each profession in order to ensure that any measure so developed would map against those standards; specifically this meant mapping outcomes that relate to **observable behaviours**'. In addition to the ten professions marked in table 2.1, we also found relevant outcomes for dietetics and exercise physiology, which are not regulated as yet by AHPRA.

The full list of outcomes for these professions, what we consider are observable behaviours in a team activity and how they map to the iSTAT and iTOFT, is in Appendix 1.

Table 2.1: Australian National Boards and Accreditation Authorities and inclusion of IPP and/or teamwork

NATIONAL BOARD	ACCREDITATION AUTHORITY
Aboriginal and Torres Strait Islander Health Practice Board of Australia	Aboriginal and Torres Strait Islander Health Practice Accreditation Committee
Chinese Medicine Board of Australia	Chinese Medicine Accreditation Committee
*Chiropractic Board of Australia	Council on Chiropractic Education Australasia
*Dental Board of Australia	Australian Dental Council
*Medical Board of Australia	Australian Medical Council
Medical Radiation Practice Board of Australia	Medical Radiation Practice Accreditation Committee
*Nursing and Midwifery Board of Australia	Australian Nursing and Midwifery Accreditation Council
*Occupational Therapy Board of Australia	Occupational Therapy Council (Australia & New Zealand) Ltd
*Optometry Board of Australia	Optometry Council of Australia and New Zealand
*Osteopathy Board of Australia	Australian and New Zealand Osteopathic Council
*Pharmacy Board of Australia	Australian Pharmacy Council
*Physiotherapy Board of Australia	Australian Physiotherapy Council
*Podiatry Board of Australia	Australian and New Zealand Podiatry Accreditation Council
Psychology Board of Australia	Australian Psychology Accreditation Council

*(boards marked with a * include outcomes relating to interprofessional practice and/or teamwork).*

As noted in the *Curriculum Renewal for Interprofessional Education in Health* report (p.40) the OLT funded *Learning and Teaching Academic Standards Project* (LTASP) (O'Keefe, Henderson & Pitt 2011) has shown how IPP competencies were located in accreditation requirements as of 2010. 'This important study reviewed the standards for 26 Australian health professions in terms of 'threshold learning outcomes'. To allow comparison across professions, the project used broadly specified categories in relation to standards. The most relevant standard in relation to IPP was 'Deliver safe and effective collaborative healthcare'. The LTASP noted the following common competency areas:

- Communicating
- Operating within scope of own practice, and knowing when to refer to others
- Collaborating
- Working well in a team
- IPP for service delivery

These are similar to those in other lists, for example Thistlethwaite & Moran (2010) reviewed the literature for defined learning outcomes for interprofessional activities globally and found these common themes or domains:

- Teamwork
- Roles and responsibilities
- Communication
- Learning/reflection
- The patient (client)
- Ethics and attitudes

Other examples are shown in Table 2.2.

Table 2.2: An overview of selected international IPL frameworks

Framework	Origin and year	Stimulus and background	Terminology used	Domains
CIHC	Canada 2010	To develop a national competency framework interprofessional collaboration.	Competencies	• Interprofessional communication • Patient/client centred care • Role clarification • Team functioning • Collaborative leadership • Interprofessional conflict resolution
IPEC	United States 2011	To transform health professions education; need to build safer health care systems that are more patient-centred and community oriented.	Competencies	1. Values and ethics 2. Roles and responsibilities 3. Interprofessional communication 4. Teamwork and team-based care
CUILU	United Kingdom 2004	To provide a more coherent, integrated and patient-centred approach to modernising the educational input for future health professionals; to promote teamwork, partnership and collaboration between professionals and agencies, and with patients.	Capabilities	1. Knowledge in Practice 2. Ethical Practice 3. Interprofessional Working 4. Reflection (learning)
Curtin University	Australia 2011	The capabilities needed to be a collaborative practice-ready health professional, who can work effectively and efficiently in an interprofessional team and provide safe, high quality service and care to clients, families and communities.	Capabilities	1. Communication 2. Team function 3. Role clarification 4. Conflict resolution 5. Reflection

Canada

Beginning in 2008 the federal government under the auspices of Health Canada funded a project designed to develop accreditation standards for interprofessional education in six health professions: medicine, nursing, occupational therapy, physical therapy, social work, and pharmacy. Over three years the work was undertaken by both steering and working committees comprising representatives from each profession's accreditation agency/agencies as well as noted interprofessional educators and representation from Accreditation Canada, the agency responsible for accrediting health services such as acute care hospitals across the country. In addition, consultation with stakeholder groups was conducted: these groups included other health professions, regulators, clinical service managers, and professional associations.

The project was conducted in two phases. Phase 1 resulted in consensus on guiding principles for accreditation of IPE as well as terminology and classification of standards. Standards were specifically linked to all aspects of an education program and not just the curricular components. The five categories of standards related to interprofessional education are organizational commitment, faculty/academic unit, students, resources and education program. Phase 2 resulted in a document that provided examples of language for each specific category of the standards, examples of criteria aligned with standards and examples of evidence that could meet the benchmark for accreditation compliance in the eyes of accreditation surveyors.

In a recent survey of the six initial professions involved in the project, it was clear that all professions had changed their accreditation standards to more explicitly embed interprofessional education. While some language remains more general, some is very specific requiring evidence of the involvement of students with other professions, the types of activities, the other professions involved, the learning outcomes for each activity and the assessment method. This last requirement aligns well with the iTOFT instrument and its contribution to the assessment of collaborative practice.

The language of the accreditation standards

There is considerable diversity in how accreditation standards are worded. Many are very broad, some are very specific to an individual profession, some are general and some relate to behaviours that may be observed and potentially assessed. Each accreditation program determines its language and so standards related to interprofessional education may differ from profession to profession. Even words such as "should" and "must" vary from program to program and will influence the language related to accreditation of interprofessional education.

In Australia, the *Curriculum Renewal for Interprofessional Education in Health* project noted this variability and recommended that two of the seven key areas for development are (p.93):

- Agreement on a common language for the development of IPE curricula in Australia
- Agreement on an Australian statement of core competencies and learning outcomes for IPP

Examples of observable behaviours:

- Treats other professionals with respect (chiropractors)
- Demonstrate by listening, sharing and responding, the ability to communicate clearly, sensitively and effectively with patients, their families/carers, doctors and other health professionals (medicine – observable but very broad)
- Demonstrates effective communication with midwives, health care providers and other professionals (midwifery)

Examples of very broad outcomes/ competencies

- Contribute to team of health care practitioners in delivering care in a cooperative, collaborative and integrative manner (dentistry)
- Collaborates with the health care team to inform policy and guideline development (nursing)

Example of profession specific outcomes/ competencies

- Recognises and supports the role of food service personnel in the delivery of nutrition care (dietetics)

In Canada, the language issue was left to each accreditation program so that interprofessional education language was consistent with all of the standards and criteria.

Conclusion

Teamwork competencies or learning outcomes contained within health professional accreditation standards are identified in diverse ways with varying levels of specificity. We therefore concluded that as we developed our tool we needed to be able to assess individual teamwork behaviours and take into account how these contribute to the appropriate accreditation standards.

Chapter 3: The context of assessment

Introduction

As discussed in chapter 2, learning outcomes and competencies related to teamwork and collaborative practice are included in the accreditation standards of the health professions in Australia. Therefore education providers need to ensure that learners have the opportunity to engage in activities to develop teamwork knowledge and skills. IPE is not solely about the development of teamwork as shown by the interprofessional competency frameworks discussed below.

Education providers require a method of assessing that students have achieved the required learning outcomes and competencies. The assessment of teamwork is a challenge as it should ideally be undertaken during observation of students working in teams and carrying out teamwork tasks, which will usually be undertaken during simulation or in clinical and professional settings. At present, as will be further demonstrated in chapter 4, there is a lack of valid and feasible assessment methods for teamwork for use at the prequalification level.

The alignment of outcomes, activities and assessment is based on constructivist learning theory and instructional design, and ensures learning is student-centred with meaning derived from the learning experience (Biggs & Tang, 2007). However placements or clinically based education are delivered by a wide variety of clinical educators, supervisors and health professionals who may not be fully informed about their students' curriculum and how their teaching and supervision fits within this. Yet, this same diverse body of clinicians and educators frequently carry out observation and assessment in the workplace (workplace based assessment). The introduction of a new method of assessment will therefore require additional faculty development and appropriate resources to ensure equity across all health professions.

Assessment in Australia – summary of findings from the Curriculum Renewal project

The national audit study (NAS) highlighted that 'assessment' focuses often on measuring student attitudes before and after learning activities. Fewer involve the assessment of knowledge or the observation and assessment of behaviour (The Interprofessional Curriculum Renewal Consortium Australia, 2013).

Questions that need to be considered in relation to assessment are:

- The timing
- The weighting of the assessment in terms of whether it is graded, or pass/fail only
- Who the assessors are and whether there is a moderation process
- Whether assessment is of the group/team or individuals within the group/team

And in addition we would add:

- Which professions will be involved?
- Which professions will assess?
- Does an assessor need to be from the same profession as the learner?
- What type of faculty development is required to observe, give feedback and assess?
- What impact does the assessment have on the learner?

The National Audit stated that:

> 'The survey results indicated that just over half the interprofessional activities documented were assessed. Where assessment was reported as occurring, 'written assessment', 'participation/ attendance' and 'presentation' were the predominant methodologies employed, with smaller numbers of responses reporting the use of 'reflective journals' and 'online activities' (The Interprofessional Curriculum Renewal Consortium Australia, 2014, p. 58).

Thus, of the 70 activities reported in the audit, only 59% were assessed, which raises questions about how students may perceive the relevance of their learning compared to other outcomes that are assessed. Of the 41 activities that were assessed, 22 specifically assessed teamwork or team function.

From our knowledge of the literature (see chapter 4) and the project team members' global experience of IPE, we know that it is not only Australia that lacks a good method for the assessment of teamwork competencies.

Learning outcomes and the competency based movement

The terminology relating to what should be learned includes learning objectives, outcomes, attributes and capabilities; some educators also break this down into 'knowledge, skills and attitudes' (KSA) as defined in Bloom's taxonomy of learning domains (Bloom, 1956). These domains are conceptualised as cognitive (mental/knowledge), psychomotor (manual or physical skills) and affective (feelings or emotional areas). In health professions education the current trend is towards competency-based education (CBE), which acknowledges the complexity of professional practice and aims to integrate KSA. The accreditation bodies want to know that a health professional graduate is fit to practise as an entry level, which may be translated as 'competent'. However CBE has its critics. It is not always entirely clear what competence looks like, how may it be measured and how it translates into workplace behaviour over time (see Hodges & Lingard, 2012, for detailed discussion of these issues).

When considering interprofessional practice we need to know how we may recognise that a graduating student is a competent team member. This can be difficult as many students are not working in co-located teams for long periods in clinical settings. Moreover it is important to explore whether problem-based learning or group work in non-clinical settings, such as for example community projects and presentations, predict how students perform in clinical teams.

As discussed in chapter 2, there are now a number of competency frameworks focusing on IPE (see for example Thistlethwaite et al., 2014); the Interprofessional Education Collaborative (IPEC) in the United States adopted the CBE approach in 2011 with its list of *core competencies for interprofessional collaborative practice* (IPEC, 2011). The Canadian Interprofessional Health Collaborative (CIHC) published its *National Interprofessional Competency Framework* in 2010. This succinctly defines a collaborative practice-ready health worker as someone who has learned how to work in an interprofessional team and is competent to do so (CIHC, 2010). Though this of course raises another question as to what an interprofessional team is and does.

One goal of competency-based education is to move from the subjective to the objective in assessment. While learning objectives are aspirational, competence is considered objective and observable (Carraccio et al., 2002). Discussion continues as to whether there are degrees of competence, which may be defined on a sliding scale, or whether an individual is either competent or not competent; though this omits a judgment of incompetence. IPE competency statements 'identify specific knowledge, skills, attitudes, values and judgments that are dynamic, developmental and evolutionary' (Bainbridge et al., 2010, p. 8). Competence is the minimal standard for certification and licensure. After qualification health professionals go onto develop expertise through practice, learning, reflection and feedback. Note that the term 'capability' is also used because of its overtones of evolution, highlighting the need for learners and professionals to respond and adapt to changes in health care and health services (Walsh et al., 2005).

Some competencies as written are very broad, some are abstract, and some are difficult to observe as can be seen from the accreditation standards in appendix 1 and items from existing measures, examples of which are given in chapter 4. Lurie (2012) has criticised the very broad competencies defined by medical boards and accreditation bodies, noting that many are abstract and socially constructed concepts, which are difficult to translate into observable and therefore assessable behaviours.

It is important that learners are informed of the purpose and aim of their education: they need to know what is expected of them (learning outcomes or competencies). When more than one profession is involved in interprofessional education, the learning outcomes should be the same for each learner to avoid confusion. The Interprofessional Curriculum Renewal Consortium's national audit found a marked variation in learning outcomes for IPE activities, with 15.7% of reported activities having no learning outcomes defined at all. This finding was similar to a 2010 literature review that formed part of the outputs of the World Health Organization's study group on IPE (WHO, 2010). This review analysed and synthesised key learning outcomes for IPE as defined in published descriptions of interprofessional learning activities (Thistlethwaite & Moran, 2010). While a minority of activities did not specify any outcomes, the majority fell under six main headings that correlate well with published competency frameworks: teamwork; roles and responsibilities; communication; learning/reflection; the patient (client); ethics and attitudes (Thistlethwaite & Moran, 2010). Examples of learning outcomes/competencies defined as required for interprofessional and collaborative practice from three North American sources are listed in Table 3.1.

Practice-based and work-based learning

Clinical placements are examples of broader work-integrated learning (WIL), which facilitates the integration of theory and practice (Orrell, 2006). To maximize learning about teamwork in clinical and professional environments, students should have prior learning opportunities about the theory of teamwork. They also require orientation to the practice environment and the people working within it; and they need to understand that while there will be many excellent examples of teamwork in the workplace, they will almost certainly also see poor teamwork and frequently an absence of teamwork.

The extent to which, and the ways in which, such pre-clinical placement preparation is conducted across professional curricula and institutions is highly variable. Pre-clinical education is still largely uniprofessional and conducted in the 'silos' frequently described in the interprofessional literature. Subsequently, the nature of clinical practice placements is such that there will always be variation in students' exposure to and immersion in teamwork experiences. Such experiences in the workplace may be uniprofessional, multi-professional or interprofessional (Thistlethwaite, 2015). While observation of healthcare teams in action is helpful it is not sufficient. Students need to become members of teams and be exposed to the complex tasks and boundary challenges of decision making and service delivery in order for profound learning to take place. Situated and experiential learning is enhanced through continuity of location and supervision (Thistlethwaite et al., 2013). There is no consensus as to how long a specific clinical attachment should be to enable a learner to feel part of a local team or community of practice (Thistlethwaite, 2013). Levett-Jones and colleagues (2009), for example, report that student nurses feel a greater sense of belongingness the longer their placements and this enhances their self-efficacy, confidence, capacity and motivation. At the beginning of each rotation learners need to start again to demonstrate their abilities. As learners move from one community of practice (Lave & Wenger, 1991) to another, both they and their new colleagues/supervisors need time to build trust, and such trust has been shown to be one of the features of longer rotations or longitudinal clinical placements (Couper et al., 2011; Frattarelli & Kamemoto, 2004). Across the health professions clinical rotations are of unequal lengths and this limits the ability of students to perform in teams including interprofessional teams over time.

Challenges of teamwork assessment

Learning outcomes or competencies relating to teamwork and collaborative practice are difficult to assess in the prequalification space. As many students do work infrequently in defined interprofessional teams for any length of time, observation of their teamwork may be difficult. A team may be formed for the purpose of assessment, for example for a simulation or OSCE (objective structured clinical observation). While this type of 'teamwork' mimics such team tasks as the response to a cardiac arrest, when teams form in response to an incident, it is not as authentic for other situations when teams take time to form and gel and thus to perform optimally. The team-OSCE (T-OSCE) is one example of a newly formed team assessment (Symonds et al., 2013). However a 'team' of students formed specifically to be assessed for their collaborative skills is unlikely to function well (Oakley et al., 2004). Academic, professional and interprofessional considerations and requirements often conflict; students may need to be assessed as individuals by a member of their own profession for end-point examinations. Differences in educational cultures across the professions hamper the development of acceptable and feasible assessments for interprofessional learning outcomes and competencies (Dunworth, 2007).

Table 3.1 Examples of learning outcomes and/or competencies for interprofessional practice

Organisation and reference	Domains	Examples	Comments
Interprofessional Education Collaborative (2013): USA	1. Values/ethics 2. Roles & responsibilities 3. Interprofessional communication 4. Teamwork	1. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services. 2. Communicate one's roles and responsibilities clearly to patients, families, and other professionals 3. Listen actively, and encourage ideas and opinions of other team members 4. Perform effectively on teams and in different team roles in a variety of settings	The competencies are very broad in all domains and not amenable to simple assessment methods but would require observation over time. The document states that the competencies should be both formatively and summatively assessed but does not suggest methods of assessment: 'The need for assessment instruments to evaluate interprofessional competencies represents a "next step" in the development of competency-based interprofessional education for all stages of interprofessional learning. This work is in early stages of development' (IPEC, 2013, p. 35).
Canadian Interprofessional Health Collaborative (2010)	1. Interprofessional communication 2. Patient/client/family /community-centred care 3. Role clarification 4. Team functioning 5. Collaborative leadership 6. Interprofessional conflict resolution	1. Communicate to ensure common understanding of care decisions 2. Support the participation of patients/clients, their families, and/or community representatives as integral partners alongside with healthcare personnel	Within the document, there is a discussion of the concepts of competence and competency: 'Competencies do not measure the level of competence. They provide the foundation upon which assessment of ability can be built, but they do not describe the levels at which individuals are expected to perform' (p. 31). No specific assessment methods suggested.
CanMeds – the Royal College of Physicians and Surgeons of Canada – 2015 Framework draft online (Frank and Snell 2014)	Six roles of which collaborator is one Working within the health care team and interprofessional health care are core concepts	Actively participate, as an individual and as a member of a team, in the continuous improvement of health care quality and patient safety (medical expert role). Work effectively with other physicians and other health care professionals	While these competencies are specifically for the medical profession, the collaborator role is being used to guide interprofessional outcomes by other organisations. There is a companion to the 2005 framework: An introductory guide to assessment methods (Bandiera et al., 2006).

Thus assessment and observation methods need to be introduced concurrently with the development of teamwork tasks and activities for students, if these are not already available. Aligning interprofessional learning outcomes, activities and assessment almost certainly requires a curriculum commitment to IPE, an interprofessional institutional champion and high-level support, as well as faculty development and training.

Assessment *of* learning and assessment *for* learning

Assessment is frequently referred to as either summative or formative. Summative assessment is the endpoint of a particular course, program or university degree and compares a learner's achievement through marks or grades with a previously set standard or benchmark. Summative assessment aims to answer the questions: has the learner shown evidence of adequate learning? Has the learner achieved the pass mark? Is the learner competent in this area? Formative assessment is a process that provides information to both learners and educators about the progress of the learner and aims to identify areas of strength and/or weakness. This type of assessment is about feedback and dialogue between learner and teacher. Of course, ideally, all summative assessment should allow an opportunity for feedback and reflection, but there is often no time or space for this in end-point high stakes assessment. Succinctly, summative assessment is assessment of learning while formative assessment is assessment for learning. Formative assessment of skills-based activities and complex tasks such as teamwork requires observation with constructive and timely feedback. When done well it is time and resource intensive.

David Boud discusses new approaches to feedback in the resource pack for the iTOFT (chapter 10). He recommends that to have an educational impact, feedback should no longer be viewed as a passive activity on the part of the learner. 'The information provided to students is used to influence their subsequent task performance' (Molloy & Boud, 2013, p. 19). Students need time to reflect on and assimilate the feedback in order to make any changes in their subsequent activities. Students are encouraged to be active and indeed seek out feedback rather than wait for it to happen.

In the workplace students are often reluctant to solicit feedback; they may not be sure who to seek out in the busy environment. Informal feedback processes in relation to teamwork and collaborative work are rare due to workforce pressures. More formal systems of work-based assessment (WBA) are therefore being put into place to enable a more structured feedback process, but this is still largely contingent on goodwill and the need for protected time.

Work-based assessment and teamwork

WBA takes place, as the name indicates, in real as opposed to simulated clinical environments. As performance in controlled assessment environments (such as the T-OSCE) may not be representative of actual work-based performance (Rethans et al., 1991), WBA instruments have been developed to improve validity and the authenticity of judgments of competence. To improve reliability and objectivity complex and context-specific clinical tasks have been broken down into discrete elements, the mini-CEX (the mini-clinical evaluation exercise in which a learner interacts with a patient to elicit a history and carry out a physical examination) (Norcini et al, 2003) being one example. Though patients are involved in the mini-CEX, they are not necessarily asked for their opinion on the student's or professional's performance. While the mini-CEX does mimic the task of a medical student or junior doctor in this case, check lists of discrete elements are 'at least in part, responsible for what might be described variously as "reductionist", "deconstructive", "tick-box", "mechanistic" or "instrumentalist' approaches to assessment' and 'the lack of appreciation of assessment as the learning tool for the student' (Amin, 2012, p.5). To avoid the assessment of learning usage (summative), WBA should be linked to opportunities for feedback and repeat performance in a feedback loop.

As chapter 4 demonstrates there are a number of instruments for the assessment of teamwork using behavioural markers for the observation of healthcare teams. Multisource feedback (MSF), also known as 360 degree appraisal, promotes learning depending on the quality and timing of the feedback and its individualization to the appraisee (Atwater et al., 2002). However MSF is collected over time from different stakeholders and is not specific to teamwork tasks or activities. MSF forms are completed by a variety of appraisers, who may include self, peer, own profession clinicians, other health professionals and, sometimes, patients, service users and carers. MSF and other WBA best practice suggests that they are kept simple with few items, but there is a lack of consensus as to how many assessors (or appraisers) are needed (Word et al., 2006). Self and peer assessment are being increasingly used as a means of assessing group and teamwork in university settings. One innovative tool for this is SPARKplus, which is web-based (Freeman & McKenzie, 2002).

Conclusion

Learning outcomes and competencies are the current defined end-points of periods of education. Competencies have been defined for interprofessional learning by various organisations, including accreditation bodies though the language differs markedly across professions and frameworks. When planning the development of the tool for this project, we were interested in observable behaviours relating to teamwork involving two or more professions and competencies derived from these. The tool was planned to be a WBA though we decided that simulation involving teamwork would also be suitable as an activity to be observed. While we agreed on the importance of feedback from patients and families, we were not sure how such feedback could be incorporated into a tool that requires observation by someone external to the team. In designing the tool we therefore took into account previous work in this area and placed an emphasis on changes in behavior which could be identified. .The tool is designed to be used by an assessor or observer who may be a peer or supervisor of the student.

Chapter 4: Review of existing teamwork measures

Background

In this chapter we review the literature for existing teamwork assessment tools to identify items for possible inclusion in a work-based assessment tool for formative feedback in relation to observed individual teamwork behaviours.

As discussed in chapter 1, health care delivery is an increasingly team-based activity and, to graduate health care professionals with the capability to work in teams, education providers are interested in the provision and evaluation of programs that facilitate learning and experience of teamwork. The evidence base for interprofessional education and collaborative practice (IPECP) while growing, needs further empirical studies to explore and understand: the nature of teams in different health care settings; the optimal team composition for varying contexts; the differing effects of co-located teams and wider collaborations; how people learn to work together; and, the relationships between educational interventions, teamwork processes, health outcomes and health care costs.

For empirical studies, methods and measures are required to: look at team functioning, compare 'teamwork' before, during and after training interventions, categorise teamwork to compare against outcomes, explore the effects of IPE initiatives, and evaluate educational processes. Moreover, in the context of this project, we require measures of student competencies and achievements to both assess their performance, ensuring they are fit to move onto the next stage of training, or to graduate and practice as professionals, and to evaluate the outcomes of their interprofessional learning activities. Such measures, as we argue in this report, are also important for learning and feedback.

The literature shows that there is no shortage of measures (surveys, tools and instruments etc.) for the various purposes outlined above. There is a need to categorise and quality assure existing measures to help educators, evaluators and researchers select the right measure for their needs. This requires a systematic exploration of existing measures and a consideration of their fitness for purpose and psychometric properties.

In particular for this project we focussed on measures that may be used for the observation of students engaged in team-based activities, involving at least two different professions, followed by feedback in order that they may enhance their performance in readiness for work as health care professionals. Therefore we wished to identify existing measures incorporating observable teamwork behaviours that could be included in the development of a work-based observation tool.

Terminology

From our previous experience in this field we were familiar with a number of commonly used measures with varying terminology:

- Index
- Instrument
- Measure
- Questionnaire
- Scale
- Survey
- Tool

It is not always clear why a particular terminology is used and what the differences amongst the various nomenclatures are intended to convey. Table 4.1 lists frequently occurring definitions of these words. Table 4.2 defines terms used in relation to the validation of measures and their psychometrics. Note that there is no one definition of most of these terms.

Table 4.1: Common definitions of terminology used in measurement

NAME	DEFINITION	REFERENCE
Index	A type of composite measure that summarizes several specific observations and represents a more general dimension.	http://www.researchconnections.org/childcare/research-glossary#I
Instrument	A testing device for measuring a given phenomenon, such as a paper and pencil test, a questionnaire, an interview, a research tool, or a set of guidelines for observation.	http://medical-dictionary.thefreedictionary.com/research+instrument
Item	A question that appears on a questionnaire, scale or index.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Measurement tool	Instruments used by researchers and practitioners to aid in evaluating different variables in their patients/clients/subjects. The variables can range from physical functioning to psychosocial well-being. The instruments also vary in format. They can take the form of a formal questionnaire or an informal observation.	Measurement Research Library of Brooklyn. http://library.downstate.edu/resources/measurementtools.htm
Questionnaire	A questionnaire is a survey tool that uses questions to gather information from multiple respondents.	Read more: Difference Between Questionnaires and Surveys | Difference Between | Questionnaires vs Surveys http://www.differencebetween.net/miscellaneous/difference-between-questionnaires-and-surveys/#ixzz3HbdGavem
Scale	A series of items measuring a single variable, trait, or domain.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Survey	A survey is the systematic collection of information from different individuals. It is the process of using questionnaires to gather information.	Read more: Difference Between Questionnaires and Surveys | Difference Between | Questionnaires vs Surveys http://www.differencebetween.net/miscellaneous/difference-between-questionnaires-and-surveys/#ixzz3HbdGavem
	A series of items that typically contains several scales. A survey may be self-administered or may require a trained interviewer. It may be very long or contain a single item.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Tool	Any physical item that can be used to achieve a goal. Something used in the performance of an operation; an instrument.	http://en.wikipedia.org/wiki/Tool http://www.thefreedictionary.com/tool

In this chapter we use the word 'measure' as a generic term and the specific word as identified by the developers of individual measures in their titles. For the overall project we define an assessment or evaluation tool as the overarching package that outlines the assessment or evaluation process and performance criteria. The instrument sets out the criteria and measurement for the assessment or evaluation and is located within the tool. We have decided to utilise the term 'tool' as it encompasses a wider range of measures and is situated within an educational evaluation framework.

There is also sometimes confusion as to the meaning of assessment and evaluation, as these words are used differently, for example, in the USA. We use assessment to mean focussing on and making a judgment of a person or team's performance, and evaluation as focussing on the value of a program, usually outcomes.

Table 4.2: Common definitions of terminology used in psychometrics

TERM	DEFINITION	REFERENCE
Concurrent validity	A measure of survey accuracy in which the results of a new survey or scale are compared with the results from a generally accepted gold-standard test after both tests are administered to the same group of respondents.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Construct validity	A theoretical gestalt-type measure of how meaningful a survey instrument is, usually after many years of experience by numerous investigators in many varied settings.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Content validity	A measure of survey accuracy that involves formal review by individuals who are experts in the subject matter of the survey.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
	Triangulation by comparison of survey results to data obtained by observation, interviews and/or expert reviews.	Valentine, M.A., Nembhard, I.M. & Edmondsen, A.C. (2014). *Medical Care*
Convergent validity	A measure of survey accuracy that involves using different tools to obtain information about a particular variable and seeing how well the results correlate.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Correlation coefficient	A statistical measure of how closely two variables or measures are related to each other. Correlation coefficients are usually calculated and reported as r values.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Criterion validity	The degree to which the scores of an instrument are an adequate reflection of a 'gold standard'.	COSMIN: COnsensus-based Standards for the selection of health Measurement Instruments. http://www.cosmin.nl/
	Involves comparing the survey to other tests. Criterion validity may be categorized as convergent or divergent.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Face validity	The degree to which the items of an instrument indeed looks as though they are an adequate reflection of the construct to be measured.	COSMIN: COnsensus-based Standards for the selection of health Measurement Instruments. http://www.cosmin.nl/
	The most casual measure of a survey's accuracy, usually assessed informally by non-experts.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Factor analysis	A computer-assisted method of analysis used to assess whether different items on a survey belong together in one scale.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Internal consistency	The degree of the interrelatedness among the items.	COSMIN: COnsensus-based Standards for the selection of health Measurement Instruments. http://www.cosmin.nl/
	Reflects how well different items in a scale vary together when applied to a group of respondents.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
	Reported as Cronbach's α, which ranges between negative infinity and 1. Experts note that a value of 0.9 is the minimum that should be tolerated, though for newly developed surveys 0.7 is considered acceptable (which means that 70% of variance is true score variance and 30% is random measurement error variance). Needs to be interpreted with caution.	Valentine, M.A., Nembhard, I.M. & Edmondsen, A.C. (2014). *Medical Care*
Predictive validity	A measure of survey accuracy in which an item or scale is correlated with future observations of behavior, survey responses or other events.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
Reliability	The ability of a measurement instrument to consistently discriminate between 'objects of measurement' (people or things) that have a lot of the characteristic of interest and those that have little of the characteristic.	Norman, G. (2014). When I say…reliability. *Medical Education*, 48, 946–947.
	The reproducibility or stability of data or observations. When using a survey or index, one wants to achieve high reliability, which implies that the data are highly reproducible.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
	Inter-rater reliability (IRR) and agreement (IRA) assess the level of similarity between responses provided by different judges/observers. IRR focuses on absolute consensus, and there is a number of metrics used. IRA focusses on relative consistency, using the rwg index (0 to 1) and compares the observed response variance to the variance expected. 0.7 is the minimal accepted level (though not universally).	Valentine, M.A., Nembhard, I.M. & Edmondsen, A.C. (2014). *Medical Care*
Structural validity	The degree to which the scores of an instrument are an adequate reflection of the dimensionality of construct to be measured.	COSMIN: COnsensus-based Standards for the selection of health Measurement Instruments. http://www.cosmin.nl/
	Answers: how many concepts does this scale measure? Generally established by exploratory (EFA) and confirmatory factor analysis (CFA). Results should include: number of distinct factors, % of variance explained by the factor structure, the values of factor loading (ideally > 0.40) and eigenvalues (ideally >1.0).	Valentine, M.A., Nembhard, I.M. & Edmondsen, A.C. (2014). *Medical Care*
Validity	An assessment of how well a survey or index measures what it is intended to measure.	Litwin, M.S. (2003). *How to assess & interpret survey psychometrics*. 2nd edition. Thousand Oaks, CA: Sage, p.83
	The degree to which the interpretation of scores resulting from an assessment activity are 'well grounded or justifiable'.	Cook, D. (2014). When I say…validity. *Medical Education*, 48, 948–949.

Classification of teamwork measures

It is important when deciding on which measure to use to have a good understanding of the purpose of the measurement and then to select a measure with that specified purpose. For high stakes evaluation and assessment, and for research purposes, the measure should be of high quality as demonstrated by its psychometrics and validation process. The purpose of the measure should be clearly defined. There may be follow-up studies that have used the measure again in the same circumstances and these repeated uses attest to the reliability of the measure. Where the measure has been used in different circumstances, further validation studies need to be undertaken. Likewise if a measure is modified, then the validation process needs repeating. This includes modification through translation into another language and for use in another country. Note that validity is not a property of a measure itself but refers to its usage in a context and with a defined sample of participants. Moreover validity is not an all or nothing concept: validity statistics are estimates.

Table 4.3 classifies the various types of measures by context and what they are measuring. When considering what measure to use for a particular purpose it is important to know: who and what is being measured (attitudes, confidence, competency, behaviour, performance); the location of the participants (for example whether they are in university, community, hospital settings etc.); who is observing and/or assessing (for example: self, peer, tutor etc.); at what point(s) the measure should be used (timing, for example: before, before and during, or after a task or intervention etc.); and what data is available in terms of psychometrics to evaluate the quality of a tool. This table can be used to describe an individual measure as shown in the example with the ISVS (King et al., 2010). The words in bold are the characteristics of ISVS; for example the participants are students in the specified area of mental health; assessment is self-assessment, and attitudes to interprofessional practice are being measured as well as confidence and change in behaviour. The ISVS has psychometrics related to content validity, structural validity and internal consistency.

The development and validation of a measure

The stages that should be expected when developing and testing a measure are shown in Figure 4.1. These are the frequently used stages as described in the papers reporting on the development of teamwork measures included in this review.

Recent reviews of teamwork measures

We used as the basis for our own review two recent publications: Valentine, Nembhard & Edmondsen (2011; 2012; 2014) from the Harvard Business School; and the CIHC – the Canadian Interprofessional Health Collaborative (2012). The former of these was updated in 2014 as discussed below. The aims and scope of the two reviews were different, resulting in two sets of measures included in the reviews.

HBS – The Harvard Business School (Valentine, Nembhard & Edmondsen, 2011), updated as Valentine et al (2012) and published as Valentine et al (2014)

The aims of this study were to identity, review and evaluate 'survey instruments' used to assess teamwork. The evaluation focussed on the psychometric validity of identified teamwork instruments as well as describing the components of teamwork identified in each instrument. The authors highlight the lack of consensus on what constitutes teamwork, and the number of different conceptual models and multiple dimensions. They decide on the definition of Ilgen et al. (2005) as teamwork:

> 'generally refers to behavioural processes that people use to accomplish interdependent work, and/or the affective, cognitive and motivation states that emerge during the course of that work. Behavioural processes include actions such as communication, coordination, sharing expertise and helping. Emergent states include, for example, mutual respect and psychological safety' (Valentine et al., 2014, p.2).

The search syntax resulted in over 1,800 articles in management, social science, medicine, and health services research journals.

Papers were excluded if they:

- Had not been published in peer-reviewed journals
- Did not empirically assess teamwork
- Reported on studies that used methods other than surveys to assess teamwork such as:
  - Interviews
  - Direct observation
  - Video analysis
  - Behavioral marker systems in which observers watch teams in action and rate them on predetermined lists of behaviors
  - An individual level of analysis

In summary 36 surveys published between 1991 and 2009 were included. The authors subsequently update the review in 2012 and published this as a paper in the journal Medical Care in 2014 using the same search strategy (though they do not refer to the review as an update from 2011). Note that we refer to the second review in this chapter and the tables as Valentine et al (2014) though we had access to its contents as

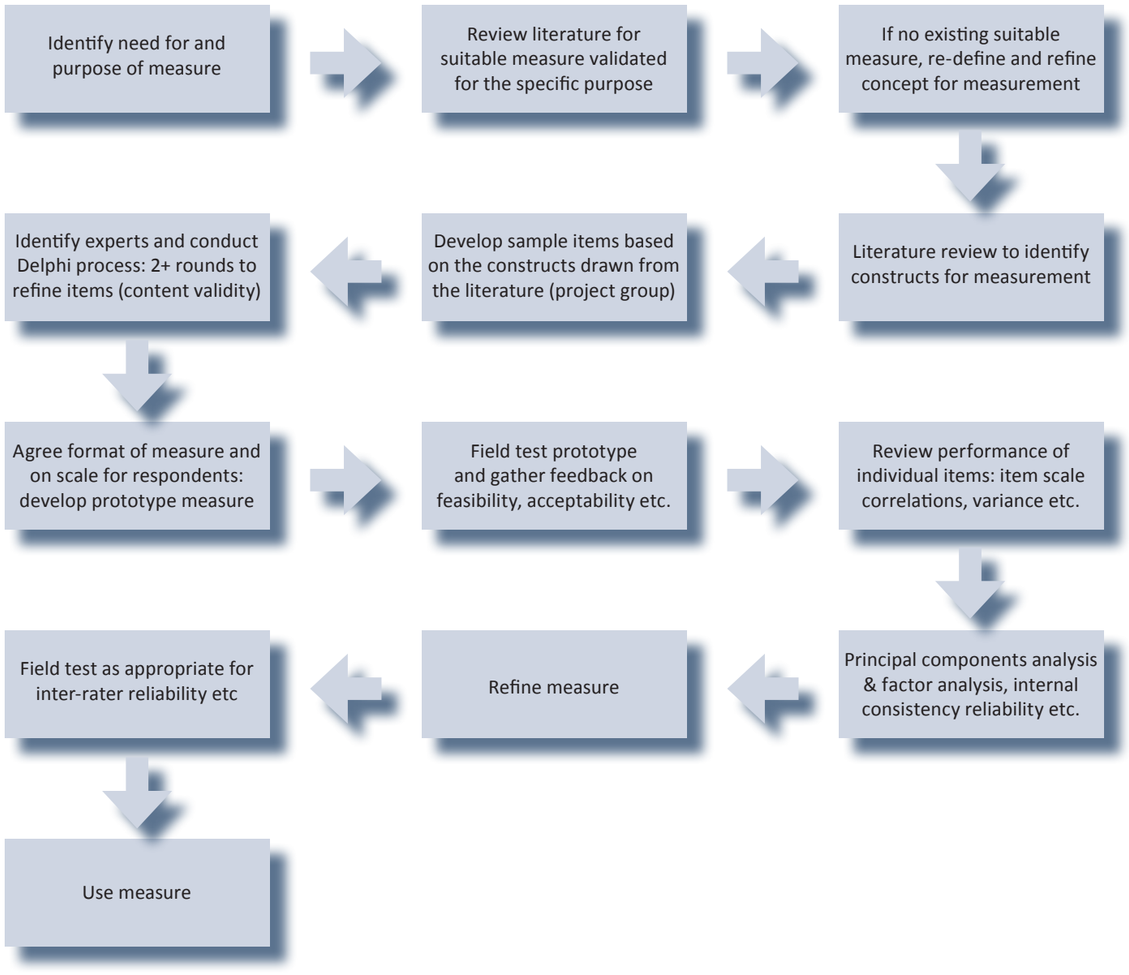
Table 4.3: Classification of measures: examples (not exhaustive), does not include knowledge by itself

CONTEXT							MEASURING					QUALITY
Participants	Location	Type of team/ collaboration	Assessor/ evaluator	Timing	Type	Purpose	Attitudes to	Confidence	Competency – in simulation	Behaviour	Performance – in workplace	Psychometrics
Learners	University	Identify as team (stable)	Self (individual)	Before	Formative	Evaluation	IPE	Self-report	Defined competencies	Markers	Markers	Content validity
Students	Community	Co-located	Peer (in team)	Before & after	Summative	Learning	Team work			Change	Change	Construct validity
Health professionals	Hospital	New team (for purpose of intervention)	Peer (observer)	During		Training	Collaborative practice					Structural validity
Number of different professions	Out-patients	Bounded[1]	Senior/tutor /Supervisor etc.	After		QA	IPP					Internal consistency
Specified teams	Specified department	Unbounded (larger, unit or department level)	Patient/ client/family	Longitudinal			Other professions					Inter-rater reliability
Individual within team	Specified area	Individual	360 degree									
Whole team												
Numbers												

Example: The ISVS. King, G., Shaw, L., Orchard, C. A., and Miller, S. (2010). The interprofessional socialization and valuing scale: A tool for evaluating the shift toward collaborative care approaches in health care settings. *Work*, 35(1), 77–85.

CONTEXT							MEASURING					QUALITY
Participants	Location	Type of team/ collaboration	Assessor/ evaluator	Timing	Type	Purpose	Attitudes to	Confidence	Competency – in simulation	Behaviour	Performance – in workplace	Psychometrics
Learners	University	Identify as team (stable)	**Self (individual)**	Before	Formative	**Evaluation**	IPE	**Self-report**	Defined competencies	Markers	Markers	**Content validity**
Students	Community	Co-located	Peer (in team)	Before & after	Summative	**Learning**	Team work			**Change**	Change	Construct validity
Health professionals	Hospital	New team (for purpose of intervention)	Peer (observer)	During		Training	Collaborative practice					**Structural validity**
Number of different professions	Out-patients	Bounded[1]	Senior/tutor /Supervisor etc.	**After**		QA	**IPP**					Internal consistency
Specified teams	Specified department	Unbounded (larger, unit or department level)	Patient/ client/family	Longitudinal			Other professions					Inter-rater reliability
Individual within team	**Specified area**	**Individual**	360 degree									
Whole team												
Numbers: 124												

Figure 4.1: How a measure is developed



Valentine et al (2012) during the project. In this second review they scrutinised over 2100 articles from the same type of journals now up to 2012; there were an additional 300 papers since the first review. They listed the same exclusion criteria as above with the addition of:

- Measurement of development over time
- Did not measure behaviour.

