



Building interprofessional learning sustainability: development and evaluation of an interprofessional learning placement resource

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Abstract

The workplace setting is ideal for health care students on placement to develop interprofessional competencies through relevant, authentic and engaging interprofessional learning (IPL) experiences. Stand-alone structured IPL programs, where the primary focus is on IPL, are often labour intensive, logistically difficult to timetable and challenging to sustain. A practical, scalable and sustainable approach to promoting IPL is to build IPL experiences into each discipline's regular placements. Thus, IPL becomes part of usual placement practice, rather than being treated separately. This approach capitalizes on currently under-utilized informal IPL opportunities within the workplace. We have used an educational design research methodology to develop and evaluate a stakeholder-informed set of authentic, practical and relevant IPL activities for use by students and their educators when on placement. Through an iterative cyclic process utilizing surveys, focus groups, workshops and interviews with students, placement site educators and academics, we have developed a publicly available interactive website containing the IPL activities. Student learning data are captured via an online form at <https://health-ipl.sydney.edu.au/>. Importantly, we have extracted a set of design principles that enable others to build on the learnings from this study. Future analytic data collected from our website will enable this approach to IPL to have impact in the longer term.

Keywords: interprofessional learning, informal learning, clinical placement

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INTRODUCTION

Within health care curricula, interprofessional learning (IPL) is widely recognized as an essential graduate capability on entering the workplace (Frenk et al. 2010; World Health Organization 2010). We adopt the widely used definition of IPL to be when two or more students, 'learn about, from and with each other to enable effective collaboration and improve health outcomes' (World Health Organization 2010, p.13). On graduation, our health care students should understand, value and respect other professional roles, place the patient/client at the centre of health care delivery, and be confident and competent in integrating the skills, knowledge and perspectives of others when providing patient/client care (O'Keefe, Henderson & Chick 2017; Schmitt et al. 2011). Accreditation standards for many health professional courses now demand evidence that IPL has been incorporated within curricula (e.g. Australian Nursing and Midwifery Accreditation Council 2012, Medical School Accreditation Committee 2012, Physiotherapy Board of Australia and Physiotherapy Board of New Zealand 2015). However, these demands are not easily met. The challenges faced when embedding IPL within curricula are well documented. These include, for example, timetabling constraints, fitting IPL into an already crowded academic curriculum, and reliance on 'champions' to drive IPL activity (Lawlis, Anson & Greenfield 2014; Nisbet et al. 2011).

To date, the IPL literature has focused mainly on the delivery of more formal structured IPL programs, whether that is through campus-based classroom teaching (e.g. Kilminster et al. 2004), in the placement setting (e.g. Nisbet et al. 2008, Kent et al. 2018), as simulations (e.g. Gough et al. 2012, Kumar et al. 2018), or via online learning (e.g. Solomon et al. 2010). These structured IPL programs often require: timetabling well in advance to ensure the availability of students; substantial infrastructure development (for example with simulation or online platforms); and additional staff resources for teaching and program administration. Many remain as small, extra-curricular voluntary IPL experiences, and therefore fall short of meeting accreditation requirements for all students to have opportunities for IPL.

A complementary and potentially more practical, cost-effective and sustainable approach to incorporating IPL into the curriculum is to capitalize on those contexts where students *informally* interact with each other, for example the placement setting, and develop these as IPL opportunities. This builds on the notion of 'informal learning' found within the broader education literature (Eraut 2011; Marsick & Watkins 2015; Wolfson et al. 2018) and contextualized to the health setting by Nisbet, Lincoln and Dunn (2013). Although the term 'informal learning' is contested within the education literature (Billett 2004), we define it as the unstructured, experiential learning that occurs as part of everyday work practice (Marsick & Volpe 1999; Regehr & Mylopoulos 2008). Learners are actively engaged in the experience through interacting with others as they ask questions, observe practice, provide information, and/or give and receive feedback (Cerasoli et al. 2018; Noe, Tews & Marand 2013; Tannenbaum et al. 2010). This type of learning is not necessarily recognized as learning (Eraut 2004, 2011; Nisbet, Dunn & Lincoln 2015) as it is often implicit and forms part of our tacit knowledge (Eraut 2000). However, by adding some intentionality to the learning process, the implicit becomes more explicit. This is clearly captured through a typology for informal learning (Eraut 2000), where intention to learn is categorized across three levels:

- 1.** implicit, unintended learning where there is no awareness of learning as it occurs
- 2.** reactive learning where there is some awareness of learning but it is unplanned, taking place almost spontaneously in response to an event, and
- 3.** deliberate learning where time is set aside for acquiring new knowledge and learning is an intentional component of the workplace activity.

