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Understanding students' and clinicians' experiences of informal interprofessional workplace learning: an Australian qualitative study

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ABSTRACT

Objectives While postgraduate studies have begun to shed light on informal interprofessional workplace learning, studies with preregistration learners have typically focused on formal and structured work-based learning. The current study investigated preregistration students' informal interprofessional workplace learning by exploring students' and clinicians' experiences of interprofessional student-clinician (IPSC) interactions.

Design A qualitative interview study using narrative techniques was conducted.

Setting Student placements across multiple clinical sites in Victoria, Australia.

Participants Through maximum variation sampling, 61 participants (38 students and 23 clinicians) were recruited from six professions (medicine, midwifery, nursing, occupational therapy, paramedicine and physiotherapy).

Methods We conducted 12 group and 10 individual semistructured interviews. Themes were identified through framework analysis, and the similarities and differences in subthemes by participant group were interrogated.

Results Six themes relating to four research questions were identified: (1) conceptualisations of IPSC interactions; (2) context for interaction experiences; (3) the nature of interaction experiences; (4) factors contributing to positive or negative interactions; (5) positive or negative consequences of interactions and (6) suggested improvements for IPSC interactions. Seven noteworthy differences in subthemes between students and clinicians and across the professions were identified.

Conclusions Despite the results largely supporting previous postgraduate research, the findings illustrate greater breadth and depth of understandings, experiences and suggestions for preregistration education. Educators and students are encouraged to seek opportunities for informal interprofessional learning afforded by the workplace.

Strengths and limitations of this study

- This study is the first to explore student and clinician experiences of work-based interprofessional student-clinician interactions.
- We collected a large number of narratives from a relatively large qualitative sample of students and clinicians, enhancing the transferability of our findings.
- Our reflexive approach to teamwork helped to enhance our analytical rigour.
- We acknowledge the smaller subsamples of participants in our study, making comparisons by participant groups challenging.
- We had relatively low numbers of male and non-white participants, thus limiting the transferability of our findings to female and white students and clinicians.

INTRODUCTION

While healthcare students often participate in interprofessional learning activities as part of formal 'classroom-based' curricula,[1] their understanding of other healthcare professionals' roles and interprofessional team-working are often learnt as part of work-based informal learning.[2 3] Healthcare students develop their knowledge and learn skills, behaviours, attitudes and practices, both good and bad—through the structures and cultures of the healthcare workplace and work-based role modelling involving student–clinician interactions.[4] Some of those student-clinician interactions will be interprofessional, with students experiencing (often informally) supervision, feedback and support from clinicians from other healthcare professions.[2 4 5] While the interprofessional learning literature is vast, very little research has explored the content or impact of work-based interprofessional student-clinician (IPSC) interactions. What research has been conducted has focused on postgraduate rather than preregistration learners.[6–10] Furthermore, preregistration studies typically focus on formal and structured interprofessional work-based learning rather than informal learning.[11–15] Therefore, this study sought to provide an original

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contribution to the literature by addressing this gap through exploring informal work-based interprofessional learning of preregistration healthcare students through investigating student and clinician experiences. We felt that this endeavour was important in order to identify potential opportunities and challenges within IPSC interactions (and therefore interprofessional learning), which might serve to inform educational strategies to improve the preparation of students for positive interprofessional practice in the workplace.

Informal workplace learning

Much work-based learning can be described as *informal*,[16] defined as: 'learning that comes closer to the informal end than the formal end of a continuum… [and including] implicit, unintended, opportunistic and unstructured learning and the absence of a teacher'.[16] Eraut[17] describes three types of informal learning varying by level of learning intention: *implicit, reactive* and *deliberative learning*,[16] which is perhaps why students and teachers do not always recognise informal learning as education.[2 9] Eraut[18] outlined a range of informal workplace learning outcomes including task performance, awareness and understanding, personal development, teamwork, role performance, academic knowledge and skills, decision-making and problem solving and judgment.[16] He suggested four key types of work activity giving rise to informal learning: participation in group activities; working alongside others; tackling challenging tasks and working with clients.[16] Much of these informal learning activities are embedded in acts such as listening, observing, reflecting, problem solving, practising skills, receiving information, asking questions and giving and receiving feedback.[16] Factors affecting learning in the workplace include both *learning factors* such as challenge and value of the work, confidence and commitment and feedback and support and *context factors* such as allocation and structuring of work, expectations of everyone's role, performance and progress and encounters and relationships with people at work.[16] Interestingly, Eraut's[16] work has been taken up by many interprofessional healthcare scholars[6 9 10 13 19] who argue that more attention be paid to direct learners to seek out informal interprofessional workplace learning opportunities.

Informal interprofessional workplace learning

Interprofessional workplace learning offers preregistration students realistic, complex and authentic experiences focusing on patient-centred collaboration and engagement.[19 20] As mentioned above, current informal interprofessional workplace learning research has centred on postgraduate rather than preregistration learners.[6–10 21] Therefore, we summarise key literature from this next closest level of learners in this section: junior doctors learning from nurses[6] or pharmacists[7 8]; residents learning from nurses and senior doctors[10] and residents learning from nurses, allied health professionals and senior doctors.[9] These studies have employed various methods including qualitative methods such as interviews[6–8] or non-participant observation[9] and quantitative methods such as a survey asking social network questions.[10] While some of these studies found low levels of informal interprofessional workplace learning, for example, between residents and nurses,[9 10] many of the papers highlight the important informal learning that can occur through interprofessional learner–clinician interactions.