Thus the surveys in the report are completed by team members based on their experience of what is happening in the team. In summary they included 39 surveys. However this does not equate to three new surveys but rather five, as two of the surveys from the original review were excluded because of the extra exclusion criteria: Wheelan & Hochberger (1996) – included development over time; Gibson et al. (2003) – did not measure behaviour. Papers have been included that use self-report measures as long as these relate to performance of the team as a whole, rather than individuals within the team.

The new papers are:

1. Schroder et al. (2011)
2. De Wet et al. (2010)
3. Cooper et al. (2010).
4. Strasser et al. (2010)
5. Kalisch et al. (2010)

New surveys excluded on the criteria above are:

1. Flowerdew et al. (2012)
2. Patterson et al. (2012).

According to the authors, teamwork can be seen as a process, in which a set of behaviours is exhibited in order to complete a task. They suggest that teamwork is dynamic and should not be confused with the personality of team members. There is an extensive discussion of the concepts of behavioural processes and emergent states. Behavioural processes commonly include communication strategies and utilising team members effectively. Emergent states result from the educational intervention or collaboration, and may include situational awareness and appreciation of the roles and responsibilities of team members.

The authors suggest that the way in which teamwork is evaluated largely depends on the specific aspects of teamwork in which researchers are interested. Team type must also be considered when choosing an appropriate evaluation method. Healthcare teams are categorised as bounded (stable teams with a small membership) and larger unbounded workgroups such as units or departments.

The psychometrics of each survey are summarised. Of the 39 surveys only 11 had standardised psychometric criteria and only five of these showed significant statistical associations with non-self report outcomes. The authors also note that rather than use or adapt existing surveys, new surveys are developed limiting the 'production of cumulative knowledge'. Of course, if a survey is modified from its original form further validations processes are required.

CIHC – the Canadian Interprofessional Health Collaborative (2012)

The CIHC review provides an overview of 'quantitative tools' that may be used to evaluate the effectiveness of IPE by measuring outcomes in relation to learning and collaborative practice; thus it has a different focus to the Valentine et al. (2011; 2012; 2014) papers. Each tool had to measure at least one outcome of IPE. The search resulted in 2162 abstracts. After pruning and analysis, the review includes 128 quantitative tools from 136 articles published from 2000 to May 2011. They are classified following the modified six-level Kirkpatrick framework of the Joint Evaluation Team (JET) (Barr, Freeth, Hammick, Koppel & Reeves, 2000) omitting level 1 (learners' reaction); thus: attitudes (64 tools); knowledge, skills and abilities (20); behaviour (34); organisational level (6); patient satisfaction (rather than benefits to patients) (8); and added provider satisfaction as an extra outcome (14) (Table 4.4). The satisfaction had to be related to the interprofessional education or collaborative aspects of practice, rather than non-specific satisfaction. Excluding those tools that focus on attitudinal change, many of the others may be used to assess how a team is performing and changing over time.

Grouped tools are listed alphabetically, and are repeated in subsequent groupings if the authors deemed that the tool measured multiple IPE outcomes. The CIHC (2012) reports some but limited psychometric data. This inventory is comprehensive of the instruments available to measure IPE outcomes, and is useful to IPE educators and evaluators to initially source a potentially suitable tool.

Overlap between the two reviews

There is very little overlap between the two papers. Common papers are:

- Anderson & West (1998).
- Baggs (1994).
- Gittell et al. (several versions from various years: Valentine et al – 2000; 2002; 2010; CIHC: 2000)
- Heinemann et al. (1999).
- Hojat et al. (1999).
- Millward & Jeffries (2001).

The two reviews employed different descriptors for the teamwork measure. 'Tools', 'surveys' and 'instruments' were words frequently used, with limited definition around the use of any of these.

Table 4.4: The modified Kirkpatrick framework for the classification of interprofessional education outcomes (Barr et al., 2000) further modified by the CIHC (2012).

Level 1: Reaction	Learners' views on the learning experience and its interprofessional nature. **Omitted by the CIHC**
Level 2a: Modification of perceptions and attitudes	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitude towards the value and/or use of team approaches to caring for a specific client group. *Attitudes about other disciplines or about working with other professions (CIHC, 2012)*
Level 2b: Acquisition of knowledge and skills	Including knowledge and skills linked to interprofessional collaboration. *...and abilities around IPE and collaborative practice (CIHC, 2012)*
Level 3: Behavioural change	Identifies individuals' transfer of interprofessional learning to their practice setting and their changed professional practice.
Level 4a: Change in organisational practice	Wider changes in the organisation and delivery of care. *Interprofessional collaboration at the level of the organization such as organizational culture and organizational readiness (CIHC, 2012)*
Level 4b: Benefits to patients/clients	Improvements in health or well being of patients/ clients *Patient satisfaction: referring only to the aspects of patients' satisfaction involving interprofessional collaboration (CIHC, 2012)*
	Provider satisfaction: referring only to the aspects of providers' satisfaction involving teamwork processes or work environment involving interprofessional collaboration (CIHC, 2012)

Aim of the project review

The aim of this review was to extend and update the reviews conducted by the CIHC and Valentine et al. (2011), by replicating their searches for the updated period 2010-2013.
The search was intended to identify:

- New measures developed since the timeframe of the two reviews
- Measures from the two reviews that have subsequently been used by other authors
- Measures that the two reviews may have inadvertently overlooked or excluded
- Whether there is an existing measure for individual, observable teamwork behaviours
- Measures that include items for inclusion in our new measure.

We chose to start at 2010 as Valentine et al, (2011) was up to 2009, though this would overlap with the CIHC (2012) review which included papers up to May 2011. Starting at 2010 also served as a check of our search strategy against the existing reviews. Following our search Valentine et al. (2014) was published so there is further overlap between the searches, which we acknowledge below.

Method

Searches and search syntax

We were able to replicate Valentine et al's (2011) search for the Harvard Business School without any modifications to the search syntax. This review searched the ISI Web of Knowledge article database

Table 4.5: Modified syntax search

SOURCE JOLT Search Strategy for Literature Review v.12 29/10/13 Done in November 2012 – replicated CIHC 2010 to current and Harvard 01012011 to current	Search replicated by Robyn Dickie (29/10/13). For clarity identified as a post CIHC_HBR Search Strategy for literature review and saved with a new name on 20/5/2014 by KD/WF. EndNote Library filepath is Jolt/Library/Teamwork/Jolt EndNote Library 4.12.12 Copy.Data. SUMMARY (as understood by KD): 2177 articles retrieved from search; 138 duplicates removed; 2039 titles reviewed; 1924 abstracts reviewed; 132 papers retrieved for review; 91 papers detailed review; 81 papers met all inclusion criteria. (need to specify what the inclusion criteria were)		Removed Duplicates	Reduction following Title Review	Reduction Following abstract review	Papers that fit inclusion criteria
	Database, Search Syntax and Limiters	**Total Number**				
HARVARD						
ISI Web of Knowledge	Topic=(team) AND Topic=(teamwork) OR Topic=("work groups") AND Topic=(collaboration) AND Topic=(survey) AND Topic=(questionnaire) Timespan=2011-01-01 - 2012-11-05. Databases=SCI-EXPANDED, SSCI. Lemmatization=Off	367				
CIHC						
CINAHL	MW (inter-profession* or interprofession* or inter-disciplin* or interdisciplin* or inter-occupation* or interoccupation* or inter-institution* or inter institution or inter-department* or interdepartment* or inter-organization* or interorganization* or inter-organisation* or interorganisation* or multi-profession* or multiprofession* or multi-disciplin* or multidisciplin* or multi-occupation* or multioccupation* or multi-institution* or multiinstitution* or multi-organisation* or multiorganisation* or multi-organization* or multiorganization*) and MW (education or practice) and MW (instrument* or questionnaire* or survey or scale or scales) and MW (care team or care teams) and (collaborat*) Limits - 2010-Current	15				
Medline 2009 OVID	MW (patient care team* or interdisciplin* or inter-disciplin* or multi-disciplin* or multidisciplin* or trans-disciplin* or transdisciplin* or interprofession* or inter-profession* or multi-profession* or multiprofession* or trans-profession* or transprofession* or inter-occupation* or interoccupation* or multi-occupation* or multioccupation* or trans-occupation* or transoccupation* or cross-occupation* or crossoccupation* or cross-disciplin* or crossdisciplin* or cross-profession* or crossprofession*) and MW (care team or care teams) and collaborat* and MW (questionnaire* or instrument* or scale*) and MW (education* or practice*)	83				
Medline 2009 EBSCO	MW (patient care team* or interdisciplin* or inter-disciplin* or multi-disciplin* or multidisciplin* or trans-disciplin* or transdisciplin* or interprofession* or inter-profession* or multi-profession* or multiprofession* or trans-profession* or transprofession* or inter-occupation* or interoccupation* or multi-occupation* or multioccupation* or trans-occupation* or transoccupation* or cross-occupation* or crossoccupation* or cross-disciplin* or crossdisciplin* or cross-profession* or crossprofession*) and MW (care team or care teams) and collaborat* and MW (questionnaire* or instrument* or scale*) and MW (education* or practice*)	107				
Medline 2010 OVID	MW (cross*disciplin* or cross-disciplin* or cross*occupation* or cross-occupation* or cross*profession* or cross-profession*or inter*disciplin* or inter-disciplin*or inter*occupation* or inter-occupation*or inter*profession* or inter-profession* or multi*occupation* or multi-occupation* or multi*disciplin* or multi-disciplin* or multi*profession* or multi-profession*or trans*disciplin* or trans-disciplin*or trans*occupation* or trans-occupation*or trans*profession* or trans-profession*) and (education* or learning* or practice * or care or instruction*) and (collaborat* or ipe or iecpcp or *Patient Care Team or Patient Care Team or interprofessional relations or cooperative behaviour or *patient-centered care) and (questionnaires or health care surveys or psychometrics or program evaluation or measurement$ or evaluation$ or tool$ or scale$ or reliab$ or valid$)	592				
Medline 2010 EBSCO	inter*profession* or inter-profession* or multi*occupation* or multi-occupation* or multi*disciplin* or multi-disciplin* or multi*profession* or multi-profession*or trans*disciplin* or trans-disciplin*or trans*occupation* or trans-occupation*or trans*profession* or trans-profession*) and (education* or learning* or practice * or care or instruction*) and (collaborat* or ipe or iecpcp or *Patient Care Team or Patient Care Team or interprofessional relations or cooperative behaviour or *patient-centered care) and (questionnaires or health care surveys or psychometrics or program evaluation or measurement$ or evaluation$ or tool$ or scale$ or reliab$ or valid$)	637				

Table 4.5 *(continued)*: Modified syntax search

	Database, Search Syntax and Limiters	Total Number
Web of Science	multiprofession* OR interprofession* OR interdisciplin* OR interdepartment* OR interorganization* OR interorganisation* OR multidisciplin* OR multioccupation* OR multiinstitution* OR multiorganisation* OR multidisciplin* OR multiprofession* OR multioccupation* OR multiinstitution* OR multiorganization* OR multidisciplin* OR inter-profession* OR inter-disciplin* OR inter-department* OR inter-organisation* OR inter-organization* OR multi-occupation* OR multi-institution* OR multi-organisation* OR multi-organization*	18500 + results using CHIC published search syntax. RD contacted 4 members of the CHIC research team, who were unable to provide further information regarding syntax. RD contact the Librarian listed who suggested using own search syntax. No additional instruments retrieved.
ERIC	DE"Program Evaluation" or "Program Effectiveness" or "Evaluation Methods" or "Evaluation Procedures" or "Formative Evaluation" or DE "Health Services" or "Medical Services" or "Health Facilities" or "Clinics" or "Hospitals" "Health Care Evaluation" or "Medical Care Evaluation" or "Medical Evaluation"andTX "inter-profession*" or "inter-disciplin*" or "interdisciplin*" or "cross-disciplin*" or "crossdisciplin*" or "multi-disciplin*" or "multiprofession*" or "multidisciplin*" or "multi-occupation*" or "multioccupation*" or "collab*"	0
	RD SEARCH SYNTAX FOR ERIC((Keywords:DE and Keywords:"Program Evaluation" or Keywords:"Evaluation Methods" or Keywords:"Evaluation Procedures" or Keywords:"Formative Evaluation") or (Keywords:DE and Keywords:"Health Services" or Keywords:"Medical Services" or Keywords:"Clinics" or Keywords:"Hospitals" and Keywords:"Health Care Evaluation" or Keywords:"Medical Evaluation") and (Keywords:TX and Keywords:"inter-profession*" or Keywords:"interdisciplin*" or Keywords:"cross-disciplin*" or Keywords:"multi-disciplin*" or Keywords:"multidisciplin*" or Keywords:"multiprofession*" or Keywords:"multi-occupation*" or Keywords:"multioccupation*" or Keywords:"collab*")) and (Education Level:"Adult Education" OR Education Level:"Higher Education")Publication Date:2010-2013 ((Keywords:Program and Keywords:Evaluation) and (Keywords:Health and Keywords:Care and Keywords:Evaluation) and (Keywords:Medical and Keywords:Care and Keywords:Evaluation) and (Keywords:Program and Keywords:Effectiveness)) and (Keywords:Evaluation and Keywords:Procedures) or (Keywords:Formative and Keywords:Evaluation) and (Keywords:Services) and (Keywords:Hospitals)) and (Education Level:"Adult Education" OR Education Level:"Higher Education") and Peer ReviewedPublication Date:2010-2013	376
PSYCH INFO	DE "Questionnaires" OR "General Health Questionnaire" or "Surveys" OR "Consumer Surveys" OR "Mail Surveys" OR "Telephone Surveys" or "Quantitative Methods" "Program Effectiveness" OR "Educational Program Effectiveness" OR "Mental Health Program Evaluation" OR "Program Evaluation" OR "Peer Evaluation" OR "Organizational Effectiveness" OR "Personnel Evaluation" OR "Professional Competency" OR "Employee Skills" OR "Job Knowledge" orTX "inter-profession*" or "interprofession*" or "inter-disciplin*" or "interdisciplin*" or "multi-disciplin*" or "multidisciplin*" or "cross-disciplin*" or "crossdisciplin*" or "multi-profession*" or "multiprofession*" or "multi-occupation*" or "multioccupation*" or "collab*" "Continuum of Care" OR "Communities of Practice" OR "Intergroup Dynamics" OR "Interdisciplinary Research" OR "Multimodal Treatment Approach" OR "Integrated Services" OR "Collaboration" OR "Group Participation"	0
EMBASE	MP (interprofessional or interdisciplinary or interdisciplinary education or interdisciplinary research or crossdisciplinary or multidisciplinary or multiprofession* or multi-profession* or education or collaborat*) or interdisciplinary communication or interprofessional education or interdisciplinary education or allied health education or adult education or education program or professional practice or patient care or primary health care or health care delivery or team building or cooperation or teamwork or performance measurement system or parameters of measurement and analysis or self-evaluation or course evaluation or evaluation or evaluation research or outcome assessment or measurement/ or questionnaire or course evaluation or "evaluation and follow up" or evaluation research or quantitative analysis	0
	Total	**2,177**
	Removed 138 duplicates	
	Reduction of 1,924 following Title Review	
	Reduction of 132 following abstract review	
	45 Papers that fit inclusion criteria	

only and in addition five previously published and highly-cited literature reviews on teams.

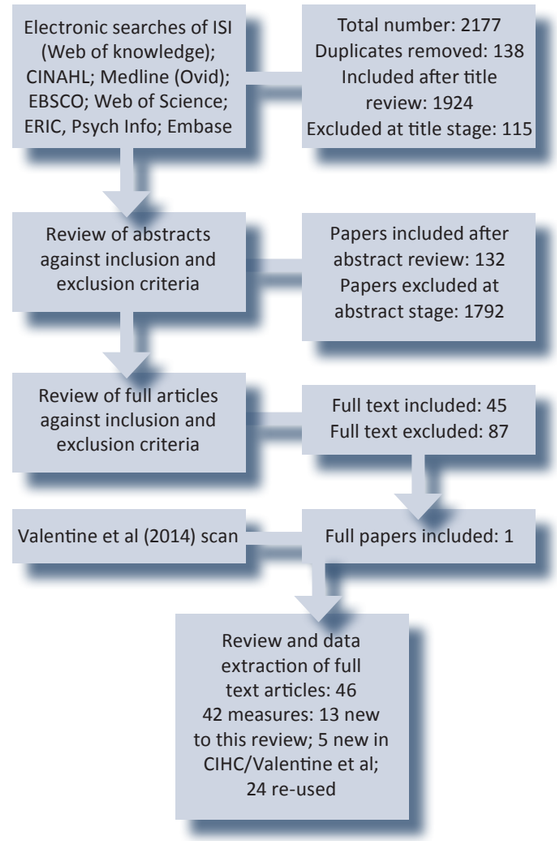
The CIHC searched the following databases: CINAHL, Medline (2009 & 2010), Web of Science, ERIC, PSYCH INFO and EMBASE. The CIHC report's published search syntax was difficult to replicate for the Web of Science and ERIC, in that we did not identify any papers. We contacted the CIHC team who were unable to help with this problem. The Web of Science search using the CIHC syntax gave 18500 hits but did not include the words evaluation or similar. When modified to include more specific terms around teams and evaluation, no additional papers were found. The original CIHC ERIC syntax had no hits but after expansion in line with other databases it was more successful.

Our modified search syntax and the resulting numbers of papers are shown in table 4.5. We found 2177 articles that were reduced to 2039 after 138 duplicates were removed. The titles and then abstracts were read and papers excluded. The remaining papers were retrieved and read in full.

Inclusion criteria: papers published from 2010 and including a measure of teamwork assessment/ evaluation either newly developed, modified or being re-used in another study with sufficient details about the measure and its format. ***Exclusion:*** not a specific focus on a teamwork measure.

We also checked the Valentine et al. (2014) review when published for new tools since 2010.

Figure 4.2: Flow diagram of literature search and paper selection



Findings

We identified 46 papers, of which only one was identified solely from Valentine et al., 2014 (Flowerdew et al., 2012). The papers included 42 measures (Figure 4.2).

The findings are presented in three tables:

Table 4.6: overview of findings. The measures are presented in alphabetical order with their purpose and whether they are a new measure, or one being re-used either in original form or modified in a subsequent study. References are given to the papers including one to the original source paper of a re-used measure as appropriate. We also state whether the paper/ measure is included in the CIHC and Valentine reviews.

Some measures are reported in more than one paper (5 measures) and some papers include more than one measure (4 papers).

Table 4.7: Newly developed or majorly modified measures with psychometric data (n=20 papers and 18 measures)

Table 4.8: Existing measures used in other studies.

Table 4.6: Overview of findings

TOOL	PURPOSE	NEW/ RE-USED	REFERENCE TO ORIGINAL DEVELOPMENT	USED BY/DEVELOPED BY	CIHC	VALENTINE
AITCS: Assessment of Interprofessional Team Collaboration Scale (AITCS)	37 items with 4 subscales Measures collaboration within teams Individual self-report of team performance	N		Orchard, C. A., King, G. A., Khalili, H., & Bezzina, M. B. (2012). Assessment of Interprofessional Team Collaboration Scale (AITCS): Development and testing of the instrument. *Journal of Continuing Education in the Health Professions*, 32(1), 58–67.		
ANTS: anaesthetists non-technical skills system	4 categories: task management, team working, situation awareness, decision making; 15 element Behavioural markers	R	Fletcher, G., Flin, R., McGeorge P. et al. (2003). Anaesthetists' Non-Technical Skills (ANTS): evaluation of a behavioural marker system. *Br J Anaesth*, 90, 580–588.	Jankouskas, T. S., Haidet, K. K., Hupcey, J. E., Kolanowski, A., & Murray, W. B. (2011). Targeted Crisis Resource Management Training Improves Performance Among Randomized Nursing and Medical Students. *Simulation in Healthcare*, 6(6), 316–326.	Y	
Assessment of EM physicians' non-technical skills (no acronym)	Observational assessment of emergency physicians: 12 EM-specific skills in 4 categories Behavioural markers	N		Flowerdew, L., Brown, R., Vincent, C. & Woloshynowych, M. (2012). Development and validation of a tool to assess emergency physicians' nontechinical skills. *Annals of Emergency Medicine*, 59(5), 386–385.	Y	Sourced from Valentine (2014) but excluded from their review because used behavioural marker systems
ATPI: Aston Team Performance Inventory	Self-reported team performance for teams that are performing well: 3 element model (team inputs, processes & outputs) with 18 dimensions	R	http://www.astonod.com/team-tools/aston-team-performance-inventory-diagnostic-tool-	Taylor, C., Sippitt, J. M., Collins, G., McManus, C., Richardson, A., Dawson, J., et al. (2010). A pre-post test evaluation of the impact of the PELICAN MDT-TME Development Programme on the working lives of colorectal cancer team members. *BMC Health Services Research*, 10, 187–187.		
ATHCT: Attitudes towards health care teams scale	Original: The quality of care/ process (14 items) and physician centrality (6 items) subscales on a 4-point scale.	R	Heinemann, G.D., Schmitt, M.H., Farrell, M.P. et al. (1999). Development of an attitudes towards health care teams scale. *Eval Health Prof*, 22, 123–142. Original scale: 20 items with 6-point scales – used by Braithwaite et al. (2012).	Braithwaite, J., Westbrook, M., Nugus, P., Greenfield, D., Travaglia, J., Runciman, W. et al. (2012). A four-year, systems-wide intervention promoting interprofessional collaboration. *BMC Health Services Research*, 12, 99.	Y	Y
	Modified: 21-item with 3 subscales: attitudes toward team values, team efficiency, physician's shared role on team.		Hyer, K., Fairchild, S., Absraham, I. et al. (2000). Measuring attitudes related to interdisciplinary training: revisiting the Heinemann, Schmitt & Farrell ATHCT scale. *JIC*, 14, 249–258.			
	Modified: 14-item 5-point scale to determine the effect of interprofessional education on quality of care and teamwork. 2 subscales: quality of care/ process and cost of team care		Modified by: Curran, V. R., Sharpe, D., and Forristall, J. (2007). Attitudes of health sciences faculty members towards interprofessional teamwork and education. *Medical Education*, 41(9), 892–896. 14 items with 5-point scales and called the 'Attitudes toward interprofessional health care teams' *(There are other versions of this scale also available)*			
ATHS: Attitudes towards teamwork in healthcare	This is the same reference as ATHCT but Faulk et al. (2012) state this is a 28-item scale but give no details	R	Heinemann, G.D., Schmitt, M.H., Farrell, M.P. et al. (1999). Development of an attitudes towards health care teams scale. *Eval Health Prof*, 22, 123–142.	Faulk, C. E., Lee, T. J., & Musick, D. (2012). Implementing a Multidimensional Geriatric Curriculum in a Physical Medicine and Rehabilitation Residency Program. *American Journal of Physical Medicine & Rehabilitation*, 91(10), 883–889.	Y	Y
CHIRP: The Collaborative Healthcare Interdisciplinary Planning scale	14 items Self-report of attitudes	N	Note: concurrent validation in: Hollar, D. et al. (2012). Concurrent validation of CHIRP, a new instrument for measuring healthcare student attitudes towards interdisciplinary teamwork. *J Appl Meas*, 13(4), 360–375.	Hobgood, C., Sherwood, G., Frush, K., Hollar, D., Maynard, L., Foster, B. et al. (2010). Teamwork training with nursing and medical students: does the method matter? Results of an interinstitutional, interdisciplinary collaboration. *Quality & Safety In Health Care*, 19(6), e25–e25.		
Collaboration and Satisfaction about Care Decisions instrument	7 questions concerning collaboration, 7-point scale	R	Modified from: Baggs, J.G. (1994). Development of an instrument to measure collaboration and satisfaction about care decisions. *Journal of Advanced Nursing*, 20, 176–182.	Nathanson, B. H., Henneman, E. A., Blonaisz, E. R., Doubleday, N. D., Lusardi, P., & Jodka, P. G. (2011). How much teamwork exists between nurses and junior doctors in the intensive care unit? Journal of Advanced Nursing, 67(8), 1817-1823.		
Communication, collaboration & critical thinking for quality patient outcomes	2 versions Nurse: 11 items, 5 point Likert, 3 subscales Physician: 12 items 3 subscales	R	Vazirani S., Hays R., Shapiro M. & Cowan M. (2005). Effects of a multidisciplinary intervention on communication and collaboration among physicians and nurses. *American Journal of Critical Care* 1491, 71–77.	McCaffrey, R., Hayes, R. M., Cassell, A., Miller-Reyes, S., Donaldson, A., & Ferrell, C. (2012). The effect of an educational programme on attitudes of nurses and medical residents towards the benefits of positive communication and collaboration. *Journal of Advanced Nursing*, 68(2), 293–301.		
Communication, Teamwork, Threats, and Climate Assessment	Observable elements: Communication & teamwork (6 items) Threats to outcome (11 items) Climate assessment (3 items) Developed in thoracic surgery but could be applied to any surgical team	N		Nurok, M., Lipsitz, S., Satwiwicz, P., Kelly, A. & Frankel, A. (2010). A novel method for reproducibly measuring the effects of interventions to improve emotional climate, indices of team skills and communication, and threat to patient outcome in a high-volume thoracic surgery center. *Archives of Surgery*, 145(5), 489–495.		
CPAT – collaborative practice assessment tool	56 items Self-report about team performance	N		Schroder, C., Medves, J., Paterson, M., Byrnes, V., Chapman, C., O'Riordan, A. et al. (2011). Development and pilot testing of the collaborative practice assessment tool. *Journal of Interprofessional Care*, 25(3), 189–195.	Y	Y2014
CTS: clinical teamwork scale For obstetrics teams	15 items in 5 domains: Communication Situational awareness Decision making Role responsibility (leader/helper) Other (patient friendly) Behavioural markers Observed performance	R	Guise JM, Deering SH, Kanki P et al. (2008). Validation of a tool to measure and promote clinical teamwork. *Simul Healthc*, 3, 217–223.	Fransen, A. F., van de Ven, J., Merien, A. E. R., de Wit-Zuurendonk, L. D., Houterman, S., Mol, B. W., & Oei, S. G. (2012). Effect of obstetric team training on team performance and medical technical skills: a randomised controlled trial. *Bjog-an International Journal of Obstetrics and Gynaecology*, 119(11), 1387–1393.		
EMT-teamwork	2 versions: 30 item short form and 45 item long form; to measure teamwork of EMT personnel Behavioural markers Observed performance	N		Patterson, P. D., Weaver, M. D., Weaver, S. J., Rosen, M. A., Todorova, G., Weingart, L. R. et al. (2012). Measuring teamwork and conflict among emergency medical techinican personnel. *Prehospital Emergency Care*, 16(1), 98–108.		Y2014 But excluded from their review because used behavioural marker systems

Table 4.6 *(continued)*: Overview of findings

TOOL	PURPOSE	NEW/ RE-USED	REFERENCE TO ORIGINAL DEVELOPMENT	USED BY/DEVELOPED BY	CIHC	VALENTINE
HTVI: Healthcare team vitality instrument	10 item self report 5 point Likert	N	Adapted from: Buckingham, M. & Coffman, C. (1999) *First Break All the Rules: What the World's Greatest Managers Do Differently.* New York: Simon & Schuster. Aiken, L.H. & Patrician, P.A. (2000) Measuring organizational traits of hospitals: the Revised Nursing Index. *Nursing Research*, 49, 146–153. Sorra J.S. & Nieva V.F. (2004). *Hospital Survey on Patient Safety. AHRQ Publication No. 04-0041*. Rockville MD: Agency for Healthcare Research and Quality. Sexton J.B., Helmreich R.L., Neilands T.B., Rowan K., Vella K., Boyden J., Roberts P.R. & Thomas E.J. (2006); The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research*, 6,44.	Upenieks, V. V., Lee, E. A., Flanagan, M. E., & Doebbeling, B. N. (2010). Healthcare Team Vitality Instrument (HTVI): developing a tool assessing healthcare team functioning. *Journal of Advanced Nursing*, 66(1), 168–176. Y	Y	
ICAR: interprofessional collaborator assessment rubric	Observable teamwork with 6 domains Can be used for individuals or groups.	N		Curran, V., Hollett, A., Casimiro, L. M., McCarthy, P., Banfield, V., Hall, P. et al. (2011). Development and validation of the interprofessional collaborator assessment rubric (ICAR). J*ournal of Interprofessional Care*, 25(5), 339–344.		
ICU interdisciplinary communication	Separate instruments for doctors & nurses; themed Self report 12 scales for communication and leadership, includes understanding patient care goals	R	Adapted by Reader et al, 2007 from Shortell et al, 2004 Reader TW, Flin R, Mearns K, Cuthbertson BH. (2007). Interdisciplinary communication in the intensive care unit. *BJA*, 98, 347–52. Shortell SM, Zimmerman JE, Rousseau DM, Gillies RR, Wagner DP, Draper EA et al. (1994). The performance of intensive care units: does good management make a difference? *Med Care*, 32, 508–25.	Chang, L. P. T., Harding, H. E., Tennant, I., Soogrim, D., Ehikhametalor, K., James, B., et al. (2010). Interdisciplinary communication in the intensive care unit at the University Hospital of the West Indies. *The West Indian Medical Journal*, 59(6), 656–661.		
Interprofessional collaboration scale	4-point Likert scale In-patient multiple professions Self-report 3 factors: Communication Accommodation Isolation	R	Kenaszchuk, C., Reeves, S., Nicholas, D. & Zwarenstein, M. (2010). Validity and reliability of a multiple-group measurement scale for inteprofessional collaboration. *BMC Health Sciences Research*, 10, 83. Adapted from the Nurses' Opinion Questionnaire (NOQ) of the Ward Organisational Features Scale: Adams, A., Bond, S. & Arber, S. (1995). Development and validation of scales to measure organisational features of acute hospital wards. *Int J Nurs Stud*, 32, 612–627.	Kenaszchuk, C., MacMillan, K., van Soeren, M., & Reeves, S. (2011). Interprofessional simulated learning: short-term associations between simulation and interprofessional collaboration. *BMC Medicine*, 9.		
Interprofessional OSCE (iOSCE)	Behavioural indicators Specific skills for the stations plus teamwork as one aspect with 4 items: Demonstrates knowledge and understanding of, and respect for, the roles of different members of the MDT Demonstrates ability to work well with different team members Has ensure all significant aspects of management have been addressed by a member of the team Does not duplicate information provided by a colleague Observed 0–3 scale	R	Morison, S. L., & Stewart, M. C. (2005). Developing interprofessional assessment. Learning in Health and Social Care, 4, 192–202.	Simmons, B., Egan-Lee, E., Wagner, S. J., Esdaile, M., Baker, L., & Reeves, S. (2011). Assessment of interprofessional learning: the design of an interprofessional objective structured clinical examination (iOSCE) approach. *Journal of Interprofessional Care,* 25(1), 73–74.		
ISVS: Interprofessional socialization and valuing scale	7-point Likert scale 3 scales – 24 items Self-report	N		King, G., Shaw, L., Orchard, C. A., & Miller, S. (2010). The interprofessional socialization and valuing scale: a tool for evaluating the shift toward collaborative care approaches in health care settings. *Work*, 35(1), 77–85.	Y	
Jefferson scale of attitudes towards physician collaboration	4-point Likert scale Physician-nurse collaboration 20 items: Shared educational and collaborative relationships Caring as opposed to curing Nurse's autonomy Physician's authority Other	R	Hojat, M., Fields, S.K., Veloski, J.J. et al. (1999) Psychometric properties of an attitude scale measuring physician-nurse collaboration. *Eval Health Prof*, 22, 208–220. Note that there is also a Jefferson Interprofessional Observation Guide	Hansson, A., Arvemo, T., Marklund, B., Gedda, B., & Mattsson, B. (2010). Working together--primary care doctors' and nurses' attitudes to collaboration. *Scandinavian Journal of Public Health*, 38(1), 78–85. McCaffrey, R., Hayes, R. M., Cassell, A., Miller-Reyes, S., Donaldson, A., & Ferrell, C. (2012). The effect of an educational programme on attitudes of nurses and medical residents towards the benefits of positive communication and collaboration. J*ournal of Advanced Nursing*, 68(2), 293–301.	Y	Y
JIT-PAPPS: Just In Time Paediatric Airway Provider Performance Scale	Just in Time paediatric airway provider performance scale; 2 domains Behavioural markers	N		Nishisaki, A., Nguyen, J., Colborn, S., Watson, C., Niles, D., Hales, R.,et al. (2011). Evaluation of multidisciplinary simulation training on clinical performance and team behavior during tracheal intubation procedures in a pediatric intensive care unit. *Pediatric Critical Care Medicine*, 12(4), 406–414.		
Modified team skills scale	Adapted from Geriatric Interdisciplinary Team Training program (GITT) Team skills scale has 17 items Self-assessment of own ability	R	Hepburn, K., Tsukuda, R.A., & Fasser, C. (1996). Team skills scale, 1996. In Hyer, K., Flaherty, E., Fairchild, S., Bottrell, M., Mezey, M., & Fulmer, T. (Eds.), *Geriatric interdisciplinary team training: The GITT Kit*, 2nd edition. New York: John A. Hartford Foundation, Inc.	Packard, K., Chehal, H., Maio, A., Furze, J., Huggett, K., Jensen, G. et al. (2012). Interprofessional Team Reasoning Framework as a Tool for Case Study Analysis with Health Professions Students: A Randomized Study. *Journal of Research in Interprofessional Practice and Education*, 2.3, 250–263.		
Modified University of Toronto Framework for the Development of Interprofessional Education Values and Core Competencies Collaboration.	Observable behaviour rubric, 12 point scale assessing three domains: Collaboration Communication Values/ethics	N	Adapted from: University of Toronto Office of Interprofessional Education; Health Professional Programs. (2010). *A framework for the development of interprofessional education values and core competencies*. Note: this is a framework not a measure	Packard, K., Chehal, H., Maio, A., Furze, J., Huggett, K., Jensen, G. et al. (2012). Interprofessional Team Reasoning Framework as a Tool for Case Study Analysis with Health Professions Students: A Randomized Study. *Journal of Research in Interprofessional Practice and Education,* 2.3, 250–263.		

Table 4.6 *(continued)*: Overview of findings

TOOL	PURPOSE	NEW/ RE-USED	REFERENCE TO ORIGINAL DEVELOPMENT	USED BY/DEVELOPED BY	CIHC	VALENTINE
NOTECHS – non-technical skills for surgical team	Observable teamwork behavior of surgical teams 4 dimensions Behavioural markers	R	Mishra, A., Catchpole K., McCulloch P., et al. (2009). The Oxford NOTECHS system: reliability and validity of a tool for measuring teamwork behaviour in the operating theatre. *Qual Saf Health Care*, 18, 104–108	Catchpole, K. R., Dale, T. J., Hirst, D. G., Smith, J. P., & Giddings, T. A. E. B. (2010). A multicenter trial of aviation-style training for surgical teams. *Journal Of Patient Safety*, 6(3), 180–186.	Y	
OSCAR: Observational Skill-based Clinical Assessment tool for Resuscitation	Observational skill-based clinical assessment tool for resuscitation	N		Walker, S., Brett, S., McKay, A., Lambden, S., Vincent, C., & Sevdalis, N. (2011). Observational Skill-based Clinical Assessment tool for Resuscitation (OSCAR): Development and validation. *Resuscitation*, 82(7), 835–844.		
OTAS: observed teamwork assessment for surgery	Operating room, surgical theatre Behavioural markers	R	Sevdalis, N., Lyons, M., Healey, A.N. et al. (2009). Observational teamwork assessment for surgery: construct validation with expert versus novice raters. *Annals of Surgery*, 249(6), 1047–1051.	Hull, L., Arora, S., Kassab, E., Kneebone, R., & Sevdalis, N. (2011a). Assessment of stress and teamwork in the operating room: an exploratory study. *American Journal Of Surgery*, 2011(1), 24–30.	Y	
Questionnaire on teamwork	24 bipolar items Structure orientation Person orientation Self report	R	Kauffeld, S. (2004). FAT – Fragebogen zur Arbeit im Team. Göttingen: Hogrefe.	Korner, M. (2010). Interprofessional teamwork in medical rehabilitation: a comparison of multidisciplinary and interdisciplinary team approach. *Clinical Rehabilitation*, 24(8), 745–755.		
RIPLS: Readiness for Interprofessional Learning	Several modifications of this Original 19 items and 5-point scale Attitudes	R	Parsell, G. & Bligh, J. (1999). The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Medical Education*, 33(2), 95–100.	Braithwaite, J., Westbrook, M., Nugus, P., Greenfield, D., Travaglia, J., Runciman, W. et al. (2012). A four-year, systems-wide intervention promoting interprofessional collaboration. *BMC Health Services Research,* 12, 99. Davies, K., Harrison, K., Clouder, D. L., Gilchrist, M., McFarland, L., & Earland, J. (2011). Making the transition from physiotherapy student to interprofessional team member. *Physiotherapy*, 97(2), 139–144. Williams, B., Brown, T., & Boyle, M. (2012). Construct validation of the readiness for interprofessional learning scale: a Rasch and factor analysis. J*ournal of Interprofessional Care*, 26(4), 326–332.	Y	
Safety organising scale	9 items self report	R	Vogus TJ, Sutcliffe KM. (2007). The safety organizing scale: development and validation of a behavioral measure of safety culture in hospital nursing units. *Med Care*, 45, 46–54.	Manojlovich, M., Saint, S., Forman, J., Fletcher, C. E., Keith, R., & Krein, S. (2011). Developing and testing a tool to measure nurse/physician communication in the intensive care unit. *Journal Of Patient Safety*, 7(2), 80–84.		
SAQ: safety attitudes questionnaire	Attitudes & perceptions Self-report 60 items Teamwork climate Job satisfaction Perceptions of management Safety climate Working conditions Stress recognition	R	Sexton J.B., Helmreich R.L., Neilands T.B., Rowan K., Vella K., Boyden J., Roberts P.R. & Thomas E.J. (2006); The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research*, 6, 44.	Bleakley, A., Allard, J., & Hobbs, A. (2012). Towards culture change in the operating theatre: Embedding a complex educational intervention to improve teamwork climate. *Medical Teacher*, 34(9), E635– E640. Carney, B. T., West, P., Neily, J., Mills, P. D., & Bagian, J. P. (2010) Differences in nurse and surgeon perceptions of teamwork: implications for use of a briefing checklist in the OR. *AORN Journal,* 91(6), 722–729. Catchpole, K. R., Dale, T. J., Hirst, D. G., Smith, J. P., & Giddings, T. A. E. B. (2010). A multicenter trial of aviation-style training for surgical teams. *Journal Of Patient Safety*, 6(3), 180–186.	Y	
SSRQ: student stereotypes rating scale	Self-report 9 items 5-point Likert	R	Hean, S., Macleod-Clark, J., Adams, K., & Humphris, D. (2006). Will opposited attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. *Journal of Interprofessional Care*, 20, 162–181.	Ateah, C. A., Snow, W., Wener, P., MacDonald, L., Metge, C., Davis, P. et al. (2011). Stereotyping as a barrier to collaboration: Does interprofessional education make a difference? *Nurse Education Today*, 31(2), 208–213.		
Team climate inventory	Original: 38-item tool using both 5 and 7 point scale. Measures team function. 5 subscales: vision, participative safety, task orientation, support for innovation, interaction frequency. Short version has 14 items, 4 subscales (deletes the interaction frequency)	R	Anderson, N.R., & West, M.A. (1998). Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19(3), 235–258. Kivimaki, M., & Elovainio, M. (1999). A short version of the Team Climate Inventory: development and psychometric properties. *Journal of Occupational and Organizational Psychology,* 72(2), 241–246. Modified versions as well	Howard, M., Brazil, K., Akhtar-Danesh, N., & Agarwal, G. (2011). Self-reported teamwork in family health team practices in Ontario Organizational and cultural predictors of team climate. *Canadian Family Physician*, 57(5), E185–E191.	Y	
Team Functioning Assessment Tool (TFAT)	Non technical skills of ward based multidisciplinary healthcare teams Behavioural markers	N		Sutton, G., Liao, J., Jimmieson, N. L., & Restubog, S. L. D. (2011). Measuring multidisciplinary team effectiveness in a ward-based healthcare setting: development of the team functioning assessment tool. *Journal for Healthcare Quality*, 33(3), 10–23.		
Team orientation scale	10 self report items about own performance within a team	N (major mod and renamed)	Modified from the cognitive-motivational survey of Millward & Purvis (1998). *Team building techniques – a critical evaluation*. Farnborough, UK: Defense Evaluation Research Agency. And Millward & Jeffries (2001). The team survey: a tool for health care team development. *Journal of Advanced Nursing*, 35(2), 276–287.	Andreoli, A., Fancott, C., Velji, K., Baker, G. R., Solway, S., Aimone, E., & Tardif, G. (2010). Using SBAR to communicate falls risk and management in inter-professional rehabilitation teams. *Healthcare Quarterly*, 13 Spec No, 94–101.	Y – the Millward papers but not TOS	
TeamSTEPPs attitudes questionnaire (T-TAQ)	Self-report Team structure, leadership, communication, mutual support, and situation monitoring	R	Baker, D.P., Krokos, K.J., & Amodeo, A.M. (2008). TeamSTEPPS® Teamwork Attitudes Questionnaire. American Institutes for Research, Washington, DC.	Armour Forse, R., Bramble, J. D., & McQuillan, R. (2011). Team training can improve operating room performance. Surgery, 150(4), 771–778. Posmontier, B., Montgomery, K., Smith Glasgow, M. E., Montgomery, O. C., & Morse, K. (2012). Transdisciplinary teamwork simulation in obstetrics-gynecology health care education. Journal of Nursing Education, 51(3), 176–179. Schultz, L. (2012). Applying a Multidisciplinary Approach Using the TeamSTEPPS Communication and Teamwork Methodology While Debriefing a Critical Event Simulation. Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing, 41, S109–S109.		
TeamSTEPPs teamwork perceptions questionnaire (T-TPQ)	Self-report Team structure, leadership, communication, mutual support, and situation monitoring	R	American Institutes for Research. (2010). TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) Manual. Washington, D.C.: American Institutes for Research	Armour Forse, R., Bramble, J. D., & McQuillan, R. (2011). Team training can improve operating room performance. *Surgery*, 150(4), 771–778.		
Teamwork knowledge, skills & ability test	35 item MCQ	R	Stevens, M.J. & Campion, M.A. (1994).The knowledge, skill and ability requirements for teamwork: Implications for human resource management. *Journal of Management*, 20(2), 503–530.	O'Neill, T. A., Goffin, R. D., & Gellatly, I. R. (2012). The Knowledge, Skill, and Ability Requirements for Teamwork: Revisiting the Teamwork-KSA Test's validity. *International Journal of Selection and Assessment*, 20(1), 36–52.		