Roxå and Mårtensen's work builds on Eraut to argue that informal learning is not just dependent on intentionality and reflection, but also upon the 'traditions, norms and habits of the local context' (Roxå & Mårtensson 2015, p. 194).

It is the third element of Eraut's typology for informal workplace learning, 'deliberate learning', that we draw on for this current study. This study aimed to develop and evaluate a stakeholder-informed set of authentic, practical IPL activities for use by students and educators on placement that can readily be built into each discipline's regular placements. Thus, rather than set up a separate IPL placement, IPL becomes part of a student's usual placement practice. Students invariably interact with students and staff from other professions as part of their everyday placement experience. For example: a speech pathology student may interact with a nutrition and dietetics student (or dietitian) to discuss the most appropriate diet and texture for a patient who has had a stroke; an occupational therapy student may work with a classroom teacher to make adjustments to the classroom environment for a student; a nursing student may attend a morning medical ward round, providing a nursing update on overnight care. These types of situation can provide opportunities for learning that may go largely unrecognized. We suggest they provide immense potential for IPL, particularly

if appropriate learning resources are available to make the learning process more intentional and hence more explicit.

Interprofessional learning on placement using existing workplace opportunities, as described above, can partly be theorized through Billett's work on affordance and engagement and the notion of learning as occurring through participation in everyday work practices (Billett 2001, 2009). Authentic learning activities and interactions afforded in the placement setting can support learning (Billett 2016). For instance: guidance from educators, interaction with peers and other health professionals, structuring and ordering of workplace experiences to match student ability. However, it is how the students elect to engage with these affordances that influences learning (Billett 2001, 2009). Reflective practice (Boud, Keogh & Walker 1985; Schon 1983) can also help conceptualize the learning process required to shift from unintentional to the more deliberate informal learning of Eraut's typology outlined earlier. Through deep reflection, new insights are likely developed, bringing about changes in understanding, perspectives or the way something is done or acted upon (Nisbet, Lincoln & Dunn 2013). In other words, learning becomes explicit.

Although the notion of informal workplace IPL for existing practitioners is gaining traction (Nisbet, Lincoln & Dunn 2013; Wagter et al. 2012), few researchers have considered its application for pre-registration students and how we might shift from the implicit to more explicit workplace IPL (Kent & Nisbet 2018; Rees et al. 2018). However, we can draw on the broader IPL literature to inform ways of building IPL into existing student placements so that IPL becomes part of usual placement practice. A literature scan of peer-reviewed and grey literature as part of this current project (available on request from the authors) identified a wide range of publicly available IPL resources from more structured IPL programs that could potentially be adapted to provide the necessary affordances to support workplace IPL. For example, we considered the length of time to complete the IPL activity, suitability for a range of placement settings and/or staff resources required. These included: case-based discussion and other joint student activities (Anderson & Thorpe 2010; Gilbee et al. 2014; O'Carroll et al. 2012; van Soeren et al. 2011); interprofessional shadowing (Lait et al. 2011; Riva et al. 2010); patient interview (Street et al. 2007); and reflection (Zarezadeh, Pearson & Dickinson 2009). What is missing though, is a resource specifically tailored and readily accessible to capitalize on informal IPL opportunities in the placement setting. Therefore, this study aimed to develop and evaluate a stakeholder-informed set of authentic, practical IPL activities for use by students and educators on placement. We sought to answer the research question, 'what are the essential elements for an IPL placement resource that will best engage students, placement site educators and academics in workplace IPL?'

METHODS

DESIGN

We used educational design research methodology for this project (Plomp & Nieveen 2013). Design research is ‘...the systematic analysis, design and evaluation of educational interventions with the dual aim of generating research-based solutions for complex problems in educational practice, and advancing our knowledge about the characteristics of these interventions and the processes of designing and developing them’ (Plomp 2013, p.16). Design research focuses on understanding and improving the intervention (Van den Akker et al. 2006); in our case this is the IPL placement resource. Furthermore, involvement of users is critical to ensure relevance and successful future implementation of the intervention (Van den Akker et al. 2006). Typically, there are three phases to the methodology: a preliminary research phase that generates the conceptual framework; a prototyping phase involving cycles of development and evaluation; and an assessment phase, which evaluates how well the project outcome meets the initial specifications for the design (Plomp 2013). An overview of the phases of design research methodology as applied to our project is presented in Figure 1.