Burford *et al*[6] found that nurses helped junior doctors' orientation into their new roles. Junior doctors learnt much from nurses such as their roles, interprofessional hierarchies and skills development. Nurses also helped identify junior doctors' errors relating to paperwork and prescribing. Noble and her colleagues determined that pharmacists helped junior doctors build their prescribing capabilities, that junior doctors sought advice and guidance from pharmacists, plus received feedback about their prescribing including errors and explanations about prescribing practices.[7 8] Finally, Varpio *et al*[9] noted that informal interprofessional education from nurses to residents mostly related to: (1) nurses highlighting concerns with residents relating to patient care, (2) nurses sharing knowledge with residents about how certain tasks should be done, (3) nurses giving advice to residents about how best to manage patients and (4) nurses assuming the role of resident resource with trainees seeking assistance with knowledge or skills.

While these studies have begun to shed light on informal interprofessional workplace learning, to our knowledge, no studies exist exploring work-based informal interprofessional learning with preregistration students. Indeed, the burgeoning literature on work-based interprofessional learning with preregistration students[11 12] typically focuses on formal and structured learning opportunities such as case-based activities, workshops, interprofessional training wards, student-led clinics and so on.[19] Furthermore, the interprofessional relationship explored in these studies is typically student-student rather than IPSC interactions.

Research aim and questions

This study aimed to better understand students' and clinicians' experiences of work-based IPSC interactions. We sought to answer the following research questions:

RQ1. What are participants' understandings of IPSC interactions?

RQ2. What are participants' experiences of IPSC interactions?

RQ3. What are participants' suggestions for improving IPSC interactions?

RQ4. What are the similarities and differences in understandings, experiences and suggestions between students and clinicians and across different professions?

METHODS

Design

A qualitative design involving group and individual semi-structured interviews with students and clinicians was undertaken. The study employed a social constructionist perspective, which acknowledges multiple

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Table 1 Participant characteristics

Characteristic	Students (n=38)	Clinicians (n=23)
Profession		
Medicine	5	4
Midwifery	3	4
Nursing	5	6
Occupational therapy	12	3
Paramedicine	7	3
Physiotherapy	6	3
Age		
20–29	31	3
30–39	7	3
40–49	0	10
50+	0	7
Gender		
Male	13	8
Female	25	15
Ethnicity		
White	28	19
Non-white	10	4

interpretations of reality as individuals make sense of their experiences through social interactions and the surrounding environment.[22] We employed narrative interviewing techniques to help us understand participants' experiences and how they constructed themselves and others through their stories.[23] The findings relating to student and clinician identity constructions will be presented elsewhere.

Sampling and recruitment

Following ethics approval, we collected data from students and clinicians (April 2016–March 2017) representing six healthcare professions (medicine, midwifery, nursing, occupational therapy, paramedicine and physiotherapy). Maximum-variation sampling was used to obtain a diverse range of understandings, experiences and suggestions. Students and clinicians were recruited through multiple methods including: e-notices on virtual learning environments; hard copy notices on notice boards; email; snowballing and face-to-face advertisements after formal lectures. Overall, 12 group (6 with students, 6 with clinicians) and 10 individual semistructured interviews (5 with students, 5 with clinicians) were conducted yielding a sample of 61 participants (38 students and 23 clinicians) and amounting to 10 hours and 16 min of student data and 7 hours and 31 min of clinician data. Whether participants took part in group or individual interviews depended on pragmatic considerations such as participant availability and thus ease of organisation. See table 1 for participant characteristics.

Data collection

A discussion guide helped to achieve consistency across the interviews facilitated by two authors (CR and FK). After welcomes, introductions and ground rules, interviews began by exploring students' and clinicians' understandings of workplace IPSC interactions. Then, using narrative interviewing techniques, participants were asked to narrate workplace experiences of IPSC interactions. A series of prompts were used around these narratives (eg, 'what was the impact of that experience on your understandings of interprofessional practice?'). Once participants had fully shared their experiences, we asked for their suggestions for improving workplace IPSC interactions. The interviews were audio-recorded with participants' permission. The interviews were drawn to a close by asking participants to complete a brief personal details questionnaire. A copy of the interview schedule can be requested from the corresponding author.

Data analysis

The data were analysed using an inductive five-step process of framework analysis.[24] In step one, *familiarisation*, we initially selected a sample of five diverse transcripts with each transcript being reviewed by two members of the research team. In step two, *identifying a thematic framework*, we came together to compare, contrast and negotiate our individual interpretations of the transcripts to develop an initial coding framework. In step three, *indexing*, one author (PC) used the coding framework to code all data using NVivo 11. PC both read the transcripts and listened to the data thereby attuning to linguistic cues such as emphasis, intonation and laughter that were not wholly apparent from the transcripts.[25] During this coding, PC and CR met five times to double-check coding, clarifying points of uncertainty and discussing any ambiguities within the transcripts in relation to the coding framework. This checking was conducted across approximately 20% of the coded data. In step four, *charting*, PC interrogated patterns in the data by different types of participant groups in discussion with CR. Note that while we quantify some of our qualitative data in order to make sense of the patterns across our participants groups, as has been done in other research,[26 27] we maintain a qualitative interpretative approach.[28] Finally, in step five, *mapping and interpretation*, CR and PC interpreted findings in light of the research literature. Note that the interpretations of PC and CR were shared fully and agreed among the team through the iterative processes of writing-up the results and preparing the manuscript.

Team reflexivity

We conducted team reflexivity prior to data analysis, in order to acknowledge members' prior experiences, beliefs and attitudes that might influence our interpretations.[29] This exercise highlighted that we had diverse academic and clinical backgrounds, representing many different healthcare professions. While we had a range of experience with qualitative research (novice to expert), we all held similar positive beliefs about the power of

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qualitative research to unpack complexity and we shared similar theoretical frameworks (eg, social constructionism). Undertaking this reflexivity exercise enabled us to work better collaboratively, to understand each other's perspectives and to add to the rigour of the analysis.[30]

Patient and public involvement

Given the focus on student-clinician interactions in this study, patients and the public were not involved in the design, data collection or data analysis.