Table 4.6 *(continued)*: Overview of findings

TOOL	PURPOSE	NEW/ RE-USED	REFERENCE TO ORIGINAL DEVELOPMENT	USED BY/DEVELOPED BY	CIHC	VALENTINE
Teamwork mini-practice environment checklist (PEC)	5 questions, self report A much shorter version of the Practice Environment Checklist (PEC) – 75-items – modification enough to be classed as new tool	N	Original PEC: Jaén, C.R. et al. (2010). Methods for evaluating practice change toward a patient-centered medical home. *Annals of Family Medicine*, 8 Suppl 1, S9–S20.	Lurie, S. J., Schultz, S. H., & Lamanna, G. (2011). Assessing Teamwork: A Reliable Five-Question Survey. *Family Medicine*, 43(10), 731–734.		
T-NOTECHS: Non-technical skills in trauma	Teamwork in trauma bay 5 observable behavioural domains	N		Steinemann, S., Berg, B., DiTullio, A., Skinner, A., Terada, K., Anzelon, K., & Ho, H. C. (2012). Assessing teamwork in the trauma bay: introduction of a modified "NOTECHS" scale for trauma. *American Journal Of Surgery*, 203(1), 69–75.		
T-OSCE (Team-OSCE) (also known as the McMaster-Ottawa TOSCE)	Scenario-based assessment with scenario specific content and collaborative practice competencies. Observation of students in teams No items actually given in either of the papers. Website: 6 core objectives each containing several items: Communication Collaboration Roles & responsibilities Collaborative patient-family-centred approach, Conflict management/ resolution, Team functioning. 9 point scale	N	The TOSCE is now described at: http://fhs.mcmaster.ca/tosce/en/administration_checklist.html	Hall, P., Marshall, D., Weaver, L., Boyle, A., & Taniguchi, A. (2011). A method to enhance student teams in palliative care: piloting the McMaster-Ottawa Team Observed Structured Clinical Encounter. *Journal of Palliative Medicine*, 14(6), 744–750. Solomon, P., Marshall, D., Boyle, A., Burns, S., Casimiro, L. M., Hall, P., & Weaver, L. (2011). Establishing face and content validity of the McMaster-Ottawa team observed structured clinical encounter (TOSCE). *Journal of Interprofessional Care*, 25(4), 302–304. Note: These 2 papers were published in the same year and have some overlap with authors. Hall et al. is based in palliative care; Solomon et al. in primary care.		
Unnamed	Hospice IDT preparation for collaboration in team meetings; 23 item semi-structured survey by phone. 21 closed, 2 short open ended questions	N		Baldwin, P. K., Wittenberg-Lyles, E., Oliver, D. P., & Demiris, G. (2011). An Evaluation of Interdisciplinary Team Training in Hospice Care. *Journal of Hospice & Palliative Nursing*, 13(3), 172–182.		
Unnamed	Team behaviours in critical care teams managing critical events 20 items 3 factors	N		Weller, J., Frengley, R., Torrie, J., Shulruf, B., Jolly, B., Hopley, L. et al. (2011). Evaluation of an instrument to measure teamwork in multidisciplinary critical care teams. *BMJ Quality & Safety,* 20(3), 216–222.		

New measures (Table 4.7)

We found 18 new measures and one which had such major modifications from existing measures that we classified it as new (19 in total). Of the 19, the HTVI (healthcare team vitality instrument, Upenieks et al. 2010 is adapted from several sources; and the modified University of Toronto Framework for the development of interprofessional education values and core competencies for collaboration (Packard et al. 2012) is based on the University of Toronto framework, which is not a measure. The modified measure, the team orientation scale (Andreoli et al, 2010), cites two sources. The other new measures are derived from multiple sources during their development as part of the process of establishing content validity. Three of the new measures are cited in Valentine et al (2014): Flowerdew et al., 2012; Schroder et al., 2011; Patterson et al., 2012; and three in the CIHC review: King et al., 2010; Schroder et al., 2011; Upenieks et al., 2010.

Papers with new measures not cited in either of the Valentine reviews or the CIHC are: Andreoli et al, 2010; Baldwin et al., 2011; Curran et al., 2011; Hobgood et al., 2010; Lurie et al., 2011; Nishisaki et al., 2011; Nurok et al., 2010; Orchard et al., 2012; Packard et al., 2012; Steinemann et al., 2012; Sutton et al., 2011; Walker et al., 2011; and Weller et al., 2011. Two papers published in the same year report on the development of the TOSCE (team observed structural clinical encounter) (Hall et al., 2011; Solomons et al., 2011). The remaining 26 papers re-used measures or reported existing measures with minor modifications (note Packard et al., 2012 includes both a new and a re-used measure).

Types of measures

The measures are in three main categories:

1. For completion by individuals in relation to their perception of some aspect of their team's functioning (i.e. self-report of behaviour or performance); aspects include collaboration, job stress/satisfaction, communication (17 measures of which 7 new) [highlighted in yellow in table 4.6]
2. For completion by one or more assessors using behavioural markers during observation of a team in action at a specific location or during a specific task (16 measures of which 11 new) [highlighted in blue in table 4.6]
3. Attitudinal measures completed by individuals including (9 measures of which one new) [highlighted in green in table 4.6]

The observation measures include specific teams and/or locations such as: paediatric intensive care (Allan et al., 2010; Nishisaki et al, 2011), adult critical care (Weller et al., 2011), operating rooms (Armour Forse et al., 2011; Catchpole et al., 2010; Hull et al., 2011a/b); Nurok et al., 2010), emergency and trauma medicine, (Flowerdew et al., 2012; Patterson et al., 2011; Steinemann et al, 2012); adult resuscitation (Walker et al., 2011), anaesthesia (Jankouskas et al., 2011), obstetrics (Fransen et al., 2012), and hospital wards (Sutton et al., 2011). Three observation measures, the interprofessional collaborator assessment rubric (ICAR) (Curran et al., 2011), the interprofessional OSCE (iOSCE) (Simmons et al, 2011) and the rubric of Packard et al., (2012) are more generic observation measures but of the team rather than individuals (Curran et al., 2011). These aforementioned measures are for use during simulation activities, real-time clinical or videoed observations. Many of these are underpinned by crisis resource management (CRM) principles, originally developed by the aviation industry, which have been effectively adapted by health simulation educators. The TOSCE (Hall et al., 2011; Solomons et al., 2011) is based on the OSCE (objective structured clinical examination) and includes content specific items based on the particular scenarios developed and six collaborative competencies standard across each scenario. In the two papers describing the measure, two observers mark individual students and also assess overall team performance. The scenarios are scripted rather than occurring in practice. Examples of items from selected measures are listed in table 4.8.

The closest measures to the aim of this project are the ICAR (Curran et al., 2011) and the TOSCE (Hall et al., 2011; Solomons et al., 2011). The 31 items of the ICAR limit its feasibility in pre-qualification situations and certain of the items would be difficult to observe in a team-based activity, for example: recognition of the relationship between team functioning and quality of care; recognition of strategies that will improve team functioning; recognition of oneself as part of the team. The TOSCE has several items within each of the six core

Table 4.7: Newly developed teamwork measures from 2010–2013

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/ construct validity	Comments
Andreoli et al., 2010 Canada	Using SBAR to communicate falls risk and management in inter-professional rehabilitation teams	Team Orientation Scale Used pre and post to look at team orientation post a training intervention focussed on SBAR. Used with 105 clinical and non-clinical staff in rehabilitation units.	10 items Self report	Says 'the survey and its domains have been found to be valid and reliable' and refers to Millward & Purvis but no details are given and this is not the same tool.				Says this scale is based on work by Millward & Purvis (1998), mentioned in CIHC report as well as Millward & Jeffries (2001) but the scale is different and just referred to as a team survey. So seems this is a modification/new tool and no psychometric data given.
Baldwin, Wittenberg-Lyles, Oliver, & Demiris, 2011 USA	An Evaluation of Interdisciplinary Team Training in Hospice Care	Unnamed Assessment of hospice IDT member preparation for collaboration in team meetings and whether teams receive training	23 item semi-structured survey Administered by phone to hospices 21 closed questions, 2 short open ended questions 4 aspects of team processes: Nature & structure of the current team Organisational training procedures currently in place Perceived needs assessment for team training Current evaluation practices			Developed by members of research team based on previous research (gives 3 references to papers by Wittenberg et al – 2007, 2008, 2010) Categories for items developed through audio of first 34 surveys – 9 transcribed and constant comparison technique to develop categories – frequency counts, defining relationships between data. Remaining 25 initial surveys coded by 2 coders independently using categories. Not clear how this process changed the survey from its original version or how categories used.		This is a survey rather than a tool – no 'marks' or 'grading'. Primary purpose of paper not the development of the survey but exploring the preparation of the IDTs.
Curran et al., 2011 Canada	Development and validation of the interprofessional collaborator assessment rubric (ICAR)	Interprofessional collaborator assessment rubric (ICAR). IP collaborator competencies				2 stage mixed method approach 1. Development of IP collaborator competencies: literature review; typological analysis; identification of several common competency categories; research team compared and contrasted these, reviewed and revised to produce a final list of competency statements and associated performance criteria/behavioural indicators 2. Development of assessment rubric: Delphi survey to rate validity using 5-point scale – 2 rounds; focus groups – students and faculty Grammatical revisions		Define rubric as a way to make judgments about what elements of performance matter most in a valid and reliable way (= scoring guideline).
Flowerdew at al., 2012 From Valentine et al, (2014) UK	Development and validation of a tool to assess emergency physicians' nontechiical skills.	Unnamed	Provisional tool: 13 skills revised to 12 skills in 4 categories with a descriptor Management & supervision Teamwork & cooperation Decision-making Situational awareness			9-point rating scale from unacceptable to acceptable to exemplary Non-technical skills literature and curricula review, combined with analysis of other tools led to version 1 Interviews and field observations in the ED led to version 2 Staff survey (148 questionnaires) of validity of behavioural markers led to final version		Observation of an individual physician for formative assessment purposes ie WBA

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/construct validity	Comments
Hall et al., 2011 Solomon et al., 2011 Canada	A method to enhance student teams in palliative care: piloting the McMaster-Ottawa team observed structured clinical encounter. Establishing face and content validity of the McMaster-Ottawa team observed structural clinical encounter (TOSCE).	TOSCE	**Hall:** Original developed for palliative care scenarios with content and assessment specific to this, plus interprofessional collaborative practice competencies for health care students. Assessment of the individual student and the team as a whole for specific content and IP competencies **Solomon:** primary care scenarios. No items given in these 2 papers Need to refer to McMaster website (see table 4.6) 6 core elements 9 point scale	158 students, each station observed by 2 observers and inter-rate reliability 0.916. Correlation between 2 observers for team global scores for all 3 stations combined = 0.844.	For IPE scales (checklists) of the 3 stations ranged from 0.725 to 0.865 for both observers. Face and content validity for the 10 scenarios established by a convenience sample of 41 clinicians working in primary care teams. Ranked topics – not much detail in this short report		The Hall et al. paper looked student and observer satisfaction, acceptability and feasibility. Students: 73% rated stations as fair; 43.3% agreed that stations appropriate for demonstrating knowledge & skills. 65.2% agreed that were able to demonstrate key elements of collaboration. Observers: 82.6% agreed manageable to assess students from different professions; 43.8% agreed were able to assess more than 1 student at a time	
Hobgood et al., 2010 USA Psychometrics from Hollar et al. (2012)	Teamwork training with nursing and medical students: does the method matter? Results of an inter-institutional, interdisciplinary collaboration	The Collaborative Healthcare Interdisciplinary Planning (CHIRP) scale To measure attitudes towards interdisciplinary teamwork geared specifically to medical and nursing students	Original 36 items 5-point Likert scale Teamwork attitudes (25 items) Need for recognition Expertise acknowledgement Communication Final tool – 14 items Self-report	Reliability for combined 55 item scale 0.98 item separation CHIRP alone 0.97	For all 36 items = 0.850	Items identified by authors and panel of faculty experts Compared to RIPLS –19 items version Administered to 266 students (approx. 52% RR) Raasch analysis across both tools using OUTFIT zone 2 instruments correlated at r = .582 (p, 0.1) 14 of CHIRP items were in the satisfactory OUTFIT zone	9 factors with eigen values > 1 9 factors explained 59.8% of the variance 32 items loaded onto 2 factors 25 items loaded onto 1 factor	The Hobgood paper just says that CHIRP was developed and how used – 36 items. The Hollar paper has all the data. Have found a version of CHIRP from 2006 but has 15 items – modified with permission by Gwen Sherwood
King, Shaw, Orchard, & Miller, 2010 Canada/ others	The interprofessional socialization and valuing scale: a tool for evaluating the shift toward collaborative care approaches in health care settings	The Interprofessional Socialization and Valuing Scale (ISVS) To assess aspects of the interprofessional socialisation process underlying the enactment of collaborative care in the health care context, within the socio-cultural context in which collaborative care occurs	7-point Likert self-report scale 3 scales – 24 items Self-perceived ability to work with other (self-perception of abilities and skills – 9 items) Value in working with others (enhanced appreciation and understanding of interprofessional practice – 9) Comfort in working with others (comfort in interprofessional team interaction – 6)		Item-scale correlations, item variances, item means. No items excluded Cronbach's alpha ranged from 0.79 to 0.80 for the 3 scales Captured diversity in responses	*A priori* conceptual domains from the literature. Items developed by 3 of the authors (34). Reviewed by working group. Administered to 124 health professional students	Principal components analysis with varimax rotation using data from 124 respondents: Kaiser-Meyer-Olkin measure of sampling adequacy = 0.85 3-factor solution, accounting for 48.7% of the variance 10 items dropped leading to 24 item measure Person correlation coefficients indicate scales capture different aspects of IP socialisation	The ISVS aims to capture the beliefs, behaviours and attitudes of professionals that influence and are influenced by their transactions in enacting collaborative approaches. Self-report measure Lowest correlation between value in working with others and comfort in working with others: indicates difficulty in working despite positive attitudes

Table 4.7 *(continued)*: Newly developed teamwork measures from 2010–2013

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/ construct validity	Comments
Lurie, Schultz, & Lamanna, 2011 USA	Assessing Teamwork: A Reliable Five-Question Survey	The Teamwork Mini-Practice Environment Checklist (mini-PEC) In primary care	The original PEC has 75 items completed by outside facilitators. Mini-PEC 5 items: This team encourages everyone to share ideas Leadership in this team creates an environment where things can be accomplished People in this team have the information that they need to do their jobs well When people in this team experience a problem, they make a serious effort to figure out what's really going on Everyone in the team feels able to act on the team vision Self-report	Validation study 5-item scale 0.84 with high internal consistency	Cronbach alpha 0.94 for 29 items 5 items 0.89 4 items 0.61 6 items 0.70	Selected at least 1 item from each of the 18 domains of the PEC. Final set had 29 items & administered to each person on 6 clinical teams in the OPD (n=56) during a weekly team meeting 5 item survey administered to larger sample (n=89) of team members.	Principal factors extraction + varimax rotation of 29 items: first factor with eigenvalue of 12 accounting for 41% of variance in the correlation matrix. 6 additional factors with eigenvalues between 1-2.1 – 30% of variance Concluded single-factor solution best fit for data 5-item survey resulted	Development of mini-PEC for increased feasibility. 5-item scale could be completed in much shorter time
Nishisaki et al., 2011 USA	Evaluation of multidisciplinary simulation training on clinical performance and team behaviour during tracheal intubation procedures in a pediatric intensive care unit	Just In Time Paediatric Airway Provider Performance Scale (JIT-PAPPS)	Pediatric intensive care Task-based team evaluation scale for pediatric incubation outside the OR. Through 3 versions 2 domains: Technical (14 items) – max score 62 Behavioural (20 items) – max score 80 Behavioural markers	Between expert facilitator and 2 trained raters. .62 for video observation; .88 for direct observation (.73 for technical; .34 for behavioural)		Used the healthcare failure mode and effect analysis approach – identified important processes and sub processes necessary for safe advanced airway management in PICU. Item-specific weight by team. Refined by trained raters using both videotaped & live simulation training events. Categorised by expert group consensus		Scores were significantly associated with number of team members who had previously had JIT training Note – a large part of this paper aimed to show that training increased performance
Nurok, Lipsitz, Satwicz, Kelly, & Frankel, 2010 USA	A novel method for reproducibly measuring the effects of interventions to improve emotional climate, indices of team skills and communication, and threat to patient outcome in a high-volume thoracic surgery centre	Communication, teamwork, threats and climate assessment Aim to create reproducible measure of emotional climate, communication, & team skills, & threats to patient outcome Thoracic surgery operating room teams	Observation with behavioural markers: Climate score: Surgical and sterile environment Anaesthetic environment Other Communication & team skills: 6 items (including SBAR, debriefing) Threats to outcome assessment: 11 items	Inter-rater reliability for 30 initial paired observations: >0.70 for all but 3 of communication and team skills; threat to outcome >.90 except for 1 item = .70.	Standardised observation form was used (presumed developed by the expert steering group) Pilot observations to develop and test operability of behavioural definitions. Definitions refined in consultation with observers and steering group. Communication and team skills refined from standardized observational template used by patient safety group (no details) Threats to outcome from a study at Kaiser Permanente (Referenced)			Very specific behavioural observation instrument A new form is completed every 10 minutes

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/construct validity	Comments
Orchard, King, Khalili, & Bezzina, 2012 Canada	Assessment of Interprofessional Team Collaboration Scale (AITCS): Development and testing of the instrument	Assessment of Interprofessional Team Collaboration Scale (AITCS) To measure collaboration using multiple elements	Preliminary: 48 items reduced to 47 to 37 5-point Likert scale 'when we are working as a team, all my team members…' Individual self-report 1. Partnership/SDM (19 items) 2. Cooperation (11) 3. Coordination (7)	Overall reliability = 0.98 (subscales 0.8 -0.97)	Bivarate correlations Coefficients of 0.5 and above	Literature search to identify constructs underlying IP team collaboration: 1. Coordination (7) 2. Cooperation (15) 3. Shared decision making (12) 4. Partnership (14) 24 IPE expert reviewed items, 3 added & 3 redundant Tested on 125 practitioners in 7 teams	Factor analysis using PCA and varimax rotation KMO = 0.91 FA: 3 components with eigenvalues >1 explaining 58% of variance Removed 8 cross loaded items and variance improved to 61.02% Retained 37 items	Can be used as pre/post measure
Packard et al., 2012 USA	Interprofessional Team Reasoning Framework as a tool for Case Study Analysis with Health Professions Students: A randomised study	Modified University of Toronto Framework for the Development of Interprofessional Education Values and Core Competencies Collaboration. Intended to foster effective collaboration between the various disciplines and to improve patient care.	The reasoning framework is not the tool. Faculty assessed students in a team reasoning task using a 'rubric based on the UoT framework'. 12 point (marks) scale with 3 areas: Collaboration (2 items with 3 points each) Communication (1 – 3 points) Values/ethics (1 – 3 points)	15 faculty assessed taped interactions of the 3 teams in the study – 5 per team No reliability data for this study – just gives means of assessors				Need to check against original tool Observation of teamwork
Patterson et al., 2012 USA	Measuring teamwork and conflict among emergency medical technical personnel.	EMT-TEAMWORK For EMTs and paramedics working together so not interprofessional as such Short form (30 items) Long form (45 items) Behavioural markers Observed performance	9 factors: Team orientation Team structure & leadership Partner communication, team support & monitoring Partner trust and shared mental models Partner adaptability & back-up behaviour Process conflict Strong task conflict Mild task conflict Interpersonal conflic	Pearson correlation item-scale >0.40 Other correlations indicated high reliability	Positive internal consistency – mean Cronbach alpha for 9 scales was >0.70 (0.78 – 0.94)	Theory and components of teamwork, existing tools etc from literature, assembly of existing items into draft list and adaptation of wording to EMS,, expert group, edited wording, identification of deficits. Draft survey tool piloted with sample of EMTs and paramedics – 687	Long description of data analysis EFA reduced items to 122 10 factor model PFA and oblique rotation until single factor model Short form – 3 items per construct CFA linked 30 high loading items to 9-factor structure of teamwork and conflict specified in EFA	Can be used at individual or team level – though usually these means 2 people in EMS
Schroder et al., 2011 Canada	Development and pilot testing of the collaborative practice assessment tool	The Collaborative Practice Assessment Tool (CPAT) Developed with 42 participants across disciplines	Full survey. 56 items Self report about the team 8 dimensions: Mission, meaningful purpose, goals (8 items) General relationships (8) Team leadership (9) General role responsibilities, autonomy (10) Communication and information exchange (6) Community linkages and coordination of care (4) Decision-making and conflict management (6) Patient involvement (5) 7-point Likert scale	Not reported	Relationships 0.81, Communication 0.74 Decision making 0.74	Literature review & expert team to develop items. 2 separate pilot tests & revisions to develop final instrument	CFA revealed 8 factors that matched model of collaborative practice. Tests of model fit included normed fit index, comparative fit index, Tucker Lewis index, which all reported acceptable scores	First developed in 2007–2008 but piloted and validated in this paper

Table 4.7 *(continued)*: Newly developed teamwork measures from 2010–2013

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/ construct validity	Comments
Steinemann et al., 2012 USA	Assessing teamwork in the trauma bay: introduction of a modified "NOTECHS" scale for trauma T-NOTECHS	Non technical skills for trauma	5-point Likert scale Initially 26 exemplar behaviours, final 27. 5 essential behavioural domains: Leadership Cooperation & resource management Communication & interaction Assessment & decision making Situation awareness/coping with stress	.44 simulated; .48 real moderate	Cronbach's α >.90 and did not improve with elimination of any domain	Panel of trauma practitioners – 5 people – reviewed trauma teamwork evaluation tools, nomenclature of teamwork skills, modified NOTECHS' consensus on additional emphasis on role assumption, task completion., coping with stress and disruptions. Clinical evaluation lost 2 exemplars and gained 3. Used in simulated & real life resuscitations	Scores for 5 domains clustered together	Observed teamwork Behavioural domains
Sutton, Liao, Jimmieson, & Restubog, 2011 Australia	Measuring Multidisciplinary Team Effectiveness in a Ward-Based Healthcare setting: Development of the Team Functioning Assessment Tool	Team Functioning Assessment Tool (TFAT) Non technical skills of ward based multidisciplinary healthcare teams aimed at evaluating team functioning	Behavioural markers, based on CRM Argue that assessment of non technical skills for teams is conceptually distinct from that of individuals 3 core categories with 11 elements: • Clinical planning (3) • Executive tasks (4) • Team relation (4) 7-point rating scale Concordance on ranking – Kendall coefficient of concordance for 3 categories: 0.59, 0.46, 0.78 and for whole TFAT 0.78	Field study – 10 raters after training rated 3 videos of MDT meetings Rwg Video 1: .67-.99 Video 2: .71 -.98 Video 3: .82-.98		Developed a taxonomy describing key dimensions of high-performing MDTs: Generated initial items based on lit review and FGs (5 category model) Assessing content validity using card sorting exercise to refine and classify items into categories (3 category model) Using in a field observation study to refine items and check inter-rater reliability	Authors state further work needed for this	After the field observations – removed the 'no opportunity to observe' as decided that a MDT should display all elements Modified wording
Sutton, Liao, Jimmieson, & Restubog, 2011 Australia	Measuring Multidisciplinary Team Effectiveness in a Ward-Based Healthcare setting: Development of the Team Functioning Assessment Tool	Team Functioning Assessment Tool (TFAT) Non technical skills of ward based multidisciplinary healthcare teams aimed at evaluating team functioning	Behavioural markers, based on CRM Argue that assessment of non technical skills for teams is conceptually distinct from that of individuals 3 core categories with 11 elements: • Clinical planning (3) • Executive tasks (4) • Team relation (4) 7-point rating scale Concordance on ranking – Kendall coefficient of concordance for 3 categories: 0.59, 0.46, 0.78 and for whole TFAT 0.78	Field study – 10 raters after training rated 3 videos of MDT meetings Rwg Video 1: .67-.99 Video 2: .71 -.98 Video 3: .82-.98		Developed a taxonomy describing key dimensions of high-performing MDTs: Generated initial items based on lit review and FGs (5 category model) Assessing content validity using card sorting exercise to refine and classify items into categories (3 category model) Using in a field observation study to refine items and check inter-rater reliability	Authors state further work needed for this	After the field observations – removed the 'no opportunity to observe' as decided that a MDT should display all elements Modified wording

Authors	Article Title	Tool/instrument	Items, dimensions assessed, response scale	Inter-rater agreement & reliability	Internal consistency	Content validity/concurrent validity	Structural validity/construct validity	Comments
Upenieks, Lee, Flanagan, & Doebbeling, 2010 USA	Healthcare Team Vitality Instrument (HTVI): developing a tool assessing healthcare team functioning	The Healthcare Team Vitality Instrument (HTVI)	20 item revised to 19 items then to 10. Self report Engagement & empowerment Support structures Patient care transitions Team communication 5-point Likert scales	Not reported		Adapted wording of selected questions from many different instruments. Phase 1: cognitive interview of 18 healthcare providers and 439 completed surveys: how accurately each question of the tool measured what it is intended to measure. Tool administered along with 2 other validated surveys. 10/20 items moderately (>0.50) to strongly (>0.70) with the 2 surveys. ISVS revised then readministered in phase 2 to about 400 providers.	Phase 2: Long descriptions of exploratory factor analysis and CFA. 4-factor solution optimal – all items loaded at least moderately strongly with minimal cross-loading – model explained 58% of variation. NNFI = 0/96, CFI = 0.98, RMSEA = 0.06 Revised to 10 items	
Walker et al., 2011 UK	Observational Skill-based Clinical Assessment tool for Resuscitation (OSCAR): Development and validation	Observational Skill-based Clinical Assessment tool for Resuscitation (OSCAR)	1st version – 6 domains with 3 behaviour exemplars in each for each team member (anaesthetist, physician and nurse) = 54 exemplars Final version (each profession has different items) 7-point rating scale Domains: Communication: 3–4 items Co-operation: 2–3 items Co-ordination: 2–3 items Leadership: 2–3 items Monitoring:2–3 items Decision making: 2–3 items	Phase 3 – 8 videos of cardiac arrest teams watched by 2 clinical experts Good inter-rater agreement in all scoring Cronbach α 0.736–0.965	Phase 3 83% behaviours (15 of 19) behaviours demonstrated high internal consistency Intraclass correlations strong: 0.652–0.911	Phase 1 – looked at 3 tools used in other disciplines: OTAS, ANTS, NOTECHS. Led to 6 behavioural domains Phase 2 – ten experts 18 changes made		Observed behavours
Weller et al., 2011 New Zealand	Evaluation of an instrument to measure teamwork in multidisciplinary critical care teams	Unnamed	To measure team behaviours in critical care teams managing critical events 7-point rating scale 23 items then reduced to 20 (though this is not clear from the abstract) 3 factors Leadership & team coordination (10 items) Mutual performance monitoring (4 items) Verbalising situations information (6 items)	Raters differed most on: = variation in marking hard and being lenient • Team called attention to hazardous actions/ omissions • Reacted appropriately when others pointed out • When ignored by leader, team persisted Poor reliability across some items	Cronbach's α generalizability theory – full crossed design with team as object of measurement Scenario fixed factor Rater random factor 3 factors: Leadership & team coordination (0.917) Mutual performance monitoring (0.915) Verbalising situations information (0.893)	Modified the Mayo High Performance Teamwork scale as more specific and potentially observable actions compared to other scales found on literature review. Modified items to reduce ambiguity and added 6 items that were present in other instruments or the teamwork literature. 6 experienced clinicians and 2 psychologists applied the instrument to 6 videotaped simulations of critical care – discussed and consensus reached on final 23 items. Instrument used to observe simulation – 3 raters independently rated 40 critical care teams undertaking 4 scenarios each; halfway through this exercise the raters were interviewed to give their perceptions of the items and how they interpreted them.	EFA – clustered round 3 factors 3 items did not load against any factor and were removed (referred to written aids, made inappropriate assumptions about capabilities or action of team members, team became fixated in an isolated indicator to exclusion of other aspects of care) G coefficient for overall team behaviour = 0.78 Leadership & team coordination (0.85) Mutual performance monitoring (0.4) Verbalising situations information (0.37) Items relating to team coordination clustered with leadership items Construct – differences between team's mean scores over time and between trainee and specialist-led teams were calculated using two-tailed independent T-test	Construct validity was supported by improved performance of the teams over time, and superior performance of teams led by specialists (mean score 4.98) compared to trainees (4.43) p<0.0001 Detailed variance components included and rater views on items Further work in progress

Table 4.8: Examples of items from selected measures

Reference	Measure	Selected items
Self-report of teamwork		
Lurie et al., 2011	PEC	• This team encourages everyone to share ideas. • People in this team have the information that they need to do their jobs well. • Everyone in the team feels able to act on the team vision.
Kenaszhuk et al., 2011	Interprofessional collaboration scale	• The team has a good understanding about their respective responsibilities. • Individuals on the team share similar ideas about how to treat patients. • Team members cooperate with the way care is organized.
Andreoli et al., 2010.	Team orientation scale	• The team has agreed methods for communication. • I act upon the information that other members of the team communicate to me. • All team members' perspectives are important.
Observation: behavioural markers		
Curran et al., 2011	ICAR	• Ability to communicate effectively in a respectful and responsive manner with others (includes team members, patient/client, and health providers outside the team). • Establishes collaborative relationships with others in planning and providing patient/client care. • Describes one's own roles and responsibilities in a clear manner.
Weller et al., 2011	Unnamed	• The leader's plan for treatment was communicated to the team. • Individual team members reacted appropriately when other team members pointed out their potential errors or mistakes. • When directions were unclear team members asked for repetition and clarification.
Measures of attitudes		
Hobgood et al., 2010	CHIRP	• I need the expertise of health care professionals from other disciplines to provide patient care. • I feel confident in my knowledge and am willing to share my ideas with members of a health care team. • When making treatment decisions, I consider the perspectives of the patient and their family as well as other disciplines involved in their care.

competencies but are not marked separately. While individuals are graded on the nine point scale, there is also assessment of overall team performance.

Conclusion

None of the new or re-used measures, except the iCAR and TOSCE, are for the observation of individuals within teams but they do include items of observable behaviour that are included in the content validation and Delphi process detailed in chapter 5.

References: Teamwork measures from search

Key: New tools; Re-used tools; New tools from other sources not this search

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Chapter 5: The Delphi consultation

Background

Teamwork in healthcare is a complex area with little consensus amongst experts about how to name its component parts, how to measure it and how to assess it. The review of team measures in Chapter 4 demonstrates the number of publications on teamwork and collaboration and the increasing development of measures designed to evaluate and assess teamwork to improve the way healthcare is delivered by multidisciplinary and interprofessional teams.

The purpose of the Delphi stage of the project was to reduce the number of assessment items selected from the measures identified in the literature review and refine these in order to develop a suitable scale for the observation and assessment of teamwork. The project group aimed to achieve consensus on a measure to be field-tested during pre-qualification student work-based interprofessional activities at the project partner pilot sites. Practical key criteria were that the measure would be easy to use, suitable for use with students from different health professional programs and would promote observation and feedback processes.

As interprofessional education is not well understood within the mainstream of health professional education, the development of a new measure to observe and assess behaviours that demonstrate teamwork by students from different health professional programs requires knowledge from people who know and understand interprofessional practice and education. The project group agreed that a Delphi consultation was a suitable method to gather appropriate expert opinion. The Delphi process is a robust method for rigorous enquiry of expert stakeholders. The use of an "expert Delphi panel" is well documented. The method allows experts to rank opinion and the flexible design allows for follow up providing deeper understanding (Jones & Hunter, 1999; Schmidt, 1997; Yousaf, 2007). The Delphi consultation process also provides content validation for the development of a new measure (Greenwood 2004; Bowling 2002; Jordan et al 1998). The choice of appropriate panel experts is critical when the subject is complex and not well understood in the mainstream. The selection process we undertook is described in a later section.

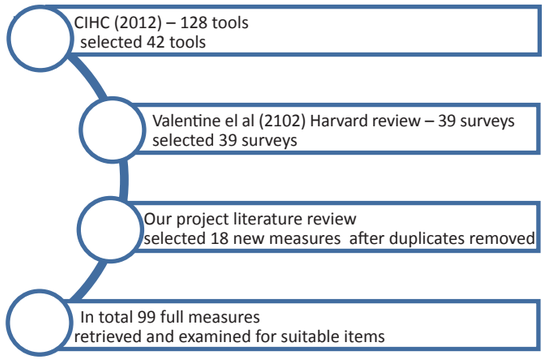
Preparation for the Delphi consultation process

The literature search described in chapter 4 focussed on two recent publications (Valentine, Nembhard & Edmonson, 2012, from the Harvard Business School, the CIHC – the Canadian Interprofessional Health Collaborative, 2012) as the basis for a further literature search which identified 46 full text articles published in the period after the CIHC and Harvard searches were conducted. These articles described 42 measures, 18 of which were not included in the CIHC and Harvard reviews.

The Harvard review describes 39 teamwork survey instruments from peer reviewed articles and the CIHC inventory 128 tools that have at least one outcome specifically relating to interprofessional education or practice. Three researchers from the project team examined the two reports: specifically the teamwork dimensions being measured by the surveys and tools, and the psychometric properties and related outcomes.

Ninety nine full surveys/tools were retrieved (Figure 5.1) to identify possible items that could be used within a new measure for the observation and assessment of teamwork behaviours of an individual healthcare student within an interprofessional work integrated learning activity.

Figure 5.1 Overview of surveys and tools retrieved for item selection



Item generation

Items from the measures that met the inclusion criteria below were retrieved.

1. The item describes a teamwork behaviour that can be demonstrated by an individual and observed, OR
2. The item describes a self report perception of an aspect of teamwork behaviour OR performance that could be reworded as an observable behaviour, AND
3. The item is not a technical behaviour of a specialist role.

From the 99 measures, 481 items were retrieved by the three researchers from the project team. In an iterative process the same researchers met and further examined the items for suitability and meaning and grouped them according to themes relating to teamwork behaviours. During this process items were synthesised and items measuring the same behaviour were excluded as they were redundant.

Over four iterations the 481 items were synthesised and reduced to 99 items under the themes of: communication (36), leadership (6), negotiation and conflict resolution (6), patient/client centred (7), roles and responsibilities (9), situation/awareness monitoring (6), task orientation (6), and team process (23) in preparation for the Delphi consultation with an expert group. An example of some of items within these themes can be found in table 5.1.

Table 5.1. An example of some items from the literature review

Themes	Items
Communication	Provides helpful advice and constructive feedback in order to encourage team members to do the job to the best of their ability
	Integrates information and perspectives from others in planning and providing patient/client care.
Leadership	Shares leadership and alternates leadership with others when appropriate for the discipline involved.
Negotiation and Conflict resolution	Helps resolve conflicts, even when the conflicts have become personal.
Patient/Client centred	Advocates for patients even when their own opinion conflicts with a senior team member
Roles and Responsibilities	Acknowledges the aspects of care where team members have more skills and expertise
Situation Awareness/ Monitoring	Exchanges relevant information as it becomes available
Task orientation	Participates in setting team objectives.
Team Process	Shares accountability for team's decisions and outcomes

Selection of the Delphi panel

The aim of establishing an expert panel was to obtain a comprehensive view from across academia, fieldwork educators and supervisors, curriculum developers and from learning and teaching experts. Through initial and ongoing stakeholder engagement the project team maintained a list of people who had self-identified through the AIPPEN (Australasian Interprofessional Practice and Education Network) website as wanting to be involved in the project. Other stakeholders expressed this same interest directly with the project team through email, phone or face-to-face contact. The project team also added key leaders of Australian university IPE programs if they were not already on the list. The stakeholder list included national and international colleagues.

The project team refined the stakeholder list to those with a specific role for assessment, IPE, IPP or fieldwork supervision. Ninety one potential panel experts from a broad range of disciplines and

professions within higher educational institutions (HEIs) or health care provider organisations, national and international, were invited to participate in the Delphi consultation process as members of the panel (Table 5.2). Forty three experts consented to participate.

Table 5.2 Stakeholders by discipline/setting invited to join the Delphi panel

	HEI	Health care Providers	Total
Academic, Research	14	5	19
IPE	15	4	19
Medicine	9	3	12
Nursing	8	1	9
Education	6	6	6
Rehabilitation	3	1	4
Psychology	2	1	3
Social work (and mental health and community health)	1	1	2
Pharmacy	1	1	2
Diagnostic Radiography	1	1	2
Occupational Therapy		2	2
Allied Health		2	2
Speech pathology	1		1
Physiotherapy	1		1
Nursing and Midwifery	1		1
Dietetics	1		1
Children's allied health		1	1
Community and primary prevention services		1	1
Indigenous rural health		1	1
Midwifery		1	1
Nursing and Allied Health		1	1
Aged care dementia	1		
		TOTAL	**91**

Survey development

The next step in the Delphi consultation process was the development of a questionnaire for distribution via a web-based survey to gather opinion from the Delphi panel to provide an additional source of data to evidence content validity of the developed tool.

SurveyMonkey® was chosen to administer the questionnaire and ethical approval was obtained from the University of Queensland Human Research Ethics Committee.

Figure 5.2 provides an overview of the refinement of the 99 items gathered from the literature and the Delphi consultation process to the development of the new 18 item teamwork assessment tool.