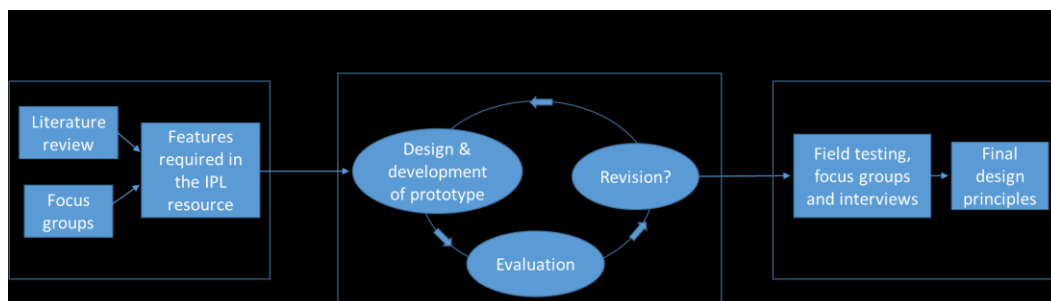


Figure 1: An overview of the design research methodology as applied to our project (adapted from Plomp 2013)

Due to the multiple phases and the cyclical nature of the methodology, where there is an iterative process of design, evaluation and revision of the design, the methods and results of this paper have been presented in one section so that the reader can identify how the findings of one stage informed the next.

PARTICIPANTS

Our participants for all phases of the study were health care students, placement site educators and/or academics from a range of health disciplines including: dentistry, diagnostic radiography, exercise physiology, medicine, nursing, occupational therapy, pharmacy, physiotherapy, social work and speech pathology. We used convenience sampling (Gravetter & Forzano 2012) to recruit to the study. Placement site educators (i.e. staff members responsible for supervising students on placement) were recruited from our study placement provider – a metropolitan tertiary referral teaching hospital. Students were recruited through emails sent to specific cohorts of students known to be on campus at the time of recruitment and/or at

our study placement provider. University academics and educators with a responsibility for placement learning were invited through project team members. Participation in the study was voluntary in all phases of the study. In total, 90 students, 29 site educators and 33 academics participated in the study across the various phases.

ETHICS APPROVAL

The study was approved by Sydney Local Health District Human Ethics Committee (Protocol number: X15—0399). All questionnaire responses were anonymous. Students were informed that participation had no bearing on their placement assessments or relationship with their placement site or their university.

DESIGN RESEARCH PHASES

PHASE 1: PRELIMINARY RESEARCH PHASE

Phase 1 set out to answer the following questions:

1. Is there a need for an IPL resource for use by students and educators on placement?
2. If so, what would this resource contain, how might it be presented and how could it be used?

We adopted a qualitative approach to answer these questions. Focus groups were held with each of the stakeholder groups (students, placement site educators, academics), with all but one facilitated by the same two project team members. All focus groups were audio-taped and detailed written notes taken throughout. In total, eight focus groups were held to capture the perspectives of each of the participant stakeholder groups (four with students; two with educators; two with academics). This was to ensure the views of all stakeholders were heard. A description of the participants in the focus groups is provided in Table 1. All but three focus groups comprised mixed professions. Logistics necessitated three focus groups being discipline specific and the need for additional student focus groups. At the end of the focus groups, participants were invited to register to participate in the next phase of the project.

Table 1: Phase 1 focus group participants

Stakeholder group	Number of focus groups	Number of participants	Professions included
Academics	2	15	Diagnostic Radiography Exercise Physiology Medicine Nursing Occupational Therapy Pharmacy Physiotherapy Speech Pathology

Stakeholder group	Number of focus groups	Number of participants	Professions included
Students	4	42	Medicine * Nursing * Occupational Therapy Physiotherapy Social Work Speech Pathology
Placement educators	2	17	Nursing Occupational Therapy Physiotherapy Radiation Therapy Social work Dentistry*

* Focus groups held with that profession only (all others comprised of mixed professions)

Two members of the research team analyzed the focus group data. Each separately listened to the audio-tapes and added further detail to the written notes. Notes were independently coded for units of meaning and codes with similar meaning were grouped under key concepts. Each participant stakeholder group was analyzed separately then across the groups, to determine any similarities. We deliberately did not attempt to draw out higher order themes as this was not the objective of this phase.