RESULTS

We identified six themes in relation to the research questions: one theme relating to RQ1 called (1) conceptualisations of IPSC interactions; four themes relating to RQ2 called (2) context for interaction experiences, (3) the nature of interaction experiences, (4) factors contributing to positive or negative interactions and (5) positive or negative consequences of interactions and finally, one theme relating to RQ3 called (6) suggested improvements for interactions. Postcoding interrogation of data allowed us to examine RQ4 across themes 1–6 to explore the similarities and differences across participant groups; this is presented below across RQ1–3. Interested readers can request a copy of the coding framework from the corresponding author.

What are participants' understandings of IPSC interactions? (RQ1 and RQ4)

The participants had many different understandings of IPSC interactions. The most frequent conceptualisation

Table 2 Understandings of IPSC interactions

Understandings	Theme description	Illustrative quotes
Facilitating student learning (n=123, 41%)	Participants talked about how IPSC interactions facilitated student learning, either through direct teaching and clinical supervision (eg, cannulation), students observing clinicians and/or students receiving feedback and debriefing from clinicians. Feedback is sometimes direct to students or indirect through the student's uniprofessional supervisor.	'If I'm…in the room I can give them feedback directly or if I know that the student's actually having a lot of issues I might personally not give it to them. I'd give it to their supervisor to then feedback to them, so it depends how well they can take feedback' (Physiotherapy clinician, F1PT1C1*)
Working together to deliver patient care (n=84, 28%)	Participants talked about how students from different professions and clinicians work together to deliver patient care. This might involve, for example, students and clinicians doing joint assessments of patients, interprofessional handovers, discharge planning and referrals.	'It could be to do with teamwork and communication, and discharge planning, and joint assessments and paperwork' (Paramedicine clinician, F4PT2C2)
Facilitating understandings of roles and working in the healthcare system (n=70, 24%)	Participants talked about how interprofessional students and clinicians help one another better understand the nature of others' roles, scopes of practice and boundaries. This includes how the interprofessional team and healthcare system works. Interestingly, students can sometimes act as the bridge/broker between their own profession and other healthcare professionals in the workplace.	'Often the job of the medical team [is] to refer to other teams, in my experience. Knowing what the other teams do is important. It's the same reason that we go and see different procedures' (Medicine student, M13MS1)
Psycho-social-emotional safety (n=21, 7%)	Participants talked about the psycho-social-emotional nature of workplace IPSC interactions. This might involve the development of mutual respect and trust between IP students and clinicians, along with clinicians providing emotional support and empathy to students and making them feel welcome and a legitimate player within the broader interprofessional team.	'They welcomed me… before they brought the patient in, they orientated me to all the equipment they've used, the cameras, everything. And it was two nurses, an anaesthetist and a surgeon. And they were all so lovely and they loved having a student' (Nursing student, F25NS2)

*IDs throughout consist of unique identifiers, which contain information on participant gender (male/female), participant number (ascending order), profession (M, Medicine; Mid, Midwifery; N, Nursing; OT, Occupational therapy; P, Paramedicine; PT, Physio) and participant type (S, student; C, clinician).
IPSC, interprofessional student-clinician.

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Box 1 Similarities/differences in understandings by participant group

- While clinicians most commonly conceptualised interprofessional student-clinician (IPSC) interactions as student learning, students most commonly conceptualised them as working together to deliver patient care and student learning.
- All professions most commonly conceptualised IPSC interactions as education and least commonly as psycho-social-emotional safety.
- Working together to deliver patient care was the second most common conceptualisation across all professions (with clinician and student data combined) except nursing and occupational therapy participants. Facilitating understandings of the healthcare team was the second most common for nursing participants and equal first for occupational therapy participants.

Box 2 Similarities/differences in the contextual features of interprofessional student-clinician interactions by participant group

- While students and clinicians evaluated their narratives as negative in similar numbers, students tended to evaluate their narratives more positively than clinicians.
- Midwifery, nursing, paramedicine and physiotherapy participants (student and clinician data combined) most frequently evaluated their narratives positively.
- Occupational therapy participants evaluated their narratives as equally positive and negative, while medicine participants most frequently evaluated their narratives as negative.

across the whole dataset was that IPSC interactions were about facilitating student learning, both formally and informally. Some participants described IPSC interactions as professions working together to deliver patient care and others suggested that interactions facilitated understandings of how professions worked together. Fewer participants described clinicians providing psycho-social-emotional support for students (see table 2).

The similarities and differences in understandings of IPSC interactions between students and clinicians and across different professions are summarised in box 1.

What are participants' experiences of IPSC interactions? (RQ2 and RQ4)

We identified four crosscutting themes across the narratives in relation to the second research question. The narrators' evaluations of their experiences were interpreted based on their language such as using mainly positive (eg, 'fantastic') or negative emotion talk (eg, 'horrible') and/or if they explicitly stated whether their experience was a 'very good' or 'negative' one.

Contextual features of IPSC interactions

Two hundred and eight narratives were identified in the dataset, with most occurring in hospital settings. The highest frequency of IPSC interaction narratives involved *students* from any profession interacting with medical clinicians followed by nursing, then physiotherapy, paramedicine, midwifery and finally, with occupational therapy clinicians. The highest number of IPSC interactions involved *clinicians* from any profession interacting with nursing students, then medical, followed by occupational therapy, midwifery, paramedicine and finally, physiotherapy students. The top five most frequent IPSC dyads discussed in the narratives were (in decreasing order of frequency): medical student-nurse; midwifery student-doctor; nursing student-physiotherapist; nursing student-doctor and occupational therapy student-physiotherapist. Interactions between medical and allied health professions (ie, paramedicine, physiotherapy and occupational therapy) were uncommon. Narratives were more likely to be evaluated positively by narrators than negatively, although some narratives included both positive and negative evaluation. The similarities and differences in the contextual features of IPSC interactions between students and clinicians and across the different professions are summarised in box 2.