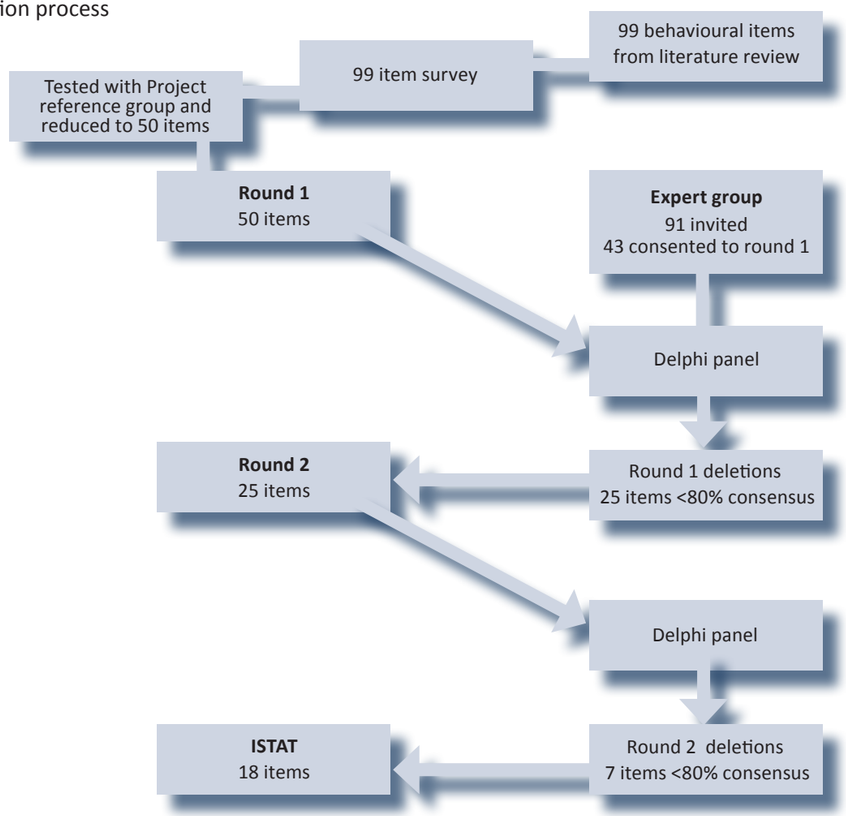
The first survey included 99 behavioural items and respondents were asked to answer three questions related to each: Do you think this item should be included? In which category do you think this item should be included? Do you think the wording of this item needs changing? Drop down menus containing the categories which reflected the themes described in the previous section were provided for ease of response (table 5.3) and free text comment fields were included to allow for elaboration of responses.

Table 5.3 Online survey answer choices related to behaviour items

Questions about the ITEM	Response choices
Do you think this item should be included?	Yes
	No
	Possibly
What category do you think this item should be grouped in?	Communication
	Leadership
	Negotiation and conflict resolution
	patient/client centred
	Roles and responsibilities
	Situational awareness/ monitoring
	Task orientation
	Team process
	Other please comment
Do you think the wording of this item needs changing?	Yes – please comment below
	No
Comments about the item	

The survey also collected the consent of the participant and demographic data: gender, year of birth, health profession, current position and number of years in current position. The items where thus reduced to 50 for the first consultation round with the Delphi panel. The Delphi panel were asked the same questions as in table 5.3.

Figure 5.2 Development of new measure in the Delphi consultation process



First Delphi consultation round

Round 1 results

Of the 91 stakeholders who were invited to take part, 43 began the survey (response rate 47%). Four surveys were excluded because they were incomplete. Of the remaining 39 respondents, 17 had been in their current position for 1 to 4 years, 10 for 5 to 9 years, and 12 for 10 to 26 years. All had a specific role for IPE/IPP.

Responses to questions on the 50 behavioural items were ranked by the project team according to the level of agreement on inclusion in a new measure. Items that received 80% or more agreement to be included were allocated to one of three positions; 1, 2 or 3 (Table 5.3). The response criterion for these rankings were:

- Rank 1 – 'yes include' = 35-36 and 'no do not include' ≤ 1 and 'possibly include' ≤3
- Rank 2 – 'yes include' = 33-34 and 'no do not include' ≤ 2 and 'possibly include' ≤5
- Rank 3 – 'yes include' = 31-32 and 'no do not include' ≤ 4 and 'possibly include' ≤6

Where there was 50%–79% agreement to include an item and more than 25% of these responses indicated the item should "possibly" be included, the participants' comments were analysed to inform the ranking.

Table 5.4: Round 1 rankings

Rank	% yes responses	No of items	No of yes responses per item
Rank 1: yes≥35 and no≤1 and possibly≤3	90–92%	9	35–36
Rank 2: yes=33-34 and no≤2 and possibly≤3	85–89%	10	33–34
Rank 2: yes=31-32 and no≤4 and possibly≤6	80–84%	8	31–32
total		**27**	

Panel members thought that three items relating to conflict resolution should be included. Over 80% also thought that two of these, 'uses appropriate conflict resolution strategies to manage and/or resolve conflict' and 'is able to recognise the type and source of conflict confronting the team, and to implement an appropriate conflict resolution strategy' are advanced conflict resolution behaviours and would most likely not be observed in students. One item 'works with others to deal effectively with conflict' remained for the second consultation round.

Eighteen items were slightly reworded for clarity following suggestions and, in total, 25 behavioural items were included in the second round of the consultation with the Delphi panel.

Second Delphi consultation round

The second online survey asked the Delphi panel to rank the 25 items using the choices below;

- Rank 1 – Absolutely must be included, or
- Rank 2 – Not as vital, or
- Rank 3 – Not necessary

Ten measurement scales were also identified from the literature (Figure 5.1) and the panel members were asked to indicate their preferences for two scales for the purposes of: to rate a student's behaviour against each item in the measure; and to rate a student's overall behavioural performance during the activity. The panel were finally asked to suggest other scales for inclusion and to provide comments on each of the ranking and preference questions.

Round 2 results

Twenty three of the 43 original panel members consented and began the Round 2 survey. All but one provided a complete set of responses to the questions. This reflected a completion rate of 53% from the first round. Respondents' backgrounds were diverse and spread across health professions and sectors (Table 5.5).

Table 5.5. Delphi round 2 respondents by health profession and current sector

	Discipline/profession	Role
1	Mental Health	Education (student placement provider)
1	Linguist	Consultant in health education policy
1	Medical Education	Clinical (Hospital, General Practice, Community)
2	Medicine	Education (Higher Education Institution)
2	Medicine	Research
1	Midwifery	Education (Higher Education Institution)
2	Nursing	Education (Clinical)
1	Occupational Therapy	Education (Clinical)
1	Occupational Therapy	Education (Higher Education Institution)
1	Pharmacy	Education (Higher Education Institution)
1	Physiotherapy	Education (Higher Education Institution)
1	Radiography	Education (Higher Education Institution)
1	Research	Research
2	Social Work	Health Management / Retired
1	Sociology	Education (Higher Education Institution)
2	Speech Pathology	Education (Higher Education Institution)

Figure 5.1: Measurement Scales A–J ITEM ASSESSMENT – Delphi Round 2
Below are 10 measurement scales, titled Measurement Scale A–J, for your overall impression and consideration. They are a sample of measurement scales intended to measure all of the behaviour ITEMs, listed in the instrument, that are demonstrated by an individual. If there is a measurement tool that you would prefer to be considered by the group, please provide details as well as an overall impression within our Survey Monkey questionnaire. Thank you.

Measurement Scale A

Rarely demonstrated ☐ | Occasionally demonstrated ☐ | Sometimes demonstrated ☐ | Frequently demonstrated ☐ | Not demonstrated ☐

Measurement Scale B

Exceptional ☐ | Exceeds expectations ☐ | Meets expectations ☐ | Below expectations ☐ | Needs improvement ☐ | Not observed ☐

Measurement Scale C

Expert — Proficient — Competent — Advanced Beginner — Novice | Not observed ☐

Please mark along the continuum

Measurement Scale D

Rarely ☐ | Sometimes ☐ | Usually ☐ | Consistently ☐ | Not rated ☐

Measurement Scale E

Developed ☐ | Developing ☐ | Unsatisfactory ☐ | Not observed ☐

Measurement Scale F

☐ Competent ☐ Not Yet Competent ☐ Not Observed

Measurement Scale G

Competent: ☐ Yes ☐ Partial ☐ No ☐ Not Observed

Measurement Scale H

Yes — Competent — No ☐ Not Observed

Please mark along the continuum

Measurement Scale I

Not yet competent 1 2 3 4 Competent 5 ☐ Not Observed

Measurement Scale J

Poor — Fair — Good — Very Good — Excellent

0 1 2 3 4 5 6 7 8 9 10

Table 5.6: Ranking of items from round 2

Round 2 item rankings				
Rank 1 = yellow, Rank 2 = blue, Rank 3 = no shading	**Absolutely**	**Not so vital**	**Not necessary**	**iSTAT item no.**
Item 1. Uses communication strategies appropriately in a variety of situations (verbal, non verbal, written).	22	0	0	1
Item 9. Works with others to deal effectively with conflict	22	0	0	18
Item 10. Advocates for patient/client and family as partners in decision-making processes.	21	0	1	11
Item 12. As a team, shares options and health care information with patients/clients and families.	20	1	1	2
Item 11. Promotes and integrates patient's/client's and family's circumstances, beliefs and values into team care plans	19	1	2	12
Item 16. Re-evaluates patient/client care goals with the team when aspects of the situation have changed	19	3	0	16
Item 2. Contributes and engages with interprofessional team discussions.	19	3	0	3
Item 20. Plans with team members to make decisions about patient/client care	19	2	1	14
Item 25. Openly discusses adverse events that happen in the team	19	2	1	7
Item 3. Demonstrates respect for the values of the other members of the team and their contributions.	19	3	0	8
Item 4. Solicits the perspectives and opinions of others.	19	3	0	10
Item 8. When leading, is responsive to the needs of the team	19	3	0	17
Item 18. Collaborates with others in order to help develop and apply new ideas	18	4	1	
Item 19. Demonstrates shared accountability for team's decisions and outcomes	18	6	1	
Item 21. Reflects on team performance	18	4	0	5
Item 23. Prioritises items, action and/or issues pertinent to the management of the situation	18	4	0	15
Item 24. Fosters an atmosphere of non-threatening cooperation amongst team members	18	3	1	
Item 13. Promotes and includes the roles and responsibilities of all relevant health providers to optimise collaborative patient/client care	17	5	0	9
Item 15. Cautions team members about potentially dangerous situations	17	5	0	6
Item 6. Provides constructive feedback in order to encourage team members to do the job to the best of their ability	17	4	0	4
Item 17. Actively participates in setting team objectives	16	6	1	13
Item 5. Integrates information for others in planning and providing patient/client care.	15	6	1	
Item 14. Exchanges relevant information in an appropriate format as it becomes available	14	5	3	
Item 7. Shares leadership and alternates leadership with others	12	10	0	
Item 22. Participates in establishing deadlines to meet outcomes for patient care	11	11	0	

The ranking criteria for the results in Table 5.6 are as below:

- **Rank 1:** Items with at least 19 or more responses '*absolutely include*', no more than 1 response '*not necessary*' and no more than 3 '*not so vital*'
- **Rank 2:** Items with at least 18 or more responses '*absolutely include*' and no more than 2 '*not necessary*' responses and no more than 4 '*not so vital*'
- **Rank 3:** All other Items

The three researchers involved in constructing the Delphi process reviewed the ranking for the inclusion of items in the new measure, which was named the individual student teamwork assessment tool (iSTAT) at this point.

All rank 1 items were included on the new measure'. All rank 2 items were included except: 'Fosters an atmosphere of non-threatening cooperation amongst team members' – the ranking team did not feel that this was an easily observable behaviour; and 'collaborates with others in order to develop and apply new ideas' – the ranking team did not feel this was as appropriate for students over a short period of observation. The top four of the rank 3 items were included.

The Likert scale

The respondents indicated the most preferred scale to use for rating each item of observed behaviour; a five point scale: '*rarely*', '*sometimes*', *'usually*', '*consistently*' and '*not rated*' (option D Figure 5.1).

The most preferred scale for rating the overall performance of the student was; a five point scale: from 'not yet competent' to 'competent' (option I Figure 5.1).

During early pre-testing of the ISTAT these scales were slightly modified as a result of feedback: the '*not rated*' was replaced with '*not applicable in this setting*' for each item rating; and the overall performance scale was replaced with '*underperforming*' to '*performing well*'.

The individual Student Teamwork Assessment Tool (iSTAT)

The iSTAT form (Table 5.7) was developed from the 18 behavioural items from the round 2 rankings, presented under three categories: communication; cooperation; coordination. These dimensions are frequently used in the literature (see Orchard, 2011). The form contained space for information about the characteristics of the student being observed and assessed, the observer/assessor, the activity being observed, and the demands of using the form e.g. time spent preparing and using the form. The first version was tested with two small groups of students and health professional assessors on three occasions to see if the form was understandable and practical, and to resolve any presentation or wording concerns. At this stage the iSTAT was ready for entry into the pilot stage of the project.

Conclusion

The 481 candidate behavioural items identified in the literature review were reduced through systematic thematic analysis and refinement to an acceptable level for entry into the Delphi consultation. The Delphi, over two rounds, achieved a high degree of consensus and the 18 item iSTAT was ready to be field tested.

Table 5.7: Individual Student Teamwork Assessment Tool iSTAT

Date of Assessment _____ Pilot site _____

Student Name _____ Student Discipline _____

Year Level _____ Undergraduate Postgraduate

What teamwork behaviours would you like to develop during this activity? _____

_____

Assessor Name _____ Assessor Discipline _____ I am a student assessing a peer Yes No

Individual Student Teamwork Assessment Tool iSTAT Please tick in the appropriate box when behaviour is observed during the activity. There is a comment box for each item for specific feedback. An overall comment box is located on the back page.	Not applicable in this setting	Rarely	Sometimes	Consistently	Assessor Comments for individual teamwork behaviours
COMMUNICATION – *to succeed in sharing/exchanging information or ideas using a variety of methods.*					
1. Communicates appropriately in a variety of contexts					
2. Shares health care information with patients/clients/ families					
3. Contributes to team discussions					
4. Provides constructive feedback to team members					
5. Discusses team performance					
6. Cautions team members about potentially dangerous situations					
7. Discusses errors that happen					
COOPERATION – *the process of working together to the same end*					
8. Demonstrates respect for other members of the team					
9. Includes health professionals as relevant in care management					
10. Solicits the opinions of other team members					
11. Advocates for patient/client/family as partners in decision-making processes					
12. Integrates patient's/client's/family's circumstances, beliefs and values into care plans					
COORDINATION – *the organisation of the different elements of patient/client care to enable the team to work together towards the same goals*					
13. Participates in setting team objectives					
14. Plans patient/client care with team members					
15. Prioritises actions pertinent to the management of the patient/client					
16. Reviews patient/client care goals when the situation has changed					
17. When leading, is responsive to the needs of the team					
18. Works with others to deal effectively with conflict					
Overall individual teamwork behaviour score (5=Performing well; 1=Underperforming) (please circle)					
1	2	3	4	5	

Assessment Location (please tick all that apply)

- ☐ Hospital
- ☐ Inpatient Service
- ☐ Outpatient/Clinic
- ☐ Community
- ☐ General Practice
- ☐ School
- ☐ Aged Care Facility
- ☐ University Campus

Other _____

Type of Activity (please tick all that apply)

- ☐ Simulation
- ☐ Bedside Teaching
- ☐ Student led/Assisted Clinic
- ☐ Longitudinal Placement
- ☐ Short, focused activity

Other _____

Number of Students in activity (please circle) 1 2 3 4 5 6 7

Disciplines participating in the activity (please list) _____

Assessor Feedback for Student _____

_____

_____

How long did you spend on preparation for the iSTAT assessment? _____

How long did you observe the student in the activity? _____

How long did it take to complete the assessment? _____

How long did it take to provide the feedback? _____

Student Comments on the Assessor's feedback and/or Reflection on Own Teamwork Behaviour _____

_____

_____

Will you incorporate this feedback to change your behaviour for future practice ☐ YES ☐ NO ☐ UNSURE

Student Signature _____ Assessor Signature _____

Chapter 6: Field work testing

Interprofessional work based student learning activities were identified as ideal opportunities to test the iSTAT (Individual Student Teamwork Assessment Tool) described in chapter 5. All project partners agreed to pursue opportunities to field-test the iSTAT in their organisations. A number of institutions were offering health students interprofessional elective courses that included simulation events, student assisted or led clinics, short term or longitudinal placements.

There were delays in acquiring appropriate ethical approvals from all sites. These in turn had a knock on effect of delaying the project partner local discussions. Additionally, changes in facility operational management at some potential field-work sites suspended plans for field-testing.

The field testing took place at eight sites with five institutions involved:

- The University of Queensland (UQ) – Greenslopes Clinical School (1 site)
- UQ Healthcare Clinic (a limited company owned by UQ and operating as a GP Superclinic) in Ipswich, Queensland (1 site)
- Curtin University – Juniper Annesley Residential Home, Challis Primary School, Neerigen Brook Primary School, Brookman Primary School (4 sites)
- The University of British Columbia (Canada) (1 site)
- The University of Derby (UK) (1 site)

A summary of the characteristics and process at each site is described below.

The University of Derby (UK)

The University of Derby has a history of interprofessional development, initially called Shared Learning, since 1992. The concepts which have been developed at the University of Derby over the last 25 years still hold true in that all health and social care professional students learn about their own professional scope of practice but also the communication and collaboration skills which are necessary to ensure the safety and care of the individuals with whom they are working. The concept which the National Health Service (UK, NHS) has more recently termed "developing an integrated workforce" imply that the policy and structural mechanisms of working on an inter-agency basis would further facilitate the care of the individual and build on interprofessional ways of working (Barr, 2012).

The project member (Dawn Forman) having collaborated on the development of the iSTAT whilst working in Australia, and knowing that the tool was being piloted in Canada as well as Australia, felt it appropriate to seek opportunities to pilot the tool with a UK university. The University of Derby with its history of interprofessional education seemed a natural choice. A small team was therefore drawn together and reciprocal ethics approval was gained through the University of Derby systems in February 2014. The iSTAT was piloted with students on existing placements in Derbyshire. A total of a total of 24 completed iSTATs and evaluation forms were received; both staff and students were keen to trial the tool further as part of the students' formative competency assessment.

University of British Columbia (UBC) Canada

The project was presented and discussed at the College of Health Disciplines, Interprofessional Practice Education Committee (IP PEC) at UBC. This committee is comprised of clinical education representatives from the 15 health and human service programs educated at UBC. Packages of all the iSTAT materials were provided to committee members to review. At that meeting, individually and collectively, sites were identified: facilities and practice areas where students would be out on placement during the specified data collection period and would most likely have a team experience. Packages of all the iSTAT materials were created so that the respective IP PEC members could hand the packages to the students to give to their preceptors, or alternatively some IP PEC members went to the sites to discuss the project and deliver the packages for them to use with students on upcoming placements. Completed forms were either mailed into the UBC PI, Donna Drynan (project member), or the completed forms were picked up from the sites and hand delivered to Donna Drynan to upload to the secure website system.

Curtin University

Curtin University has had an interprofessional focus and a fully integrated IPE program for Health sciences since 2011. The Faculty's Interprofessional Capability Framework (Brewer and Jones, 2013) focuses on collaborative practice to provide high quality, safe care/service which is client-centred, with a broad definition of client including individuals, carers, groups, families, communities or organisation. In the first year students learn about IPE, collaborative practice and health professional roles and they are placed in interprofessional groups in four core health sciences units. In later years they undertake IPE case studies and placements. Placements occur in hospitals, aged care, community and educational settings.

The iSTAT was field-tested in both aged care and educational settings with groups of students in both peer to peer and some facilitator to student assessment. Generally the iSTAT tool was piloted with each new group of students who paired up and completed the form on each other's teamwork skills. The iSTAT was piloted in one aged care and three early childhood and primary school settings.

A total of 49 iSTAT (plus 31 assessor feedback forms, and 45 observed student feedback) forms were returned from the pilot sites over two semesters in Semester 2 2013 and Semester 1 2014.

The University of Queensland

The Faculty of Health Sciences offers an interprofessional elective subject to final year students from medicine, nursing, pharmacy, occupational therapy and physiotherapy on clinical placement at Greenslopes Private Hospital in Brisbane. The students were involved in high fidelity simulation and a simulated ward round led by a hospital consultant with simulated patients. The activities lasted for 45 minutes each including a debriefing session. Students were invited to participate in the project and 37 consented. Field work testing of the iSTAT took place from 24 July 2013 to 28 August 2013. Three researchers from the project team used the iSTAT to observe and give feedback to the students during the activities on different occasions.

UQ Healthcare

UQ Healthcare is a not for profit limited company owned by the University of Queensland and operating as a GP superclinic with clinics at Annerley Brisbane, Ipswich and Meadowbrook. The focus of the primary health care group is on interprofessional service delivery, education and research. Interprofessional elective placements are offered to medicine, nursing, occupational therapy, physiotherapy, exercise physiotherapy, pharmacy, dietetics, psychology, social work, and speech pathology students from around the country. Supervised by clinical educators from the University of Southern Queensland and UQ the students lead and assist in a variety of settings: falls prevention group for the elderly, cardiac rehabilitation group, diabetes education, healthy lifestyle, continence program, men's health, healthy ageing, and child wellbeing. The activities of the students are IPE initial assessment, case conference, group programs, individual consultations and care coordination.

A total of 19 students participated in the project and iSTAT forms were collected during the period from 24 September 2013 to 11 December 2013.

Chapter 7: Results – quantitative data

In this chapter, we present the quantitative data from the field-testing of the iSTAT that provides evidence about its validity, reliability, feasibility, acceptability and educational impact. We conclude with a discussion about how these data prompted further development of the iSTAT and its evolution into the iTOFT format.

Field-testing of the ISTAT

Data for the validation of the Individual Student Teamwork Assessment Tool (iSTAT) were collected over a nineteen-month period from November 2012 to June 2014 from eight pilot sites in 5 institutions. Characteristics of these sites are listed in table 7.1. They were used to test the iSTAT with students, peer assessors and supervisor assessors and resulted in completion of iSTATs from 132 observation and assessment episodes. Pilot sites are anonymised for the purpose of confidentiality for the participating institutions.

Table 7.1: Characteristics of sites and IP educational activities/placements

Pilot site	Country	Educational activity	Student disciplines	Setting	No. of additional institutions invited by host institution	Peer assessors	Supervisor assessors
1	Australia	Elective in senior pre-qualification year	Medicine, nursing, pharmacy	High and low fidelity simulation in hospital precinct clinical school	Only hosting institution	Y	Y
2	Australia	Elective in senior pre-qualification year	Physiotherapy, Exercise physiology	Student-led community clinic	6	Y	Y
3	Australia	Mandatory in senior pre-qualification year	Nursing, pharmacy	Residential aged care placements,	Only hosting institution	Y	Y
4	Australia	Mandatory in senior pre-qualification year	Occupational therapy, social work, physiotherapy	Community placements at IP clinics and primary school	Only hosting institution	Y	Y
5	Australia	Mandatory in senior pre-qualification year	Physiotherapy, Exercise physiology, nursing, speech therapy, occupational therapy	Short and longitudinal placements at primary school	Only hosting institution	Y	Y
6	Australia	Mandatory in senior pre-qualification year	Speech therapy, occupational therapy, nursing	Short and longitudinal placements at primary school	Only hosting institution	Y	Y
7	Canada	Elective in senior pre-qualification year	Physical therapy, occupational therapy,	Longitudinal placements, student assisted clinics, community	Only hosting institution	Y	Y
8	England	Core placements with established integrated IP learning outcomes	Nursing, pharmacy	Hospital, university campus	Only hosting institution	Y	Y

Episodes of observation and assessment

For the purposes of this chapter, whilst the encounters between assessors and observed students encompassed observation and feedback facilitated by the structure of the iSTAT format, we use the term of assessment to be inclusive of observation and feedback for reasons of brevity.

Within the 132 episodes of assessment, 108 students and 85 assessors were engaged such that 84 students were assessed at least once, 21 twice and two students were assessed three times. Of the 85 assessors, 10 were staff, and 75 were student assessors. With respect to assessors, 73 assessed once, three twice while one assessor assessed up to nine times. The majority of observation and feedback episodes (64 per cent, n=84/132) consisted of a student assessing a peer.

Characteristics of students who were observed with iSTAT

The year level and degree of students who were observed are shown in table 7.2. Ninety eight per cent of the students were second year or higher. Nearly three quarters of the students assessed were undergraduate students (72 per cent, n=78/108).

Table 7.2: The year level and degree type of students by (n=132)

Year Level	N	Percent	No of Under graduate	Per cent Under-graduate
First year	2	2	1	1.3
Second year	48	44.4	30	38.5
Third year	10	9.3	10	12.8
Fourth year	47	43.5	37	47.4
5–6 yr.	1	0.9	0	0
Total	108	100	78	100

The health professions of assessed students and of assessors are presented in table 7.3. Fourteen professions were involved.

Table 7.3: Observed students (n= 108) by profession.

Profession/ Discipline	No of students	Percent of students
Medicine	8	7.4
Nursing	44	40.7
Pharmacy	4	3.7
Physiotherapy	8	7.4
Occupational Therapy	25	23.1
Speech Therapy	7	6.5
Exercise Physiology	4	3.7
Applied Psychology	2	1.9
Clinical Psychology	1	.9
Nursing and Midwifery	1	.9
Speech Pathology	2	1.9
Rehabilitation Assistant	1	.9
Radiography	1	.9
Total	**108**	**100.0**

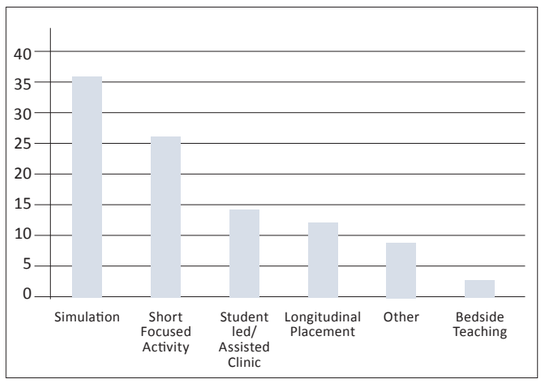
The types of settings in which students were assessed are summarised in Table 7.4 in three groups: hospital-based; within a primary or community care context; or within a school.

Table 7.4: Number of students assessed by setting (n=108)

Pilot Site		Setting type			Total
		Hospital and simulation	Primary or Community Care context	Primary School	
1	N	25			25
	%	62.7%			23.1%
2	N		16		19
	%		51.6%		14.4%
3	N		10		11
	%		32.4%		8.3%
4	N			5	5
	%			16.7%	4.6%
5	N			9	9
	%			30.0%	8.3%
6	N			16	16
	%			53.3%	14.8%
7	N		5		5
	%		16.1%		4.6%
8	N	22			22
	%	46.8%			20.4%
Total	**N**	**47**	**31**	**30**	**108**
	%	**100.0%**	**100.0%**	**100.0%**	**100.0%**

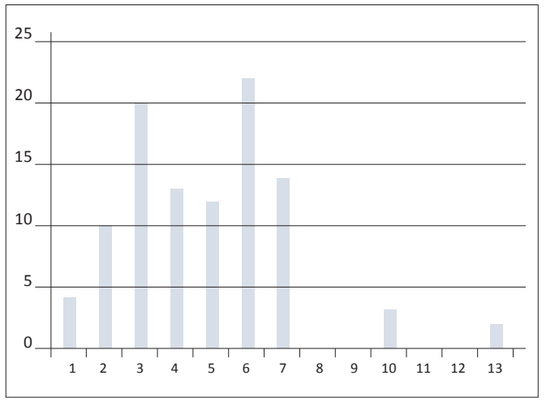
The type of activity in which the assessment episodes occurred is given in Figure 7.1, most were simulation type activities.

Figure 7.1: Proportion (%) of assessment episodes (n=132) by activity type



The number of students in the teamwork activity where the iSTAT was used was recorded for 80% of assessments; the number of students involved in a single activity is listed in Figure 7.2 with percentages based on those who answered the questions. Most activities involved small groups of students of seven or fewer.

Figure 7.2: Proportion of students (%) (n= 86) participating in the activity being assessed



Student experience of being observed using the iSTAT

At the start of the observation and assessment, students were asked an open-ended question about the teamwork behaviours they would like to develop during the activity: 61% of responses concerned communication, 25% co-operation or co-ordination, and 22% leadership or group skills. Students reported variable prior engagement in team based learning activities. Of those who reported prior activities, three students had been involved in a music group in an aged residential facility, and three had taken part in simulation activities. However two students reported more formal team based activities, the details of which were not provided.

Assessor experience of using the iSTAT

The distribution of assessors and assessment episodes by pilot site is given in table 7.5, and that by profession in table 7.6. Assessors were asked to complete an assessor feedback form giving information about their experience of observing the student and using the iSTAT. Data were available from 63 of the 85 assessors involved in the field-testing projects, a response rate of 74.1%. The forms were completed between April 2013 and June 2014.

Table 7.5: Proportion of participant assessors and assessment episodes at each site

Pilot Sites	% (n) proportion of assessors	% (n) proportion of assessment episodes
1	22.4 (19)	28.0 (37)
2	7.1 (6)	14.4 (19)
3	12.9 (11)	8.3 (11)
4	5.9 (5)	3.8 (5)
5	1.2 (1)	6.8 (9)
6	22.4 (19)	18.2 (24)
7	2.4 (2)	3.8 (5)
8	16.7 (22)	16.7 (22)
Total	**100.0 (85)**	**100 (132)**

Table 7.6: Proportion and number of participant assessors and assessment episodes by profession

Assessor profession	% (n) proportion of assessors	% (n) proportion of assessment episodes
Medicine	7.1 (6)	4.5 (6)
Nursing	45.9 (39)	37.9 (50)
Nursing and Midwifery	4.7 (4)	8.3 (11)
Pharmacy	3.5 (3)	2.3 (3)
Physiotherapy	7.1 (6)	6.8 (9)
Occupational Therapy	16.5 (14)	10.6 (14)
Speech Therapy	4.7 (4)	12.1 (16)
Speech Pathology	4.7 (4)	3.0 (4)
Exercise Physiology	2.4 (2)	6.8 (9)
Nutrition and Exercise	1.2(1)	1.5 (2)
Not known/Other	2.4 (2)	6.1 (8)
Total	100.0 (85)	100 (132)

The response rate by health profession also differed with 54% of respondents being from nursing (46% of completed iSTATs). Twenty-one (33%) of the assessors had assessed teamwork previously. There was only a slight difference by professional group: 35% for nursing and 31% for other disciplines. These 21 assessors described a range of Interprofessional activities that they had observed and assessed prior to the pilot (table 7.7). Insufficient details were provided to determine to what extent these activities might be expected to produce observable team working behaviours; for example the music group described an activity in either a residential care activity or a primary school activity.

Table 7.7: Types of previous teamwork activities that had been assessed by assessors prior to the iSTAT project

Activity	Number of assessors reporting
Simulation/ simulated ward round	3
Music group	3
Peer learning/review session	2
Teamwork in Action	1
Assessed students' IPP skills	1
Clinical skills	1
Informal physiotherapy classes	1
Management teamwork	1
Practical placement peer reviews	1
Speech Therapy session	1
Team building in sports	1

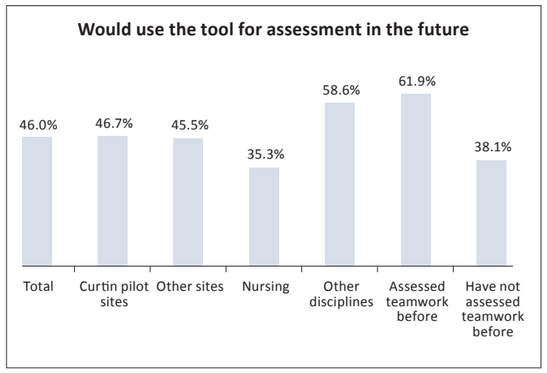
A total of 15 assessors completed the iSTAT during the observation, 10 after the observation, four partially during the observation and eight as part of a group reflection after the observation. Over half of the sample (33, 52%) made suggestions for changing the tool (table 7.8).

Table 7.8: Suggestions by assessors for changing the tool (n=15)

Suggestion for enhancing tools	No of assessors
Make it shorter	6
Make it clearer/ simpler	6
More specific questions	5
More space for comments	5
Incorporate self reflection	3
More coding of options	2
A range of other suggestions	6

Fifty-seven assessors responded to the question asking for a description of the process of giving feedback. Over half (n=31) gave feedback verbally, whereas eight preferred to give feedback as part of a group discussion. Almost 1 in 2 (46%) reported that they would use the tool for assessment in the future, with a further 40% being unsure and 14% reporting they would not use it in the future. Assessors with prior experience were more interested in the tool (Figure 7.3).

Figure 7.3: Intention to use the iSTAT tool by field site, profession and previous assessment of teamwork (n=57).



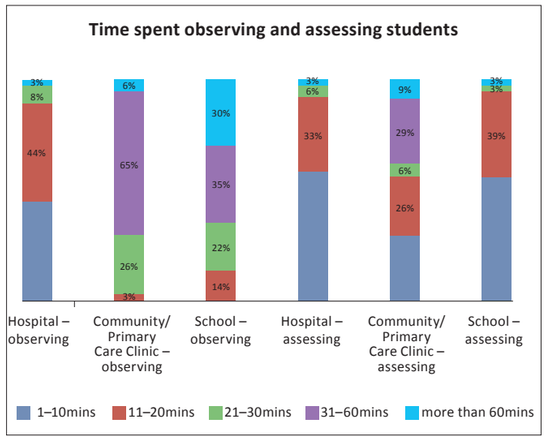
The periods of time for observation and assessment are shown in table 7.9: 58 out of 107 of respondents were observing up to half an hour, whereas 44 out of 107 were spending between a half and two hours. There was a small minority 5 out of 107 who observed for 8 hours.

Table 7.9: Time spent observing the student activity and time to complete the assessment during each assessment episode (n=132)

Time period	Time spent observing the student activity	Time to complete the assessment	Time to complete the assessment	
	N	Percent	N	Percent
1–10 mins	16	12	52	39
11–20 mins	22	17	36	27
21–30 mins	20	15	5	4
31–60 mins	35	27	10	8
61 mins–2 hours	9	7	5	4
More than 8 hours	5	4	0	0
Total Answered	107	81	108	82
No Answer	25	19	24	18
TOTAL	132	100%	132	100%

The distribution of responses by type of setting is shown in Figure 7.4: a longer time was taken to observe students in schools and to assess students in community/ primary care clinics.

Figure 7.4: Variation in length of time observing and assessing student by activity type.



The assessors were asked to indicate the time spent on preparing for the iSTAT observation and the amount of time giving feedback (table 7.10): note the non-response rate of almost 1 in 4.

Table 7.10: Time spent on preparation for the iSTAT assessment by assessors and time to provide feedback for all assessments completed (n=102)

Time period	Time spent on preparation for the iSTAT assessment	Time to provide feedback	Time to provide feedback	
	N	Percent	N	Percent
0 mins	24	18	3	2
1–5 mins	31	23	57	43
6–10 mins	16	12	27	20
11–30 mins	28	21	13	10
More than 30 mins	3	2	1	1
Total Answered	102	77	101	77
No Answer	30	23	31	23
TOTAL	132	100%	132	100%

Nearly a quarter of those who answered spent no time at all. The majority of assessments involved less than 10 minutes feedback, with some involving no feedback, and a more significant minority, spent greater than 10 minutes.

Analysis of the iSTAT

The Likert Scale

The iSTAT includes 18 observations covering three domains: 7 communication; 5 cooperation; and 6 coordination. The assessor was asked to rate the student on each behaviour on a four-point scale: '*consistently*', '*sometimes*', '*rarely*' or '*not applicable in this setting*'. However, there were two issues with the way the scale had been coded. Firstly, in the beginning of the project, an earlier version of the iSTAT form had included an opportunity to record an additional category of '*Not Demonstrated*'.

Secondly, a number of items were left blank by assessors on some iSTATs. From a statistical perspective this is counted as missing data, as it was unclear if the activity was expected but not demonstrated, or was not expected and therefore not demonstrated. In order to use all of the data available, the data were recoded to a four-point scale to enable meaningful statistical analyses to be conducted:

1 = Not demonstrated/ Not applicable/ No answer
2 = Rarely
3 = Sometimes
4 = Consistently

Table 7.11 provides the frequency data for the 18 iSTAT behaviours with number and percentages for each criterion of the Likert scale.

It would appear that items 1, 3, and 8, and perhaps 10, were always able to be observed whatever the setting, all of the other items were less likely to be observed in all settings.

Reliability Analysis

We conducted a reliability analysis on the tool with the data shown in table 7.11. The Cronbach alpha coefficient for the scale was very high at r = 0.88. The gold standard for scale development is usually set at r= 0.80. This suggests that some items were redundant in that they were measuring the same construct. Later in this chapter, as part of the development of the iTOFT tool from the iSTAT analysis, we recalculate the reliabilities for the domains used in the iTOFT.

Factor Analysis

We anticipated that ideally checklist items 1–7 would load on a factor named communication, checklist items 8–12 on cooperation, and 13–18 on coordination. These data were initially too skewed to conduct a factor analysis to confirm the structure of the scale.

A pattern evident from table 7.11 is that assessors tended to use the code '*rarely*' infrequently, and that the category most frequently used was '*consistently*' or '*not applicable*'. Additionally the data showed that where assessors did not record anything, it was impossible to know whether they had meant the behaviour was not performed when expected or there was no opportunity to observe the particular checklist item.

Table 7.11: Frequency data for the 18 iSTAT behaviours with number and percentages for each criterion in the Likert scale.

iSTAT Behaviours	Not demonstrated/ NA	Rarely	Sometimes	Consistently	Total
1. Communicates appropriately in a variety of contexts	6	1	15	110	n=132
	5	1	11	83	100%
2. Shares health care information with patients/clients/families	46	2	12	72	n=132
	35	2	9	55	100%
3. Contributes to team discussions	7	1	17	107	n=132
	5	1	13	81	100%
4. Provides constructive feedback to team members	28	3	21	80	n=132
	21	2	16	61	100%
5. Discusses team performance	33	4	21	74	n=132
	25	3	16	56	100%
6. Cautions team members about potentially dangerous situations	73	9	15	35	n=132
	55	7	11	27	100%
7. Discusses errors that happen	52	2	14	64	n=132
	39	2	11	48	100%
8. Demonstrates respect for other members of the team	5	1	5	121	n=132
	4	1	4	92	100%
9. Includes the roles and responsibilities of relevant health professionals in management plan	29	0	13	90	n=132
	22	0	10	68	100%
10. Solicits the opinions of other team members	14	0	23	95	n=132
	11	0	17	72	100%
11. Advocates for patient/client/family as partners in decision-making processes	52	1	22	57	n=132
	39	1	17	43	100%
12. Integrates patient's/client's/family's circumstances, beliefs and values into care plans	60	1	18	53	n=132
	45	1	14	40	100%
13. Participates in setting team objectives	25	0	13	94	n=132
	19	0	10	71	100%
14. Plans patient/client care with team members	34	2	18	78	n=132
	26	2	14	59	100%
15. Prioritises actions pertinent to the management of the patient/client	38	2	21	71	n=132
	29	2	16	54	100%
16. Reviews patient/client care goals when the situation has changed	46	2	19	65	n=132
	35	2	14	49	100%
17. When leading, is responsive to the needs of the team	32	3	13	84	n=132
	24	2	10	64	100%
18. Works with others to deal effectively with conflict	57	2	9	64	n=132
	43	2	7	48	100%

We therefore decided to conduct all subsequent analyses on the iSTAT data recoded as a dichotomous variable as to whether the behaviour was consistently observed or was not consistently observed. When the data were changed to a dichotomous scale the reliability results did not change, with the alpha coefficient being almost the same at 0.88.

As shown in Figure 7.6, the student assessors tended to give 'consistently' ratings more often than academic or clinical staff assessors. For 13 of the 18 scale behaviours the difference between the two assessor types was significant at the $p<0.05$ level. The scale behaviours where there was no significant difference between student and professional assessors were items 2, 8, 11, 12 and 15, three of these being in the cooperation dimension. However it is interesting to note that the proportion of both student and staff assessors who gave 'consistently' ratings was lowest for items 6 and 18. These issues of patient safety and dealing with conflict are unlikely to be experienced by relatively junior students and less likely to be able to be meaningfully assessed by their peers.

A principal components factor analysis, using an eigenvalue greater than 1 criterion and a Varimax orthogonal rotation, was used to investigate the correlation structure in the iSTAT scale. The correlation matrix shows that few items have patterns of interdependency to support the initially labelled structure of the scale i.e. communication, co-ordination and collaboration. Only 9 of the 18 scale behaviours have a communality (squared multiple correlation) of at least 0.60. Four factors were extracted that together accounted for 60% of the variance in the 18 scale behaviours: 22% Factor 1, 14% Factor 2, 13% Factor 3 and 12% Factor 4.