Four unique concepts were identified from the student focus group data: self-motivation; confidence; role of placement site educator; and relevance. These concepts are explained below:

Self-motivation

Students described IPL experiences as inherently valuable for future collaborative practice and patient/client care and this meant that motivation to complete these activities was intrinsic. Because of this intrinsic motivation, they did not need to be explicitly assessed on each individual IPL activity, but rather recommended that completion of the IPL activities be used as evidence towards existing overarching placement assessments.

Confidence

While some students had sought IPL experiences on placement, many students indicated that they would be unlikely to approach students or health professionals from other disciplines if they had not been previously introduced, or if it was not an expected explicit part of their placement. Overall, students indicated that placement IPL resources might help them to gain confidence by giving license to approaching or interacting with staff and students from other professions who were on placement at the same time and location as them (for example a speech pathology student and nursing student who happen to be placed on a neurology inpatient hospital ward at the same time).

Role of placement site educator

Students talked about the importance of their placement site educator's skills (e.g. teaching skills), qualities and attitudes towards interprofessional learning and practice in how a particular placement unfolded. An IPL experience could be more or less valuable depending on the educator leading it, their teaching skills and their understanding of the student's level of ability and experience.

Relevance

Students emphasized the importance of working with real patients/clients on real cases, and expressed an unwillingness to spend placement time on activities that might take them away from authentic placement tasks. The IPL activities therefore had to be relevant and to add value to their placement learning experience.

Whilst overall, academics and placement site educators were positive about the value of an IPL placement resource for student learning, four similar concepts were identified from the academic and placement site educator focus groups: capacity; quality and educational outcome; collaborative practice student skills and qualities; and culture of workplace. These are outlined below:

Capacity

Almost all educators and academics spoke of the capacity limitations of practitioners who educate students on placement, whether that be because of the number of students on placement or the workload expected of them while they are also taking students. Time pressures were frequently cited, with the implication that IPL resources must be easy to use and implement, and cannot take more time to organize than they might free up while students are independently engaged on a quality IPL activity. Some educators also raised the issue of student capacity with their own professional learning while on placement; that is, fitting these IPL activities into an already packed placement. It was noted that some courses have highly structured placement programs where it would be difficult to find long periods of time (for example, more than 1 hour) for IPL activities.

Quality and educational outcome

There was a strong view amongst participants that the IPL activities needed to be of high quality and to have professional as well as interprofessional relevance. It was felt this could be achieved by ensuring that the educational outcomes related to general placement competencies, and that outcomes were measurable, in a context where placements are increasingly governed by legal agreements between education and placement providers. Activities should also be person-centred and promote a person-centred outlook in student practice. Participants also emphasized that the best quality placement experiences are those where students are directly engaged with, or at least relating to, real-life issues and real patients or clients.

Collaborative practice student skills and qualities

Educator and academic participants were asked about the skills and qualities they thought important to develop in students to be able to work collaboratively. The most prominent of these was general communication skills. In addition, other important capabilities included initiative and self-directed learning, teamwork, respect for other professions, listening skills, curiosity and a 'switched on' attitude to learning opportunities.

Culture of workplace

Placement site educators noted that a culture of interprofessional collaboration does not exist in all placement workplaces. In these contexts, students may miss out on interprofessional role modelling and other IPL opportunities. However, it was also noted that IPL introduced at the student level could potentially have a positive influence on overall culture in these workplaces. Participants suggested an IPL resource package could be transformative in some placement contexts, promoting access to IPL experiences that might otherwise be considered too difficult or not worthwhile.

Findings from the focus groups were combined with our previous scan of the published and grey IPL literature (as outlined in the Introduction) to determine a set of features required for the IPL placement resource. These included the following:

- authenticity and relevance
- anticipated learning outcomes
- potential to prepare students for interprofessional placements
- integration within placements
- ease of implementation.

PHASE 2: PROTOTYPING PHASE

Phase 2 set out to answer the following questions:

- 1.** What are the elements/characteristics of an IPL placement resource which will best engage students, placement site educators and academics in informal workplace IPL?
- 2.** What characteristics best support functionality and usability?