Conceptual themes of IPSC interactions

The narratives were most frequently about IPSC interactions facilitating student learning. Also common in the data were narratives about roles and delivering patient care. However, there were fewer narratives on dignity, hierarchies, conflict and communication (see table 3).

The similarities and differences in the conceptual themes of IPSC interactions between students and clinicians and across the different professions are summarised in box 3.

Factors contributing to positive or negative IPSC interactions

There were many contributory factors identified within the data relating to positive and negative IPSC interactions at the individual, interactional and organisational levels. A total of 465 positive contributory factors were identified across the dataset (note that the numbers here refer to the number of distinct statements alluding to positive contributory factors within the narratives). The most frequently identified positive factors across the narratives related to the *interactional* level, followed by the *individual* and *organisational* levels. At the interactional level, narrators mostly talked about positive student-clinician relationships. At the individual level, they most frequently talked about the clinician as a positive contributory factor, followed by the student. Finally, at the organisational level, the most frequently mentioned positive contributory factors included physical space (ie, shared break rooms) and having sufficient time for education alongside service provision.

A total of 241 negative contributory factors were identified across the whole dataset, with the most frequent factor related to the *interactional* level followed by the *individual* and *organisational* levels. At the interactional level, narrators mostly spoke about negative student-clinician relationships. At the individual level, the most frequent negative contributory factor was the clinician, followed by the student. Finally, at the organisational level, the most

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Table 3 Conceptual themes of the 208 IPSC interaction narratives

Theme*	Definition	Illustrative quote†
Student learning (n=130/63%, of which 67 were evaluated positively, 25 negatively, 22 mixed and 16 unclear)	IPSC interactions facilitating student education either informally through opportunistic discussions, observations and role modelling or formally such as supervised practise of clinical skills and/or feedback and debriefing.	[Talking about a female Doctor] 'It was a totally awesome experience and that is something you'd hope that you would have a mentor like that who was open and constructive and could rationalise… the things that you're learning and put them into practice… we all thought it was like, "wow that was amazing" ' (Nursing student, F11NS2)
Interprofessional roles (n=114/55%, of which 54 were evaluated positively, 24 negatively, 22 mixed and 11 unclear)	IPSC interactions including talk about the scopes of practice, role boundaries, overstepping boundaries, protecting role boundaries and role extensions.	'I was talking with the woman [patient] about her situation and trying to find out why she was so anxious and nervous and wanted her birth move[d] forward, it was because the woman and partner had split up… I went and let the social worker know of the woman's situation… sometimes our scopes can fold and blur over each other… they're [social workers] good at saying… "You can actually make that phone call, were you aware of that?"…They teach me about their discipline and also how far mine extends before I have to refer women on to them…' (Midwifery student, F22MidS1)
Interprofessional team working to deliver patient care (n=105/50%, of which 57 were evaluated positively, 26 negatively, 12 mixed and 9 unclear)	IPSC interactions providing collaborative care to patients, where each profession has their own responsibility for treating patients.	'We actually got to do treat[ment]s with an OT, so, physio and OT would go see a patient together… having co-treat with somebody, you often see things that you might not necessarily see when you go see a patient [alone]. They [OT] assess the patient's cognition, the patient's memory and everything and you might not pick up on those things… you kinda get a more holistic approach like you look at the patient as a whole rather than just your side…' (Physiotherapy student, F17PHS1)
Interprofessional dignity (n=55/26%, of which 23 were evaluated positively, 19 negatively, 7 mixed and 3 unclear)	IPSC interactions characterised by interprofessional trust, respect, inclusion and/or support.	'My third year placement… we worked really closely with physios… about halfway and towards the end of it, the physios really… responded to me and actually would speak to me casually even if my supervisor wasn't there. They'd be asking my opinion… I even had one of the… physios ask, you know, "Oh, how do I do this?" like, from an OT perspective. I just felt really taken a back and just happy they actually valued my opinion and didn't just look down on me… I felt included' (Occupational Therapy student, F6OTS1)
Interprofessional hierarchies (n=48/23%, of which 25 were evaluated negatively, 11 positively, 7 mixed and 4 unclear)	IPSC interactions characterised by interprofessional hierarchies, power and status. This may include stories about ingrained hierarchies or transgressing ingrained hierarchies across professions and/or student and staff status.	'As [a] midwife we really value the therapeutic relationship… in a birthing, we value the experience too whereas a medical person might be focusing on the opportunity to see something pathological… we value some things that would be considered softer, and so we hold our space as much as we can, and we often don't have a lot of power in the big hospital to do that' (Midwifery clinician, F14Mid3C10)
Interprofessional conflict (n=34/16%, of which 23 were evaluated negatively, 5 positively, 5 mixed and 1 unclear)	IPSC interactions characterised by interprofessional conflict, competition and/or workplace abuse (eg, verbal abuse and so on). This may include stories about the enactment of conflict or its prevention and management.	'I heard a fifth year (medical student) talking to a third year about… "Oh, maybe a OT home assessment for this patient", and I sort of just lashed out and said, "Hang on a second, talk [to] me about this patient first" … I then went to their registrar and said… "just a little bit of feedback here with the discharge planning process, it would be good for the students to actually have a talk with you first" ' (Occupational Therapy clinician, F3OT2C1)

Continued

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Table 3 Continued

Theme*	Definition	Illustrative quote†
Interprofessional communication (n=30/14%, of which 12 were evaluated negatively, 11 positively, 5 mixed and 2 unclear)	IPSC interactions characterised by interprofessional communication, discussions and/or clarifying misunderstandings. This also included interactions involving stories with profession-specific language.	'You get a knack of sort of helping out a little bit with whichever clinician in their role… whether it is nurses and you hand them stuff or like help them with their gate-aide… having like an extra pair of hands… then enables them to talk a little bit more and teach a little bit more and chat to you more… Like even if you're not physically helping them, sometimes it's as little as just engaging them in conversation' (Medical student, F14MS1)

*The numbers presented in the left hand column of the table are not mutually exclusive as narratives often contained multiple issues and were thus coded to multiple themes.
†Illustrative quotes may contain multiple themes.
IPSC, interprofessional student-clinician.

frequent negative contributory factors related to high workloads contributing to insufficient time to teach, plus limited physical space (see table 4).