Figure 7.6: ISTAT ratings by assessor type

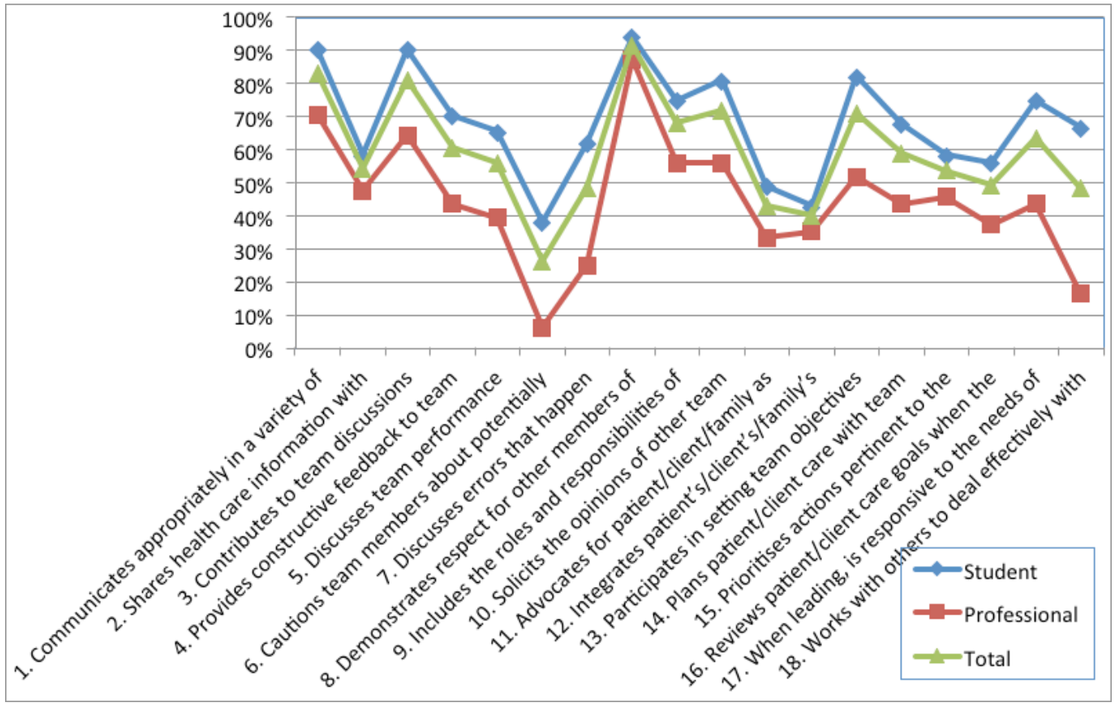


Table 7.12: Rotated factor loadings for each of the 18 checklist items (values <0.1 are suppressed)

ISTAT SCALE BEHAVIOURS	Factor			
	1	2	3	4
COMMUNICATION				
1. Communicates appropriately in a variety of contexts	0.22		0.47	0.43
2. Shares health care information with patients/clients/families	0.71			0.26
3. Contributes to team discussions		0.16	0.43	0.72
4. Provides constructive feedback to team members		0.39	0.40	0.37
5. Discusses team performance		0.50	0.37	0.14
6. Cautions team members about potentially dangerous situations	0.22	0.79		0.13
7. Discusses errors that happen	0.12	0.81		
COOPERATION				
8. Demonstrates respect for other members of the team	0.18		0.14	0.72
9. Includes the roles and responsibilities of relevant health professionals in management plan	0.66	0.11		0.36
10. Solicits the opinions of other team members	0.24	0.36		0.48
11. Advocates for patient/client/family as partners in decision-making processes	0.61	0.30	0.25	-0.17
12. Integrates patient's/client's/family's circumstances, beliefs and values into care plans	0.66	0.30		-0.35
COORDINATION				
13. Participates in setting team objectives	0.19		0.84	0.10
14. Plans patient/client care with team members	0.80	0.15	0.18	0.12
15. Prioritises actions pertinent to the management of the patient/client	0.82		0.10	0.17
16. Reviews patient/client care goals when the situation has changed	0.73	0.16	0.25	0.13
17. When leading, is responsive to the needs of the team	0.24	0.17	0.71	0.22
18. Works with others to deal effectively with conflict	0.12	0.58	0.42	

As shown by the rotated factor loadings in table 7.12, every factor includes items from at least two of the three areas. Items from both the cooperation and coordination dimensions load heavily on factor 1 suggesting that they are measuring the same thing. Four statements only have moderate loadings on any factor (1, 4, 5 and 10), suggesting they are measuring something separate.

Scoring system

We had anticipated that an overall individual teamwork behaviour score would be available. However given that the non-response rate was high at 22%, it was impossible to determine a denominator of observed behaviours. In terms of the global score a frequency count is shown in table 7.13. It appears that nearly 95% of the assessments were rated as students who performed well or thereabouts.

Table 7.13: A frequency count of overall individual teamwork behaviour score (5=Performing well; 1=Underperforming)

Overall teamwork behaviour score	N	Percent	Percent answered
1	1	1	1
2	2	2	2
3	2	2	2
4	16	12	16
5	81	61	79
Sub-Total	103	78	100
Missing	29	22	
Total	132	100	

Post factor analysis development of the iSTAT item pool

There were many positives to draw from the quantitative data in that we had demonstrated good reliability and validity but only modest acceptability and educational impact. In order to enhance the utility of the tool, a further round of development was required informed by the assessment and evaluation data. There were a number of issues, which needed to be resolved in producing the next iteration of the iSTAT form. These were to do with psychometric issues of the performance of the tool, and evaluation issues identified by our participants. From the evaluation data, the ISTAT assessment was valued but our participants wanted something shorter (this feedback is similar to that received from the qualitative data discussed in chapter 8). It is common practice for the item and factor analysis to lead to a shorter number of items. In reviewing table 7.12 it can be seen that certain items performed reasonably well (highlighted: for example item 2 which loaded at 0.71). However a number of items, for example item 1 loaded on three different factors and therefore was withdrawn. The second common issue with factor analysis in developing new assessment tools is that the items do not always load on the initially stated domain. So for example in Table 7.12 item 1 loads on factor one but item 6 and item 7 did not. Thus we needed to accept that the notion of three factors communication, co-ordination, and collaboration were not the domains of interest, rather there were four other factors that best explained our data.

The project team thus went back to each of the original items in the iSTAT, and underwent a three-stage process in order to produce table 7.14. The left hand column describes the items for the iSTAT

The next column describes the initial domain of interest i.e. communication, cooperation and collaboration. The analysis/component column provides comments from the factor analysis. The original measure describes where the checklist item comes from in regards to the literature review, and the original measurement domain it was intended to measure. Using this table iteratively, the project group were able to identify the items, which were to be preserved in the next iteration of iSTAT (which at this stage had been renamed the iTOFT – see chapter 9), and which items were to be disregarded.

Table 7.14: Summary of iSTAT items, factor analysis findings, and original derivation

COORDINATION *– the organisation of the different elements of patient/client care to enable the team to work together towards the same goals*
COOPERATION *– the process of working together to the same end*
COMMUNICATION *– to succeed in sharing/exchanging information or ideas using a variety of methods.*

Individual Student Teamwork Assessment Tool iSTAT items	**iSTAT dimension**	**Components from factor analysis**	**Baseline original measure :** Note that many of the 487 items from the literature review have been mapped to items in these scales with rewording where relevant	**Original Dimension** Some reworded.
1. Communicates appropriately in a variety of contexts	Communication	Not working	Interprofessional Collaborator Assessment Rubric (ICAR) (Curran)	Communication strategies
4. Provides constructive feedback to team members	Communication	moderate loading on 2 & 3	Team Climate Inventory (Anderson & West)	Communication
5. Discusses team performance	Communication	moderate loading on 2 & 3	Aston Team Performance Inventory (Aston Development Group)	Team process
2. Shares health care information with patients/ clients/families	Communication	1	Interprofessional Collaborator Assessment Rubric (ICAR) (Curran)	Patient centred
9. Includes health professionals as relevant in care management	Cooperation	1	Assessment of Interprofessional Team Collaboration Scale (Orchard)	Roles and responsibilities (reworded)
11. Advocates for patient/ client/family as partners in decision-making processes	Cooperation	1	Interprofessional Collaborator Assessment Rubric (ICAR) (Curran)+ Team-OSCE (McMaster-Ottawa TOSCE)	Patient/client centred
12. Integrates patient's/client's/ family's circumstances, beliefs and values into care plans	Cooperation	1	Interprofessional Collaborator Assessment Rubric (ICAR) (Curran)	Patient/client centred
14. Plans patient/client care with team members	Coordination	1	Collaborative Practice Assessment Tool (CPAT) (Schroder)	Roles and responsibilities
15. Prioritises actions pertinent to the management of the patient/client	Coordination	1	Clinical Teamwork Scale (Guise)	Team process
16. Reviews patient/client care goals when the situation has changed	Coordination	1	TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) (American Institutes for Research)	Situation monitoring
6. Cautions team members about potentially dangerous situations	Communication	2	TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) (American Institutes for Research)	Situation awareness/ monitoring
7. Discusses errors that happen	Communication	2	Teamwork mini-practice environment (PEC) Checklist	Team process
18. Works with others to deal effectively with conflict	Coordination	2	Team-OSCE (McMaster-Ottawa TOSCE)	Conflict management resolution (reworded)
13. Participates in setting team objectives	Coordination	3	Team Climate Inventory (Anderson & West)	Task orientation
17. When leading, is responsive to the needs of the team	Coordination	3	Interdisciplinary Team Performance scale (Temkin & Greener)	Leadership
3. Contributes to team discussions	Communication	4	Interprofessional Collaborator Assessment Rubric (ICAR)(Curran)	Communication
8. Demonstrates respect for other members of the team	Cooperation	4	Teamwork Competency Map (Holt)	Communication (reworded)
10. Solicits the opinions of other team members	Cooperation	4	Collaborative Practice Assessment Tool (Schroder)	Communication (reworded)

In a related exercise it was apparent that the 15 item iSTAT loaded on four factors, and that these had to be renamed to reflect the domain that the items appeared to be measuring As a result of the group deliberations the four domains making up the 15 item iSTAT were as follows in table 7.15.

Table 7.15: Renamed domains for assessment following the factor analysis.

Factor	**Domain Name**	**iSTAT items**	**Reliability**
1	Shared Decision Making	2,9,11,12,14,15, 16	0.86
2	Working in a team	6,7,18	0.76
3	Leadership	13,17	0.74
4	Patient Safety	3,8,10	0.67

The reliability of the 15 item iSTAT was 0.89, and the domain reliabilities are also given in table 7.15. These figures suggest there is some redundancy in domain 1 (shared decision making) and a possible need for further items in domain 4 (patient safety). It was noted in table 7.2 that about half the students in the sample were in the early undergraduate years, but the other half were in the later years of the curriculum or postgraduate. The project group decided that domains one and two (shared decision making and working in a team) were likely to be observed in any team learning activity. However it was thought that domains three and four (leadership and patient safety) were only likely to be observed in more advanced learning activities. It was for this reason that it was decided to have a basic and advanced version of the iTOFT:

- A short version iTOFT suitable for junior undergraduates containing the 'shared decision making' and "working in a team" items (iTOFT BASIC) (Table 7.16).
- A longer version suitable for senior students which includes the 'leadership' and 'patient safety' items in addition to the shorter version items (iTOFT ADVANCED) (Table 7.17)
- Descriptors for each of the behavioural items were worked iteratively around the original items in the item bank derived from the literature.

In order to respond to the very clear message from the evaluation of having a shorter form a further iterative process was undertaken for the advanced version. Items were examined once again for relevance and clarity in the context of the intended domain. This process led to a readjustment of the item wording.

The Likert scale

The iSTAT Likert scale didn't perform as well as anticipated in the statistical analysis. There was a degree of concern from the working group that the interval scale in the marking rubric was about frequency (rarely/consistently) and not about the quality of the observed behaviour. The working group therefore went back to the literature on scales and produced a version that addressed the quality of expected behaviour (not at the level expected/the expected level/ more than the expected level) for students/learners at their stage in learning). However the concerns from the working group in reviewing this type of scale were that it was not suitable for peer observations, as peers could not make the judgement about the expected level of behaviour in collaborative teamwork. Additionally the working group highlighted that this 'expected level of performance scale' did not to meet one of the project objectives of having 'an educational impact in promoting, and not just measuring…so that the assessment itself helps develop productive student learning'.

Given that the purpose of iTOFT was now focused around the giving and receiving of feedback rather than assessment (see chapter 9 and the resource pack chapter 10), the working group revisited the underpinnings of assessment for learning and the importance of feedback as discussed in the resource pack. In particular, the working group focussed on the feedback model (see Figure 7.7), which is discussed in more detail in Chapter 10 (and included as Figure 10.2) . This proved insightful to the working group and was discussed as a way of giving feedback based on three levels of observed behaviours: "inappropriate/ appropriate and responsive'. Thus the interval scale now proposed in the iTOFT is thought to better reflect the theoretical underpinning of feedback.

Table 7.16: iTOFT BASIC version

iTOFT BASIC Version ***Individual Teamwork Observation and Feedback Tool***				Not applicable to this activity	Please tick one			Institutional logo Date
Student ID		Observer ID						**Activity observed:**
Profession		Profession						
Year level		Student peer observer Yes/No						Team composition
Graduate entry Yes/No								
Observable behaviours					Inappropriate	Appropriate	Responsive	**Feedback for student**
Shared decision making								
1. Plans patient/client care or group/community intervention with team members								
2. Prioritises actions relevant to the management of the patient/client or the group/community intervention								
3. Reviews patient/client or group/community goals when/if the situation has changed								
4. Advocates for patient/client/family or group/community as partners in decision-making processes								
5. Shares health care information with patients/clients /families or group/community								
6. Integrates patient's/client's/family's or group/community's circumstances, beliefs and values into care/ intervention plans								
7. Includes relevant health professionals in patient/client care management or group/community intervention as appropriate								
Working in a team								
8. Participates in interprofessional discussions about patient/client care or group/community intervention								
9. Demonstrates respect for others in and outside the team								
10. Invites the opinions of other team members								
11. Participates in discussions about team performance								
Overall global impression								Comment:

Scale descriptors

Not applicable to this activity	It is not possible to demonstrate this behaviour in this activity, in this context. **For example:** there may be no reason/opportunity to have a discussion about team performance.
Inappropriate	The student's teamwork behaviour is not appropriate in this context. **For example:** doesn't respond when asked a question; disrespectful or insufficient communication; insensitive behaviour; inadequate or incorrect information given; doesn't gain informed consent; doesn't disclose an error; aggressive behaviour.
Appropriate	The student is engaged with the team in the activity. However, does not take the opportunity to further develop teamwork behaviours. **For example:** gives accurate responses to questions when asked but does not ask questions or seek clarification; listens to feedback but does not initiate discussion; does not offer suggestions.
Responsive	The student is actively engaged with the team in the activity and demonstrates commitment in learning about teamwork. **For example:** speaks up, asks for information; integrates the perspectives of others; reflects back to others; clarifies, motivates, acknowledges the contribution of others; builds upon the ideas of others; encourages others.

Behavioural item descriptors

Shared decision making
1. The student actively engages with the team to achieve an integrated care management plan or group/community intervention plan and identifies actions within their scope of practice that address needs. **Includes:** creates, plans, negotiates, speaks up, agrees.
2. The student actively engages with the team to prioritise the actions identified in the integrated care management plan or group/community intervention plan. **Includes:** negotiates, speaks up, agrees.
3. The student actively engages with the team to review the goals of the integrated care management plan or group/community intervention plan when the situation has changed. **Includes:** monitors, reassesses, negotiates, speaks up, agrees.
4. The student actively with the team to put a case on behalf of a patient/client or group/community for the right to be a partner in decision making. **Includes:** gives information, speaks up, negotiates.
5. The student actively engages with the patient/client or group/community to exchange information to achieve a shared understanding of the subject. **Includes:** gives information, seeks information, listens, reflects back, discusses options, discusses preferences.
6. The student actively engages with the team to achieve a shared understanding of the patient's/client's or group's/ community's predisposition and integrate considerations into the integrated care management plan or group/community intervention plan.**Includes:** listens, reflects back, asks questions, clarifies, negotiates, agrees.
7. The student recognises the boundaries of his/her and colleagues' scope of practice and identifies a knowledge gap that may be met by another health professional. **Includes:** questions, evaluates, sources, refers.
Working in a team
8. The student actively engages with the team in discussions to achieve a common understanding about decisions and actions to take. **Includes:** speaks clearly, removes jargon, explains discipline specific terminology, reflects back, clarifies, builds on another's ideas.
9. The student is polite and shows consideration of the contributions of other people. **Includes:** acknowledges another's opinion, actively listens, is kind, is mindful, appreciates.
10. The student actively seeks information from others in the team. **Includes:** asks, requests, searches, asks for feedback.
11. The student actively engages in discussions about how the team performed together and the impact on patient/client care or group/community intervention. **Includes:** evaluates, clarifies, reflects, speaks directly, encourages, gives feedback, receives feedback.

Table 7.17: iTOFT ADVANCED version

iTOFT ADVANCED Version ***Individual Teamwork Observation and Feedback Tool***				Not applicable to this activity	Please tick one			Institutional logo Date
Student ID		Observer ID			Inappropriate	Appropriate	Responsive	**Activity observed:**
Profession		Profession						
Year level		Student peer observer Yes/No						Team composition
Graduate entry Yes/No								
Observable behaviours								**Feedback for student**
Shared decision making								
1. Plans patient/client care or group/community intervention with team members								
2. Includes patient/client/family or group/community as partners in decision-making processes								
3. Includes relevant health professionals in patient/client care management or group/community intervention as appropriate								
Working in a team								
4. Participates in interprofessional discussions about patient/client care or group/community intervention								
5. Demonstrates respect for others in and outside the team								
6. Invites the opinions of other team members								
Leadership								
7. When leading is sensitive to the needs of the team								
8. Provides constructive feedback to team members about their performance								
Patient Safety								
9. Discusses patient safety issues with the team								
10. Works with other team members to manage conflict								
Overall global impression								Comment:

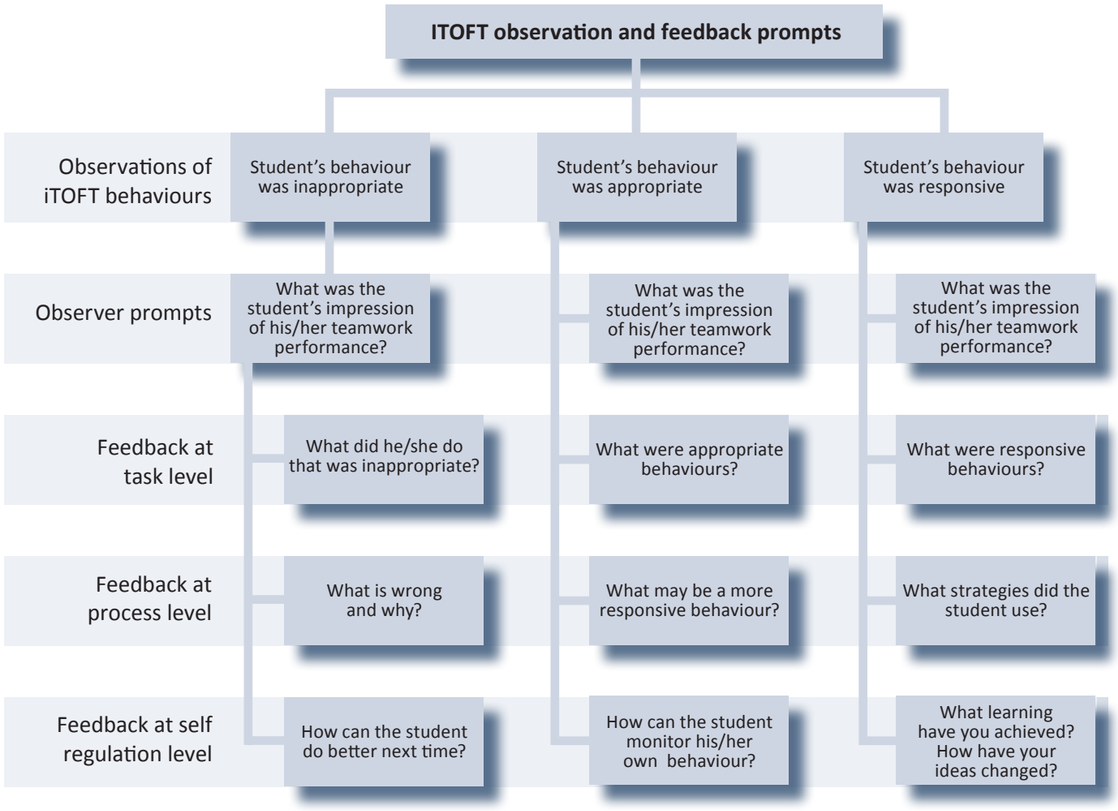
Scale descriptors

Not applicable to this activity	It is not possible to demonstrate this behaviour in this activity and/or in this context. **For example:** there may be no reason to have a discussion about patient safety issues; the facilitator or a health professional is leading the team not a student.
Inappropriate	The student's teamwork behaviour is not appropriate in this context. **For example:** doesn't respond when asked a question; disrespectful or insufficient communication; insensitive behaviour; inadequate or incorrect information given; doesn't gain informed consent; doesn't disclose an error; aggressive behaviour; becomes personal in conflict.
Appropriate	The student is engaged with the team in the activity. However, does not take the opportunity to further develop teamwork behaviours. **For example:** gives accurate responses to questions when asked but does not ask question or seek clarification; listens to feedback; does not initiate discussion; does not offer suggestions.
Responsive	The student is actively engaged with the team in the activity and demonstrates commitment in learning about teamwork. **For example:** speaks up, asks for information; integrates the perspectives of others; reflects back to others; clarifies, motivates, acknowledges the contribution of others; builds upon the ideas of others; encourages others; deals with tensions; self regulates when there is conflict.

Behavioural item descriptors

Shared decision making
1. The student actively engages with the team to achieve an integrated care management plan or group/community intervention plan and identifies actions within their scope of practice that address needs. **Includes:** creates, plans, negotiates, speaks up, agrees, prioritises, reviews, refers.
2. The student actively engages with the patient/client or group/community to achieve agreed decisions on the plan and management. **Includes:** shares information, seeks information, integrates preferences, discusses options, advocates.
3. The student recognises the boundaries of his/her and colleagues' scope of practice and identifies a knowledge gap that may be met by another health professional. **Includes:** questions, evaluates, sources, refers.
Working in a team
4. The student actively engages with the team in discussions to achieve a common understanding about decisions and actions to take. **Includes:** speaks clearly, removes jargon, explains discipline specific terminology, reflects back, clarifies, builds on another's ideas.
5. The student is polite and shows consideration of the contributions of other people. **Includes:** acknowledges another's opinion, actively listens, is kind, is mindful, appreciates.
6. The student actively seeks information from others in the team. **Includes:** asks, requests, searches, asks for feedback.
Leadership
7. The student assumes a situational leadership role to coordinate and integrate perspectives of team members. Includes: listens, is approachable, invites participation, uses direct language, coordinates, integrates, speaks up, acknowledges limits, uses mistakes for learning, sets boundaries, holds people accountable.
8. The student gives objective practical advice and guidance to encourage other team members to consider options for further development of teamwork skills, Includes: supports, is consistent, facilitates understanding, uses direct language, shares information, questions, reflects back.
Patient safety
9. The student speaks up if there is a risk of harm, is open to talking about risk and errors and supports others to do so. Includes: is honest, problem solves, analyses, is constructive, prevents, learns, encourages, supports.
10. The student actively discusses disagreements in the team and supports the integration and reconciliation of differences. Includes: engages, speaks directly, is calm, is self aware, reflects, is willing, negotiates, facilitates, motivates, learns lessons.

Figure 7.7: Modified model for giving feedback of team collaborative behaviours, adapted from Hattie and Gan (2011).



There were two reasons for clarifying the 'not applicable' item. The first was to ensure that for each completed feedback episode it was clear to both the learner and the person giving feedback which items on the scale had been considered in the observation and which had not. (This was not at all clear in the empirical ISTAT data.) The second is to provide an evaluation of the use of iTOFT in working in a team programs by providing a weighted scoring system. Whilst a score is NOT relevant for individual feedback, it is important for providing psychometric data for the development of the scale and data at the program level to inform curriculum development. The following process could calculate an iTOFT score. First weight the Likert scale of inappropriate/appropriate/responsive item scores e.g. 0/0.5/1 or 0/1/2 i.e. two for a responsive rating and one for an appropriate rating. Next sum the weighted scores to get a raw score. Next determine the denominator by subtracting the number of 'not applicable for this activity' items from the total. The adjusted raw score is the ratio between the weighted raw score and the number of checklist items that were observable. This can then be scaled to 100 to give an adjusted score.

Conclusion

In this chapter we have demonstrated that the iSTAT tool had good reliability and validity but only modest acceptability and educational impact. In order to enhance the utility of the tool, a further round of development was required informed by the assessment and evaluation data. Based on the psychometric analysis, the evaluation data, and an iterative review by the project team, the following major refinements were made to the initial iSTAT tool and it was renamed the iTOFT.

1. Change of the Likert rating scale to one based on a feedback model derived from the literature with the levels inappropriate/appropriate/responsive with accompanying descriptors
2. Change of the domains from collaboration/communication/co-ordination, to shared decision making, team working, leadership, and patient safety
3. Clarity around the 'not applicable rating', so as to clearly indicate a total number of checklist items considered in any feedback episode between a learner and the person giving feedback.
4. Provision of a basic and advanced version of iTOFT, the first aimed at junior students, the second aimed at more senior students in complex settings.
5. Provision of descriptors for each checklist items derived from the item bank derived from the literature.
6. Redesign of iTOFT form to be more user friendly.

Chapter 8: Learner and observer feedback

Introduction

During the course of the project we explored the views of health educators and students in order to gain a more in-depth understanding of their experiences as observers and observed with regard to the iSTAT. In particular we focussed on which items in the tool were viewed as appropriate and which not appropriate, whether there were any barriers to the tool's implementation and what were the benefits relating to the use of the tool. Qualitative data were generated from the following sources:

- Three group interviews conducted with students and staff at a regional university
- Statements from students and staff at a wide range of locations after they completed the iSTAT forms (which included space for feedback).

Group interviews

Location

Three group interviews were held across a range of educational environments linked to a regional university in Australia. Ethical approval to interview students and educators was obtained from the university Human Ethics Committee and from the local Hospital and Health Service Ethics Committee. The following groups were recruited:

1. Senior students completing block professional (clinical) practice in a clinic (n=11).
2. Junior students completing academic, interprofessional teamwork subject in their first year (n = 2).
3. University educators who coordinate subjects that involve team based professional (clinical) practice or academic teamwork activities (n =5).

Recruitment

Participants volunteered to take part in the process. Students in group one responded to an email flyer sent via the clinic manager. Students in group two responded to noticeboard flyers, and participants in group three responded to a general staff email. A member of the project team, an academic staff member at the university, facilitated the group interviews. All participants were provided with an information document that outlined the purpose of the project and how data would be managed. Participants provided written consent for their de-identified comments to be incorporated in the report. Students were assured that their comments would have no bearing on any assessment or evaluation feedback that they might receive as part of their studies.

Group Interview 1

This group interview took place at an interprofessional chronic disease management clinic located on the campus grounds. This clinic provides free community health services to a large population of community dwelling people diagnosed with chronic diseases. On a daily basis up to 11 different health professions offer services using an interprofessional service delivery approach. The clinic consistently offers interprofessional student placements. Students from most health professions and from universities across the country complete professional practice (clinical placements) for periods of between two and 12 weeks.

Participants

Eleven senior students (3rd or 4th year of a bachelor degree or 2nd year of a master's entry degree) from a wide range of health professions agreed to participate at the campus based community health clinic. All participants were female. As an acknowledgement of their contribution to the project students were given a music token to the value of A$20.

Duration

The focus group lasted approximately 50 minutes and was digitally recorded for later transcription.

Process

Students responded to a series of probe questions exploring their experiences of teamwork learning and teamwork assessment. A copy of the interview guide is included as appendix 2. They were then provided with a copy of the iSTATv4 and their opinions were sought regarding its utility, appearance, items and other observations. The recording was transcribed and all identifying details were removed. Two members of the project team not involved in the facilitation independently analysed the data.

Group Interview 2

This group interview took place within the university. First year allied health students volunteered to participate.

Participants

Participants were a first year female occupational therapy student and a first year male physiotherapy student who had both just completed an online interprofessional project with students from a wide range of health professional programs. As an acknowledgement of their contribution to the project both students were given a music token to the value of A$20.

Duration

The interview lasted approximately 50 minutes and was digitally recorded for later transcription.

Process

The same process was used as for focus group one.

Findings

The themes and sub themes from the two group interviews were similar and are listed in table 8.1 with selected quotes (more quotes are included in appendix 3). The students in the second group interview students also stressed:

- The importance of everyone in the health care group
- The need for a common understanding of the purpose of the team in any setting
- That team members and numbers may differ at different times
- A variety of settings should be used for the assessment
- The assessor should discuss the outcome rather than just providing a mark.

Specific points about the iSTAT included that positives should be discussed within the team as well as errors and that rapport is important between team members.

Group interview 3

Group interview 3 occurred in the university and included five academic educators who teach into health education programs both interprofessionally and uniprofessionally. All of their teaching involves some degree of authentic learning eg. simulation, online group learning, field based observations and introductory clinical activities. Educators were offered lunch as part of the interview.

Participants

Four course (subject) coordinators volunteered to participate in the focus group.

Duration

The group interview lasted approximately 60 minutes and was digitally recorded for later transcription.

Process

The same process was used as for groups one and two.

Table 8.1: Themes arising from the group interviews.
An example quote is given for each theme. After each quote in brackets is: group (1 or 2) and an identifying number for the student. A fuller selection of quotes is available in appendix 3.

THEME	SUB-THEMES	EXAMPLE QUOTE
Teamwork	The importance of team work	I think in this, allied health, patients don't just need to see one discipline, usually they need to see a range of people and so like working together… you need to work with other professions so you can all see that person in time [in hospital] (1.3)
	Learning about teamwork	Through our actual university degree as well we did lots of group assignments with the other professionals and that was really teamwork (1.2)
	Features of teamwork Group and team work easier if already know each other	It's sharing the same goal (2.1)
	Meetings important to foster teamwork	I reckon it would be better if they had people from - at least if all the group came to uni on a sort of regular basis that would be easier for people to sit around a table. That would work best I think (2.2)
IPE	Importance of IPE	It seems to me imperative or far more important that as we come together, as we're moving together as disciplines and learning, that interaction helps us understand the other disciplines (2.1)
	Timing of IPE	I also think in terms of group work the interdisciplinary aspect that was part of this professional practice, because it's happening so early in your discipline or your area, you're not really getting the same scope you might get if you had to do the same thing later on (2.1)
Assessment	Attributes	
	Group assessment: students not all putting in the same amount of work	Having to evaluate your own team may actually, you might not get the most truthful result just because they don't want to give such a negative feedback if it's bad (1.7)
	Peer assessment and feedback	I guess it's that learning to be able to constructively criticise and also to receive constructive criticism (2.1)
	Assessment and evaluation overload	I know throughout my multiple years at university we've gone through so many of these forms and evaluations for each course and you do get a little bit sick of filling them out (1.9)
	Being observed and feedback	One of our clinical courses this year we were working in pairs and dealing with one client once in a clinic based setting. So we were observed and marked on our teamwork between us and dealing with the one patient… that was challenging [no checklist used] (1.9)
The iSTAT	iSTAT overall	I think it's pretty through, like in terms of the tools I've seen this has probably got the broadest collection of items, I think (1.8)
	iSTAT items	I like the idea of having – question, point, 17 – one leading is responsible to the needs of the others, sort of says that group, teamwork process is more than one leader at one point or another, that's a kind of nice way to identify that without sort of being too rigid. (1.4)
	Format of iSTAT	I don't really mind paper – online is easy (2.2) An app's a good idea (2.1)
	Timing and usefulness of iSTAT	I mean like say once a week you got together and you evaluate each other I think would be quite useful. Not all the time, just sometimes (1.5)
	Who should complete?	So I guess it really depends who's seeing you perform (1.2)

Findings

The staff discussed the purpose of the assessment and agreed the assessment would increase the awareness of:

- The need for communication
- Encouraging confidence building
- Sharing clinical information
- Seeing the situation as a whole
- Leading and participation in the team

They felt not all the items were necessary in every setting, that the teaching/ student learning aspects of the assessment were important and that students would learn from the scaling of the abilities. They agreed that electronic and paper based versions of the tool would be helpful. Appendix 4 includes themes and quotes from this group interview.

iSTAT Form Feedback

In addition to the data produced in the focus groups, we collated free text comments included on the iSTAT forms completed by assessors and those who had been observed over the 12 month period. This feedback is broken down and described in the following sections.

Assessor comments: n=14, 3 sites

The iSTAT was used in a variety of settings with observation over a short activity or over a period of up to two weeks. Specific activities lasted from 5 to 45 minutes; four of the 14 assessors had prior experience of assessing teamwork.

Assessors were mainly positive about the tool – its ease of use ('user friendly', 'very simple', 'easy to follow') and its relevance ('helpful aide memoire'). One commented: 'lengthy but obviously required and yet succinct'. A total of 12 of the 14 would use the iSTAT again, one was unsure ('depends on context') and one answered no because 'quite lengthy'.

Reasons for using again included:

- 'It is brief but covers all relevant areas without including unnecessary information/domains'
- 'Useful for assessing teamwork, individual behaviours criteria are specific identified'
- 'This tool is very useful when it comes to assessing the student; it provides each section with appropriate behaviours'
- 'Easy way to assess someone within a short timeframe.'

Suggested changes to the tool included adding a prompt to enable more personalised comments/ feedback 'with more directed question at the end of feedback form'.

Comments relating to assessor feedback to learners

In line with the diversity in the settings and activities, feedback was given in different ways: collectively (to a group or team of students – though this is not the recommended use) or to a single student. The tool's items were used to tailor the feedback so that it was not just a 'general chat'. The criteria were discussed as part of the feedback process. Some assessors commented that they asked the student for his/her feelings first. Feedback was usually given immediately after the activity but in some cases was given more than a week later.

One assessor commented: 'this was a learning process for myself. Read and understood the criteria that had to be filled in and kept these in mind during the …session'. Another mentioned observation over time: 'I observed the student over the two weeks to see how consistent they were in the three domains'. One peer assessor wrote: 'discussed findings with fellow student'.

Learners' comments (the observed): n= 24, 3 sites

Time taken for an observed activity varied from 5 to 90 minutes. Time between activity and feedback varied from immediately to two weeks. All but four students stated they had received previous teaching/ learning about teamwork in their course and only one stated he/she had had no previous experience of teamwork outside their course. Ten students had

been assessed on teamwork before and 14 had not. Twenty-one students felt the feedback process was useful, two were unsure and one said not. For those who found the feedback useful reasons given were that it was 'relevant and practical', 'consolidated the need for family-centred practice', 'enabled greater self-reflection', 'brought my attention to how I work in a team' and 'let me know the positive things I did'.

In reply to the question: if your team working behaviours have been observed more than once, has your behaviour changed since the previous assessment? – nine replied that they felt their teamworking had changed. Examples included: 'tried to increase communication (giving and receiving)', 'have framework for case conference now' and two stated they had 'more confidence'.

Comments on the tool itself

The majority view from assessors and those being assessed was that the tool is comprehensive and covers most areas/relevant domains: 'the criteria is [sic] specific, allowing the assessor to justify their reason'; 'rates performance across all areas involved in clinical practice (communication etc.)'; 'allows for feedback and reflection'. The observation was seen as non-threatening and non-intimidating. One comment was that the tool is 'great in some teamwork situations but not all' and that 'it does cover aspects of skills needed to work cooperatively in a team, although may not be discipline specific'. A concern regarding bias due to the student-assessor relationship was noted and the suggestion was made that there should be two assessors/observers (though this would be important to improve reliability for summative assessment, it is unlikely to be feasible and is unnecessary for formative observation and feedback). Other suggestions included that 'the objectives need to be more measurable' that 'there needs a details explanation of what each skill looks like'. In terms of learning one suggestion was to have a session in which the educator/supervisor would go through the marking criteria.

Conclusion and recommendations

Whilst these three group interviews were undertaken with participants associated with one university in the pilot study, they provided a further insight to that gained in using the tool and the feedback from that usage. The comments derived from each of the groups pointed to the clear need for this type of assessment and observation tool and that, by using the tool, awareness of the need for communication, sharing of information and confidence building would be enhanced. The groups also advised a reduction in the number of items and that some of the questions would be more appropriate in some placement settings rather than others. While some modification of the tool would therefore be required participants clearly stated the tool was an "easy way to assess someone within a short timeframe". This feedback was echoed in the comments provided by assessors and students who piloted the iSTAT tool over the 12 month duration of the project.

Recommendations

1. The tool should be reduced in length to 10-12 items
2. Additional items could be incorporated for different placement settings
3. The tool should be made available in paper and electronic formats
4. The tool should be used to discuss the way the team has worked and not just a numerical assessment of the individual.

Chapter 9: The iTOFT

The iSTAT was the tool that emerged from the Delphi process as outlined in chapter 5. The 'individual student teamwork assessment tool v4' had 18 items under the three domains of communication, cooperation, and coordination. The starting points for changes to the iSTAT were acceptance of the positive feedback from users of iSTAT, a focus on fixing the less positive feedback, and responding to the analysis of the assessment data. In view of the timescales, a working group from amongst the project management group took on this task, incorporating the expert opinion of Professor Boud. They considered three areas of change based on a repurposing of the tool, and responding to both the evaluation and assessment data.

1. Reconceptualization of the purpose of the tool from a summative instrument with a focus on judgment of a student's competence to a more formative instrument to help guide student learning and improvement. The importance of observation and feedback for the enhancement of performance is well documented (see for example: Hattie & Timperley, 2007; Shute, 2008). The assessor becomes the observer.
2. Implementation of the evaluation feedback from observers and students who had participated in assessment, using the iSTAT, and from the focus groups, which indicated that the ISTAT was too long, and needed to be shorter and clearer.
3. The analysis of assessment data from the iSTAT showed two issues. First, problems with the Likert scale – it wasn't working as a scale, for example a lack of clarity around missing data as to whether a particular checklist item was absent or not assessable. Second, the factor analysis showed there wasn't a match between the items and the domains.

To capture the change in focus of the assessment tool, the next iteration of the scale was named the 'individual teamwork observation and feedback tool' (iTOFT). We wanted to emphasise the developmental nature of the revised tool: this is not a one-off judgment of competence but an ongoing process to aid student learning. In this model the assessor becomes the 'observer'. The tool is still for the observation of an individual within a team but now the focus is on feedback rather than assessment.

The tool was modified addressing six specific points, which we summarise below.

1. The Likert scale

Given that the purpose of the iTOFT was focused around the giving and receiving of feedback, the working group revisited the underpinnings of assessment for learning and the importance of feedback as discussed in the resource pack and the early chapters of this report. In particular, the working group focused on the feedback model (cross reference). This proved insightful to the working group and was discussed as a way of giving feedback based on three levels of observed behaviours: "inappropriate; appropriate; and responsive." Thus the interval scale now proposed in the iTOFT is thought to better reflect the theoretical underpinning of feedback.

2. Feedback items matching domains of interest

The factor analysis showed the iSTAT items did not match the initial domains of communication, cooperation and coordination. Four components emerged that seemed to focus on behaviours that encompassed shared decision-making, leadership, patient safety, and working in a team. This process was articulated to the working group through a series of tables resulting from the factor analysis. It was also noted by the working group that the iTOFT had utility

in public health focused team collaboration learning activities, and thus we recommend the benefits and challenges of changing patient/client to patient/client/community in the relevant checklist items.

3. Quality assurance at the program level for iTOFT scores

There were two reasons for clarifying the "not applicable for this activity" item. The first was to ensure that for each completed feedback episode it was clear to both the learner and the observer giving feedback which items on the scale had been considered in the observation and which had not (this was not at all clear in the empirical ISTAT data). The second was in providing an evaluation of the use of iTOFT in team collaboration programs by providing a weighted scoring system. Whilst a score is NOT relevant for individual feedback, it is important for providing psychometric data for the development of the scale and data at the program level, which could inform curriculum development. An iTOFT score may be calculated by the following process:

- First weight the Likert scale of inappropriate/appropriate/responsive item scores e.g. 0/0.5/1 or 0/1/2 i.e. two for a responsive rating and one for an appropriate rating. Next sum the weighted scores to get a raw score. Then determine the denominator by subtracting the number of "not applicable for this activity" items from the total. The adjusted raw score is the ratio between the weighted raw score and the number of checklist items that were observable. This can then be scaled to 100 to give an adjusted score.

4. Descriptors

The behavioural item descriptors for iTOFT are designed to facilitate reflection, observation and feedback of both learners and observers. The library of behavioural items (497) identified by the literature review was used to provide the descriptors of anticipated behaviours for each checklist item in each version of the iTOFT. In an iterative process, the group reviewed the selected iTOFT checklist items to ensure matching with the item library, the accreditation standards, and the experience of the group as assessors of team collaborative learning.