Both survey and qualitative approaches (using focused workshops) were adopted in this phase.

PROTOTYPE 1: THE IPL PLACEMENT RESOURCE (PAPER-BASED PDF VERSION)

Prototype 1 of the IPL resource was a paper-based version containing five IPL activities, with a series of instructions and prompt questions to facilitate the task, and reflective questions to consolidate student learning. The five IPL activities (Table 2) were either developed by the team or adapted from other activities identified through the grey literature search. This was a collaborative and iterative process, with members of the project team taking into consideration the features required that were identified in Phase 1.

Table 2: IPL activities

IPL activity	Description of activity
Interprofessional Observation Experience	Student takes part in a structured observation of an area of practice of a student or staff member from a different profession.
Joint Patient/Client Activity	Students from different professions interact with a patient/client in providing a component of care.
Shared Workplace Debrief	Students from different professions constructively critique the collaborative care elements of interprofessional practice in a workplace
Patient/Client Experience Activity	Students from different professions listen to a patient/client's story of their interactions with multiple health or community service professionals
Interprofessional Handover or Referral Activity	Students conduct a client handover or referral to one another and give mutual feedback.

Participants who had registered their interest for Phase 2 during Phase 1 (30 students, 14 placement site educators, 14 academics) were emailed Prototype 1 with a link to an online survey developed by the research team, requesting feedback on each of the activities within the resource package. The survey comprised 5-point Likert scale questions and open-ended responses (see Appendix 1) relating to the features required for the IPL placement resource from Phase 1.

Closed question survey data were analyzed descriptively. Open-ended responses were grouped and categorized under common content. In total, 13 participants completed the survey: 6 students (20% response rate); 3 educators (21% response rate); 4 academics (28% response rate). Table 3 presents the participant responses to the closed questions and indicates that the content was well received. Activities were considered authentic and relevant, manageable (in terms of clear instructions to implement and time allocated to complete) and well-aligned to expected learning outcomes. However, there was greater variation in responses about the ease of integrating the activities into placements. Qualitative comments indicated potential barriers relating to fitting the IPL tasks within busy placement schedules, organizational aspects of finding other students on placement to complete the IPL activity, and a potential de-prioritizing by educators of the value of IPL and hence of completing the IPL activities. The visual design and layout of the resource was also considered poor.

Table 3: Initial evaluation of IPL placement resource package: percentage of responses in strongly agree/agree band for each activity

		IPL Resource Activity									
		IP observation		Patient/client interaction		Shared debrief		Patient/client experience		Structured IP communication	
		Student	Placement educator/academic	Student	Placement educator/academic	Student	Placement educator/academic	Student	Placement educator/academic	Student	Placement educator/academic
Phase 1 features required in IPL resource	Authentic & relevant	100	100	100	87.5	100	100	100	100	100	100
	Integration with placement	50	100	83.3	87.5	100	100	66.6	71.4	83.3	100
	Manageable: clear instructions	100	100	83.3	87.5	100	100	100	100	83.3	85.7
	Alignment of learning outcomes to activity	100	87.5	83.3	87.5	100	100	83.3	100	100	100
	Relevance for preparedness to IPP	100	100	100	100	100	85.7	100	100	83.3	100
	Manageable: time	83.3	100	83	87.5	100	85.7	83.3	100	83.3	100

PROTOTYPE 2: A WEB-BASED IPL PLACEMENT RESOURCE

Consideration of the survey feedback by the research team led to a second prototype of the IPL resource, which was now housed on a web-based platform (Prototype 2). Educational designers were employed to build a web platform that enabled easy access and navigation for users, was engaging and had online functionality to complete and submit IPL activities. Small changes to the five IPL activities were also made in response to the evaluation of Prototype 1, these being mainly around clearer instructions for completing the IPL activities.

Refinement of Prototype 2 was an iterative process: participant feedback was used to create and further refine subsequent iterations until a final version was reached that met the majority of stakeholder needs. A focused workshop format was used to seek student, placement site educator and academic views on the various iterations of the prototype. Participants were provided with the website address in advance and asked to navigate through the various pages. Facilitated discussion focused on website functionality, design, engagement, and usability. Detailed notes were taken during the workshops.