The similarities and differences in factors contributing to positively and negatively evaluated IPSC interactions between students and clinicians and across the different professions are summarised in box 4.

The consequences of positive and negative IPSC interactions

We identified a total of 343 positive consequences of IPSC interactions across the data (note that the numbers here refer to the number of distinct statements alluding to positive consequences within the narratives). The most frequently narrated were better learning, such as students practising clinical skills and enhancing their knowledge, students learning how to work effectively in the healthcare team and their better understanding of patient care pathways. Other positive consequences of IPSC interactions included better patient care, the development of better interprofessional attitudes, increased student well-being, better future interprofessional interactions and more positive career decision-making. In contrast, we identified a total of 187 negative consequences across the dataset. In decreasing order of frequency, narrators outlined the negative consequences of negative IPSC interactions as: worsening student learning, worsening patient care, decreasing student well-being, negative future interprofessional interactions, developing poorer interprofessional attitudes and more negative career decision-making (see table 5).

Box 3 Similarities/differences in the conceptual themes of interprofessional student-clinician interactions by participant group

- While students' narratives were most commonly about team working, student learning and roles (in roughly equal proportions), clinicians' narratives were most commonly about student learning.
- Across the professional groups, narratives were most commonly about student learning, apart from stories narrated by occupational therapists and physiotherapists, which were more commonly about roles and team working.

The similarities and differences in consequences resulting from positively and negatively evaluated IPSC interactions between students and clinicians and across the different professions are summarised in box 5.

What are participants' suggestions for improving IPSC interactions? (RQ3 and RQ4)

The participants suggested a wide variety of ways to improve IPSC interactions aimed at, in decreasing order of frequency: students, organisations, interactions and clinicians. Suggested interventions targeted at students included formal preparation and teaching initiatives in the classroom and the workplace. This often included groups of students being taught about the different roles of healthcare professionals and shared tasks such as handovers. There were also interventions suggested at the organisational level, which included timetables, orientations for students and clinicians and protected time for interprofessional teaching in the workplace. Interventions aimed at relationships included developing formal interventions such as guides about one another's roles and scopes of practice and informal interventions such as increasing informal opportunities for students to observe other professions at work. Finally, participants also suggested interventions aimed at clinicians including initiatives to help them develop their educational knowledge, skills and attitudes and thus improve their clinical teaching with students from other professions (see table 6).

The similarities and differences in suggestions for improving IPSC interactions between students and clinicians and across the different professions are summarised in box 6.

DISCUSSION

Summary of key findings and comparison with literature

RQ1. Participants' understandings of IPSC interactions

Participants had varied understandings of IPSC interactions with the most common relating to facilitating student learning. While this finding seems contrary to others' assertions that students and teachers do

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Table 4 Positive (n=465) and negative (n=241) contributory factors to positive or negative IPSC interactions

Theme	Definition	Illustrative quote
Individual		
Positive (n=160, 34%)	Individual level factors contributing to positive experiences related to students (eg, seeking out opportunities, knowledge, motivation, self-awareness, openness), clinicians (eg, warmth, teaching capabilities, approachability, motivation) or other individuals (eg, patient openness).	'He [pharmacist] sat down with me… he said, "Okay, so, this is how it works and this [is] why it works. These are the risks. These are the patients that we would give it to, and this is why"… felt like it… wasn't a big issue for him to explain that to me' (Nursing student, F10NS1)
Negative (n=73, 30%)	Individual level factors contributing to negative experiences related to students (eg, unmotivated, incompetent, resistant to feedback), clinicians (eg, anxiety about patient safety, lack of knowledge about scopes of practice, rude/abrupt, poor teachers) or other individuals (eg, patient, family members, peers).	
Interactional		
Positive (n=251, 54%)	Interactional level factors contributing to positive experiences related mostly to IPSC relationships (eg, making the student feel welcome, encouraging student to seek IP learning opportunities). Other times they related to clinician-IP clinician relationships (eg, uniprofessional clinician arranging an IPSC interaction with the IP clinician) or student-patient relationships (eg, building rapport).	'There still was this barrier of, "I was this physio and there was this OT"… there was… a distinction. It was… a little bit awkward. They [OT students] achieved their objective, we [Physiotherapy clinicians] achieved ours but it was kind of disjointed' (Physiotherapy clinician, M3PT3C4)
Negative (n=100, 42%)	Interactional level factors contributing to negative experiences related mostly to IPSC relationships (eg, relationships characterised by mistrust, poor communication, insensitivity). Other relationships impacting negatively on experiences included student-patient (eg, no trust), clinician-patient/family (eg, no inclusion), uniprofessional student-clinician (eg, lack of communication) or clinician-IP clinician (eg, animosity between roles).	
Organisational		
Positive (n=54, 12%)	Organisational level factors contributing to positive experiences such as having: sufficient time, setting conducive to interprofessional interaction (eg, shared physical space), controlled learning environment (rather than uncontrolled), optimal student numbers on placement and opportunities for student input into formal or informal care meetings.	'The biggest issue in general whether it'd be in a hospital or even in a community setting, is everybody in their role is so time-pressed because of just the demands on healthcare' (Midwifery student, F22MidS1)
Negative (n=68, 28%)	Organisational level factors contributing to negative experiences included: insufficient time, suboptimal setting (eg, acute care less of a team-based approach), limited physical space (eg, uncontrolled/high risk environments), interprofessional hierarchies/siloes, simultaneous delivery of patient care and student learning and lack of opportunities for student input during formal or informal care meetings.	

