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DEPASQUALE, C., ARNOLD, A., CUNNINGHAM, S., KERR, A., JACOB, S.A., BOYTER, A., BOYD, M., POWER, A. and ADDISON, B.

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Research

An Exploration into Student Pharmacists' Experiences of Practice-Based Interprofessional Education During Experiential Learning Placements

Clare Depasquale[a,*], Amy Arnold[a], Scott Cunningham[a], Aisling Kerr[a], Sabrina A. Jacob[b], Anne Boyter[b], Matthew Boyd[c], Ailsa Power[d], Brian Addison[a]

[a] Robert Gordon University, School of Pharmacy & Life Sciences, Aberdeen, United Kingdom
[b] University of Strathclyde, Strathclyde Institute of Pharmacy and Biomedical Sciences, Glasgow, United Kingdom
[c] Nottingham University, School of Pharmacy, Nottingham, United Kingdom
[d] NHS Education for Scotland, Glasgow, United Kingdom

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ABSTRACT

Objective: This study aimed to explore student pharmacists' experiences of interprofessional education (IPE) during experiential learning (EL) placements.
Method: A paper questionnaire was used to collect data and was distributed to all penultimate/final-year student pharmacists enrolled in the Master of Pharmacy programs at Robert Gordon University or the University of Strathclyde (n = 485). Data collection took place between January and March 2023, shortly after student pharmacists attended EL placements in various practice settings. Participation in the research was voluntary, and questionnaires were completed anonymously. Thematic analysis was used to identify themes from responses to open-ended questions, aligning with the research aim. Ethical approval was granted by the Robert Gordon University School Ethics Research Committee.
Results: The questionnaire was completed by 328 (67.6%) student pharmacists. Themes identified included: (1) Nature of IPE experiences: mostly unplanned or informally planned, with few examples of formally planned IPE; opportunities varied across areas of practice; professional groups varied, with medicine and nursing most represented. (2) Factors influencing interprofessional learning: related to EL facilitator (preceptor), student pharmacist, placement, and cultural factors. Facilitators included prioritization of IPE and positive role modeling by mentors; barriers included student pharmacists' perceived lack of preparedness for IPE, lack of specific IPE learning outcomes, and sector-specific limitations. (3) Student pharmacists' perceived value of IPE: experiences supported the development of collaborative competencies, as well as personal, professional, and interprofessional identity development.
Conclusion: Greater emphasis on the relevance of IPE in the EL curriculum and the wider Master of Pharmacy curriculum could enhance learning from opportunistic IPE. The lack of formally planned IPE opportunities requires further attention.

1. Introduction

Over the past 3 decades, the environment in which health and social care professionals practice has changed significantly. Patients' needs have increased in complexity due to a shift in both societal demographics and disease epidemiology, as a result of an aging population and higher prevalence of chronic disease and multimorbidity.[1,2] This increased complexity has the potential to jeopardize the quality and continuity of care, with serious consequences for patient safety. Seminal reports, published in response to international high-profile cases of health care-related failings, have concluded that safe and effective daily work processes can be impacted by the absence of interprofessional team working and collaboration.[3–6]

Interprofessional collaborative practice (IPCP), where "multiple health workers from different professional backgrounds work together with patients, families, carers and communities to deliver the highest quality of care," is viewed as an integral part of transformative policies aimed at strengthening integrated health and social care systems.

* Corresponding author.
E-mail address: c.depasquale@rgu.ac.uk (C. Depasquale).

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Consequently, the focus has shifted to interprofessional education (IPE), which "occurs when students from 2 or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes."[7] IPE is increasingly viewed as the foundation for developing the health and care workforce's capacity to engage in IPCP by enabling learners to develop core collaborative competencies such as teamwork, an understanding of team members' roles and responsibilities, communication, reflective, and ethical practice.[7–9]

Globally, accreditation bodies overseeing the initial education and training of health care professionals, including pharmacists, specify the inclusion of IPE in undergraduate curricula. Examples include the United States Accreditation Council for Pharmacy Education standards and the Canadian Council for Accreditation of Pharmacy Programs standards, which call for curricular content that prepares graduates for patient care provision as collaborative team members.[10,11] The General Pharmaceutical Council (GPhC), the United Kingdom regulator, specifies the inclusion of IPE opportunities that "mirror practice … to enable students to develop the skills and level of competency they need…"[12].

Published literature reports on different IPE initiatives, including campus-based, practice-based, online (synchronous and asynchronous), and blended activities, in addition to extracurricular opportunities, with initiatives involving different professional groups, employing different pedagogical approaches, and focusing on different topics.[13,14] The literature highlights that no one approach is sufficient; it is important that educators adapt pedagogical approaches to align with students' developmental needs.[15] In addition, it is reported that IPE initiatives conveying a sense of relevance to professional practice are evaluated more positively by students.[16–18] Reference is made in the literature to the role of practice-based IPE opportunities in supporting students' interprofessional learning (IPL) by reducing the theory-practice gap through authentic collaborative experiences.[15,19,20] Several authors report that allowing students to immerse themselves in the complexity of the health care system enhances the development of collaborative competencies and IPCP as practitioners.[21,22]

In 2018, the Scottish Government made available the Additional Cost for Teaching for Pharmacy funding to support the development of the practice-based experiential learning (EL) curriculum.[23] This study forms part of a research program exploring the development of practice-based IPE, which was planned to complete a situational analysis before the introduction of new IPE initiatives. Its aim was to explore student pharmacists' experiences of IPE during EL placements. A secondary objective aimed to identify facilitators and barriers to student pharmacists' IPL during EL placements.