In total, ten focused workshops of approximately 1 hour each were held (four with students; three with placement educators and three with academics). Four individual interviews were conducted with academics who could not attend a workshop. Nine placement

educators, 30 students, and 14 academics participated in the development and refinement of Prototype 2.

The website can be accessed at <https://health-ipl.sydney.edu.au/> . It has a number of features as a result of stakeholder input:

1. a consistent layout design that enables efficient navigation on a range of IT devices
2. guidelines for students and placement site educators for making the most of placement IPL opportunities
3. guidelines outlining preparation required for each activity and steps to complete post activity
4. example responses/exemplars for each IPL activity
5. functionality for online entry of responses which are then converted to a PDF and emailed to the student.

PHASE 3: ASSESSMENT PHASE

Students on placement at our study placement provider were invited to participate in the field testing of the website-based IPL resource. Participation was voluntary. Students were asked to complete one of the IPL activities on the website and then attend a focus group or individual interview to discuss their experience of using the website. All focus groups/interviews were audio-taped and detailed written notes were taken throughout. In total, three focus groups and two individual interviews were held with students from occupational therapy (2), physiotherapy (4), speech pathology (2) and nursing (4) degree programs. Analysis followed a similar process to Phase 1, where written notes were coded for units of meaning and codes with similar meaning grouped under key concepts.

While, overall, the final website received positive feedback from students on its aesthetics, content and functionality, three key concepts emerged that were considered important for functionality and usability:

IMPORTANCE OF ORIENTATION TO WEBSITE AND STUDENT REQUIREMENTS

Although the website was originally designed to be self-directed in its use, students strongly recommended an orientation to the website and its purpose prior to using it. Clear expectations were needed around when, why and how students should engage with the website. For example, it was unclear to some students that activities could be completed through engagement with other students and/or through interactions with staff from other professions.

ASSESSMENT DRIVES LEARNING

Despite recognizing the rationale for IPL, a strong driver of student engagement with the resources was assessment – that is how would completion of the activities ‘count’? Similar to earlier focus groups, students did not want a formal assessment of the individual activities, but rather that their efforts in completing the activities would be

acknowledged as part of their overall placement assessment. Completion needed to be embedded as a mandatory component of the course, otherwise it would not be prioritized.

PLACEMENT SITE EDUCATOR ENGAGEMENT AND SUPPORT

Successful engagement of students with the website relies on educator awareness and support. At times there was confusion as to the role of the educator, with many students not realizing the importance of discussing the activity when completed with their educator. Educators appeared unaware of their role in the process. This raises the need for the IPL resources to be explained to educators as well as to the students themselves.

DESIGN PRINCIPLES – FINAL

As a final step in the design research process, the design principles were further refined to reflect the new insights gained. Table 4 provides the final design principles that underpin the development of this learning resource.

Table 4: Design principles – final

1	The IPL placement resource should build on IPL activities already established and tested but adapted as necessary for the placement context.*
2	Where possible, IPL activities should be person-centred, reflecting the patient/client's role in the team, and the ultimate aim of collaborative care.*
3	IPL activities should be flexible and applicable to a variety of placement settings including those outside of traditional health care settings, professional combinations of students, and range of student experience levels (e.g. 1 st year and 4 th year).*
4	Learning outcomes should be made explicit for each IPL activity, increasing the intentionality of the learning process and clearly linked to overall placement learning outcomes and professional competencies.*
5	Steps for completing the activities should be clearly described for students <i>and</i> for placement educators, easy to implement and not too time-consuming for educator or students.*
6	Reflection should be built into each IPL activity.*
7	The structure and process for engaging with the IPL resource package should be flexible to allow students to seek IPL opportunities that are interesting and relevant to them*. These may include student-student interactions and/or student-staff interactions. †
8	Students AND educators should be orientated to the website, its purpose and their respective role in completing the activities so that they make the most of placement IPL opportunities. Where possible, use of the website and the IPL activities should be included in any educator training ‡

9	Completion of the IPL activities should be a mandatory part of curriculum to encourage prioritizing of activities. ‡
10	Assessment should be formative with completion of IPL activities informing a student's overall placement performance.*
Website aesthetics and scaffolding	
11	The website should use a consistent layout design that enables efficient navigation on a range of IT devices. †
12	There should be guidelines outlining preparation required for each activity and steps to complete post activity and example responses for each IPL activity. †
13	Functionality for online entry of responses which are then converted to a PDF and emailed to the student. †