IPSC, interprofessional student-clinician.

not always recognise informal workplace learning as learning,[2 9] our findings were influenced by our interview questions, which often included probing questions about the nature of students' educational relationships with other professions. Furthermore, while work-based learning environments typically privilege patient care needs and service delivery over and above that of student learning,[31] students and teachers will necessarily understand students' primary role within the workplace as learner rather than carer.[4 32] Interestingly, the informal learning activities discussed by participants in their conceptualisations included observation, practising skills and receiving feedback, consistent with Eraut's[16] observations on informal workplace learning as well as other interprofessional workplace learning research with employees.[21]

RQ2. Participants' experiences of IPSC interactions

Participants narrated a wide range of IPSC interaction experiences but they most commonly possessed five key features. First, they most typically involved IPSC dyads between medicine and nursing/midwifery, possibly reflecting the centrality of these professions in healthcare and the functional proximity (task interdependence) and

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Box 4 Similarities/differences in contributory factors for interprofessional student-clinician interactions by participant group

- There were similarities between clinicians and students in the positive contributory factors identified but differences in the negative contributory factors: clinicians cited a lower proportion of negative organisational factors and talked proportionately more about negative individual and interactional factors than students.
- Positive contributory factors were similar across the professions but more variation existed across the professions in terms of negative contributory factors: Although interactional factors were the most common negative contributory factors for medicine, nursing, occupational therapy and physiotherapy, the most common negative contributory factors for paramedicine and midwifery were organisational.

spatial proximity (close physical distance) of the working relationships between these professions.[10] Second, the IPSC interaction narratives were mostly evaluated positively, supporting previous research, which has found that junior doctors were mostly positive about their learning experiences with nurses and pharmacists.[6 8] Third, the IPSC interaction narratives were mostly about student learning, again reflecting our probing questions about the nature of student-clinician educational relationships and the primary role of students in the workplace as learners.[4 32] Interestingly, the informal learning activities discussed within our participants' narratives were similar to those outlined in their conceptualisations such as observation and practising skills and receiving feedback, but also included discussions and role modelling, again consistent with Eraut's[16] observations on informal workplace learning, alongside previous research in informal workplace learning with postgraduates.[6 7 9] Fourth, the IPSC interaction narratives typically cited interactional contributory factors for positive and negatively evaluated IPSC interactions. Other researchers have also flagged the importance of relationships in terms of facilitating or hindering learning at work.[7 16] Finally, the consequences of the IPSC interaction narratives mostly related to student learning, that is, improved student learning for positively evaluated IPSC interaction narratives and worsened student learning for negatively evaluated narratives. Other researchers have similarly highlighted the positive learning consequences of interprofessional relationships such as postgraduates learning about roles, hierarchies and developing skills.[6–8 13]

RQ3. Participants' suggestions for improving IPSC interactions

Participants suggested a multiplicity of ways to improve IPSC interactions but most common suggestions related to developing interventions aimed at students including both formal and informal interventions, as suggested by previous researchers.[2 6 7 13] Also highly salient were organisational interventions such as protected time and co-located space, also supporting previous research.[2 9 10]

RQ4. Similarities and differences in understandings, experiences and suggestions

An assortment of similarities and differences existed between students and clinicians and across the professions in relation to understandings, experiences and suggestions. Indeed, we felt it was crucial to explore such similarities and differences in order to identify potential problems with the enactment of IPSC interactions in the workplace. For example, if students and clinicians report different understandings and experiences of IPSC interactions, this could hint at future difficulties with IPSC interactions in the workplace. In fact we identified seven notable differences between different types of participants that are worthy of further consideration.

In terms of differences between students and clinicians, we found four key differences. First, clinicians most commonly conceptualised IPSC interactions as student learning and narrated IPSC interactions involving student learning, whereas students more commonly understood IPSC interactions as team-working to deliver patient care and narrated IPSC interactions involving team-working, student learning and roles. This suggests that clinicians might not fully appreciate the diversity and breadth of interprofessional learning opportunities afforded by the workplace, meaning that they might miss opportunities with students from other professions to facilitate their learning of interprofessional team-working and roles. Second, students evaluated their IPSC interaction narratives more positively than clinicians, plus students outlined many more positive consequences of IPSC interactions than clinicians, indicating that students more readily realised the benefits of IPSC interactions than did clinicians. This is perhaps consistent with uniprofessional research illustrating some clinicians' reluctance to teach healthcare students in the workplace.[4] However, this finding again points to the notion that some clinicians do not fully appreciate the benefits of informal interprofessional learning for students. Third, clinicians talked more about negative individual and interactional contributory factors for negative IPSC interactions than did students, who mostly focused on organisational contributory factors. This suggested that clinicians more readily blamed individuals (often students) and relationships for negative IPSC interactions, whereas students seemed more comfortable to blame the system. Indeed, students' articulated contributory factors related to the culture of healthcare, which sees innumerable healthcare hierarchies existing—including levels of training, specialties and healthcare professional groups—all of which have the potential to affect interprofessional learning and working.[4 33] While students in our study may have censored their narratives given that some of their teachers were involved in this research as co-investigators, this difference between student and clinician perceptions of contributory factors might mean that negative IPSC interactions are hard to resolve. Fourth, students were much more likely than clinicians to cite decreased well-being as a negative consequence of IPSC interactions.