2. Method

2.1. Context

In Scotland, pharmacy programs are offered at the School of Pharmacy and Life Sciences at Robert Gordon University (RGU) and the Strathclyde Institute of Pharmacy and Biomedical Sciences at the University of Strathclyde (UoS). Student pharmacists undertake a 4-year Master of Pharmacy (MPharm) university degree followed by a Foundation Training Year in a practice setting and the successful completion of the GPhC assessment before registering as pharmacists. Currently, as part of the EL curriculum, all student pharmacists attend mandatory placements in various practice settings (community pharmacy, primary care, hospital, and specialist areas of practice) for 9 weeks during the 4 years of study at university. Placements are organized in partnership between RGU, UoS, National Health Service (NHS) Education for Scotland, and pharmacy stakeholders. NHS Education for Scotland (NES) is a national organization with statutory functions for providing, coordinating, developing, funding, and advising on education, training and workforce development for the NHS in Scotland. NES Pharmacy manages aspects of financial governance and quality management of EL for student pharmacists in Scotland on behalf of the universities, including approval of training sites and EL facilitator (preceptor) training.[23,24]

2.2. Study Design

The wider research program took a pragmatic worldview and adopted a case study research strategy. For this study, a cross-sectional, theory-based survey design using a paper questionnaire—including open-ended questions—was developed by the research team. A growing number of theories relevant to IPE research were identified, stemming from and across disciplines—educational, psychological, sociological, and management.[25–27] In view of the exploratory nature of this research program, systems theory, which follows the principle of thinking about things as a whole rather than in parts was considered appropriate. The Biggs 3P Model and the 3P Model of Learning to Collaborate were used to underpin the study, taking the view that the dynamic teaching and learning environment is made up of a set of microsystems, each having an element of autonomy but also interacting with other microsystems in the system as a whole. Presage factors (learner characteristics, teacher characteristics, teaching/learning/organizational context), process factors (pedagogic components, facilitation style), and product factors (student learning—collaborative competencies) can all interact to influence the teaching and learning environment.[28,29]

2.3. Sampling

A purposive sampling strategy was used to recruit participants. All student pharmacists enrolled in the MPharm programs at RGU or UoS who were in the penultimate or final years of study during the 2022/2023 academic year were invited to participate in the study (n = 485). Using an online survey sample size calculator with a 95% confidence level, a population of 485, and a 5% margin of error, the ideal sample size was calculated to be 215.

2.4. Data Generation

2.4.1. Questionnaire Development

Initial development of the questionnaire was guided by the research aim and objectives, systems theory, and a review of published IPE literature.[28,29] Further development took an iterative approach, with the draft questionnaire undergoing several rounds of review by the research team. The final questionnaire included (i) an introduction inviting student pharmacists to take part in the study, (ii) a participant information sheet, (iii) 5 open-ended questions about IPE (Table 1), and (iv) a demographic section.

Table 1
Open-Ended Questions About Interprofessional Education (IPE) Included in the Questionnaire Linked to the Biggs 3P Model Domains.[28]

Question (3P Domain)
1. Please explain in a few words what you understand by the term "interprofessional education". (Domain: Presage)
2. Please tell us about any experience(s) you had interacting with students or qualified professionals from other health and social care disciplines while on placement. This could include doctors, nurses, physiotherapists, occupational therapists, dentists, social workers. (Domain: Process)
Things to think about: What did the experience involve? Which setting – community, hospital, primary care, specialist? Which healthcare professional(s) was/were involved? Was this planned by your EL facilitator or initiated by you? Was it unplanned?
3. Was/were the experience(s) beneficial? Why? What did you learn? (Domain: Product)
4. How did you feel throughout the experience(s)? (Domain: Presage)
5. Is there anything you would like to add?

Abbreviations: EL, experiential learning; IPE, interprofessional education.

2.4.2. Questionnaire Distribution

Questionnaires were distributed to student pharmacists between January and March 2023. Data collection was overseen by a member of the research team or academic staff and took place on campus during timetabled sessions, the week after student pharmacists had attended their semester 2 EL placement. All completed questionnaires were collected during the session. Participation was voluntary, and questionnaires were completed anonymously; no incentives were provided.

2.5. Data Analysis

All data gathered from paper questionnaires were transcribed into a Microsoft Excel spreadsheet by the first author (CD); this permitted immersion in the data. A 10% sample was accuracy-checked by a member of academic staff (BD); in addition, any responses that were difficult to decipher were checked. Responses to quantitative demographic questions were exported to SPSS v29 and analyzed using descriptive statistics to summarize sample characteristics; results were presented as numbers and frequencies.

Qualitative data gathered from open-ended questions were analyzed using thematic analysis, combining both deductive and inductive approaches.[30] A random 10% sample was analyzed independently by 2 authors (CD and AK) using an *a priori* codebook; its development was informed by the Biggs 3P Model and the 3P Model of Learning to Collaborate.[28,29] During the coding process, any newly identified codes were added to the codebook by the researchers. Emerging themes and subthemes were discussed. The remaining data were analyzed by 1 researcher (CD), with frequent discussions taking place between the 2 researchers (CD and AK). Additionally, selection of the most appropriate supporting quotations was discussed between the 2 researchers.