5. User friendly form

The form has gone through several iterations to settle on a design that provides all of the information required by learners and those giving feedback. It was thought important to keep the descriptors available for those using the ITOFT tools. On the back of the tool are scale and item descriptors. On the front is space for written feedback to complement the oral feedback given at the time of the activity.

6. iTOFT versions

A basic and an advanced version (attached) were developed in response to evaluation and feedback on useability and qualitative analyses.

- The BASIC version is intended for use by/with junior students in low complexity activities. It contains behavioural items within the domains of shared decision making and working in a team that are individually separate and distinct and suitable for junior students. This version has 11 observable behaviours under two headings: 'shared decision making' (7 items) and 'working in a team' (4 items).
- The ADVANCED version is intended for use by/with senior students and recently qualified professionals in more complex team activities. It contains consolidated behavioural items in the domains of shared decision making and working in a team, and also includes behavioural items in the more advanced domains of leadership and patient safety. This version has 10 observable behaviours under four headings: 'shared decision making' (3 items), 'working in a team' (3 items), 'leadership' (2 items), and 'patient safety' (2 items).

The iTOFT has the potential of being a rigorously developed and powerful tool for learning and teaching and needs to be further tested in other settings.

How the iTOFT should be used for observation and feedback is detailed in the Resource Pack that will accompany the tool when disseminated to interested educators, clinical teachers, supervisors and health professionals. The pack is included as chapter 10 of this report.

Chapter 10: Conclusion, recommendations and limitations

In this report we have described the rationale behind and the development of a new tool, the iTOFT, for the observation of and feedback on a student's individual behaviour during a team-based activity. Such a tool is necessary because of the lack of an existing suitable instrument as evidenced by our literature search, published reviews of teamwork measures and the experience of the project and reference groups. The initial tool developed, the iSTAT, focused more on assessment of learning rather than assessment for learning. The change in our thinking resulted from discussions within the groups and the expertise of group members.

We have produced two versions of the iTOFT: a basic version with 11 items for the observation of less experienced and junior students, and the advanced version, with 10 items for students and junior health professionals with more experience of teamwork. Both tools are for use in the workplace or during simulations involving teamwork activities. Observers may be clinicians, tutors, supervisors or peers who are not actively engaged in the teamwork activity under observation; thus in its present incarnation the iTOFT is not suitable for use by patients/clients. At present we do not recommend that observers are carers or family members. However it is possible with further development that carers, who are observing a team process but who are not actively engaged in that process, may be able to be involved in observation and feedback. This possible extension of usage needs to be evaluated for feasibility, acceptability and educational impact.

The iTOFT comes with a resource pack (chapter 10 in this report) for observers and those being observed, which includes a detailed description of our recommended feedback process.

The iTOFT should not be used as a one-off observation and feedback experience. It is a developmental tool for use on multiple occasions to monitor the progress of students in teamwork behaviours. The feedback it promotes should facilitate students' learning and subsequent performances.

The iTOFT developed from the iSTAT – the tool which underwent field-testing and statistical analysis. The iTOFT has fewer items as the evaluation of the iSTAT strongly indicated that the latter tool was too long and too complicated. The two versions of the iTOFT have not yet been used in the field for the observation of students. Such field-testing is required.

The iTOFT may be used to observe behaviours that fit with the outcomes/competencies defined within the accreditation standards of those health professions that are regulated by AHPRA (see appendix 1). A series of iTOFTs for individual students helps provide evidence that they are achieving the desired outcomes or developing the competencies of their own health professional standards.

Recommendations

Using the iTOFT

- All health professional students have learning activities that promote and develop teamwork behaviours and competencies and that align with their professional standards
- Such activities include the theory behind teamwork processes and why teamwork is important for the delivery of optimal patient/client-centred health care
- Such activities also include practical teamwork experiences in clinical settings, community settings and/or through simulation
- It is preferable if students are able to work in teams over time so that their skills are developed within a team environment
- Some teamwork activities may relate to teams that form for acute problems such as emergencies including cardiac arrests etc. This type of teamwork activity is usually experienced through simulation, at least to start with

- Students should have the opportunity to be observed on more than one occasion in an interprofessional team and receive feedback on their performance
- The iTOFT may be used as one piece of evidence to show that a student is developing teamwork behaviours

Evaluating the iTOFT

- Further formal testing of the two versions of the iTOFT is required. This will require funding to collate and analyse new data and an institutional home to oversee the evaluation.
- The iTOFT and resource pack should be disseminated widely and users asked to evaluate its utility and performance as an observation and feedback tool.

Limitations

Although this project had a relatively short timeframe, given the work required to create and further trial and validate our tool, two versions for the observation of and feedback on an individual's conduct in team-based activities were developed. Time was associated with the main limitation which is the number of completed iSTATs for analysis. Of note is that some limitations clearly highlight a number of issues in the area of interprofessional observation and assessment. For example, more data would have been collected if not for the difficulty in recruiting students and observers. This is related to the fact that many students do not undertake interprofessional activities that are congruent with the use of an observation tool and, if they do undertake such activities, they may not be observed. As found in studies of other forms of work-based assessment, allotting time for oral and written feedback is often not a priority. Nevertheless the iTOFT is delivered at an advanced stage of development where further field testing will strengthen its validity, feasibility, acceptability and educational impact.

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Appendices

Appendix 1: Accreditation standards mapping to iSTAT and iTOFT

AHPRA	Discipline	Document	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/ Unit	Element	Description of Element	Performance Criteria	Observable behaviour in team activity?	Mapped to iSTAT items	Mapped to iTOFT basic	Mapped to iTOFT advanced	Comments
Y	ATSI Worker	NIL – Working party to develop														
Y	Chinese Medicine	NIL – Working party to develop														
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 2.1	Relates effectively and knowledgeably to other professions and agencies	Recognises the paradigms within which other professionals function	N				Difficult to observe
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 2.1	Relates effectively and knowledgeably to other professions and agencies.	Treats other professionals with respect	Y	8	9	5	
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 2.1	Relates effectively and knowledgeably to other professions and agencies.	Communicates effectively	Y	1, 3	Included in all to some extent	Included in all to some extent	
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 3.3	Skills in intraprofessional referral	Colleagues are effectively consulted including skilful communication, the use of their special expertise and provision of adequate referral notes.	y	1, 3, 9, 10	7, 10	3	
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 3.3	Skills in intraprofessional referral	Effectively responds to referring colleagues with prior patient consent to release information	N				
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 2	Health Care System Interaction		Element 3.3	Skills in intraprofessional referral	Respect and personal regard for colleagues is always maintained	Y	8	9	5	
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 6	Patient Assessment		Element 6.7	Effectively deals with patients referred by another health care provider or an agency.	Demonstrates skills in communicating with other professionals, health disciplines, the legal profession and the courts, the scientific and academic community.	N				too broad
Y	Chiropractors	Competency Based Standards for Entry Level Chiropractors, 2009				Unit 9	Implementation of Care		Element 9.4	Refers patients	Communicates effectively with other professions and agencies, the legal profession and the courts, the scientific and academic community and other complementary health practitioners; works effectively in a multidisciplinary setting; integration of health services is promoted to enable access to appropriate and comprehensive services for patients, family and/ or care givers.	N				not specific team
Y	Dentistry	Professional attributes and competencies of the newly qualified dentist, 2010				Domain 2	Communication and Social Skills	Covers interpersonal skills, ability to work cooperatively and to communicate effectively with a range of people	8		Communicates effectively with other health professionals involved in patients' care and convey written and spoken information clearly.	N	1			not specific team

AHPRA	Discipline	Document	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/ Unit	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/ Unit	Element	Description of Element	Performance Criteria	Observable behaviour in team activity?	Mapped to iSTAT items	Mapped to iTOFT basic	Mapped to iTOFT advanced	Comments
Y	Dentistry	Professional attributes and competencies of the newly qualified dentist, 2010				Domain 2	Communication and Social Skills	Covers interpersonal skills, ability to work cooperatively and to communicate effectively with a range of people	12		Contribute to teams of health care practitioners in delivering health care in a cooperative, collaborative and integrative manner.	N				too broad
Y	Dentistry	Professional attributes and competencies of the newly qualified dentist, 2010				Domain 6	Patient Care		3		Understands his or her limitations and know when and how to refer a patient for appropriate opinion and/or treatment, where the diagnosis and/or treatments are beyond his or her skills or to confirm prescribed treatment.	N				not observable
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 4	Individual Case Management	Manages client-centred nutrition care for individuals	4.4	Prepares plan for achieving management goals in collaboration with client or carer and other members of the health care team.		4.4.1		Determines realistic goals for nutritional management in collaboration with client and other members of health care team.	Y	12, 13, 14, 15	1, 3	1, 4	Can be generic if not specifically abut nutrition
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 4	Individual Case Management	Manages client-centred nutrition care for individuals	4.6	Implements nutrition care plan in collaboration with the client or care and other members of health care team.		4.6.2		Implements nutrition plan and a system for monitoring and review with client and other health care team members.	Y	16	3		
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 4	Individual Case Management	Manages client-centred nutrition care for individuals	4.6	Implements nutrition care plan in collaboration with the client or care and other members of health care team.		4.6.3		Promotes physical activity guidelines in care plan with client and other health care team members.	N				too specific
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 4	Individual Case Management	Manages client-centred nutrition care for individuals	4.6	Implements nutrition care plan in collaboration with the client or care and other members of health care team.		4.6.4		Participates in multi-disciplinary team activities (such as case conferencing) to achieve nutrition goals.	N				no specific behaviours
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 4	Individual Case Management	Manages client-centred nutrition care for individuals	4.8	Documents and communicates all steps of the process.		4.8.3		Communicates the nutrition care plan to other members of the healthcare team as appropriate, including referring practitioners.	Y	1	7	3	
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 5	Community and Public Health Nutrition and Advocacy for Food Supply	Plans, implements and evaluates nutrition programs with groups, communities or populations as part of a team	5.8	Documents and disseminates all steps of the process		5.8.3		Communicates outcomes of nutrition programs to relevant internal and external stakeholders	N				
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 5	Community and Public Health Nutrition and Advocacy for Food Supply	Plans, implements and evaluates nutrition programs with groups, communities or populations as part of a team	5.8	Documents and disseminates all steps of the process		5.8.4		Provides handovers to relevant personnel as required in relation to program	N				

AHPRA	Discipline	Document	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Element	Description of Element	Performance Criteria	Observable behaviour in team activity?	Mapped to iSTAT items	Mapped to iTOFT basic	Mapped to iTOFT advanced	Comments
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 6	Food Service Management	Manages components of a food service to provide safe and nutritious food.	6.3	Implements activities to support delivery of quality nutrition and food standards within a food service		6.3.6		Recognises and supports the role of food service personnel in the delivery of nutrition care	N				too specific
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 6	Food Service Management	Manages components of a food service to provide safe and nutritious food.	6.3	Implements activities to support delivery of quality nutrition and food standards within a food service		6.3.7		Provides accurate and clear information to food service personnel and other health carers to allow implementation of plans.	N				too specific
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.1	Demonstrates safe practice		9.1.2		Refers clients/patients/ issues to appropriate professional when beyond own level or area of competence.	Y	9, 10	7	3	
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.2	Develops and maintains a credible professional role by commitment to excellence of practice		9.2.4		Promotes a high standard of nutrition care, while respecting the goals and roles of other professionals.	N				not team specific
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.3	Demonstrates professional leadership to promote the contribution of nutrition and dietetics to health and prevention of disease		9.3.3		Identifies opportunities to collaborate with other professionals/ organisations to improve nutrition outcomes.	N				
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.7	Develops sustainable collaborative relationships and networks		9.7.1		Contributes effectively to work undertaken as part of a multi-disciplinary team.	Y				broad and goes across most items, needs definition of effectively
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.7	Develops sustainable collaborative relationships and networks		9.7.2		Builds relationships with key stakeholders	N				not team specific
N	Dietetics	National Competency Standards for Entry Level Dieticians in Australia	Unit 9	Professionalism, advocacy, innovation and leadership	Demonstrates a professional, ethical and entrepreneurial approach to advocating for excellence in nutrition and dietetics	9.7	Develops sustainable collaborative relationships and networks		9.7.3		Acknowledges the different ways that different people may contribute to building or enhancing a team.	N				not observable
N	Exercise Physiology	Exercise and Sports Science Australia:2013 Application Guide				Area 3	Exercise behaviour/ exercise and sports psychology	An understanding of the many physiological, psychological, social and environmental factors influencing participation and adherence to a physically active lifestyle	3.9		Demonstrate an ability to recognise when and how to refer a client for further professional intervention and/or counselling.	N				not team specific

AHPRA	Discipline	Document	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/ Unit	Element	Description of Element	Performance Criteria	Observable behaviour in team activity?	Mapped to iSTAT items	Mapped to iTOFT basic	Mapped to iTOFT advanced	Comments
N	Exercise Physiology	Exercise and Sports Science Australia:2013 Application Guide				Area 8	Have the ability to develop individualised exercise prescriptions.		8.13		Demonstrate the ability to recognise when and where to refer client for further professional advice.	N				not team specific
Y	Medicine	Accreditation Standards for Primary Medical Education Providers and their Program of Study and Graduate Outcomes Statement, 2010				Domain 2	Clinical Practice: the medical graduate as a practitioner		2.1		Demonstrate by listening, sharing and responding, the ability to communicate clearly, sensitively and effectively with patients, their family/carers, doctors and other health professionals.	Y	1, 2,	2, 3, 4	2, 3, 4	though broad
Y	Medicine	Accreditation Standards for Primary Medical Education Providers and their Program of Study and Graduate Outcomes Statement, 2010				Domain 4	Professionalism and Leadership: the medical graduate as a professional and leader		4.4		Explain the main principles of ethical practice and apply these to learning scenarios in clinical practice. Communicate effectively about ethical issues with patients, family and other health care professionals.	N				needs including?
Y	Medicine	Accreditation Standards for Primary Medical Education Providers and their Program of Study and Graduate Outcomes Statement, 2010				Domain 4	Professionalism and Leadership: the medical graduate as a professional and leader		4.8		Describe and respect the roles and expertise of other health care professionals, and demonstrate ability to learn and work effectively as a team member of an interprofessional team or other professional group.	Y				very broad and across most items
Y	Medicine	Accreditation Standards for Primary Medical Education Providers and their Program of Study and Graduate Outcomes Statement, 2010				Domain 4	Professionalism and Leadership: the medical graduate as a professional and leader		4.9		Self-evaluate their own professional practice; demonstrate lifelong learning behaviours and fundamental skills in educating colleagues. Recognise the limits of their own expertise and involve other professionals as needed to contribute to patient care.	N				too broad
Y	Midwifery	National Competency Standards for the Midwife 2006	Domain 1	Legal and Professional Practice	This domain contains the competencies that relate to legal and professional responsibilities including accountability, functioning in accordance with legislation affecting midwifery and demonstration of leadership.	Competency 2		Accepts accountability and responsibility for own actions within midwifery practice	Element 2.3		Consults with, and refers to, another midwife or appropriate health care provider when the needs of the woman and her baby fall outside own scope of practice or competence.	Y	9, 10,	7	3	
Y	Midwifery	National Competency Standards for the Midwife 2006	Domain 2	Midwifery Knowledge and Practice	This domain contains the competencies that relate to performance of midwifery practice including assessment, planning, implementation and evaluation. Partnership with the woman is included in this domain.	Competency 6		Assesses, plans, provides and evaluates safe and effective midwifery care for the woman and/or her baby with complex needs as part of a collaborative team	Element 6.1		Utilises a range of midwifery knowledge and skills to provide midwifery care for the woman and/or her baby with complex needs as part of a collaborative team.	N				too broad
Y	Midwifery	National Competency Standards for the Midwife 2006	Domain 3	Midwifery as Primary Health Care	This domain contains the competencies that related to midwifery as a public health strategy. Included are the notions of self determination and the protection of the individual and group rights.	Competency 8		Develops effective strategies to implement and support collaborative midwifery practice	Element 8.1		Demonstrates effective communication with midwives, health care providers and other professionals	Y	1			across most items

AHPRA	Discipline	Document	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Domain/Unit /Competency Standard	Title	Description of Standard/ Domain/Unit	Element	Description of Element	Performance Criteria	Observable behaviour in team activity?	Mapped to iSTAT items	Mapped to iTOFT basic	Mapped to iTOFT advanced	Comments
y	Midwifery	National Competency Standards for the Midwife 2006	Domain 3	Midwifery as Primary Health Care	This domain contains the competencies that related to midwifery as a public health strategy. Included are the notions of self determination and the protection of the individual and group rights.	Competency 8		Develops effective strategies to implement and support collaborative midwifery practice	Element 8.2		Establishes, maintains and evaluates professional relationships with other health care providers.	Y	4, 5	7	3	
y	Midwifery	National Competency Standards for the Midwife 2006	Domain 3	Midwifery as Primary Health Care	This domain contains the competencies that related to midwifery as a public health strategy. Included are the notions of self determination and the protection of the individual and group rights.	Competency 9		Actively support midwifery as a public health strategy	Element 9.2		Collaborates with, and refers women to, appropriate community agencies and support networks.	N				too specific
y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 1	Professional Practice	This relates to the professional, legal and ethical responsibilities which require demonstration of a satisfactory knowledge base, accountability for practice, functioning in accordance with legislation affecting nursing and health care, and the protection of individual and group rights.	Competency 1	Practises in accordance with legislation affecting nursing practice and health care		Attribute 1.2		Fulfils the duty of care - clarifies responsibility for aspects of care with other members of the health team.	Y	13, 14, 15	8, 10	1, 4, 6	
y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 1	Professional Practice	This relates to the professional, legal and ethical responsibilities which require demonstration of a satisfactory knowledge base, accountability for practice, functioning in accordance with legislation affecting nursing and health care, and the protection of individual and group rights.	Competency 2	Practises within a professional and ethical nursing framework		Attribute 2.3		Practise in a way that acknowledges the dignity, culture, values, beliefs and rights of individuals/groups. (a) provides appropriate information within the nurse's scope of practice to individuals/groups; (b) consults relevant members of the health care team when required; (c) questions and/ or clarifies interventions that appears inappropriate with relevant members of the health care team.	Y	most items including 5, 6, 16	most items including 6	most items	very broad and across most items
y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 1	Professional Practice	This relates to the professional, legal and ethical responsibilities which require demonstration of a satisfactory knowledge base, accountability for practice, functioning in accordance with legislation affecting nursing and health care, and the protection of individual and group rights.	Competency 2	Practises within a professional and ethical nursing framework		Attribute 2.5		Understands and practises within own scope of practice - questions and/or clarifies interventions that appears inappropriate with relevant members of the health care team.	Y				as above
y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 3	Provision and Coordination of Care	Relates to the coordination, organisation and provision of nursing care that includes the assessment of individuals/ groups, planning, implementation and evaluation of care.	Competency 6	Plans nursing care in consultation with individuals/ groups, significant others and the interdisciplinary health care team.		Attribute 6.4		Plans for continuity of care to achieve expected outcomes - collaboratively supports the therapeutic interventions of other health team members.	Y	10,			fits with several items
y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 3	Provision and Coordination of Care	Relates to the coordination, organisation and provision of nursing care that includes the assessment of individuals/ groups, planning, implementation and evaluation of care.	Competency 7	Provides comprehensive, safe and effective evidence-based nursing care to achieve identified individual/group health outcomes		Attribute 7.7		Educates individuals/groups to promote independence and control over their health - identifies appropriate educational resources, including other health professionals.	N				

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Y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 4	Collaborative and Therapeutic Practice	Relates to establishing, sustaining and concluding professional relationships with individuals/groups. This also contains those competencies that relate to the nurse understanding their contribution to the interdisciplinary health care team.	Competency 9	Establishes, maintains and appropriately concludes therapeutic relationships		Attribute 9.4		Maintains and supports respect for an individual/ group's decision through communication with other members of the interdisciplinary health care team.	Y	1, 3, 8, 9, 10	most items	most items	very broad
Y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 4	Collaborative and Therapeutic Practice	Relates to establishing, sustaining and concluding professional relationships with individuals/groups. This also contains those competencies that relate to the nurse understanding their contribution to the interdisciplinary health care team.	Competency 10	Collaborates with the interdisciplinary health care team to provide comprehensive nursing care		Attribute 10.1		Recognises that the memberships and roles of health care teams and service providers will vary depending on an individual's/group's needs and health care setting.					not observable
Y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 4	Collaborative and Therapeutic Practice	Relates to establishing, sustaining and concluding professional relationships with individuals/groups. This also contains those competencies that relate to the nurse understanding their contribution to the interdisciplinary health care team.	Competency 10	Collaborates with the interdisciplinary health care team to provide comprehensive nursing care		Attribute 10.2		Communicates nursing assessments and decisions to the interdisciplinary health care team and other relevant service providers.	N				not team specific
Y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 4	Collaborative and Therapeutic Practice	Relates to establishing, sustaining and concluding professional relationships with individuals/groups. This also contains those competencies that relate to the nurse understanding their contribution to the interdisciplinary health care team.	Competency 10	Collaborates with the interdisciplinary health care team to provide comprehensive nursing care		Attribute 10.3		Facilitates coordination of care to achieve agreed health outcomes.	Y	13	most items	most items	
Y	Nursing	National Competency Standards for the Registered Nurse (ANMC, 2006)	Domain 4	Collaborative and Therapeutic Practice	Relates to establishing, sustaining and concluding professional relationships with individuals/groups. This also contains those competencies that relate to the nurse understanding their contribution to the interdisciplinary health care team.	Competency 10	Collaborates with the interdisciplinary health care team to provide comprehensive nursing care		Attribute 10.4		Collaborates with the health care team to inform policy and guideline development.	N				
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 1	Occupational Therapy Professional Attitudes and behaviour		Element 1.7	Demonstrates professional knowledge, skills, and attitudes appropriate for the working environment	1.7.4 - Co-operative and collaborative relationships within teams are fostered and facilitated by understanding, respecting and supporting the roles and responsibilities of different team members, including awareness of group dynamics within that team	Y	8, 9, 18	most items	most items including 10	very broad, touches on conflict
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 1	Occupational Therapy Professional Attitudes and behaviour		Element 1.7	Demonstrates professional knowledge, skills, and attitudes appropriate for the working environment	1.7.5 - Differences within teams and between colleagues are acknowledged and assistance sought to deal with any conflicts	Y	18		10	

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Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 2	Occupational Therapy Information Gathering and Collaborative Goal Setting		Element 2.2	Engages in critical, collaborative professional reasoning processes to determine priorities for intervention	2.2.1 - Priorities for intervention are developed in collaborative partnership with the client, and with informed consent with significant others and team members, and are informed by assessment outcomes.	Y	10, 11, 12, 13, 14, 15, 16	most items	most items	
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 2	Occupational Therapy Information Gathering and Collaborative Goal Setting		Element 2.3	Develops, communicates and implements and effective, efficient plan for occupational therapy intervention.	2.3.1 - Realistic short-term and long-term measurable goals are established collaboratively with the client and the team.	Y	12, 13, 14, 15	1, 2, 3	1	though wording different
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 2	Occupational Therapy Information Gathering and Collaborative Goal Setting		Element 2.3	Develops, communicates and implements and effective, efficient plan for occupational therapy intervention.	2.3.4 - The occupational therapy intervention plan to address relevant aspects of the client, his/her environment and occupations is consistent with the overall service provision of the team or agency.	N				very broad
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 3	Occupational Therapy Intervention and Service Implementation		Element 3.1	Demonstrates client-centeredness during intervention	3.1.2- Specific client issues are targeted by strategies that incorporate intervention goal(s) that have ideally been collaboratively developed and agreed upon by the client and team.	N				too broad
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 3	Occupational Therapy Intervention and Service Implementation		Element 3.4	Selects and implements intervention strategies and methods appropriate to the working environment	3.4.3 - Intervention priorities and strategies are integrated within, and congruent with, the overall service provided by the team.	Y	13, 14	fits across items	fits across items	difficult to observe in many activities
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 3	Occupational Therapy Intervention and Service Implementation		Element 3.7	Plans cessation/ completion of services/effective handover	3.7.1 - Decisions regarding ceasing intervention are negotiated and made in collaboration with client, interprofessional team and other relevant stakeholders (e.g. family, client's employer, other service providers).	N				too specific
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 4	Occupational Therapy Service Evaluation		Element 4.1	Incorporates perspectives of multiple stakeholders in evaluation of occupational therapy service provision	4.1.2 - Effectiveness, efficiency and quality of occupational therapy interventions and services are evaluated in consideration of the overall goals and priorities collaboratively developed by the team.	Y	5	3		
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 5	Occupational Therapy Professional Communication		Element 5.2	Adopts a communication approach appropriate to the working environment	5.2.1- With the client's consent, effective, collaborative and co-operative relationships are developed and maintained within teams, with colleagues and other stakeholders to achieve common and client-driven goals.	N				too broad
Y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 5	Occupational Therapy Professional Communication		Element 5.2	Adopts a communication approach appropriate to the working environment	5.2.2- All important and relevant information is communicated to relevant colleagues and clients in an efficient, appropriate and timely manner that meets confidentiality requirements.	N				wider collaboration

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y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 7	Occupational Therapy Professional Practice Responsibilities		Element 7.1	Adopts an efficient, effective and systematic approach to daily workload management	7.1.5-Contributions to the team enable effective service integration, focused on shared client-centred goals	N				too broad
y	Occupational Therapy	Australian Minimum Competency Standards for New Graduate Occupational Therapists (ACSOT), 2010				Unit 7	Occupational Therapy Professional Practice Responsibilities		Element 7.1	Adopts an efficient, effective and systematic approach to daily workload management	7.1.6- Skills and expertise of team members, volunteers and support staff are recognised, utilised and understood effectively, supported and developed.	Y	9			
y	Optometry	Optometrists Association Australia Universal (entry-level) and Therapeutic Competency Standards for Optometry, 2008				Unit 1	Professional Responsibilities		Element 1.2	Practises independently	1.2.3 - Advice is sought from other optometrists, health and other professionals when it is deemed that a further opinion is required.	N				wider collaboration
y	Optometry	Optometrists Association Australia Universal (entry-level) and Therapeutic Competency Standards for Optometry, 2008				Unit 1	Professional Responsibilities		Element 1.4	Communicates appropriate advice and information to patients and others	1.4.1 Information is clearly communicated to patients, patient carers, staff, colleagues and other professionals	Y	1, 2	shared decision making	shared decision making	
y	Optometry	Optometrists Association Australia Universal (entry-level) and Therapeutic Competency Standards for Optometry, 2008				Unit 1	Professional Responsibilities		Element 1.4	Communicates appropriate advice and information to patients and others	1.4.2 Liaison with other professionals is maintained.	N				too broad
y	Optometry	Optometrists Association Australia Universal (entry-level) and Therapeutic Competency Standards for Optometry, 2008				Unit 2	Patient History		Element 2.4	Obtains and interprets patient information from sources other than the patient.	2.4.1 - Subject to the patient's permission, pertinent information from previous assessments by other professionals or information from other people is sought and interpreted for relevance to the patient's management.	N				not team specific
y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 4	Primary Healthcare Responsibilities	This capability incorporates an osteopath's role in the delivery of primary health care, both as a primary contact practitioner and as a member of the health care community. This capability requires the osteopath to be knowledgeable about health, disease, disease management and prevention and health promotion. It incorporates an osteopath utilising healthcare networks and community services and referral as necessary.	Element 4.2	Recognises and responds to professional capabilities and limitations, as a primary healthcare provider	4.2.1 - Identifies situations where other healthcare professionals may be required to perform these roles, in whole or part and acts accordingly.	Y	9			vague ? Observable
y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 4	Primary Healthcare Responsibilities	This capability incorporates an osteopath's role in the delivery of primary health care, both as a primary contact practitioner and as a member of the health care community. This capability requires the osteopath to be knowledgeable about health, disease, disease management and prevention and health promotion. It incorporates an osteopath utilising healthcare networks and community services and referral as necessary.	Element 4.3	Relates effectively and knowledgeably with other health and community services providers	4.3.1 - Effective and informed working relationships are established and maintained with other health and community services or providers	N				too broad

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Y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 4	Primary Healthcare Responsibilities	This capability incorporates an osteopath's role in the delivery of primary health care, both as a primary contact practitioner and as a member of the health care community. This capability requires the osteopath to be knowledgeable about health, disease, disease management and prevention and health promotion. It incorporates an osteopath utilising healthcare networks and community services and referral as necessary.	Element 4.3	Relates effectively and knowledgeably with other health and community services providers	4.3.2 - Written and verbal communication with other health and community services follows accepted protocols and procedures.	N				not team specific
Y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 5	Professional Relationships and Behaviour	This capability incorporates an osteopath's actions in appreciating, respecting and operating in an educated, sensitive and informed manner with other healthcare providers. This includes how an osteopath acknowledges the values and procedures of those individuals and groups and how the osteopath can best facilitate the most appropriate care.	Element 5.1	Demonstrates the ability to is able to work as part of a network of osteopaths, and other disciplines and providers via respectful, effective and efficient communication.	5.1.3 - Recognises the value of a team-based approach within professional life	N				too broad
Y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 5	Professional Relationships and Behaviour	This capability incorporates an osteopath's actions in appreciating, respecting and operating in an educated, sensitive and informed manner with other healthcare providers. This includes how an osteopath acknowledges the values and procedures of those individuals and groups and how the osteopath can best facilitate the most appropriate care.	Element 5.2	Recognises how to implement a multidisciplinary approach through referral and co-management, and intra and interprofessional education.	5.2.2 - Engages in intra and interprofessional education	N				education rather than teamwork
Y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 5	Professional Relationships and Behaviour	This capability incorporates an osteopath's actions in appreciating, respecting and operating in an educated, sensitive and informed manner with other healthcare providers. This includes how an osteopath acknowledges the values and procedures of those individuals and groups and how the osteopath can best facilitate the most appropriate care.	Element 5.3	Implements the appropriate multidisciplinary care for the individual	5.3.1 - Appropriate practitioners and providers are identified for co-management or referral for the patient	Y	9			
Y	Osteopathy	Capabilities for Osteopathic Practice, 2009				Domain 5	Professional Relationships and Behaviour	This capability incorporates an osteopath's actions in appreciating, respecting and operating in an educated, sensitive and informed manner with other healthcare providers. This includes how an osteopath acknowledges the values and procedures of those individuals and groups and how the osteopath can best facilitate the most appropriate care.	Element 5.3	Implements the appropriate multidisciplinary care for the individual	5.3.3 - Collaborative working arrangements with others are reviewed to ensure an efficient team-based approach to care of the individual.	Y	4, 5	7	3	
Y	Pharmacy	National Competency standards Framework for Pharmacists in Australia 2010	Domain 1	Professional and ethical practice	This domain includes those Competency Standards that address the legal, ethical and professional responsibilities of pharmacists. It encompasses the responsibility pharmacists accept as members of a profession to commit to maintain professional competence and their obligation to upload accepted standards of behaviour and professional practice, including those imposed through legislation.	Competency Standard 2.3	Collaborate with members of the health care team	This standard addresses the ability of pharmacists to create, maintain and enhance working relationships with colleagues in a manner that provides a mutually supportive environment and enhances the care provided to consumers. It also encompasses circumstances where the pharmacist upholds a position that is consistent with sound pharmacy practice and their duty of care to consumers through the application of assertiveness skills.	Element 1	Support team development and cohesion	Accepts the value of partnerships and teamwork to improve consumer care.	N				not observable, attitude

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Y	Pharmacy	National Competency standards Framework for Pharmacists in Australia 2010	Domain 1	Professional and ethical practice	This domain includes those Competency Standards that address the legal, ethical and professional responsibilities of pharmacists. It encompasses the responsibility pharmacists accept as members of a profession to commit to maintain professional competence and their obligation to upload accepted standards of behaviour and professional practice, including those imposed through legislation.	Competency Standard 2.3	Collaborate with members of the health care team	This standard addresses the ability of pharmacists to create, maintain and enhance working relationships with colleagues in a manner that provides a mutually supportive environment and enhances the care provided to consumers. It also encompasses circumstances where the pharmacist upholds a position that is consistent with sound pharmacy practice and their duty of care to consumers through the application of assertiveness skills.	Element 1	Support team development and cohesion	2. Engenders trust for the role of a pharmacists and cooperation between team members	N				not observable
Y	Pharmacy	National Competency standards Framework for Pharmacists in Australia 2010	Domain 1	Professional and ethical practice	This domain includes those Competency Standards that address the legal, ethical and professional responsibilities of pharmacists. It encompasses the responsibility pharmacists accept as members of a profession to commit to maintain professional competence and their obligation to upload accepted standards of behaviour and professional practice, including those imposed through legislation.	Competency Standard 2.3	Collaborate with members of the health care team	This standard addresses the ability of pharmacists to create, maintain and enhance working relationships with colleagues in a manner that provides a mutually supportive environment and enhances the care provided to consumers. It also encompasses circumstances where the pharmacist upholds a position that is consistent with sound pharmacy practice and their duty of care to consumers through the application of assertiveness skills.	Element 1	Support team development and cohesion	3. Understands the role, responsibilities and expertise of the pharmacist in relation to that of other members of the health care team.	N				not observable
Y	Pharmacy	National Competency standards Framework for Pharmacists in Australia 2010	Domain 1	Professional and ethical practice	This domain includes those Competency Standards that address the legal, ethical and professional responsibilities of pharmacists. It encompasses the responsibility pharmacists accept as members of a profession to commit to maintain professional competence and their obligation to upload accepted standards of behaviour and professional practice, including those imposed through legislation.	Competency Standard 2.3	Collaborate with members of the health care team	This standard addresses the ability of pharmacists to create, maintain and enhance working relationships with colleagues in a manner that provides a mutually supportive environment and enhances the care provided to consumers. It also encompasses circumstances where the pharmacist upholds a position that is consistent with sound pharmacy practice and their duty of care to consumers through the application of assertiveness skills.	Element 1	Support team development and cohesion	4. Recognises and respects the professional rights, skills and contributions of other team members	Y	8	9	5	
Y	Pharmacy	National Competency standards Framework for Pharmacists in Australia 2010	Domain 1	Professional and ethical practice	This domain includes those Competency Standards that address the legal, ethical and professional responsibilities of pharmacists. It encompasses the responsibility pharmacists accept as members of a profession to commit to maintain professional competence and their obligation to upload accepted standards of behaviour and professional practice, including those imposed through legislation.	Competency Standard 2.3	Collaborate with members of the health care team	This standard addresses the ability of pharmacists to create, maintain and enhance working relationships with colleagues in a manner that provides a mutually supportive environment and enhances the care provided to consumers. It also encompasses circumstances where the pharmacist upholds a position that is consistent with sound pharmacy practice and their duty of care to consumers through the application of assertiveness skills.	Element 1	Support team development and cohesion	5. Respects and preserves the relationships that other members of the health care team have with consumers.	Y	8	9	5	
Y	Physiotherapy	Australian Standards for Physiotherapy				Competency Standard 2	Communicate effectively		Element 2.3		Communicate effectively with other service providers	Y	1			
Y	Physiotherapy	Australian Standards for Physiotherapy				Competency Standard 5	Interpret and analyse the assessment findings		Element 5.5		Identify areas that are outside skills and expertise and refer client appropriately	N				not team specific
Y	Physiotherapy	Australian Standards for Physiotherapy				Competency Standard 9	Operate effectively across a range of settings		Element 9.2		Work effectively in a team	Y				too broad though

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Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 3	Communicate and Interrelate Effectively in Diverse Contexts	This competency is about verbal, nonverbal, written and electronic communication and establishing respectful rapport and adjusting to meet the needs of diverse individuals, population groups and inter-professional colleagues, including complying with relevant documentation requirements.	Element 3.3	Works in partnership with teams, other professionals, support staff, community and government and demonstrates appropriate communication skills	3.3.1 Various roles and responsibilities of other health care professionals are understood and respected.	Y	8	9	5	
Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 3	Communicate and Interrelate Effectively in Diverse Contexts	This competency is about verbal, nonverbal, written and electronic communication and establishing respectful rapport and adjusting to meet the needs of diverse individuals, population groups and inter-professional colleagues, including complying with relevant documentation requirements.	Element 3.3	Works in partnership with teams, other professionals, support staff, community and government and demonstrates appropriate communication skills	3.3.2 Relevant work with other health care providers is effectively undertaken	N				too broad
Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 3	Communicate and Interrelate Effectively in Diverse Contexts	This competency is about verbal, nonverbal, written and electronic communication and establishing respectful rapport and adjusting to meet the needs of diverse individuals, population groups and inter-professional colleagues, including complying with relevant documentation requirements.	Element 3.3	Works in partnership with teams, other professionals, support staff, community and government and demonstrates appropriate communication skills	3.3.3 Acceptable protocols for interprofessional communication orally and in writing are used.	N				not specific team
Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 3	Communicate and Interrelate Effectively in Diverse Contexts	This competency is about verbal, nonverbal, written and electronic communication and establishing respectful rapport and adjusting to meet the needs of diverse individuals, population groups and inter-professional colleagues, including complying with relevant documentation requirements.	Element 3.3	Works in partnership with teams, other professionals, support staff, community and government and demonstrates appropriate communication skills	3.3.4 Negotiation, collaboration and consultation with members of the health care professional, service providers and relevant others occurs.	Y	1, 9, 10	across several items	across several items	
Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 5	Interpret, Diagnose & Analyse	This competency relates to the skills required by the podiatrist in considering the presenting symptoms, diagnostic test results and holistic clinical aspects and the communication processes involving the patient/client and other health professionals.	Element 5.3	Communicates information and involves others as appropriate	5.3.2 Other health professions are contacted/ referred to/ feedback provided, as relevant	N				too broad
Y	Podiatry	Podiatry Competency Standards for Australia and New Zealand, 2009				Competency Standard 5	Interpret, Diagnose & Analyse	This competency relates to the skills required by the podiatrist in considering the presenting symptoms, diagnostic test results and holistic clinical aspects and the communication processes involving the patient/client and other health professionals.	Element 5.3	Communicates information and involves others as appropriate	5.3.3 Case conferences are conducted with other professionals as appropriate.	N				too specific
N	Psychology	???? I can not find competency standards.														

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N	Social Work	Practice Standards for Social Workers: Achieving Outcomes, 2003				Objective 1	Direct Practice		Standard 1.1	The social worker has the necessary knowledge, skills and resources to bring to the client situation	Where the social worker does not have the necessary knowledge, skills or resources to offer an appropriate and satisfactory service to the client, the client is advised and referred to another worker or agency.	N				
N	Social Work	Practice Standards for Social Workers: Achieving Outcomes, 2003				Objective 1	Direct Practice		Standard 1.8	Within the multidisciplinary team, the social worker maintains social work principles, values and practice whilst acknowledging the practice base of other disciplines.	The social worker negotiates respectfully with colleagues from other disciplines.	Y	8	9	5	
N	Social Work	Practice Standards for Social Workers: Achieving Outcomes, 2003				Objective 2	Service Management		Standard 2.5	The social worker manager promotes effective teamwork and communication	The value of teamwork is promoted within the social work service and across the organisation.	N				too broad
N	Social Work	Practice Standards for Social Workers: Achieving Outcomes, 2003				Objective 2	Service Management		Standard 2.5	The social worker manager promotes effective teamwork and communication	Strategies for effective teamwork are identified and implemented.	N				too broad
N	Speech Pathology	Competency-based Occupational Standards: Entry Level, 2011				Unit 6	Professional and supervisory practice		Element 6.1	Develop, contribute to, and maintain professional and team based relationships in practice contexts.	Develop professional relationships with colleagues, supervisors and support staff relevant to the context and the issues being addressed.	N				too broad
N	Speech Pathology	Competency-based Occupational Standards: Entry Level, 2011				Unit 6	Professional and supervisory practice		Element 6.1	Develop, contribute to, and maintain professional and team based relationships in practice contexts.	Undertake work within a multidisciplinary and interdisciplinary teams with adequate supervision.	N				too broad
	Speech Pathology	Competency-based Occupational Standards: Entry Level, 2011				Unit 6	Professional and supervisory practice		Element 6.1	Develop, contribute to, and maintain professional and team based relationships in practice contexts.	Use team networking skills to develop an understanding of the broader contextual issues in relationship to speech pathology practice.	N				too broad

Appendix 2: Questions and areas for discussion with group interviews

Introductions, names and professions

[prompts] – do not show the iSTAT until part way through but check if have seen/used before

Introduction: We are developing and piloting a tool for the observation of teamwork by health professional students, and we are interested in your comments on the tool and its role in giving feedback on and assessment of teamwork.