* From Phase 1; † From Phase 2; ‡ From Phase 3

DISCUSSION

We have developed an IPL placement resource that provides an evidence-based means for effectively and efficiently incorporating IPL into student placements. Through our extensive stakeholder engagement process, we have developed a set of IPL activities that are relevant, authentic, accessible, and engaging. Moreover, the resource meets an unmet need and is accessible through one public website. Importantly, we have identified a set of design principles that enable others to design and implement workplace IPL activities following a set of tested principles. These principles ensure that resources developed optimize engagement of students, placement site educators and academics in workplace IPL.

The final product of this project (resource package and website) provides an alternative approach to addressing the sustainability of IPL. Our findings support Eraut's notion of adding some intentionality to the learning process, whereby the implicit becomes more explicit (Eraut 2000). However, for this to occur and for students to fully engage, certain affordances are required to ensure learning is embedded through participation in the workplace activity (Billett 2001, 2009). These are: curriculum changes to embed the IPL activities within curriculum, adequate orientation to the IPL resource and the support of placement site educators to assist students in making connections with other students. The resources must also be easily accessible to students through various ICT technologies and applicable to health as well as non-health placement settings.

Student views on assessment of the workplace IPL activities were interesting and link closely with how they engaged with the IPL activities (Billett 2001, 2009). While students did not want to introduce summative assessment of the IPL activities, they did want to make sure their efforts were externally rewarded: internal motivation was not strong enough to prioritize the learning activities over other tasks. The students' view may reflect the position of IPL within university

education. While there is much attention given to devising ways to incorporate IPL into curricula, and its profile has been raised, IPL is still largely seen as peripheral to the 'core business' of the individual health professions. 'Assessment 2020' (Boud & Associates 2010) advocates seven propositions to improve assessment and hence student learning. One of these is learning in the workplace. Coupled with this is the need to involve students in assessment design, to provide authentic activities, to incorporate peer learning, to give and receive feedback and to engage students in the assessment process. We have included elements related to each of these in our final principles, thus ensuring that we maximize the learning potential of the IPL resource.

Consistent with the work of Roxå and Mårtenson (2015), we found that context was an important element in engaging placement site educators in workplace IPL. First, by engaging with the complex 'microcultures' of each particular IPL situation, students find themselves embedded in the social practices and 'the ways things are done'. Second for an educational initiative such as the one described to succeed in a workplace, it needs the multifaceted support of those involved in the setting. Without that kind of support, particularly from their educators, students were unable to take full advantage of the learning opportunities available. This knowledge suggests we need to consider ways to better engage educators in orientating them to the rationale for workplace IPL and the supporting resources, and reinforces the value of the inclusion of a broad group of stakeholders in all of the project phases – from design to repeated implementation to evaluation. Furthermore, any curricula changes to embed workplace IPL require close collaboration between academics and placement site educators. This process requires connection among the parties and both formal and informal contact to keep the lines of communication open. One way to achieve this might be to incorporate the resource into existing education programs aimed at upskilling educators.

Our findings on educator capacity to introduce the IPL activities on placement are interesting. On the one hand, educators recognize the value of IPL in preparing students for collaborative practice. Yet, IPL was still viewed as an 'add-on' by some educators and as something that competes with, rather than complements, professional competency development. This is despite many of the interprofessional capabilities identified by participants being generic work-readiness capabilities (Caballero, Walker & Fuller-Tyszkiewicz 2011; Walker et al. 2013). We acknowledge the real time pressures on educators. However, our findings suggest that an added value emerging from introducing IPL through innovations such as those described in this paper may be a change in workplace collaborative practice more generally. Varpio et al. (2014) in their study exploring the informal learning of medical and nursing staff found that only 15% of informal learning was interprofessional, the rest being intraprofessional. Through the introduction of our IPL activities with students, there is scope to influence this ratio to favour workplace IPL more generally. This warrants further investigation.

The flexibility of the IPL activities developed as part of this project to incorporate student-student interactions and/or student-staff interactions supports the work of Rees et al. (2018), who found clinicians did engage informally with students from other professions.

However, their findings indicate that interactions with students were not viewed as positively by clinicians as by students. The authors suggest that this may reflect a limited awareness by clinicians of informal IPL opportunities. This again highlights the need for greater collaboration between university and placement sites in promoting workplace IPL.