2.6. Research Governance

Ethical approval was granted by the School of Pharmacy and Life Sciences Ethics Review Committee at RGU (Approval number S319) in November 2022. Furthermore, gatekeeper approval was sought from the MPharm course leader at RGU and the Program Director at UoS. Completion of the questionnaire was considered as informed consent. Questionnaires were completed anonymously; during transcription, respondents were assigned an identification code for reporting purposes.

3. Results

3.1. Demographic Data

The questionnaire was completed by 328 student pharmacists, yielding a response rate of 67.6%. More responses were received from student pharmacists enrolled in the MPharm program at UoS (218/328; 66.5%) (Table 2); this was expected due to the larger student pharmacist cohorts in both year groups at UoS compared to those at RGU. The majority of respondents were female (249/328; 75.9%). A small number of respondents (18/327; 5.5%) had a previous qualification, most of which were related to health care.

Table 2
Demographic Data of Questionnaire Respondents (N = 328).

Characteristics	n (%)
Response rate from RGU	110 (33.5)
Response rate from UoS	218 (66.5)
Year of Study	
Final	160 (48.8)
Penultimate	168 (51.2)
Gender	
Female	249 (75.9)
Male	68 (20.7)
Nonbinary	2 (0.6)
Rather not indicate	8 (2.4)
Previous qualification	
No	309 (94.2)
Yes	18 (5.5)
	One missing entry
Previous qualifications	
Dental nursing	1 (0.3)
Public Health	1 (0.3)
Nursing	1 (0.3)
Botany	1 (0.3)
Biomedical Science	2 (0.6)
Immunology/Pharmacology	3 (0.9)
Pharmaceutical Science	1 (0.3)
Pharmacy/ Pharmacy Technician/Pharmacy Dispenser/ Pharmacy Advisor Health and Social Care	5 (1.5)
Not health care-related/	1 (0.3)
Diploma in interpretation	2 (0.6)
	One missing entry as respondent did not provide details of qualification; one respondent reported both a diploma in interpretation and a pharmacy related qualification
Experience working in community pharmacy	
No	43 (13.1)
Yes	284 (86.6)
	One incomplete entry
Experience working in hospital pharmacy	
No	284 (86.6)
Yes	42 (12.8)
	Two missing entries
Age range (Years)	23 years (19–42)
Mean	22 years (SD 3.4)

Abbreviations: UoS, University of Strathclyde; RGU, Robert Gordon University.

3.2. Qualitative Data

Three main themes were identified from responses to the open-ended questions. Themes and subthemes are presented as a narrative description, with supporting quotations included in Tables 3–5; subthemes are linked to presage, process, and product domains.[28]

3.3. Theme 1: Nature of IPE Experiences

Subtheme (i): Approaches to teaching and learning (3P: Process)

Respondents referred to unplanned, informally planned, and formally planned IPE experiences during practice-based EL placements. The latter referred to structured IPE activities involving student groups facilitated by different members of an interprofessional team. The former 2 approaches were most common and primarily involved interactions with qualified health and social care professionals, although some respondents mentioned interactions with students from other professional groups. Informally planned experiences were perceived to be organized as part of an individual EL facilitator's role and responsibilities—for example, participation in multidisciplinary team (MDT) meetings or interprofessional ward rounds. Unplanned experiences were more opportunistic in nature—the IPE respondents took advantage of if and when the opportunity arose. There was a scarcity of examples of formally planned IPE activities; a respondent reported an example of an activity organized with input from an interprofessional team and involving student pharmacists and medical students.

Subtheme (ii): IPE activities and context (3P: Process)

Respondents identified a variety of IPE activities occurring in different practice settings, including community pharmacy, primary care, hospital, and specialist areas. Respondents reported varying degrees of interaction, ranging from observation/shadowing to active participation. Interactions occurred via email, telephone conversations, or face-

Table 3
Theme 1 Supporting Quotations Linked to Subthemes and the Biggs 3P Model Domains.[28]

Theme 1: Nature of IPE experiences
Subtheme 3P (Presage, Process, Product) domain
(i) Approaches to teaching and learning Process
"Spoke to the doctor about a patient and the doctor stated they had recently started new drug; the doctor then asked me to counsel the patient on the new drug. This was an unplanned event." **(R22)**
"In a primary care setting, I contacted a medical student to ask about a field I knew they were interested in and had researched. This was done out of my own initiative, which I then discussed with my facilitator as it was a part of their specialized field of competency. The topic at hand was HRTs in menopausal women and how it differed from HRTs for transexual individuals (M + F)." **(R54)**
"While on a hospital placement I interacted with different healthcare professionals … This was planned that I would attend this MDT meeting to learn about the different roles in treating patients." **(R74)**
"On my final year hospital placement, [X] *had planned an IPL day for us pharmacy students with 2nd year* [X] *uni medical students in* [X] *Community Hospital. This was built into our EL timetable."* **(R137)**
(ii) IPE activities and context Process
Community pharmacy
"… speaking to doctors on the phone to query an item on a prescription which was a specialized item. I communicated with them to find a suitable alternative." **(R30)**
"… speaking with nursing and care staff about MAR [Medication Administration Record] *charts and general wellbeing of the patients in question. Emailing GP practice to notify them of a patient being referred in a way that didn't make sense …"* **(R3)**
Primary care
"I was able to shadow a mental health nurse in a primary care setting. This was planned and it allowed me to gain a better understanding of what mental health nurses do and how pharmacists can work with them." **(R47)**
"… sat in a meeting/huddle with the GPs, nurses, pharmacists to discuss input on "tough" cases - people that don't have a straightforward treatment plan due to complexities. Planned weekly huddle - everyone gets to give input and share opinions; best care of patient is always the goal. Meetings like this help each member of the MDT feel supported." **(R324)**
Hospital
"Working on a ward round with fellow medical student, situations were proposed to us by the senior staff, (consultant, pharmacist, dietician, nurses) and asked to work together to problem solve in areas that were unfamiliar to us (TPN)." **(R301)**
"… I was also reading patient's notes considering what other healthcare professionals had written such as occupational therapy." **(R91)**
"While I was on my last placement, I had MDT meetings which involved student nurses, nurses, psychiatrists and pharmacists. The meetings were to discuss the progression of each patient …" **(R170)**
"In hospital cancer clinics worked with nurses in giving chemotherapy via IV and saw the final checks before being administered. Also sat in on a nurse consultation for a patient who was starting chemo soon." **(R149)**
"Diabetes clinic with a nurse prescriber which was very interesting and planned by my supervisor." **(R209)**
Specialist care
"… social workers in addition to healthcare within the hospice, were helping organize transport and housing for a patient who was being discharged from the hospice but did not have a home to go back to while the pharmacist looked for community pharmacies nearby." **(R271)**
"Meeting with the student nurses [at NHS 24[a]], *we got to ask each other questions about our courses and team and how we can work together in our future careers."* **(R232)**