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Table 5 Consequences of IPSC interactions

Theme	Definition	Illustrative quote
Student learning		
Positive (n=145, 42%)	Positive IPSC interactions were associated with better student learning (eg, learning about the interprofessional team, continuity of care, patient journeys, developing clinical skills such as cannulation and patient assessments).	'I sort of felt he [paramedicine student] learnt a lot about… you can view things a bit differently' (Midwifery clinician, F14Mid2C10)
Negative (n=45, 24%)	Negative IPSC interactions were thought to be associated with inhibiting or blocking student learning through either students simply observing or missing opportunities for learning.	
Patient care		
Positive (n=61, 18%)	Positive IPSC interactions were thought to lead to better patient care (eg, patient safety, patient dignity and positive patient experience).	'A good outcome for everyone… they [parents] had a happy, healthy, little kid and I got some really good experience' (Paramedicine student, M10PS2)
Negative (n=40, 21%)	Negative IPSC interactions were thought to be associated with worse patient care (eg, patient safety breaches, patient dignity breaches, poorer patient experiences and poorer patient outcomes).	
Interprofessional attitudes		
Positive (n=56, 16%)	Positive IPSC interactions were thought to promote more positive attitudes towards working collaboratively across disciplines and thus may serve to break down any negative stereotypes concerning the 'Other'.	'I remember sort of being quite judgmental [about social work student].' (Nursing clinician, F8N4T7)
Negative (n=21, 11%)	Negative IPSC interactions were sometimes thought to develop or reinforce negative stereotypes in students about other professions and/or other professions' students.	
Student well-being		
Increased (n=56, 16%)	Positive IPSC interactions were thought to have positive effects on well-being such as students feeling happier, valued, relaxed, respected, more confident and/or reassured.	'You're like, well they [nursing staff] don't trust you. It's like, are they gonna trust you then for the next 5 weeks?' (Physiotherapy student, F18PHS1)
Decreased (n=37, 20%)	Negative IPSC interactions were thought to have a negative effect on well-being such as students feeling upset, belittled, disrespected, ignored, isolated, frustrated, unconfident and angry.	
Future IPSC interactions		
Positive (n=14, 40%)	Positive IPSC interactions were thought to set students up for better future IP interactions and seeking out other IP interactions.	'After that I had a lot more confidence in my own ability to communicate with the other physios and then the other speechies' (Occupational Therapy student, F9OTS2)
Negative (n=24, 13%)	Negative IPSC interactions were thought to colour negatively students' future IP interactions, causing them to avoid other IP clinicians and situations.	
Career decision-making		
Positive (n=6, 20%)	Positive IPSC interactions were thought to motivate students to consider pursuing certain specialties (eg, loving a particular IP placement leads to increased desire to work in that specialty).	'From that whole scenario, I took away that I'm not sure if I want to work in a place [ward] like this' (Occupational Therapy student, F8OTS2)
Negative (n=3, 2%)	Negative IPSC interactions were thought to motivate students to avoid certain specialties and in worst cases could lead students to consider leaving their placement or even their healthcare education entirely.	

IPSC, interprofessional student-clinician.

This illustrates that clinicians perhaps do not realise the importance of students having positive interprofessional interactions in the workplace in order to protect their well-being. Indeed, clinicians may be unaware of the extent of psychological distress caused to students by negative IPSC interactions.[4]

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Box 5 Similarities/differences in consequences from interprofessional student-clinician (IPSC) interactions by participant group

- While clinicians and students identified better learning as the most frequent positive consequence, students outlined many more positive consequences of IPSC interactions than clinicians.
- Although students identified decreased well-being as the most frequent negative consequence, clinicians identified this consequence least frequently.
- Across the six professions, the most common positive consequence identified was better learning, apart from among physiotherapy participants who identified better interprofessional attitudes more frequently.
- The six professions did not appear to differ in terms of the frequency of negative consequences identified.

In terms of differences across the professions, we identified three noteworthy differences. First, medicine participants most frequently evaluated their stories as negative, perhaps aligning with others' research suggesting that doctors may be reluctant to learn from other healthcare professionals and are less ready for interprofessional learning.[21 34 35] However, an alternative interpretation might relate to medical students experiencing negative interactions due to the hierarchy in the workplace.[4 33] For example, one medical student reported being warned not to get on the 'wrong side' of other professionals and was given a hard time on placement, and another was warned not to treat others badly like their senior medical colleagues when they qualified in the future. Second, while most professions cited interpersonal contributory factors for negative IPSC interactions, paramedicine and midwifery typically cited organisational factors, possibly reflecting the more unpredictable and emergent nature of midwifery and paramedicine practice.[36] Finally, all professions suggested interventions at the individual level, except nursing and paramedicine who instead recommended relationship or organisational level interventions, respectively. These differences may reflect the enculturation of nursing for extensive interprofessional team-working (learnt from day one of nursing student placements) versus the relative independent practice of paramedicine, as well as paramedicine education taking place in typically uncontrolled and variable learning environments.[36] Altogether, these profession differences speak to Eraut's[16] context factors believed to affect workplace learning and indicate future possible challenges around IPSC interactions in the workplace.

Methodological strengths and limitations

To our knowledge, this is the first study of its kind to explore students' and clinicians' experiences of work-based IPSC interactions. While our most common study findings are largely consistent with previous research at the postgraduate level,[6–9] our findings illustrate greater breadth and depth of understandings, experiences and suggestions and in a previously under-researched context, that is, preregistration learning. Furthermore, unlike these previous studies, which tend to focus on medical learners, our study focuses on both learners and clinicians from six different healthcare professions and has made comparisons between students and clinicians and across professions. Moreover, we have collected a large number of narratives from a sufficient sample size of students and clinicians. Indeed, given our: (1) focused study aim; (2) drawing on informal learning theory;[16] (3) strong dialogue between interviewers and participants and (4) thorough team-based approach to framework analysis,[24] we believe our sample has sufficient information power.[37] Finally, we believe our reflexive approach to teamwork throughout the study,[29] from study conception through to recruitment, data collection, analysis and finally, write-up, has helped us to work better collaboratively and added to the rigour of our analysis and interpretation of the data.[30]