STRENGTHS AND LIMITATIONS

A clear strength of this project is our use of design research methodology to systematically integrate the perspectives of all stakeholders in extracting the final design principles. Goodyear (2018), an advocate of design research, argues that learning is complex and that it is no longer enough to know what works but, more importantly, it is necessary to know what works, for whom and in what circumstances. We have achieved this through the inclusion of students, educators and academics as well as through the professional diversity of our project team: our team comprised academics and placement educators from ten professional backgrounds and an educational designer. This has enabled us to develop design principles that are practical and relevant to others developing similar resources.

One limitation of this project is the narrow context for recruitment of placement site educators – a metropolitan tertiary referral teaching hospital. Field testing of the IPL resource by students was also completed in the same context, with only four professions undergoing this final step. This was done mainly for pragmatic reasons. While the diverse professional and work experience background of the project team kept us cognizant of the need to make the resource applicable to a range of settings (health and non-health) and professions, further research is required to test the design principles in other contexts; for example, in schools and community services such as non-government organizations.

This project developed and evaluated five IPL activities – a somewhat arbitrary figure based on what was manageable for the project and what was gleaned from the literature scan. This process could be seen as a limitation. However, this did not surface as an issue in any phase of the project. We did not attempt to investigate the impact on learning of the IPL activities, but rather focused on the essential elements for engagement, functionality and usability.

CONCLUSION

We have applied our knowledge of informal workplace learning and existing IPL literature to develop a sustainable means by which universities can take a whole-of-faculty approach to IPL. The IPL activities developed can be readily introduced at any stage of curricula across a range of placement settings, ensuring an efficient and effective means of providing IPL opportunities to students. We are not suggesting this as the only way that universities embed IPL within curricula. Rather, the resources developed and evaluated as part of this project may form part of a larger IPL curricula strategy.

Our final design principles provide guidance for others in how best to further this work to engage students, placement site educators and academics in workplace IPL. However, the long-term success and uptake of the IPL placement resource is dependent on the affordances identified in this paper, specifically that universities embed the resource within curricula and that there is 'buy-in' from placement site educators. As with any website, it will be important to ensure that systems are in place to maintain and further develop this website's functionality. Analytic data collected from the website in the future will enable evaluation of the long-term impact of the resources on learning. For example, there is potential to analyse student responses for each activity against anticipated learning outcomes and to subsequently track the development of interprofessional capability across a student's degree program. We welcome a collective approach between universities and placement sites to explore how this is best achieved.

APPENDIX

APPENDIX 1: PROTOTYPE 1 EVALUATION SURVEY

(Questions to be asked for each IPL activity)

STUDENT SURVEY QUESTIONS

- 1.** This IPL activity is authentic and relevant to the workplace, that is, it reflects and builds on the type of scenarios and situations I may face when working.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

- 2.** This IPL activity could readily be incorporated into student placements/professional placements/fieldwork.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

- 3.** The instructions in the resource provide enough guidance for me to complete the activity.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree].

Please use the text box below to elaborate on your response (optional)

4. The suggested approach to assessment for this IPL activity is appropriate.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

5. By completing this IPL activity, I am likely to be better prepared for collaborative practice (working with other professions) on graduation

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

6. Time allocated to complete activities is achievable / appropriate

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

7. What if any, would be the barriers to you implementing this IPL activity whilst on placement?

Please use the text box below to respond.

SUPERVISORS AND ACADEMICS SURVEY QUESTIONS

1. This IPL activity is authentic and relevant to the workplace, that is, it reflects and builds on the type of scenarios and situations students may face when working

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

2. I could readily incorporate this IPL activity into student placements.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

3. The instructions in the resource provide enough guidance to implement the activity.

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

4. The expected student learning outcomes for this IPL activity are aligned to the activity (i.e. are well matched, realistic and achievable).

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

5. By completing this IPL activity, students are likely to be better prepared for collaborative practice (working with other professions) on graduation

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

6. Time allocated to complete activities is achievable/appropriate

[Strongly agree | agree | neither agree nor disagree | disagree | strongly disagree]

Please use the text box below to elaborate on your response (optional)

7. What if any, do you see as barriers to you or others implementing this IPL activity with students?

Please use the text box below to respond.

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Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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