Abbreviations: EL, experiential learning; GPs, general practitioners; IPE, interprofessional education; HRT, hormone replacement therapy; IPL, interprofessional learning; MAR, medication administration record; MDT, multidisciplinary team; NHS, National Health Service; TPN, total parenteral nutrition.
[a]NHS 24 is one of Scotland's 7 special Health Boards. It is Scotland's provider of digital health and care services; delivered by phone and through a range of digital channels including online platforms.

to-face—eg, during ward rounds and MDT meetings. Different professional groups were involved; respondents mainly referred to interactions with doctors and/or nurses. However, interactions with other professional groups such as dieticians, social workers, physiotherapists, occupational therapists, psychologists, and laboratory scientists were also reported. References were also made to carers and members of the pharmacy team.

Table 4
Theme 2 Supporting Quotations Linked to Subthemes and the Biggs 3P Model Domains.[28]

Theme 2: Factors influencing IPL
Sub-theme 3P (Presage, Process, Product) domain
(i) **EL facilitator factors** Presage; Process
"This was planned by my facilitator who asked if I wanted to consult the doctor under pharmacist supervision …" **(R65)**
"Not everyone gets the opportunity to work interprofessionally, it depends on the facilitator. Could be further stated as a learning outcome for placements." **(R19)**
"I learned the speaking mannerism between professionals …" **(R226)**
"But sometimes it is just shadowing, the pharmacist did not explain much …" **(R106)**
" … it felt as though I was holding up the pharmacist and they had more important stuff to do." **(R83)**
" … Staff have too much work to do and act like students are a burden …" **(R191)**
"… Possibly useful to make facilitator aware of what's being/has been covered at uni." **(R34)**
(ii) **Student pharmacist factors** Presage; Process
"Not aware of the term but I would guess, learning practically under the guidance/ supervision of a professional." **(R140)**
"Enjoyed collaborating with the doctor as he was in the wrong … I felt empowered …" **(R221)**
"Interacted with a GP to highlight their errors." **(R188)**
"More training activities before the actual placement…" **(R200)**
"I felt nervous at the start of the EL placements due to lack of experience in IPE …" **(R60)**
"Shadowing/experiencing ward rounds is one of the best ways to understand the multidisciplinary approach." **(R164)**
"Sometimes the shadowing felt like a waste of time." **(R141)**
"I was glad to be included in the MDT meeting and involved in the patient's care decisions. This was helpful to understand how everyone works together. However, I didn't get to participate so it was great to listen, but I think my learning could have been improved if I was asked questions after the work was covered …" **(R74)**
"… I had asked to do something like this in my pre-EL communication form." **(R4)**
"….it should be emphasized to EL facilitators that wherever possible they should be encouraging/organizing for the students to carry out any consultations/discussions with other healthcare professionals … " **(R68)**
"Although I had a great experience on this occasion overall, my opportunities for IPE on placement were minimal and I would have liked more opportunities to be involved and actively participate in IPE." ***(R79)***
"I only really had particular IPE on one week of placement and I left this feeling it was the placement I learned the most on of all. More IPE opportunities would have definitely benefitted me." **(R78)**
(iii) **Placement factors** Presage; Process
"Hospital placement was only one with notable interprofessional contact …" **(R57)**
"Hospital allows you to interact and see how pharmacy works as part of the bigger healthcare picture … as you are interacting with multiple professions on the wards as well as others in the pharmacy team … Community is fine for internal learning within pharmacy but poor for working with other disciplines." **(R63)**
"… in primary care … I had no contact with doctors, nurses or any other profession except pharmacist and pharmacy technicians." **(R241)**
"Junior doctors/FY1/2 often had no time to talk or discuss patients." **(R121)**
"This [planned IPL day during hospital placement] *was a very worthwhile experience, the EL providers structured the day very well … I feel the pharmacy and medical students both benefitted from the day. After experiencing case-based IPL with students at uni, it was great to also experience this in practice… it made uni IPL seem more relevant. I definitely think incorporating this into future placements would be very beneficial, and not just in final year but throughout. Thanks to NHS* [X] *for this experience!"* **(R137)**
(iv) **Cultural factors** Presage
"… on the ward round, the doctors were more than happy to join the conversation between myself and my facilitator … All other professionals were more than happy to help with my experience." **(R285)**
"I felt like a valued member of the healthcare team. It was initially quite daunting … However, I felt more at ease as the doctor was supporting as we worked together." **(R84)**
"… Sometimes on EL you can feel like a bit of a spare part and are getting in people's way but by the doctors including us and taking time to show and explain things to us it made me feel included." **(R155)**
"My experiences with GPs while on placement at a surgery was great. As a pharmacy student I was grateful for them treating me as a peer and teaching me what they knew." **(R302)**
"Often when you have a query for the GP you only ever get to speak to the receptionist … Rarely, in my experience do you get to speak to other healthcare professionals." **(R251)**
"To an extent most professionals I interacted with were more concerned with making sure I was meeting my learning outcomes on placement than show me how they