In terms of the methodological challenges of this study, while we use a qualitative interpretative approach, we have quantified some of our data to explore patterns in what is a reasonably large qualitative dataset. Although this is methodologically legitimate[28] and has been carried out in other published qualitative studies,[26 27] purist qualitative researchers may baulk at our approach. Second, while our total sample size could be considered large for a qualitative study, our numbers of students and clinicians representing each profession (eg, three midwifery students, four midwifery clinicians) were reasonably small making comparisons at the level of clinician/student and profession challenging. Furthermore, our sample size of students (n=38) was larger than clinicians (n=23) meaning that our comparisons between these two groups are tentative. Although our sample of students and clinicians was diverse in terms of professions, age, gender and ethnicity, our sample had disproportionately higher numbers of white and female participants, meaning that our findings may be less transferable to non-white and male students and clinicians. While our diversity as a research team was an analytic strength, some of the investigators had educational relationships with student participants, meaning that some students might have been more careful to censor their shared experiences. Finally, while we mostly collected narratives in our study (through narrative interviewing techniques), we analyse our data for this paper using thematic analysis.[24] While it is perfectly legitimate to analyse narratives using thematic analysis,[38] narrative researchers might prefer narrative analyses to explicate more fully how narrators make sense of their experiences and identities through narrative. Such analyses are outside the scope of this paper but will be presented elsewhere.

Implications for educational practice

Despite the study methodological challenges, we are able to provide recommendations for further educational practice. We would urge both preregistration educators and students to pay more attention to informal

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Table 6 Suggested improvements to facilitate effective IPSC interactions

Level of intervention	Definition	Illustrative quote
Student interventions (n=93, 39%)		
Formal	Interventions targeted at students including formal preparation (ie, teaching sessions) prior to clinical placements. Typically, in the classroom (but sometimes in the workplace) this includes groups of students being taught about the different roles of healthcare professionals and interprofessional handovers.	'I think a large part of that is having the opportunity to have informal, uhm, time such as, you know, we get on the birth with the obstetrics team occasionally where you are getting an opportunity to interact with other professionals' (Midwifery student, F24MidS3)
Informal	Informal interventions targeted at students (ie, unplanned, opportunistic learning) were suggested. Typically, in the workplace, this included them being self-directed learners seeking out their own meaningful IPSC interactions.	
Clinician interventions (n=28, 12%)		
Formal	Interventions targeted at clinicians in order to help them develop their educational knowledge, skills and attitudes and thus improve their clinical teaching with IP students (as well as their teaching with their own uniprofessional students).	'Thinking about how I would want my sort of student to be able to interact with the other disciplines, so perhaps it would be um, working out what skills they do have and increasing their confidence to be able to communicate with other disciplines… and if they're ready, just sending them straight in to do something by themselves' (Occupational Therapy clinician, F2OT1C1)
Informal	Informal interventions targeted at clinicians such as them actively involving IP students in their work, encouraging uniprofessional students to seek IPSC interactions and volunteering supervision and feedback (and thereby normalising the IP feedback culture).	
Interactional interventions (n=48, 20%)		
Formal	Formal interventions targeted at the IPSC relationship such as guides/cheat sheets for both about one another's roles/scopes of practice, supervisors formally arranging IPSC interactions and joint IP clinicians supervising students together.	'When my students report to me about any of my patients', I say, 'Okay, so what did the nurse say? Have you spoken to the OT about that? Who else do you think you could talk to?' (Physiotherapy clinician, M3PT3C4)
Informal	Suggestions included informal interventions at the IPSC relationship level such as increasing informal opportunities for students to shadow and chat to IP clinicians on an opportunistic basis.	
Organisational interventions (n=70, 29%)		
Formal	Suggestions included formal interventions at the organisation level such as changes to processes, organised IPE timetables (curriculum), orientations, protected time on clinical placements for students to talk (observe/work) with IP clinicians.	'It's important that students have access to members of other professions because they're going to be working with them in the future… it's important for the professions to value [emphasis added] teaching students from other professions' (Medicine clinician, M6M1C8)
Informal	Suggestions also included informal interventions at the organisation level such as co-located space in order for IP students and clinicians to interact informally.	

IPSC, interprofessional student-clinician.

interprofessional learning opportunities afforded by the workplace. Indeed, our study suggests that we need to invest time and energy in creating such opportunities for students through what Eraut[16] might call deliberative learning. Therefore, we recommend that work-based interventions are developed directed at students (eg, guiding students to seek out meaningful IPSC interactions), clinicians (eg, encouraging clinicians to volunteer supervision and feedback to students from other professions), student-clinician relationships (eg, increasing opportunities for healthcare students to shadow other professions) and organisations (eg, facilitating co-located space for students and other professions to interact).[8] While formal interventions might appear burdensome for already hard-pressed clinicians balancing patient care delivery with student learning,[29] we believe that healthcare professionals could harness opportunities for informal interprofessional learning[13] and without significant increases in time or workload. We think the positive outcomes from these interventions (including improved interprofessional attitudes and future interprofessional interactions) are well worth any extra investments in

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Box 6 Similarities/differences in suggestions for improving interprofessional student-clinician interactions by participant group

- Clinicians and students most commonly recommended interventions aimed at students, followed by organisational, then relationship and finally, clinician-level interventions.
- Interventions at the student level were most commonly suggested by medicine, midwifery, occupational therapy and physiotherapy participants.
- Nursing participants most frequently suggested interventions at the relationship level, while paramedicine participants most frequently suggested those at the organisational level.

time and workload—for clinicians, students and patients alike.

Implications for further research

Further qualitative research is now needed across multiple sites and countries in order to ascertain the transferability of our study findings beyond our Australian context. Further research should include larger samples to allow for clinician/student and profession comparisons plus a greater proportion of male participants should check the transferability of the study findings to a broader population of male students and clinicians. Furthermore, as with research conducted at the postgraduate level,[9] we would recommend the use of observational methods such as video-observation[39] or video-reflexive ethnography[40] in order to observe IPSC interactions in the workplace to better understand informal interprofessional learning through a multiplicity of relationships including IPSC interactions and interprofessional student-student interactions. Without such further research, it will be challenging to understand more fully the complexities of (and improve opportunities for) informal interprofessional learning for preregistration healthcare students.

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