- When and where have you learnt about teamwork? [prior to university, sports etc., university courses, theory, practice, etc.)
- Have you ever been observed working in a team? [when? Why? Feedback? Assessment? Grading? What methods used?]
- Why do you think that teamwork is important for the health professions and for health professional students?
- What would be an acceptable method to use to observe teamwork and give feedback? [for what activities? Who should observe? Supervisor? Peer?]
- Please look at the iSTAT – what are your initial thoughts?
- When might this be useful? [activities? Simulation? Patient/client interactions]
- Who should observe and feedback? [ok for peers? Would you be happy to use as a peer observer?]
- What do you think about the items? {number? Useful? Missing ones?]
- What about the 'scoring'?
- What about the global impression?
- How might the tool be improved?
- Any other comments…

After each quote in brackets is: group (1 or 2) and an identifying number for the student.

Appendix 3: Student group interviews

Importance of teamwork

Like you do need it there because obviously it's in the real world, but the hard part is how are you guys [faculty] going to make a really crazy assignment or task that forces people just to come together like that (2.1)

I think in this, allied health, patients don't just need to see one discipline, usually they need to see a range of people and so like working together… you need to work with other professions so you can all see that person in time [in hospital] (1.3)

Because when you're passing information so that it doesn't get duplicated and in terms of diagnosis to pass along the information that you have makes it easier for the other professionals not to go through the whole thing. Time management is so important currently that we have limited time with patients and so using the time appropriately (1.1)

Learning about teamwork

Others mentioned: home and school, team sports – and several group assignment.

Through our actual university degree as well we did lots of group assignments with the other professionals and that was really teamwork (1.2)

I think that regardless of whether it's negative or not you still learn things about how to deal with people in a team, because I mean at the end of the day got to get that assignment done and regardless of whether you don't like them you've got to figure out how to work with them (1.11)

We do like a simulated learning assessment which is like a multidisciplinary approach. So I just had to do one last week where I had to teleconference with a dietetic student back on the Gold Coast and then we had to work together to prescribe an exercise prescription and dietary advice to a patient with Type 2 diabetes, we had to work together in that role (1.7)

Features of teamwork

It's sharing the same goal (2.1)

I think it's that changeover in your head of understanding that a group can in the right way lend you strengths. You've got a shared brain trust and the whole idea is to start to utilise everybody's talents (2.1)

You can actually rely on the group to provide that extra support or to increase your understanding (2.1)

Group and team work easier if already know each other

That had an advantage because you had those social networks already – you could get more straight onto the thing with (2.1)

Meetings important to foster teamwork

Because we didn't do any real collaboration and it felt like when we did meet it was just like this is what I've come up with (2.1)

I reckon it would be better if they had people from - at least if all the group came to uni on a sort of regular basis that would be easier for people to sit around a table. That would work best I think (2.2)

Importance of IPE

It seems to me imperative or far more important that as we come together, as we're moving together as disciplines and learning, that interaction helps us understand the other disciplines (2.1)

Being able to understand how the other disciplines complement or you work together, how those teams work, how you come to understand the other discipline so that it's not competitive and so that it's forward thinking and productive, seems crucial (2.1)

There are those misunderstandings or those misrepresentations – should be something of the past (2.1)

When you've got Allied Health disciplines working together, or learning together, now's the time to really go look at each other, not just look at what you're doing, but understand how the other disciplines work (2.1)

Timing of IPE

I also think in terms of group work the interdisciplinary aspect that was part of this professional practice, because it's happening so early in your discipline or your area, you're not really getting the same scope you might get if you had to do the same thing later on (2.1)

Assessment – attributes

How we were able to determine what her role was and what my role was and how we could work together to contribute to the person's program and exercise prescription (1.7)

Discussion about group assessment and the problems of students not all putting in the same amount of work

So of the 40 marks – still half the marks were still down to your own work, so you had the luxury of working in a group but also knowing that all your mark wasn't dependent upon other people. Not all your marks depend on other people (2.1)

Because I mean like your final mark [the end of year] marks that will go towards your real grade. Like a lot of people, so I'm pretty sure they would go around and be like everyone mark each other well because we can't afford to lose marks (2.2)

The real jarring thing for me with regards to group work when you're in an educational setting, is there can be a real - particularly when you're just applied to a group - there can be a real disconnect between what an expectation that one person has next to how other people expect to perform. Sometimes that can create a – like if you go in prepared to do whatever you have to do to do fairly well, compared to someone who is at a time when they're just – they want to get by (2.1)

Having to evaluate your own team may actually, you might not get the most truthful result just because they don't want to give such a negative feedback if it's bad (1.7)

I've done those before and had people like in my team who've done absolutely nothing but because they were friends you kind of felt like you couldn't just write that they did nothing, yeah. So it was really hard, so you didn't want to write anything bad about them but I knew that they'd done nothing (1.7)

Peer assessment and feedback

I guess it's that learning to be able to constructively criticise and also to receive constructive criticism (2.1)
It's also if you're giving feedback you can go rather than just trying to write what you witnessed on this, you can say I really liked how you did this, or I thought maybe that you didn't do that. You can be a little bit more descriptive, a bit more (2.1)

They've been sitting in with each other when assessing patients and one of us does the assessment and the treatment while the other one, peer reviews. So we'll do each other and you say what was done well, what they could've done better and like what we've learnt. So I think that's good as well. So sitting back, you can think up stuff that you might not have been able to do when you're with the patient sort of thing. So not only is the - the student who is actually doing the assessment is learning, you're learning as well from what they're doing (1.9)

Assessment and evaluation overload

I know throughout my multiple years at university we've gone through so many of these forms and evaluations for each course and you do get a little bit sick of filling them out (1.9)

Being observed and feedback

One of our clinical courses this year we were working in pairs and dealing with one client once in a clinic based setting. So we were observed and marked on our teamwork between us and dealing with the one patient…that was challenging [no checklist used] (1.9)

Which was valuable in the long run, we learnt a lot of, got a lot of constructive feedback, which led on to us making changes about our approach and whatever. It was good. I definitely felt like I learned a lot from it (1.9)

Also examples given of being observed and given feedback in team sports by coaches.

iSTAT overall

It's also like an 18 point plan of the things you need to be addressing, like the things you need to try and do to be the best…to get the best out of your team work (2.1)

Well as we've already pointed out some of them mingle into each other, so you won't have to go oh, there are 18 things you need to do. You could break it up into the groups and go these are the sorts of things that you want (2.1)

I've found when we have things like this in relation to assignments and things, like a pre and post sort of tool to fill out I find it a little more motivating when it's maybe included in the assessment criteria, even when it's like two per cent to a grade, or something, one per cent, doesn't really matter. But I feel when I do them I probably put a little bit more effort in if I know that you're getting even the slightest benefit from it (1.2)

It'd be nice at least for say that pre and post type situations it would be nice to have a standardised tool like so that you can easily compare from pre versus post assessment of what you are doing. I think it would be quite easy to see improvements best on own performance, especially with the overall score down the bottom. A really simple tool to measure that (1.5)

A visual scale rather than a score maybe might just be a good indicator to as in [unclear] to see how you're going maybe (1.7)

I think it's pretty through, like in terms of the tools I've seen this has probably got the broadest collection of items, I think (1.8)

iSTAT items

Discusses team performance; is that like you assessing how your team's going with regard to the patient or...(2.1)

See, even this one here; solicits the opinions of other team members. Well if that's an interdisciplinary team you need to have some understanding of the other discipline's role, so that you'll make sure that you're utilising that team member to the best of their potential. So that you're sorted, so that you're getting everyone's best talent for the client, like you're making them all work together (2.1)

Cautions team members about potentially dangerous situations. Does that mean like safety or something? I'm not sure what that (2.2)

I read that I think that is you're bringing your discipline and your specialty to the team, so you might know that to get a patient to do something after a certain thing is going to be a higher risk...2.1

But I would think it's cautioning against any kind of harm that could happen, that you yourself wouldn't be aware of (2.1)

Question six in the communication [cautions team members about potentially dangerous situations] wasn't something that I've ever really come across in a team questionnaire, not saying that it's a good or bad thing, but that was just something that caught my attention because I hadn't really ever thought of that as being a team role before (1.7)

We work with patients where there are lots of trip hazards, we work with people who you have to lift or there can be a hazard to yourself in injuring yourself or injuring the patient so you have someone there who does spot the hazard before you, speaking up is really important then (1.8)

I like the idea of having – question, point, 17 – one leading is responsible to the needs of the others, sort of says that group, teamwork process is more than one leader at one point or another, that's a kind of nice way to identify that without sort of being too rigid. (1.4)

How planned patient client care with team members, but also in regards to what the client wants, like sort of working in collaboration with the client (1.2)

[In reply to any missing items or changes) The communication in number seven, this discusses errors that happen, not as good to discuss all the good things that happened within the team experience like the positive outcomes and positive things that people in the team did (1.7)

With that scale as well at the bottom I don't know if it's meant to be a summary of your whole communication or whether that's just a subjective overview of it. Because if you were to grade someone and you had like a bunch of rarely's and a bunch of consistently's and it was all over the show and you get down to the bottom one how do you officially grade someone on that scale as a reflection of that? That seems like it's really subjective instead of an added score or something. (1.7)

Maybe it should have like assigning some sort of score to [unclear] sometimes inconsistently and then combining those to get an overall score which then has sort of a scale of [performance unclear] satisfactory so that you can actually know that that score accurately reflects what the original sort of results (1.5)

There was a thing in that about how sometimes different people's expectations could potentially disrupt, like create this disconnect in the group, because even discussing it could potentially - like you were letting people maybe think they couldn't do what you needed them to do. You were setting up maybe a goal that they didn't feel they could meet and that kind of thing that happened from that (2.1)

So that means you need to be good at that though doesn't it, establishing that rapport quickly, making sure you're finding that common ground, or making sure that the goals aren't being lost in the shuffle (2.1)

So there'll be three of us working together one day, then it might be myself and another two different individuals. So still a team but different people. So just something maybe about adaptability to suit a team environment. So different individuals, still working on the same course, they're working with a particular patient, that being able to adapt to the different team dynamics. That's the only other thing (1.9)

Format of iSTAT

I don't really mind paper – online is easy (2.2)

An app's a good idea (2.1)

You could have it on you. Like you could have it there in terms of if you wanted to jot down about anything, about any time, even if you weren't assessing someone, just looking at how other teams are working. You know when you see things working well? (2.1)

The comments section broach things is very small, because we've got a form similar to this or like my, the particular discipline to me our competencies and that was one thing that my past supervisors have fed back is that they want supervisors or the assessor or whoever to comment but they only have a tiny line. So it's not really a whole lot you can write that would be of value in that little space. All you can really write

I think is good or bad, there's not really a whole lot of space to elaborate (1.5)

Maybe this comment section can just be the last question where you give total feedback on everything. So you know you're just like instead of each thing to write a comment on each - here - to just put a - yeah, it's too much and you will not be, you don't have enough space to...(1.1)

Timing and usefulness of iSTAT

I think having it mid-way through or somewhere in the progress is good, because when you do get a form there's no feedback, it's nice to have feedback at the end and you're like oh yeah, that's where I could've done better. When you get it in the middle you're like oh yeah, that's where I can do better and you fix it up at the end so that you feel more comfortable as you're tracking along instead of just cruising blind (1.7)

I mean like say once a week you got together and you evaluate each other I think would be quite useful. Not all the time, just sometimes (1.5)

I think it would also be useful for the person receiving the feedback, they can see how you're progressing (1.7)

Because if oh, another form, if it's consistent and repeated and you see the same one and you know what you've got to do and what you've got to fill out (1.9)

Who should complete?

So I guess it really depends who's seeing you perform (1.2)

Appendix 4: Faculty group interviews

After each quote in brackets is a number representing one faculty member

Teamwork and its importance

We like the students to have good teamwork skills (1)

Teamwork's really important. We all work in teams in the workplace. My goal is to

prepare the students to work in the workplace (4)

The employers if you like and also the accreditation requirements stress the need for teamwork, both intra-professional and interprofessional teamwork (3)

It's nice to see something that is actually focused just on teamwork. That's really great. I think it is underestimated (1)

Required specific learning outcomes

…they also need to be able to direct teams that may come from quite different perspectives (4)

In a team where you're actually working in your field you need to be able to communicate effectively with your colleagues and also with the reporting specialist (2)

Purpose of learning

Just so they're giving your patients the best outcome (2)

Existing assessment and peer feedback

They do self and peer assessments of each other's work. So they are already assigned to assess the team process (3)

They self and peer assess twice during their teamwork, one midway through the teamwork and one afterwards. They use team questions, which I can see you probably have them distributed through here (3)

In our practical [core] groups they work in fours. One's scanning, one's the patient and the other two have to provide feedback. That's their task (3)

The beginning of that second year, it's silent and the tutor's going, come on, what do you think, come on and they're nagging them. By the end of the year they've got it. But they're always not - they get better don't they (3)

You've really got to do it – X says you've got to stand behind them and say, what feedback will you give them? (2)

That seems to be the opposite of our students. They're not willing to say anything bad about each other [laugh]. (3)

If you tell them that it's the only way you're going to learn, if you give that person feedback, they'll turn around give you feedback (2)

I was going to say they need practice (2)

I'm in the clinic, labs…but I've actually had to demonstrate to them, I've actually had to say to them, this is what you should be saying to your colleague. So that you've actually had to teach them how to do it (2)

I think it's actually teaching them another language because they don't actually know how to put the words together. But the tutors have to model it. So the tutor starts all the feedback at first (1)

Measure for feedback important

I'd like to know how to get around it and assess it so that they can get the feedback of how we're perceiving this communication problem (2)

In that way with the second interview or use of the form they can see their own progress or lack thereof (2)

Feedback would be good, provided it's constructive feedback to team members in there (3)

Comments on specific items of iSTAT

We would need to adapt it. Sharing health information would probably need to change for us somewhat. Decision-making process, no that would be okay. Care-plans would need to change somewhat. We don't use care-plans (3)

What you were talking about before, if you look at it, it says contributes to team discussions. But then under cooperation it says, solicits the opinions of other team members. They're connected too aren't they? That's communication as well if you're soliciting their opinion as well, so it is covered to a point (2)

I find the wording, just to be a little bit critical, a little perfunctory. I don't feel it digs down enough as to what's required. For example, discusses errors that happen (1)

I was just thinking about the clinical handover situation. You've got, shares healthcare information with patients, clients, families, but not authority (1)

You've got feedback to team members, but is that feedback about their performance rather than, I'm thinking about clinical information? (1)

When leading is responsible to the needs of the team. It'd be nice to - well was it you that was saying about when they're a leader - maybe assessing how they are if they are a natural leader, how they do the reverse role when somebody else is leading? How do they cope or communication? (2)

Items that should be included

When I'm thinking of teamwork some of the things that are particularly difficult for students to get their head around is first of all acknowledging what their preferred role in the team is and then being able to be flexible enough to take a different role than their preferred role, so playing with their weakness rather than their strength. Yeah, I found that students either aren't aware that they're always taking a particular role in a team, always the leader, always the person who waits until everybody else has made a comment, whatever it might be. Because they're not aware of that they're not necessarily then able to say, okay I'm going to work out what it is to be a leader or, I'm going to try and be a leader in a team and practise those skills (4)

The fourth bit I've written down is managing disagreement and all those aspects of conflict resolution…(4)

Ability to change communication style in a variety of contexts, rather than communicates appropriately (1)

Choose communication style appropriate to context (3)

Something ability to adapt was what I meant (1)

Being able to create a rapport, because that's fundamental to communicating with people, is actually creating the relationship in the first place (1)

You wouldn't necessarily be talking a lot about dangerous situations until you had some rapport with that person, to work out what sort of information they needed (2)

I think rapport's important though (3)

The ability to actually focus on others rather than self (1)

It was the ability to negotiate. I just felt that it didn't come out quite clearly here and I just wondered whether the wording could be tightened up a little bit (1)

Appendix 5: iTOFT BASIC version

iTOFT BASIC Version ***Individual Teamwork Observation and Feedback Tool***				Not applicable to this activity	Please tick one			Institutional logo Date
Student ID		Observer ID						**Activity observed:**
Profession		Profession						
Year level		Student peer observer Yes/No						Team composition
Graduate entry Yes/No								
Observable behaviours					Inappropriate	Appropriate	Responsive	**Feedback for student**
Shared decision making								
1. Plans patient/client care or group/community intervention with team members								
2. Prioritises actions relevant to the management of the patient/client or the group/community intervention								
3. Reviews patient/client or group/community goals when/if the situation has changed								
4. Advocates for patient/client/family or group/community as partners in decision-making processes								
5. Shares health care information with patients/clients /families or group/community								
6. Integrates patient's/client's/family's or group/community's circumstances, beliefs and values into care/ intervention plans								
7. Includes relevant health professionals in patient/client care management or group/community intervention as appropriate								
Working in a team								
8. Participates in interprofessional discussions about patient/client care or group/community intervention								
9. Demonstrates respect for others in and outside the team								
10. Invites the opinions of other team members								
11. Participates in discussions about team performance								
Overall global impression								Comment:

Scale descriptors

Not applicable to this activity	It is not possible to demonstrate this behaviour in this activity, in this context. **For example:** there may be no reason/opportunity to have a discussion about team performance.
Inappropriate	The student's teamwork behaviour is not appropriate in this context. **For example:** doesn't respond when asked a question; disrespectful or insufficient communication; insensitive behaviour; inadequate or incorrect information given; doesn't gain informed consent; doesn't disclose an error; aggressive behaviour.
Appropriate	The student is engaged with the team in the activity. However, does not take the opportunity to further develop teamwork behaviours. **For example:** gives accurate responses to questions when asked but does not ask questions or seek clarification; listens to feedback but does not initiate discussion; does not offer suggestions.
Responsive	The student is actively engaged with the team in the activity and demonstrates commitment in learning about teamwork. **For example:** speaks up, asks for information; integrates the perspectives of others; reflects back to others; clarifies, motivates, acknowledges the contribution of others; builds upon the ideas of others; encourages others.

Behavioural item descriptors

Shared decision making
1. The student actively engages with the team to achieve an integrated care management plan or group/community intervention plan and identifies actions within their scope of practice that address needs. **Includes:** creates, plans, negotiates, speaks up, agrees.
2. The student actively engages with the team to prioritise the actions identified in the integrated care management plan or group/community intervention plan. **Includes:** negotiates, speaks up, agrees.
3. The student actively engages with the team to review the goals of the integrated care management plan or group/community intervention plan when the situation has changed. **Includes:** monitors, reassesses, negotiates, speaks up, agrees.
4. The student actively with the team to put a case on behalf of a patient/client or group/community for the right to be a partner in decision making. **Includes:** gives information, speaks up, negotiates.
5. The student actively engages with the patient/client or group/community to exchange information to achieve a shared understanding of the subject. **Includes:** gives information, seeks information, listens, reflects back, discusses options, discusses preferences.
6. The student actively engages with the team to achieve a shared understanding of the patient's/client's or group's/ community's predisposition and integrate considerations into the integrated care management plan or group/community intervention plan.**Includes:** listens, reflects back, asks questions, clarifies, negotiates, agrees.
7. The student recognises the boundaries of his/her and colleagues' scope of practice and identifies a knowledge gap that may be met by another health professional. **Includes:** questions, evaluates, sources, refers.
Working in a team
8. The student actively engages with the team in discussions to achieve a common understanding about decisions and actions to take. **Includes:** speaks clearly, removes jargon, explains discipline specific terminology, reflects back, clarifies, builds on another's ideas.
9. The student is polite and shows consideration of the contributions of other people. **Includes:** acknowledges another's opinion, actively listens, is kind, is mindful, appreciates.
10. The student actively seeks information from others in the team. **Includes:** asks, requests, searches, asks for feedback.
11. The student actively engages in discussions about how the team performed together and the impact on patient/client care or group/community intervention. **Includes:** evaluates, clarifies, reflects, speaks directly, encourages, gives feedback, receives feedback.

Appendix 6: iTOFT ADVANCED version

iTOFT ADVANCED Version ***Individual Teamwork Observation and Feedback Tool***				Not applicable to this activity	Please tick one: Inappropriate	Appropriate	Responsive	Institutional logo Date
Student ID		Observer ID						**Activity observed:**
Profession		Profession						
Year level		Student peer observer Yes/No						Team composition
Graduate entry Yes/No								
Observable behaviours								**Feedback for student**
Shared decision making								
1. Plans patient/client care or group/community intervention with team members								
2. Includes patient/client/family or group/community as partners in decision-making processes								
3. Includes relevant health professionals in patient/client care management or group/community intervention as appropriate								
Working in a team								
4. Participates in interprofessional discussions about patient/client care or group/community intervention								
5. Demonstrates respect for others in and outside the team								
6. Invites the opinions of other team members								
Leadership								
7. When leading is sensitive to the needs of the team								
8. Provides constructive feedback to team members about their performance								
Patient Safety								
9. Discusses patient safety issues with the team								
10. Works with other team members to manage conflict								
Overall global impression								Comment:

Scale descriptors

Not applicable to this activity	It is not possible to demonstrate this behaviour in this activity and/or in this context. **For example:** there may be no reason to have a discussion about patient safety issues; the facilitator or a health professional is leading the team not a student.
Inappropriate	The student's teamwork behaviour is not appropriate in this context. **For example:** doesn't respond when asked a question; disrespectful or insufficient communication; insensitive behaviour; inadequate or incorrect information given; doesn't gain informed consent; doesn't disclose an error; aggressive behaviour; becomes personal in conflict.
Appropriate	The student is engaged with the team in the activity. However, does not take the opportunity to further develop teamwork behaviours. **For example:** gives accurate responses to questions when asked but does not ask question or seek clarification; listens to feedback; does not initiate discussion; does not offer suggestions.
Responsive	The student is actively engaged with the team in the activity and demonstrates commitment in learning about teamwork. **For example:** speaks up, asks for information; integrates the perspectives of others; reflects back to others; clarifies, motivates, acknowledges the contribution of others; builds upon the ideas of others; encourages others; deals with tensions; self regulates when there is conflict.

Behavioural item descriptors

Shared decision making
1. The student actively engages with the team to achieve an integrated care management plan or group/community intervention plan and identifies actions within their scope of practice that address needs. **Includes:** creates, plans, negotiates, speaks up, agrees, prioritises, reviews, refers.
2. The student actively engages with the patient/client or group/community to achieve agreed decisions on the plan and management. **Includes:** shares information, seeks information, integrates preferences, discusses options, advocates.
3. The student recognises the boundaries of his/her and colleagues' scope of practice and identifies a knowledge gap that may be met by another health professional. **Includes:** questions, evaluates, sources, refers.
Working in a team
4. The student actively engages with the team in discussions to achieve a common understanding about decisions and actions to take. **Includes:** speaks clearly, removes jargon, explains discipline specific terminology, reflects back, clarifies, builds on another's ideas.
5. The student is polite and shows consideration of the contributions of other people. **Includes:** acknowledges another's opinion, actively listens, is kind, is mindful, appreciates.
6. The student actively seeks information from others in the team. **Includes:** asks, requests, searches, asks for feedback.
Leadership
7. The student assumes a situational leadership role to coordinate and integrate perspectives of team members. Includes: listens, is approachable, invites participation, uses direct language, coordinates, integrates, speaks up, acknowledges limits, uses mistakes for learning, sets boundaries, holds people accountable.
8. The student gives objective practical advice and guidance to encourage other team members to consider options for further development of teamwork skills, Includes: supports, is consistent, facilitates understanding, uses direct language, shares information, questions, reflects back.
Patient safety
9. The student speaks up if there is a risk of harm, is open to talking about risk and errors and supports others to do so. Includes: is honest, problem solves, analyses, is constructive, prevents, learns, encourages, supports.
10. The student actively discusses disagreements in the team and supports the integration and reconciliation of differences. Includes: engages, speaks directly, is calm, is self aware, reflects, is willing, negotiates, facilitates, motivates, learns lessons.

Resource pack for the iTOFT
(individual teamwork
observation and feedback tool)

For:
Learners
Teachers
Program organisers
Interprofessional facilitators

14 February 2015
iTOFT Consortium

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978-1-76028-401-5 Resource pack for the iTOFT (Individual teamwork observation and feedback tool) [PRINT]
978-1-76028-402-2 Resource pack for the iTOFT (Individual teamwork observation and feedback tool) [PDF]
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Contents

Please note:
The order of the contents in the guide does not reflect the importance of any of the sections and the sections do not need to be read consecutively. How the guide is used depends very much on the reader and prior understanding of interprofessional education and practice, teamwork and feedback.

Section 1: Purpose and definitions

The iTOFT (individual teamwork observation and feedback tool) has been developed in response to the need for graduating health professional learners to be able to practise collaboratively and interprofessionally, and to deliver team based health care. The purpose of the iTOFT is to facilitate observation and engagement of learners in feedback and review during and following teamwork and team-based activities. There are two versions: basic and advanced. Both incorporate a set of items derived from the literature on teamwork that are used to highlight optimal teamwork behaviours and prompt discussion after observation of a teamwork activity. Observers may be tutors, preceptors, supervisors, clinical teachers, or learner/learner peers. As the tool requires observation by someone not involved in the teamwork activity, it is not suitable for use by patients, clients or families who are interacting with the team. Feedback from patients, clients and families should be obtained in other ways, for example through multi-source feedback, satisfaction surveys or patient designed methods.

Teamwork is a required graduate attribute as defined by Australian higher education institutions. The accreditation bodies of increasing numbers of the health professions globally are including teamwork and interprofessional collaborative practice as core standards. However, educators and clinical teachers are continually challenged by the need to observe and assess teamwork, and to give constructive feedback to enhance learning, while learners may be asked to provide evidence that they are capable of working in teams.

Health care teams and wider collaborations may consist of members of several different disciplines and health professions. The iTOFT provides a structure for the observation and feedback (formative assessment, assessment for learning) of individuals working and learning within interprofessional teams during team-based activities focussing on patient/client care delivery. Such activities could include: a clinically activity such as an interprofessional patient management team meeting or joint interviewing of a patient/client etc. (with the patient/client's permission); a simulation activity; interviewing a patient or family; providing care as a team.

Box 1.1: Definitions of 'interprofessional'

Common themes which relate to the concept 'interprofessional' are: interaction, joint working, enhancing care delivery and, more than two professions involved.

> *Interprofessional education (IPE): Occasions when two or more professions learn from, with and about each other to improve collaboration and the quality of care (CAIPE, 2002).*
>
> *Interprofessional learning (IPL): Learning arising from interaction between members (orstudents) of two or more professions. This may be a product of interprofessional education or happen spontaneously in the workplace or in education settings (Freeth et al., 2005).*
>
> *Interprofessional collaboration is the process of developing and maintaining effective interprofessional working relationships with learners, practitioners, patients/clients/ families and communities to enable optimal health outcomes (CIHC, 2010).*

In health care, collaboration is broader than teamwork (see below) as it represents a looser interaction across many locations and care settings. The iTOFT is for the observation of teamwork rather than collaborative practice in its broadest sense, i.e. those observed have to be co-located.

Box 1.2: Definitions of teams & teamwork

There are many definitions of teams and teamwork, and part of the preparation for health professional learners to work in teams should include discussion of definitions particularly as they apply to health care delivery. Here are just two:

> *'A team is a small number of people with complementary skills, who are committed to a common purpose, performance, goals and approach, for which they are mutually accountable.*
>
> *High performance team members are… committed to one another' (Hammick et al, 2009, p39).*
>
> *'Teamwork represents a set of values that encourage behaviors such as listening and constructively responding to points of view expressed by others, giving others the benefit of the doubt, providing support to those who need it, and recognizing the interests and achievements of others' (Katzenbach & Smith, 1993, p15).*

Box 1.3: Characteristics of functioning teams

Three conditions have been defined as necessary for functioning teamwork (Dawson et al, 2007):

1. Clear objectives that are known to all members
2. Team members work closely together to achieve these objectives
3. Regular meetings to review team effectiveness and discuss how it can be improved

Section 2: Quick reference guide for observers

For more a more detailed guide see Section 6.
The observer has three tasks:

- To prepare
- To observe and record
- To contribute to feedback and debriefing

Fundamental principles related to this tool are:

- It is for the observation and feedback of an individual learner's behaviour in a team-based activity not for the observation and feedback of the team as a whole
- The tool is a support for learning in that it can help the learner reflect on and modify behaviours in a formative way. The feedback process is therefore important to enhance the observed learner's learning to improve subsequent performance. Sequential assessments over time could also inform a learner's portfolio of learning and contribute to summative assessment.
- The context in which the observation takes place needs recording, as performance is context specific and needs to take place in a variety of settings on multiple occasions over time.

Using the tool

The tool is designed for feedback processes relating to observable behaviour of an individual during a team-based activity/task. The team may be newly formed specifically for the activity or a team that has worked together before. The observer records each behaviour observed on the scale (or states 'not observed') and may provide written feedback for each behaviour. There is also an opportunity to give an indication of overall behavioural performance and space for general and specific comments.

Learners will have had variable amounts of teaching/learning in relation to the theory and practice of teamwork in their courses. Accreditation standards, health professional courses and graduate attributes include teamwork learning outcomes/competencies. Ideally, learners should be reminded of these before any teamwork tasks or learning activities to ensure they see the relevance and importance of having their teamwork behaviours assessed.

Learners should have access to the tool for comment and discussion before being observed.

Possible contexts and activities – all must involve two or more students from different professions

- Interviewing a patient/client - on a ward, in a clinic or in the community
- Carrying out a patient/client assessment
- Providing care to a patient/client
- Developing a care plan for a patient/client (this also includes activities such as the 'Health Care Team Challenge')
- A simulation activity for any of the above
- A team presentation focusing on a patient/client based activity.

Table 2.1: Checklist for use of iTOFT

CHECKLIST ITEMS	Yes	No
The appropriate version of the tool is selected (basic or advanced)		
Learners are provided copies of the tool before any observed activities		
Assessors, supervisors and learners are made aware of the learning focus of the activity		
The observer may be the supervisor, facilitator or one of the learners who will observe the activity rather than taking part		
The observer chooses which learner(s) are to be observed. Peer observers may be allocated or may choose a peer to observe. Learners may volunteer to be observed.		
The observer notes on the tool who is observing, who is being observed, their health profession, their year level, the context of the activity, the date and setting.		
Experienced observers may decide and be able to observe more than one learner per activity		
The observer chooses a suitable position from which to observe the learner and the activity		
After the activity feedback should be given to the observed learner(s) – there are many ways of giving feedback and how this is done should be indicated on the tool plus the length of time taken		
Leave the iTOFT with the learner and encourage them to make their own notes		

One suggestion: The learners constituting the 'team' gather with their facilitator/supervisor prior to the activity and discuss the tool in terms of the meaning of the items/attributes and descriptors in relation to the theory and practice of teamwork. Learners then define their own descriptors (criteria) for each item rather than these being through a facilitation process. **This may not be possible on all occasions due to time pressures, location etc.**

Section 3: Quick reference guide for learners

For more a more detailed guide see Section 7
Fundamental principles related to this tool are:

- It is for the observation and feedback of your behaviour in a team-based activity not for the observation and feedback of the team as a whole
- The tool is a support for learning in that it can help you reflect on and modify behaviours in a formative way. The feedback process is therefore important to enhance your learning to improve your subsequent performance. Sequential assessments over time may be added to your portfolio of learning and contribute to summative assessment.
- The context in which the observation takes place needs recording, as performance is context specific and needs to take place in a variety of settings on multiple occasions over time.

Using the tool

The tool is designed for feedback processes relating to your observable behaviour during a team-based activity/task. The team may be newly formed specifically for the activity or a team that has worked together before. The observer records each behaviour observed on the scale (or indicates 'not applicable to this activity' or 'not observed') and may provide written feedback for each behaviour. There is also an opportunity to give an indication of overall global impression and make general and specific comments.

You should have access to the iTOFT for comment and/or discussion before being observed.

Possible contexts and activities – all must involve two or more students from different professions

- Interviewing a patient/client – on a ward, in a clinic or in the community
- Carrying out a patient/client assessment
- Providing care to a patient/client
- Developing a care plan for a patient/client (this also includes activities such as the 'Health Care Team Challenge')
- A simulation activity for any of the above
- A team presentation focusing on a patient/client based activity.

Table 3.1 Checklist for use of iTOFT

CHECKLIST ITEMS	Yes	No
The appropriate version of the tool is selected (basic or advanced) by learner and observer		
Ensure you have a copy of the tool before you are observed and think about the areas you wish to develop and behaviours you wish to practise.		
Assessors, supervisors and learners are aware of the learning focus of the activity		
Find out what type of activity you will be undertaking		
Your observer may be the supervisor, facilitator or one of the learners who will observe the activity rather than taking part		
During the activity think about what you are doing and what you would like specific feedback about		
Before you discuss with the observer, reflect on how the team performed and how you contributed to the team's performance		
Advise the observer what sort of comments would be most helpful to you and the specific areas you would like to discuss		
Decide what you will take away from the experience and what you may need to do in response to the feedback		
Ask for the iTOFT so you can refer to it later and put it into your portfolio of learning		

Section 4: Background and context

Learning outcomes and competence

To help in understanding the development of the tool, some context in relation to contemporary thinking in health professional education is required. The current trend in health professional education is competency-based education (CBE). The question asked of and by leading educators is: 'What does competence look like and how may it be measured?' And, specifically in relation to interprofessional teamwork: 'How may a competent team member be recognised?' The Interprofessional Education Collaborative (IPEC) in the United States has adopted the CBE approach with its list of *core competencies for interprofessional collaborative practice* (IPEC, 2011). The Canadian Interprofessional Health Collaborative's (CIHC) *National Interprofessional Competency Framework* (CIHC, 2010) succinctly defines a collaborative practice-ready health worker as someone who has learned how to work in an interprofessional team and is competent to do so. There is as yet no consensus set of outcomes or competencies for IPE and collaborative practice in Australia, or in many other countries. Each health professional accreditation body has defined its own standards including outcomes. Individual universities and schools, while working with the profession specific outcomes, have either developed their own interprofessional competencies or adopted and adapted those from other sources such as the CIHC and IPEC. A comparison and examples of learning outcomes and competencies is given in Table 4.1.

Competence is seen as objective and observable (Carraccio et al., 2002). Competence is the minimal standard for qualification and certification, whereas postgraduate training and on-the-job experience is required for 'expertise'. Interprofessional competency statements are said to 'identify specific knowledge, skills, attitudes, values and judgments that are dynamic, developmental and evolutionary' (Bainbridge et al., 2010, p. 8). For further discussion about IPE competencies and frameworks see Thistlethwaite et al., 2014.

Learning outcomes and competencies need to be formulated so that a decision may be made as to whether a learner has achieved them. However such achievement takes time and practice and, while competence may be attained students and health professionals are involved in lifelong learning. They need to move from competence to expertise as appropriate and refresh their skills throughout their professional careers. Therefore the iTOFT is not a one-off assessment of a learner's competence as related to teamwork but should be used longitudinally to observe teamworking skills and enhance them through constructive feedback and monitoring development.

Opportunities for observation of and feedback about teamwork through learning activities

The iTOFT has been developed to facilitate the observation of an individual's teamwork behaviours and a feedback dialogue following that observation.

For observation and feedback to be acceptable and educational, higher education institutions (HEIs) should give learners learner appropriate and timely opportunities to learn about teamwork, to observe teamwork (generic and clinically focussed) and to undertake team-based tasks, as well as to engage with feedback processes prior to their clinical rotations. While early exposure to teamwork may be classroom and/or group based (e.g problem-based learning, projects), simulations and clinical placements are required for authentic and experiential learning. Clinical placements are examples of broader work-integrated learning (WIL), which facilitates the integration of theory and practice (Orrell, 2006). To maximize learning about teamwork in clinical environments, learners require some understanding

Table 4.1 Some examples of learning outcomes and/ or competencies for interprofessional practice (Thistlethwaite, in press 2015)

Organisation & reference	Domains	Examples	Comments
Interprofessional Education Collaborative (2011): USA	1. Values/ethics 2. Roles & responsibilities 3. Interprofessional communication 4. Teamwork	1. Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services. 2. Communicate one's roles and responsibilities clearly to patients, families, and other professionals 3. Listen actively, and encourage ideas and opinions of other team members 4. Perform effectively on teams and in different team roles in a variety of settings	The competencies are very broad in all domains and not amenable to simple assessment methods but would require observation over time. The document states that the competencies should be both formatively and summatively assessed but does not suggest methods of assessment: 'The need for assessment instruments to evaluate interprofessional competencies represents a "next step" in the development of competency-based interprofessional education for all stages of interprofessional learning. This work is in early stages of development' (IPEC, 2011, p. 35).
Canadian Interprofessional Health Collaborative (2010)	1. Interprofessional communication 2. Patient/ client/family / community-centred care 3. Role clarification 4. Team functioning 5. Collaborative leadership 6. Interprofessional conflict resolution	1. Communicate to ensure common understanding of care decisions 2. Support the participation of patients/clients, their families, and/or community representatives as integral partners alongside healthcare personnel	Within the document, there is a discussion of the concepts of competence and competency: 'Competencies do not measure the level of competence. They provide the foundation upon which assessment of ability can be built, but they do not describe the levels at which individuals are expected to perform' (CIHC, 2010, p. 31). No specific assessment methods suggested.
CanMeds – the Royal College of Physicians and Surgeons of Canada – 2015 Framework draft online (Frank & Snell, 2014)	Six roles of which collaborator is one Working within the health care team and interprofessional health care are core concepts	Actively participate, as an individual and as a member of a team, in the continuous improvement of health care quality and patient safety (medical expert role). Work effectively with other physicians and other health care professionals	While these competencies are specifically for the medical profession, the collaborator role is being used to guide interprofessional outcomes by other organisations. There is a companion to the 2005 framework: An introductory guide to assessment methods (Bandiera et al., 2006).

Note: institutions using this resource pack may wish to include their own learning outcomes or competencies as defined in their curricula.

of the theory behind teamwork on which to build their practical learning prior to clinical exposure, and subsequent orientation to the clinical environment and the people working within it. The items of the iTOFT may be used to facilitate this learning and discussion about teamwork, for example: Why are such behaviours important? What does this behaviour look like? Ideally part of this learning should be interprofessional though most pre-clinical education is still largely uni-professional.

Challenges of observation and feedback in relation to teamwork

Passive observation of healthcare teams in action is helpful for learner learning but it is not sufficient for skill development of teamwork and interprofessional interactions. Learners must have the opportunity to become members of teams and become aware of the complex tasks involved in service delivery in order for profound learning to take place (Orrell, 2006). Situated and experiential learning is further enhanced through continuity of location and supervision, i.e. learners having longitudinal clinical attachments over several weeks in the same place rather than moving location frequently (Thistlethwaite et al., 2013).

Observation of individual learners in teams by appropriate observers is best carried out once a team has formed and team members have been working together for sometime. However this may not be possible for all learners and for all placements. The history and context of the team in which an observed learner is working need to be taken into account.

Students rarely work in defined teams for any length of time and observation of their teamwork competencies and performance is often impractical. While teams may be specifically created for a learning activity or assessment, such as in a simulation or OSCE (objective structured clinical examination), this is not authentic for all team-based activities as teams take time to form and thus to perform optimally. The team-OSCE (or T-OSCE) is an example of one innovation to overcome some of these issues but still raises questions about the validity of assessing teamwork undertaken by a newly formed team (Symonds et al., 2013). We know that a 'team' of learners formed specifically to be assessed for their collaborative skills is unlikely to function well (Oakley et al., 2004). However health care professionals do need to collaborate with others they may not work with regularly in acute situations such as cardiac arrests. Such activities are suitable for observation and feedback but do not allow learners to demonstrate more certain teamwork behaviours.

Work-based assessment (WBA) in health care

The iTOFT is a work-based observation tool and has similar advantages and disadvantages as other work-based assessment, such as the mini-CEX and multisource feedback (Norcini, 2007), in relation to reliability and feasibility. Here, reliability in relation to assessment refers to the reproducibility of an assessment score, i.e. the score should be consistent when the same person takes the same assessment on two or more occasions or the scores should be the same if the person is observed and graded by two observers independently at the same time. Obviously if a learner is observed over time with the same instrument being used to give feedback, we would hope that the learner demonstrates improved skills. In clinical settings having more than one observer for a particular task is rarely feasible. Therefore the iTOFT is not intended for use as a one-off summative assessment but rather for formative feedback on multiple occasions.