(*continued on next page*)

Table 4 (*continued*)

Theme 2: Factors influencing IPL
normally work. Were under the impression that large parts of their job were irrelevant to me." **(R95)**

Abbreviations: EL, experiential learning; GPs, general practitioners; IPE, interprofessional education; IPL, interprofessional learning; MDT, multidisciplinary team; NHS, National Health Service.

Table 5
Theme 3 Supporting Quotations Linked to Subthemes and the Biggs 3P Model Domains.[28]

Theme 3: Student pharmacists' perceived value of IPE
Subtheme 3P (Presage, Process, Product) domain
(i) Development of collaborative competencies Product
"Yes, understanding the roles and responsibilities of all the professionals made it easier to designate tasks and ask for help …" **(R108)**
" … it was beneficial to see that there is more than just doctors, nurses and pharmacists in a MDT." **(R319)**
"Yes, very. It allowed me to better understand the role of a pharmacist within the MDT and helped me understand more about working within my competencies in my future career. It also allowed me to understand the roles of the different HCPs and what part they played/play in a patient's care. It will allow me to have a better understanding of referring to the most appropriate HCP in future." **(R69)**
"It was a new experience which provided more insight into the kind of relationship the pharmacist has with other professionals." **(R291)**
"… I learned how to effectively communicate with other professionals. Not using "simple" language as they know medical jargon." **(R115)**
"…Worked on communication skills and how to adapt depending on who I am interacting with." **(R135)**
"IPL not relevant to communicating with other healthcare professionals on placement. Normal communication skills required - not sure how IPL is supposed to improve this. Nothing really to comment on individual interactions - it's just part of the job." **(R185)**
"Very beneficial. Got to see how those professions work, make decisions and how everything ties together to help patients. Interprofessional learning is an absolutely essential part for all health care courses." (R73)
" … Working with other health care professionals helped me gain wider understanding of their role and importance! Importance of health care workers understanding one another "being on the same page" to provide safe and effective patient-centered care." **(R327)**
"Felt the patient's care was the priority and all teams were working together to optimize patient health and quality of life." **(R81)**
(ii) Preparation for future practice Product
"I felt useful and happy I was able to play a role in the care of the patient. It gave me a sense of belonging and a sense of achievement. I was able to put my university learnt knowledge into practice." **(R79)**
"It showed why the theory we learn is significant in practice." **(R260)**
"The placement was a very important experience for me, that has not only made me more confident, but it also served as a motivational boost." **(R11)**
"Anxious initially [to participate in IPCP], nervous I won't be able to feedback the full scope. Realized the GP was very approachable and accommodating, spoke to them easily. Was really proud of myself for taking the step despite my anxiety." **(R138)**
"It was very beneficial as it allowed me to see the multidisciplinary team and will aid my progression in a pharmacy career. It was beneficial as it allowed me to appreciate the similarities and differences between roles, but ultimately the importance of each role in the healthcare team." **(R254)**
"Seeing qualified pharmacist's opinions as experts in medication held in high regard by other health professionals made me feel proud to be studying pharmacy and working towards that level of competency. Also felt reassured of what my place might be fitting into the wider team when I graduate." **(R57)**
"I felt confident that I was able to communicate with other professionals without feeling intimidated. I was able to raise issues with conviction. It made me feel more able as a professional." **(R264)**

Abbreviations: EL, experiential learning; GPs, general practitioners; HCP, health care professional ; IPE, interprofessional education; IPCP, interprofessional collaborative practice; IPL, interprofessional learning; MDT, multidisciplinary team.

3.4. Theme 2: Factors Influencing IPL

Responses provided valuable insights into facilitators and barriers to student pharmacists' IPL.

Subtheme (i): EL facilitator factors (3P: Presage; Process)

Respondents identified an EL facilitator's enthusiasm for and willingness or unwillingness to prioritize IPE as facilitating or hindering IPE opportunities. Reference was also made to the lack of specific IPE learning outcomes in student pharmacist/EL facilitator handbooks as potentially contributing to a lack of focus on IPE. Additionally, respondents referred to learning communication skills through the observation of positive IPCP role modeling. Reference was also made to the facilitation style used by individual EL facilitators as potentially hindering student pharmacists' learning opportunities. Furthermore, an EL facilitator's competing commitments, as well as a lack of background information on a student pharmacist's level of knowledge and competence at different stages of the MPharm program, were perceived to be barriers to a student pharmacist's IPL.

Subtheme (ii): Student pharmacist factors (3P: Presage; Process)

Responses to the question asking for an explanation of their understanding of the term "interprofessional education" were varied. While the majority of student pharmacists had an idea of the IPE concept and its relevance to IPCP and patient care, a number of responses identified gaps in knowledge and understanding of what IPE is and its relevance to improving person-centered care—holistic care provision based on 4 principles, where a patient is treated with dignity, compassion, and respect and offered personalized and coordinated care that enables them to live a fulfilling life.[31] Furthermore, the terminology used by some respondents conveyed a sense of negativity, drawing attention to misconceptions that student pharmacists may have about IPCP. In one response, communicating with a doctor was perceived as adding to their workload, while other responses conveyed a sense of a "blaming" culture. Responses indicated a lack of preparation for EL placements in general and a lack of preparation for IPE. Respondents referred to a knowledge gap about different areas of practice, primary care in particular, and a lack of experience in communicating with health care professionals from other disciplines. Responses to several questions identified diverse learning preferences; for example, some viewed shadowing opportunities as an effective way to learn about IPCP, whereas others did not share this view. Furthermore, some respondents identified missed opportunities to maximize student pharmacists' IPL. Responses provided insight into student pharmacists' motivation and engagement with EL and IPE both before and during placements. Additionally, student pharmacists' expectations for IPE to be included as part of their EL were also highlighted in several responses.

Subtheme (iii): Placement factors (3P: Presage; Process)

Overall, respondents referred positively to IPE experiences, especially when referring to placements in hospital settings; they also identified a number of missed IPE opportunities and sector-specific limitations, mainly relating to IPE during placements in community pharmacy and primary care settings. However, some reference was made to competing commitments as hindering IPE opportunities on hospital wards. One response referred very favorably to the opportunity to participate in a planned IPE activity that involved medical students and student pharmacists; the respondent identified this as an opportunity to build on previous campus-based IPE activities.

Subtheme (iv): Cultural factors (3P: Presage)

The majority of responses referring to hospital, primary care, and specialist areas of practice indicated that EL placements provided an environment that was conducive to IPE and IPCP. Respondents referred to a positive IPE culture where they felt valued and welcomed by members of the MDT; this encouraged communication and created a supportive learning environment. In addition, respondents referred to a strong IPE culture, especially during MDT meetings, where health care professionals from different disciplines worked collaboratively to achieve the best patient outcomes. However, one respondents indicated a tendency by some members of the MDT to overlook prioritization of IPE activities, focusing more on uniprofessional aspects of learning. One response did highlight a cultural barrier to communication with general practitioners, indicating that it seemed common and accepted practice

to only speak to the receptionist when contacting the doctor's office with a medication query, rather than speaking to the doctor.

3.5. Theme 3: Student Pharmacists' Perceived Value of IPE

Subtheme (i): Development of collaborative competencies (3P: Product)

Respondents indicated that they had found IPE experiences beneficial, enabling them to gain new knowledge and skills required for IPCP. Reference was made to how these can be transferred into practice. Respondents referred to acquiring a better understanding of the roles and responsibilities of different MDT members and gaining insight into a pharmacist's role in the wider interprofessional team. Some respondents indicated that IPE experiences enabled a better understanding of a pharmacist's scope of practice and increased awareness of what course of action to take when encountering issues beyond their own disciplinary knowledge and skills. The majority of respondents reported improving their communication skills through the IPE experience(s), developing a better understanding of the relevance of good communication to improve teamwork and the need for adaptation when communicating with different members of the team. However, 1 response did not share this view, potentially highlighting a gap in understanding of the IPE concept and its wider relevance in better preparing student pharmacists for IPCP. Respondents referred to an increased awareness of how IPCP contributes to improved person-centered care, in particular, the relevance of effective teamwork for holistic care provision.

Subtheme (ii): Preparation for future practice (3P: Product)

Respondents reported experiences as helping to bridge the theory-practice gap, allowing them to connect theory they had learned at university to clinical practice. Additionally, responses indicated that IPE experiences had supported respondents' personal, professional, and interprofessional development. Respondents reported gaining confidence and increased motivation to complete their studies.

4. Discussion

This study examined student pharmacists' experiences of IPE during practice-based EL placements in community pharmacy, primary care, hospital, and specialist areas of practice in Scotland. The findings mainly identified unplanned and informally planned IPE, mostly involving interactions with health care professionals, although some interactions with students from other disciplines were also reported. Respondents reported varying degrees of interaction, ranging from observation/shadowing to active participation. A scarcity of formally planned IPE, organized with input from an interprofessional team and involving different student groups, was reported. Several facilitators and barriers related to EL facilitator, student pharmacist, placement, and cultural factors were identified as influencing student pharmacists' involvement in IPE experiences. Some sector-specific limitations to IPE experiences were reported, mainly relating to EL placements in community pharmacy and primary care. Overall, respondents viewed their IPE experiences as beneficial, enabling them to gain new knowledge and skills required for IPCP, while also supporting their personal development, as well as the development of professional and interprofessional identities.

In this study, most identified IPE experiences were unplanned or informally planned activities, considered to be part of an EL facilitator's remit (3P: Process), which respondents perceived as beneficial in supporting the development of collaborative competencies (3P: Product). This corroborates findings from other published studies supporting the value of informal IPE experiences.[32,33] Respondents reported improved communication skills, a better understanding of the roles and responsibilities of other professionals, and an increased appreciation of the importance of teamwork in delivering person-centered care. This reported knowledge and skill development aligns with some, but not all, of the core competencies/capabilities identified in international IPE frameworks.[34,35] This concurs with findings from the study reported by Zhao and colleagues,[33] who suggest that more explicit IPE activities may be better suited to support the development of certain IPE competencies/capabilities. One example was the inclusion of a reflective exercise as part of the IPE activity, intended to make the learning process more explicit. Shrader and Zaudke[36] emphasize the importance of EL facilitators creating such reflective opportunities to allow learners to shift their attention to the collaborative experience, rather than focusing solely on clinical aspects of learning.