There is growing interest in WBA not only for its feedback potential but also because of growing interest in the assessment of performance and how learners perform in authentic clinical settings. Research has long shown that what is demonstrated in controlled assessment environments (such as the OSCE) is not representative of actual daily work-based performance (Rethans et al., 1991). WBA tools have therefore been developed to improve validity and the authenticity of judgments of competence. The quest for reliability, and its attendant objectivity, in particular has resulted in the attempt to break down complex and context-specific clinical tasks into discrete elements, the mini-CEX (Norcini et al., 2003) being one example. Criticism of this approach is that it is 'at least in part, responsible for what might be described variously as "reductionist", "deconstructive", "tick-box", "mechanistic" or "instrumentalist" approaches to assessment' and 'the lack of appreciation of assessment as the learning tool for the learner' (Amin, 2012, p.5). There is also always an element of personal opinion even with the most detailed grade descriptors (Kogan et al, 2009), which is one reason for the frequent addition of a 'global rating' independent of the accrued grades on a checklist – a potentially reliable method of assessment if delivered by an expert in a controlled environment such as an OSCE (Regehr et al., 1998).

Self and peer assessment are now being used as a means of assessing group work in university settings in part to enhance the development of observation and feedback skills in learners but also because of the frequent difficulties in finding clinicians and educators to observe learners in the workplace (though this does vary across the professions). Questions still remain about the long term effects and transferability of peer assessment, and the differences between assessing a peer and being assessed by a peer (van Zundert et al., 2010). There are a number of instruments in use for peer assessment: at undergraduate (Speyer et al, 2011) and professional levels (DLA Philips Fox, 2009). One example for pre-qualification is the web-based SPARK (Freeman & McKenzie, 2002). Learners working in teams assess their own and each other's performance against outcomes defined for the activity. Self-assessment can be compared to the peer assessment and all judgments are de-identified.

Other teamwork observation, assessment and feedback instruments

There are many tools for the assessment and feedback of team performance, including healthcare teams. In 2013, two major reviews of teamwork instruments used in health care settings were published. The first by the Canadian Interprofessional Health Collaboration (CIHC, 2012) provides an overview of instruments (quantitative tools) that may be used to evaluate the effectiveness of IPE by measuring outcomes of IPE in relation to learning and collaborative practice. The review includes 128 tools from 136 articles. They are classified following the 4-level Kirkpatrick outcomes evaluation framework (Kirkpatrick & Kirkpatrick, 2006) as modified for IPE by the Joint Evaluation Team (JET) (Barr et al., 2000): attitudes (64 tools); knowledge, skills and abilities (20); behaviour (34); organisational level (6); patient satisfaction (8); and provider satisfaction (14). Excluding the tools focusing on attitudinal change, many of the others may be used to assess how a team is performing and changing over time, but none are for observation of individual team members specifically.

The second review, by the Harvard Business School (Valentine et al., 2012), is aimed more specifically at finding and evaluating instruments used to assess dimensions of teamwork. It focuses on the psychometric properties of the teamwork instruments as well as providing a review of the components of teamwork. The Harvard review found 36 tools that measure teamwork, with the most common dimensions included being communication, coordination and respect. Again, none are specifically for observation and feedback in relation to individual learners within teams. While the individuals within a team are observed, judgment is not of an individual's competencies but how the team performs as a whole.

The closest measure to the iTOFT is the ICAR – the interprofessional collaborator assessment rubric (Curran et al., 2011). However the 31 items of this measure limit its feasibility in pre-qualification situations and certain of the items would be difficult to observe in a team-based activity, for example: recognition of the relationship between team functioning and quality of care; recognition of strategies that will improve team functioning; recognition of oneself as part of the team.

Section 5: Development of the iTOFT and its role in IPE

The iTOFT's strength is its focus on observation and feedback rather than summative one-off assessment. During development, the tool was first known as the iSTAT (individual learner teamwork assessment tool), but for all the reasons discussed in this resource pack, it was renamed the iTOFT to highlight its purpose for interprofessional learning and the importance of observation and feedback.

The iTOFT was developed through a Delphi process and further refined through field testing (pilot testing) and factor analysis. We used the findings from the two reviews of teamwork instruments (CIHC & HBS) and updated them to include new tools from 2010 to 2012. Three people examined the identified tools and extracted items that related to o**bservable behaviours of individuals within teams**. This resulted in a list of 481 items. Following analysis and synthesis the list was reduced to 99 items and grouped in dimensions: communication, leadership, negotiation and conflict resolution, patient/client centredness, roles and responsibilities, situational awareness/monitoring, task orientation, and team process. The project management team and reference group, whose members were from diverse professions (see section 11), further reduced the items to 50 in preparation for a Delphi consultation process with an expert panel.

Ninety-one national and international interprofessional education and practice experts were invited to participate in the Delphi consultation. Forty-three gave consent to participate and 39 subsequently gave extensive feedback via the Survey Monkey™ online survey.

After analysis and ranking of the round 1 responses, the number of items was reduced to 25. Round 2 of the Delphi asked participants to indicate if these items: 'absolutely must be included'; 'were 'not as vital'; or 'not necessary'. The responses were ranked and 18 items were grouped in three dimensions: communication, coordination and collaboration, and included in the iSTAT. The scale to rank each behavioural item was a four-point scale: '*consistently*', *'sometimes*', *'rarely'* and *'not applicable in this setting'*.

Field-testing

The field (pilot) testing used the iSTAT and took place at the following locations:

- The University of Queensland Greenslopes Clinical School (1 site)
- UQ Healthcare a GP superclinic (owned by University of Queensland) – Ipswich Clinic (1 site)
- Curtin University, Western Australia – Juniper Annesley Aged Care Residential Home; and the primary schools – Challis, Neerigen Brook and Brookman (4 sites)
- The University of British Columbia, Vancouver, Canada (1 site)
- The University of Derby (1 site)

Data analysis

Data for the validation of the Individual Student Teamwork Assessment Tool (iSTAT) were collected over a nineteen-month period from November 2012 to June 2014 at the above five institutions over nine pilot sites. In total there were 132 episodes of observation and feedback resulting in completed iSTATs. As well as the iSTATs themselves, we collected demographic data, information about preparation time and completion time, and feedback from observers and observed about the tool. Group interviews with staff and students at the University of Central Queensland were also undertaken. The quantitative and qualitative data were analysed and this analysis together with discussions by the project and references groups, informed the revision of the iSTAT and the formation of the iTOFT. A recurrent theme in the feedback was that the iSTAT was too long, with too many items. There were also suggestions for additional items, however these were frequently related to team climate and context rather than being observable behaviours.

The iTOFT

The process of developing the tool through the literature review, Delphi rounds, field testing, statistical analysis, feedback and further refinement has resulted in two forms of the iTOFT:

- The **BASIC version** for junior students with little or no previous experience of undertaking interprofessional team activities. This version has 11 observable behaviours under two headings: 'shared decision making' (7 items) and 'working in a team' (4 items) (appendix 1).
- The **ADVANCED version** for senior students and junior health professionals with experience of interprofessional team activities. This version has 10 observable behaviours under four headings: 'shared decision making' (3 items), 'working in a team' (3 items), 'leadership' (2 items) and 'patient safety' (2 items) (appendix 2).

Both versions have a similar observation scale: not applicable to this activity (i.e. this behaviour would not be expected for the team activity, team composition or context being observed); inappropriate; appropriate; or responsive. On the back of the tool are scale and item descriptors. On the front is space for written feedback to complement the oral feedback given at the time of the activity.

The iTOFT versions are now ready for use in observation and feedback, in conjunction with this resource pack. They require further testing in a wider number of activities and contexts.

Section 6: Detailed observer guide

Purpose of the iTOFT

The iTOFT provides a focus for collaborative practice improvement through the observation of individual teamwork behaviours and the subsequent feedback dialogue between observed and observer. It is designed to influence learners to improve their ability to operate effectively in teamwork and collaborative practice settings. This means that the processes of observation and feedback surrounding the activity by both the observer and the observed learner are as important as the completion of the form itself. In particular, the interaction and debrief between observer and learner following observations are critical components of the iTOFT.

The key implementation elements in the use of the tool are:

1. The observer rating form and its use in observation
2. The recording on the form of specific information designed to be helpful to the learner
3. Discussion of the observations using the completed form as a focus
4. Identification of actions resulting from the discussion and debrief.

The role of the observer

The observer has three prime functions: to prepare; to observe and record; and to contribute to feedback.

Observers may be tutors/preceptors, practitioners, and/or learners who are not part of the team under observation. Observers who are also health professionals do not need to be from the same profession as the learner. While the basic use of the iTOFT is common across all observers, each type provides a different perspective and the direction of debriefing and discussions following observations may therefore vary.

While the iTOFT is for observation of an individual's behaviour during the team based activity, one observer may feel confident and able to observe more than one person at a time once they are familiar with the tool. However each person being observed should be given individual feedback using the iTOFT.

The rationale for the use of the tool

When engaged in a complex activity that involves working with others, it is useful to have an external perspective to enable the learner to become aware of features of their own behaviours that are both functional and less helpful in the situation. The combination of the tool and the observer's commentary together provide an outside view that can lead to the learner reappraising what they have done and identifying what they need to change on subsequent occasions and in future collaborations.

In the context of the observation of teamwork, a structured tool helpful for observers who may be drawn to and focus on the performance of the substantive task—the clinical activity—rather than the operation of an individual within a team. The tool deliberately draws attention to individual behaviours demonstrated to have an influence on team performance.

Stages of use

There are three stages of activity that you, the observer, need to attend to: 1. preparation and briefing before the teamwork, 2. observation and recording during the teamwork itself, and 3. subsequent debriefing and conversation after the teamwork .

Before the activity

Observer preparation

Familiarise yourself with the form and check that you understand all the descriptors of behaviour, what they mean and how you would recognise them in the context of the given activity. There will not normally be time to do this during the observation itself.

If possible, inform yourself of the prior experience of the learners involved with ideas about team behaviour, their prior learning about teamwork and group work practice in team settings. This may be done through checking the relevant curriculum documents or contacting the learners or tutors before the activity. Are you dealing with a set of learners familiar with teamwork in theory and practice and with the particular instrument? If they are unfamiliar with basic ideas about teamwork, be prepared to direct them to relevant resources.

Ensure all learners have a copy of the **iTOFT** and **Learner Guide** well in advance of the activity

Preparation and briefing of participants

If the learners/observed are not familiar with the instrument, provide a brief orientation to:

1. Reassure that the exercise does not involve grading, contributing to final judgments or examination scores, except perhaps as part of a portfolio for interprofessional learning. It is an opportunity to learn and identify areas for improvement. The observer is there to provide useful information not to assess them. It is a formative and not a summative process with the overall aim of improving patient care.
2. Emphasise that the tool focuses on particular behaviours associated with effective teamwork performance. They should prepare themselves by making their own assessment of the areas they want to focus on in the current activity and what kinds of input they would find most useful from an observer. Not all the behaviours included in the tool will be relevant for every teamwork activity; this will depend on the context and situation. However they are all important teamwork behaviours in relation to health care overall.
3. Mention that there will be a short discussion after the activity during which they will get a copy of the completed form and be given further feedback on key points by the observer. They should enter into this as a dialogue in which they seek information and guide the observer to areas they would find most helpful. They should make plans for what they would do the same and differently following this discussion and document them on the iTOFT.
4. Encourage them to focus on the activity at hand, what the team is doing and what they are doing as part of the team, and not you as the observer.

During the activity (observation and recording)

In the observation phase, position yourself so that you can see all the interactions of the team that involve the person being observed, but be as unobtrusive in doing so (e.g. do not be in the direct sight line of the person being observed). During this phase, do not intervene or provide any commentary unless there is a safety issue or risk to a patient involved and you need to do so as part of your duty of care.

Work out how you will initiate the post-activity discussion in a way that will most thoroughly engage the learner and make them feel that the observation process is worthwhile.

After the activity (feedback and debriefing)

- Give the person you have observed some time to make notes and reflect on the activity.
- Take aside the person you have been observing so that your discussion cannot be overheard (this may be difficult in the clinical environment, you may need to identify a suitable location beforehand). The discussion is between you and the person observed, not the whole team. In situations where the tool is used extensively, there may be occasions in which it would be appropriate for others to become involved in this discussion, but this should be established beforehand.
- Have the learner speak first. Encourage them first to reflect on their own behaviour—what were they pleased with, and what were they concerned about. Then, ask them what teamwork behaviours they would like you to focus on and what type of observations they may find most useful from you.

- Note the state of the learner (this is helped by having them speak first). Are they engaged or distracted or feeling unsure? Are they anxious? Couch your comments in terms of this observation.
- Reinforce what you agree with them about, but spend most time on areas in which their observations differ from your own. It is more important to have them make accurate judgments about their own behaviour than it is to exhibit any particular behaviour.
- Foster engagement of the learner in the feedback process. Stress throughout that you regard it as important to have them say what kind of comments they most need for their own development.
- Always focus on what specifically occurred. Give examples of all the points you want to make that are grounded in the actual interactions observed. Keep returning to what happened rather than generalise.
- The important characteristic of your interaction is dialogue and interchange, e.g. what constitutes standards of good team behaviour and how are these manifest? What alternative ways of behaving are possible in such a situation? The behaviours listed on the form are generalisations and need to be grounded in what the learner understands and can do and this can only become apparent and worked through in discussion.
- Encourage the learner to identify and record specific steps they would take if involved in a similar situation in future. Keep in mind that ultimately what counts is not what you write or say, but what they take up from this and act on. Good feedback is judged not in terms of the quality of the input made, but on the effect that it has on improved practice.
- Notwithstanding time constraints, avoid rushing the discussion. Spend as much time as is needed and provide the learner with the opportunity to have the final comment. It is the quality of the interaction that will influence change not the ratings on the form or your elaboration of them.
- Leave the form with the person and encourage them to make their own notes immediately following your discussion.
- Ask the person how worthwhile they have found the experience and discussion.

Section 7: Detailed learner guide

What is the iTOFT for?

The purpose of this tool is to provide you with an external perspective on what you do that contributes well to the team, and what you need to do to be more effective. It is structured around features of teamwork behaviour that have been demonstrated to have an effect on team performance.

Observers may be tutors, practitioners of various kinds, preceptors, and/or learners who are not part of the team under observation. While the basic use of the iTOFT is common across all observers, each provides a different kind of perspective and the direction of discussions following observations may therefore vary. We do not include patients as users of the iTOFT as they are really part of the team process, however they may be asked for feedback as appropriate during or after the team's interaction with them and their families.

While the tool emphasises what is effective in promoting good team functioning, keep in mind that the team only exists in order to do a particular job well, so don't lose focus on that. The challenge of teamwork is to have a dual focus on solving the problem while monitoring how you and the team are operating.

How can it be used?

The tool is most effective when you engage with it both before and after a teamwork experience, and when you take an active role in seeking and using feedback. Don't wait for an observer to tell you. Tell them what you need so that they can give you the help you want. If you don't tell them what you most need, they are unlikely to provide it!

Getting the most out of the activity and learning from teamwork involves thinking ahead of time as well as processing it afterwards. The following are prompts for each aspect of this:

Before

1. Find out what you can about the type of activity and the kind of team you will be part of
2. Identify clearly (a) what the team needs to do to get the work done, and (b) what you want to get out of the activity in relation to working in a team
3. Think about comments others have made before about your operation in a team, even if this was in quite a different context. What implications might these have for what you will do now?
4. Review the tool to identify (a) areas in which you think you need to develop, and (b) particular behaviours you want to practise
5. Make a note of what thoughts or types of behaviour you should take into the new situation
6. Recognise that any particular episode of teamwork may not allow you to practise all that you wish

During

7. Focus on the activity and being an effective member of the team
8. Mentally note what is going on in the team as well as how you are collectively dealing with the task
9. Don't get so absorbed in your part of the team task that you don't notice what others are doing and the effects you might be having on them. Try to consciously shift perspective between the substantive task and the operation of the team (the team process) from time to time
10. Ask yourself at each stage of the activity: what is it best to do to ensure a good outcome for the team as well as the task?
11. Make a mental note of anything you want to ask the observer about

After

12. Before you talk to anyone else, reflect on (a) how the team performed, and (b) how you contributed to the team's performance. Keep in mind that it is unlikely that overt displays of 'leadership' help the team most. Use the iTOFT items to reflect on your behaviour
13. In the light of your own provisional analysis and judgments, tell the observer what kinds of comment you would find most helpful. You may wish to confirm them or have them refuted. Think about what kinds of information would be most useful in developing your teamwork skills. What kind of behaviours do you most want the observer to focus on?
14. Be open to comments about aspects of your behaviour that you didn't think were problematic
15. Don't respond defensively: if you do you will miss important information. Seek clarification as you need it, but don't indulge in justification as this will lead you to miss important information you need (for example, 'I only did this because she did that'). If you think that the observer has missed something important about your behaviour, ask yourself what might have led them to that view. Perhaps some aspects of your behaviour lead others to misinterpret your actions.

Finally, ask yourself: what can I take away from this? The comments on the sheet are a starting point for your own identification of actions that need to be taken. Identify what you should do. For example, do you need to:

(a) Find out more about how teams work and how members can contribute to them?
(b) Try out some of the behaviours noted?
(c) Practice your teamwork interventions in areas seen as problematic and locate observers who can help you with further cycles of feedback?

While you may not have an identical situation in which to practise, there are many other occasions in which you work with others in groups for you to observe your own behaviour and try new ways of acting.

Additional uses

There will be many opportunities during which you may wish to develop teamwork skills when observers will not be available. There are three other ways to use the iTOFT to help you develop your skills:

1. Self-administered with personal reflection: the use of iTOFT to prompt individual sense-making
2. Self-administered with team debriefing: iTOFT as an aid to discussions within a work team
3. Non-synchronous use: video or audio recording of teamwork followed by viewing of the recording by an observer or other members of the team using iTOFT at another time.

1. Self-administered with personal reflection

Use the prompts of the iTOFT on any occasions of teamwork you wish. Fill it in for yourself and identify which behaviours you were able to demonstrate and which you need to work on further. Identify what you would need to do to bridge the gap between your current rating and where you would want to be. Draw on the resources provided elsewhere in the **Learner Guide** and choose other occasions when you may be able to practise.

2. Self-administered with team debriefing

When tutors or other observers are not available, it is open to the team to use iTOFT to record their own observations of each other immediately following a teamwork event. Whilst recall of observations afterwards is not a accurate as those done during the event, there is considerable benefit in team members sharing their own perceptions of each other. Even when you may doubt that others have given a valid response, it is still useful to know what their perceptions are of your contribution.

3. Non-synchronous use

There may be circumstances in which you can obtain permission to record a team session for the purposes of learning only. Record the event using video or audio recording and show this to a trusted observer who can complete the iTOFT form using the **Observer Guide** just as they would have done had they been present. On other occasions the viewing of such a record can be used for a team debriefing.

Section 8: Guide for those organising teamwork development within programs

A common challenge in many programs is to find ways of incorporating practice and feedback of teamwork into courses. While it is not the role of this guide to propose a curriculum for teamwork development, it is important to identify circumstances in which this tool can be usefully utilised.

The most important thing to emphasise is that a single occasion of teamwork activity or the use of the tool on a single occasion is likely to have very little effect. This might lead to some raising of awareness of some of the behaviours needed and issues involved, but it is unlikely to improve behaviour or performance.

Desirable prerequisites for use in a program

The following are features which will enhance the development of teamwork capacities when using the iTOFT:

- Learning outcomes associated with teamwork are part of an appropriate course unit or clinical placement
- Learners have been introduced to ideas about teamwork and interprofessional practice, have read about issues in teamwork and have ready access to resources they can consult further
- Examples of good practice in teamwork and commentaries about features to notice are available to learners to view (e.g. video clips etc.)
- Criteria for and models of good teamwork are available to learners
- Multiple occasions of teamwork have been arranged in the program with opportunities for learners to discuss their outcomes and relate these to their growing understandings and the resources they have consulted
- iTOFT is used with a observer for a minimum of two separate episodes of teamwork for each learner. Without repeated use the feedback mechanism can't effectively operate.
- Sufficient time is scheduled for both teamwork practice and the dialogues needed after each observation. This time will vary depending on the activity
- Comparisons are made of completed iTOFT forms for multiple occasions of use by the learner and supervisor as appropriate
- Learners are advised about alternative uses of iTOFT that don't involve the presence of a tutor/ practitioner observer (see Learner Guide)

Section 9: Conceptual framework for feedback

Key features of interprofessional team learning have been carefully represented in the observed behaviour items of the tool. However, one of the most important features of the use of the tool is in the observations made by those using it and the ways they are communicated to learners through the feedback process. Reflection following the observation and feedback dialogue also adds to the impact of the tool and the observation process.

How to provide formative assessment and build effective feedback into courses in higher and professional education has been subject to considerable recent research and reconceptualization and many of the taken-for granted nostrums of formative assessment and feedback in health-related courses are being challenged. The guidelines for feedback discussed in sections B and C are based on this contemporary thinking about assessment and feedback. The emphasis of this research is on how to engage with learners in ways likely to result in discernable change and the conditions to ensure that feedback discussions are likely to be acted upon. As is discussed in the Planner Guide, multiple opportunities for practice and the use of iTOFT is needed for the effective development of teamwork within programs.

The main aspects of assessment and feedback research drawn on here are those that focus on how assessment and feedback contributes to the ongoing learning of learners and the need for feedback necessarily to have an impact on what learners do rather than merely providing information.

Sustainable assessment and assessment futures

Learner assessment has experienced a quiet revolution in the past ten years or so, but these changes have not been so clear in everyday assessment practice. The term 'sustainable assessment' was used to focus on how assessment practices can equip learners for the challenges of learning and practice they will encounter once the current episode of learning is complete. It refers to assessment 'that meets the needs of the present and [also] prepares learners to meet their own future learning needs' (Boud, 2000, p. 151). This notion of sustainable assessment built upon a strong foundation of formative assessment (Black and Wiliam, 1998), but took the idea of formative assessment further to refer not just to the formation of learners within the timescale of a given course, but to future professional practice for which the course was a precursor. It suggested that 'for learners to become effective lifelong learners, they need also to be prepared to undertake assessment of the tasks they face throughout their lives' (p. 152). Such a view is a profound shift in thinking about assessment. Assessment in this view needs ultimately to be judged in terms of its influence on a learner's future actions.

Considerable development in assessment arose from these conceptualisations and moves were made to translate these into everyday assessment practices. While there are now many examples in the literature (eg. Fastré et al, 2013), a consolidated source of practical suggestions can be found on the Assessment Futures website (http://www.assessmentfutures.com). There is a very wide range of different kinds of assessment tasks represented there, all of which can be designed to contribute in someway to the building of learners' ability to learn and assessment beyond the end of the course, as well as address the immediate needs of formative or summative assessment. Of course, not every episode of assessment or learning task leads to marking or grading or contributes to final results. However, all potentially lead to further learning and thus considerations of feedback apply to them all whether or not there is a formal communication of information from teacher to learner as they all generate information of one kind or another that learners can use.

There are four key features of assessmentfutures.com: the need for sustainable assessment, the imperative that assessment should foster learners' ability to make judgments, the importance of constructing learners as reflexive learners, and the goal that assessment helps form useful dispositions of learners towards their professional practice. Types of tasks are arranged around the themes of: engaging learners, authentic activities, learners designing assessments, integrative tasks, learning and judgment, modelling and practice, working with peers, and giving and receiving feedback (Boud, 2010).

Sustainable feedback

Hounsell (2007) took up these ideas about sustainable assessment and used them to describe what he referred to as sustainable feedback. This is simply the application of these practices in a feedback context, that is, as a way of rethinking how feedback practices could equip learners to continue learning beyond the course. Subsequent reiterations by Carless (2011) highlighted the current absence of a significant role of learners in the feedback process, and Nicol (2010) similarly argued for feedback to involve the learner more in dialogue than as recipient of teachers' monologues of assessment commentary. More recently, Boud and Molloy (2013) proposed a new understanding of feedback that develops learners' evaluative capacity by recognizing feedback as a way of fostering active learners, and which may begin with developing learner dispositions towards seeking feedback.

Defining feedback

Courses in higher education are more frequently criticised in learner surveys for deficiencies in assessment and feedback than any other aspect (see for example the National Student Satisfaction Survey UK and the UTS student feedback survey) and this has resulted in renewed interest in what feedback is and how it can work effectively. In particular, it has led to recognition that feedback in educational settings, just like feedback in any other systems, must be characterised not in terms of inputs that are made, but the effects that result. Boud and Molloy's definition of feedback captures this as:

> "a process whereby learners obtain information about their work in order to appreciate the similarities and differences between the appropriate standards for any given work, and the qualities of the work itself, in order to generate improved work" (Boud and Molloy, 2013b, p. 6).

Teachers or others offering feedback information can therefore only confirm that learning has resulted from feedback processes if learners act on feedback, to complete a feedback loop (Sadler, 1989).

Different generations of feedback

When used in its original disciplines such as engineering, feedback describes what happens when information from a system is reinserted into the system to change its behaviour. Determining if feedback has occurred involves observing a change in response of the system. Commonly, when the idea of feedback is transferred to the educational context, the notion of providing information with the intention of changing the system (in this case, the learner) is retained, but the notion of seeking to observe a change in output is often missing. It is assumed that the desired change will occur or that if learners could pay sufficient attention to the input (eg. comments from a tutor), then the desired learning outcomes could be produced. Without knowledge of effects, the information we commonly call 'feedback' cannot adequately produce desired changes. The feedback loop is not completed, and thus feedback—in the sense understood for example by engineers—has simply not occurred. A signal has been transmitted (input from teachers), but we have no knowledge that it has been received or acted upon (through change in learners). Attending to this input is a necessary but not sufficient condition for 'feedback' to have an effect.

To ensure that feedback works for learning, we can start by making sure that there is some evidence that the feedback loop has been completed. This version of feedback has been termed Feedback Mark 1 (Boud and Molloy, 2013). The educational implications of this simple application of what feedback means in disciplines other than education are substantial. In order to identify an activity as feedback it would be necessary to detect that information provided to

learners was firstly apprehended and that it resulted in some kind of change, i.e. it has educational impact. For this to be identifiable, it would be necessary to have knowledge of subsequent work of the learner in which a change could be observed. Feedback would therefore be positioned not as an act that occurs at a single point in time—at the point of transmission of information from teacher to learner—but one that needed to be completed over time—when knowledge of subsequent work is communicated from learner to teacher.

Unfortunately, such a practice of following learners' work over time cannot always be achieved. And, even if it could be achieved, it would place too great a burden on teachers or tutors to make such inputs whenever they were needed. Indeed, in many clinical settings it is difficult to ensure that learners are observed let alone receive any useful information about their practice. Treating learners as if they were a mechanical or electronic system is also not a reasonable assumption to make about learners who have volition.

Any reframing of feedback must therefore take into account the agency of learners and how they respond to the input of others. Recognising this active role of learners implies that for them to act effectively on the input of others:

- They must value such input,
- There must be some kind of dialogue between giver and receiver (Nicol 2010) to appreciate criteria and standards to apply,
- That trust between giver and receiver be built for the learner to invest the time and effort required to act on information given (Carless 2009)
- That learners develop their capacity to calibrate their own judgements and appreciate the qualities of their work and how it might otherwise be improved (see following section).

This then leads to the next generation of feedback thinking: Feedback Mark 2 (Boud and Molloy, 2013a). This involves a central role for learners, not merely as recipients of information, but as active agents seeking and using information from a variety of sources. This requires two-way interactions between giver and receiver, and the use of peers, non-human sources and practitioners as well as teachers. Other parties are used not simply as information sources, but as means whereby learners can calibrate their own judgement, and create for themselves the expertise needed for further study and performance (Boud, Lawson and Thompson, 2013).

This view of feedback sees feedback as a curriculum element that responds to and drives learning. It is not a separate process, but a pedagogical practice that is an integral part of all learning processes. Feedback becomes a design feature of courses, located to enable sufficient practice to be had, for feedback loops to be completed and effectiveness in self-judgement developed as a learning outcome. It is also a strategy that can be deployed by learners as and when it is needed for their own learning paths. This dual nature of feedback acknowledges that while productive learning environments can be constructed for courses, in order for them to be fully utilised, there also needs to be a disposition on the part of learners to utilise what is available to them and the ability of learners to realise the potential of the environment.

Learners developing judgment

Unless learners can make good judgments about the quality of their own work beyond the end of the course in which they are enrolled, the assessment within that program cannot be regarded as sustainable.

Sadler has proposed that self-evaluative skills need to be developed 'by providing direct authentic evaluative experience for learners' (Sadler, 1989, p.119), that is, involving learners in making specific judgments about particular work they have undertaken. However, as in the development of any form of expertise, skills have to be developed over time. Even multiple examples of self-assessment activity deployed from time to time are likely to have relatively little influence. As learners will encounter new domains of knowledge that require new behaviours, these changes are disruptive for learners. It is unlikely that their judgment will improve continuously as novel situations are encountered.

The role of feedback in the development of judgment is therefore particularly important (Boud & Molloy, 2013a). Learners need to have ways of knowing whether their judgments are realistic and be able to assess these in the light of evidence. Through such calibration against others' judgments, learners can identify the areas in which they need to improve and see shifts in their ability over time. This evidence is commonly available from teachers or tutors who can provide useful information about whether work meets required standards and, if it does not, how these standards can be met. However, Sadler suggests that learners should develop means of evaluating the quality of their own work through moving beyond 'teacher-supplied feedback to learner self-monitoring'. He proposes that the situations in which they learn need to 'make explicit provision for learners themselves to acquire evaluative expertise' (Sadler, 1989, p.143). Feedback information from others may be necessary; it is not enough on its own for learners to develop evaluative expertise.

Indeed, evaluative expertise alone is not sufficient for improvement, as Ramprasad (1983) has argued. Drawing on Ramprasad, Sadler (1989) identified three requirements for effective feedback, that is feedback that influences learning: (1) a knowledge of appropriate standards, (2) a comparison of one's own work with these standards, and (3) the taking of action to close the gap between the two (Sadler, 1989, p.138). Standards not only need to be explicit—perhaps derived from statements of competencies included in regulatory requirements—but learners need to appreciate how these standards are manifest in work of the kind in which they are engaged. Relating these standards to one's own work needs an ability to see in one's own work behavioural indications of achievement. Finally, closing the gap requires opportunities for subsequent practice to show this knowledge translated into action.

A particular feature of the design of programs to aid this process is for learner judgments to be matched to those of experienced judges of the kind of work being considered. Noticing the qualities of work in one's own practice is difficult and the availability of the judgments of others with respect to the very criteria needed to judge one's own work is important. In such situations discrepancies between learners' judgment and that of the expert observer are important pointers for raising learners' awareness about what they need to do to subsequently improve their work.

Characteristics of good feedback information

While the importance of outputs from feedback processes, rather than inputs to them, has been strengthened in recent scholarship, this clearly does not mean that inputs are inconsequential. If these inputs are inappropriately constructed, then their potential value cannot be realised

Hattie and Timperley (2007) have shown that the extent to which feedback information serves to reduce the gap between current and desired performance is partly dependent on the level at which the feedback operates. Learners respond in different ways to different types of information so the information needs to be tailored to what learners need to do with it. Some information and some ways in which it is framed are demotivating and act to inhibit learning (Shute, 2008).

Hattie's model proposes that feedback can be directed at four different levels of operation of the learner and that feedback may well be ineffective if directed at an inappropriate level. The responses that learners make are dependent in part on the focus and type of feedback they get. If the focus is inappropriate to the needs of the learner, the information can be ineffective because the learner is unable or unwilling to transform the information into action where it is needed. A simple but regrettable example of this is the frequent use of the humiliation of learners in the health professions (see Lempp & Seale, 2004; Seabrook, 2004). The discussion of the four levels below is adapted from Jolly and Boud (2013).

Task focussed (FT).

Task focused information emphasizes how well a task has been done, identifying when statements are incorrect or contestable, and suggesting that more or different information is necessary to complete the task or do it better. It is most powerful when learner problems are about faulty interpretations, not lack of information. Comments at the task level do not necessarily generalize to other tasks.

Process focussed (FP)

Process focused comments are addressed to the processes used when completing tasks or to those used to make connections across tasks to broaden or expand tasks into new areas. In comments of this kind, learners are assisted to create meaning and relate to the connections between concepts, to how learners' cognitive processes are being developed, and to their application to other more difficult or untried tasks. One mode of process focused feedback tackles learners' strategies for error detection, which can range from finding a different way to express an issue to self-diagnosis by the learners of their misunderstanding. Comments at the process level can be more effective than at the task level for enhancing deeper learning. For example, asking learners to explain to themselves or a peer, will sometimes trigger a realization that they have omitted something important.

Self-regulation focussed (FR)

Self-regulation focused comments have the greatest potential to influence what learners do. Feedback is a two way process and one that, under the right circumstances, should originate within the learner. Self-regulation includes the way learners 'monitor, direct, and regulate actions toward the learning goal. It implies autonomy, self-control, self-direction, and self- discipline' (Hattie and Timperley, 2007, p 93); 'less effective learners have minimal self-regulation strategies, and they depend much more on external factors (such as the teacher or the task) for feedback' (p 94).

Self -regulation focussed comments have at least six elements that mediate the effectiveness of feedback. They are:

I. *Capacity to create 'internal' feedback.*
This includes feedback directed at encouraging the learner to monitor their engagement with work and how they are going. It focuses on the type of outcomes required and the attributes of effective cognitive strategies' required to meet them. This is the first step in self-regulation.

II. *Ability to self-assess.*
The major powerhouse of self regulation in the model involves two sub elements. First, cognitive activities where learners constantly review and evaluate their skills, their need for more knowledge about a topic, the way they are thinking about it, and how they will identify missed opportunities. Second, mental strategies to plan tasks, correct errors, and generally fix things up in their work. Put together these two sub-components deliver strengths in evaluating understanding, both in relation to curricular goals and in judging performance against that of peers.

III. *Willingness to invest effort into seeking and dealing with feedback information.*
Learners can seem to have a cost-benefit approach to using feedback appropriately. If the balance of the effort against other factors such as potential loss of face, or the difficulty of interpreting feedback, is not seen by the learner to result in a positive outcome, feedback will not be sought. The easier feedback is to assimilate, and the less it 'costs' the learner to deal with, the more likely the feedback is to produce change.

IV. *Degree of confidence or certainty in the correctness of the response.*
Feedback has its most potent effect when a learner expects a task to have been done correctly and it turns out not to be so. If the learner has low confidence in what they have done, and are given negative feedback about it, this feedback can be ignored. When this happens, additional education and/or direct information is more effective than more feedback on the same topic – a type of 'clear the decks and let's start again approach'.

V. *Attributions about success or failure.*
Learners' views about what caused the success or failure will have a major impact on the effectiveness of the feedback. One determinant of the capacity of learners to inappropriately attribute their performance to external rather than internal factors is the degree of clarity of the feedback. When it is unclear, and does not specify the basis on which learners have met with success, or lack of it, feedback can aggravate poor outcomes and increase uncertainty about how to approach the task again. Conversely, feedback that identifies he learners' own efforts as the contributor to performance can increase commitment and level of outcomes.

VI. *Level of proficiency at seeking help.*
In general, getting hints about work rather than answers to the tasks posed is more effective in focusing on the self-regulation dimension. Getting 'the answer' that can be reproduced to save time is information, at best, only at the task or process level.

Person (self) focussed. (FS)

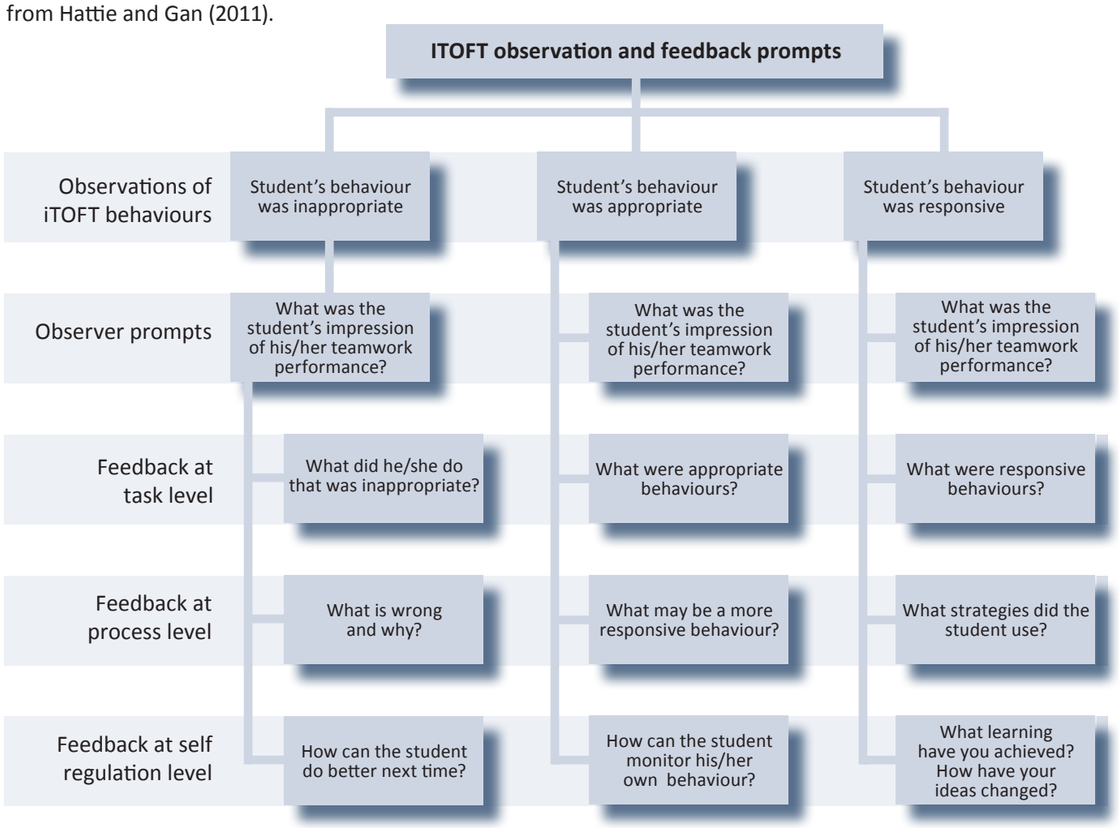
The key difference between self-regulation and person-focused feedback is that self-regulation feedback includes information about the learner's capacity to apply a metacognitive view of their task-related efforts, skills and intellectual deployment. Person-focused feedback is directed at personal attributes, such as understanding, intelligence and ability. It usually contains little or no task-related information. Examples of person-focused statements are 'You did a great job'; 'You are so clever'; 'You have a very interesting approach to things'. For this reason, person focused feedback is usually ineffective: it doesn't include information on matters that learners can see that they can change.

Studies have shown that such praise on its own, while highly valued by many learners, does not translate into more engagement with, or commitment to, learning goals, does not promote self-efficacy, nor lead to greater understanding about learning tasks. The effects of person-focused feedback are usually too dispersed in relation to usable content (task, process or self regulation information) to be effective.

However, praise directed to the person sometimes can be a vehicle for information on process issues. This would involve comments on effort, self-monitoring, engagement, or on cognitive operations relating to the task and its performance. So, although person focused feedback is not generally recommended, when also accompanied by rationales and highlighting of processes (process or self-regulatory focus), it can be a useful route to more effective modes. Both self-regulation and person focused feedback are directed at the personal attributes of the learner. They stem from teachers' perceptions and tend to be normatively judgmental. Nevertheless, person focused feedback may also be used to build trust between the learner and a supervising professional. Written person-focused statements (notes and emails) may also carry more weight than 'off the cuff' comments. They can also set better-defined challenges or limits to the learners' activities. For example 'I am impressed by your capacity to develop a management plan for this type of patient, but just check in with me briefly before prescribing this drug again: we need to ensure you have a complete grasp of the side effects and contra indications'. For undergraduate learners: 'When working on the team activity you listened well and encouraged other team members to contribute. I feel you had a lot more to contribute yourself to the discussion in relation to your own professional knowledge particularly when the team was considering how best to encourage the patient to increase her activity level'.

The levels of feedback in relation to the ITOFT are demonstrated in the diagrammatic model (fig. 9.1) adapted from Hattie and Gan's graphic organiser on feedback levels and question prompts (2011).

Figure 9.1. iTOFT feedback observation and feedback prompts, adapted from Hattie and Gan (2011).



Summary

In summary, what emerges from recent research and scholarship on feedback are the following points:

- Learning involves bridging the gap between desired and actual performance
- Feedback must be judged by its effects on learning and performance
- It is necessary to look beyond the immediate task: acts of assessment must leave learners better equipped to learn further
- Learners need to develop a view about what constitutes quality work if they are to be able to demonstrate it for themselves
- Feedback is not a unilateral act by tutors or trainers, but a set of interlinked activities
- Learners need always to be positioned by tutors and other staff as pro-active learners, promoting feedback-seeking behaviour.
- Knowledge of the learner's desires and expectations is needed for effective input
- Effective learning requires dialogue
- The overriding purpose of feedback practices is the refinement of learner's capacity use of information to judge themselves in similar situations
- Inputs from tutors are important as they can open up or close down learning possibilities.

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