Respondents perceived opportunities "to learn with, from, and about" other health and social care professionals in a practice-based setting as helping to bridge the theory-practice gap, while also enabling their personal, professional, and interprofessional development (3P: Product).[37] Reference is made in the literature to educators nurturing the development of a "dual identity" in health and social care students through the provision of uniprofessional and IPE curricular content. The purpose is to encourage belongingness to both a particular professional group and the wider interprofessional community.[38,39] Respondents referred to their IPE experiences as enabling a better understanding of the roles and responsibilities of other members of the MDT, in addition to their own role and boundaries within the team; furthermore, they referred to having increased clarity on signposting to the appropriate professional if/when the need arose (3P: Product).

The findings of this study highlight the lack of formally planned activities offered in the EL curriculum. Barriers associated with the implementation of IPE in undergraduate curricula are well reported; reasons cited are multifactorial, with logistical, cultural, and funding factors among those consistently identified across a number of published papers.[14,40–45] One respondent articulated the relevance of these formally organized practice-based IPE experiences, particularly when viewed in the context of enabling a continuum of learning (3P: Process). The literature refers to the interprofessional "learning continuum" as a gradual, complex, and iterative process[46] beginning at the undergraduate level and continuing through postgraduate opportunities within the workplace setting.[18,47]

Respondents referred to several factors as hindering their IPL. Firstly, some respondents perceived the lack of specific IPE learning outcomes as encouraging uniprofessional aspects of learning over IPE (3P: Presage; Process). Nisbet and colleagues[48] highlight the need for both IPE and profession-specific learning outcomes to be included in EL curriculum handbooks. Explicitly including learning outcomes to encourage the development of collaborative competencies, and aligning them with appropriate assessment tasks, is viewed as 1 way of clearly articulating that IPE is a core component of the EL curriculum and not an "add-on" exercise (3P: Process).[48] Additionally, some respondents perceived themselves as unprepared for IPE, citing lack of confidence and skills to communicate with members of the MDT (3P: Presage). Again, focus is drawn to the relevance of a continuum of learning (3P: Process); building on the complementary nature of campus-based and practice-based IPE. Planned campus-based IPE activities present opportunities for knowledge and skill development in a supportive and safe environment, helping to build confidence and preparedness for practice-based IPE.[15,44] Furthermore, respondents referred to EL facilitator factors as barriers that can hinder IPL; in particular, the facilitation style used by individual EL facilitators (3P: Presage). O'Carroll and colleagues[49] report misconceptions around the understanding of what interprofessional practice learning really means, leading to limited IPE activities and missed learning opportunities. This draws attention to the importance of adequate IPE training provision, leading to a common understanding of the IPE concept and its relevance to IPCP, with the aim of encouraging positive role modeling of IPCP and stimulating EL facilitators to take advantage of opportunistic IPE experiences.[15,36] Competing commitments were also reported as hindering IPE activities (3P: Presage). Respondents referred to busy EL facilitator schedules; this also extended to other members of the MDT. This

corroborates findings from a study by Ong and colleagues[50] that reports clinical educators from various health care disciplines perceived IPE as compromising efficiency in delivering patient care.

The overall response rate (67.6%; n = 328) resulted in a sample size that meets the 95% confidence level. In addition, a strong breadth of responses was received, with nearly all respondents providing answers to the first 4 questions; however, fewer student pharmacists—just over a quarter—provided responses to question 5. A robust process for questionnaire development was followed; this was informed by systems theory, IPE literature, and involved contributions from research team members with extensive educational and research experience. However, the tool was not piloted prior to use. The inclusion of open-ended questions allowed for more in-depth data collection. Completion of questionnaires anonymously aimed to minimize acquiescence and social desirability bias. Data collection took place the week after student pharmacists attended placements, minimizing recall bias. Additionally, trustworthiness in the data analysis process was increased through transcription checking, use of an *a priori* codebook, independent analysis of 10% of the collected data by 2 researchers, regular discussions, researcher reflexivity, and the inclusion of multiple supporting quotations. Data was collected in Scotland; therefore, the findings may lack transferability to other contexts and countries.

It is relevant to note that the scarcity of formally planned IPE activities reported in the findings could have influenced respondents' perceived value of unplanned and informally planned IPE activities. Further research involving an evaluation of formally planned and organized activities, following their development and implementation into the EL curriculum is recommended.

5. Conclusion

This study has provided valuable insights into student pharmacists' experiences of IPE in various practice settings and its perceived benefit to the development of collaborative competencies, as well as their personal, professional, and interprofessional development. The findings highlight several facilitators and barriers relating to EL facilitator, student pharmacist, placement, and cultural factors that influence IPL. More focus is needed to emphasize the relevance of IPE in the EL curriculum, better prepare student pharmacists for interactions with other health and social care professionals, and develop resources to encourage discussion and reflection—maximizing learning through unplanned and informally planned IPE experiences. Furthermore, the lack of formally planned IPE opportunities demands further attention, including coordinated efforts between interprofessional practice and academic teams to design and implement IPE initiatives.

Author Contributions

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Declaration of Competing Interest

None declared.

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References

1. State of health in the EU companion report 2017. European Commission. 〈https://health.ec.europa.eu/system/files/2017-11/2017_companion_en_0.pdf〉 Accessed September 1, 2024.
2. World report on ageing and health. World Health Organization. 〈https://www.who.int/publications/i/item/9789241565042〉 Accessed September 3, 2024.
3. Francis R. The Mid Staffordshire NHS foundation trust public inquiry, executive summary. Gov.UK. 〈https://www.gov.uk/government/publications/report-of-the-mid-staffordshire-nhs-foundation-trust-public-inquiry〉 Accessed September 3, 2024.
4. National Patient Safety Advisory Group. A promise to learn – a commitment to act. Improving the safety of patients in England. NHS England. 〈https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/226703/Berwick_Report.pdf〉 Accessed September 3, 2024.
5. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. National Academies Press. 〈https://www.nap.edu/download/10027#〉 Accessed September 3, 2024.
6. Kohn LT, Corrigan JM, Donaldson S. To err is human. Building a safer health system. National Academy Press. 〈https://www.researchgate.net/publication/200656918_To_Err_is_Human_Building_a_Safer_Health_System〉 Accessed September 3, 2024.
7. Framework for action on interprofessional education & collaborative practice. World Health Organization. 〈https://interprofessional.global/wp-content/uploads/2019/11/WHO-2010-Framework-for-Action-on-Interprofessional-Education-and-Collaborative-Practice.pdf〉 Accessed September 3, 2024.
8. Global strategy on human resources for health: workforce 2030. World Health Organization. 〈https://www.who.int/publications/i/item/9789241511131〉 Accessed September 2, 2024.
9. Health and care workforce in Europe: time to act. World Health Organization. 〈https://www.who.int/europe/publications/i/item/9789289058339〉 Accessed September 9, 2024.
10. Accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree ("Standards 2016"). Accreditation Council for Pharmacy Education. 〈https://www.acpe-accredit.org/pharmd-program-accreditation/〉 Accessed September 6, 2024.
11. Accreditation standards for Canadian first professional degree in pharmacy programs. Canadian Council for Accreditation of Pharmacy Programs (CCAP). 〈https://ccapp.ca/wp-content/uploads/2020/10/July7-CCAPP-Professional-Standards-ENG.pdf〉 Accessed September 6, 2024.
12. Standards for the initial education and training of pharmacists. General Pharmaceutical Council (GPhC). 〈https://www.pharmacyregulation.org/initial-training〉 Accessed September 6, 2024.
13. Fox L, Onders R, Hermansen-Kobulnicky CJ, et al. Teaching interprofessional teamwork skills to health professional students: a scoping review. *J Interprof Care.* 2018;32(2):127–135. https://doi.org/10.1080/13561820.2017.1399868
14. Olson R, Bialocerkowski A. Interprofessional education in allied health: a systematic review. *Med Educ.* 2014;48(3):236–246. https://doi.org/10.1111/medu.12290
15. Barr H, Ford J, Gray R, et al. Interprofessional education guidelines. Centre for the Advancement of Interprofessional Education. 〈www.caipe.org/resources/publications/caipe-publications/caipe-2017-interprofessional-education-guidelines-barr-h-ford-j-gray-r-helme-m-hutchings-m-low-h-machin-reeves-s〉 Accessed September 6, 2024.
16. Charrette AL, Sullivan KM, Kucharski-Howard J, Seed S, Lorenz L. Physical therapy and pharmacy interprofessional education in the context of a university pro bono physical therapy setting. *J Interprof Care.* 2020;34(3):315–323. https://doi.org/10.1080/13561820.2019.1663160
17. Illingworth P, Chelvanayagam S. The benefits of interprofessional education 10 years on. *Br J Nurs.* 2017;26(14):813–818. https://doi.org/10.12968/bjon.2017.26.14.813
18. Howkins E, Low H. Learning to work collaboratively to improve the quality of care for individuals, families and communities: the practice educator's role. *J Pract Teach Learn.* 2015;13(2-3):133–145. https://doi.org/10.1921/jpts.v13i2-3.819
19. Cox M, Cuff P, Brandt B, Reeves S, Zierler B. Measuring the impact of interprofessional education on collaborative practice and patient outcomes. *J Interprof Care.* 2016;30(1):1–3. https://doi.org/10.3109/13561820.2015.1111052
20. Thistlethwaite JE. Practice-based learning across and between the health professions: a conceptual exploration of definitions and diversity and their impact on interprofessional education. *Int J Pract-Based Learn Health Soc Care.* 2013;1(1):15–28. https://doi.org/10.11120/pblh.2013.00003
21. McNaughton S. The long-term impact of undergraduate interprofessional education on graduate interprofessional practice: a scoping review. *J Interprof Care.* 2018;32(4):426–435. https://doi.org/10.1080/13561820.2017.1417239
22. Gilligan C, Outram S, Levett-Jones T. Recommendations from recent graduates in medicine, nursing and pharmacy on improving interprofessional education in university programs: a qualitative study. *BMC Med Educ.* 2014;14(52):52. https://doi.org/10.1186/1472-6920-14-52
23. Scottish government invests £2.85m to expand experiential learning of student pharmacists to new settings. The Pharmaceutical Journal. 〈https://pharmaceutical-journal.com/article/news/scottish-government-invests-2-85m-to-expand-experiential-learning-of-student-pharmacists-to-new-settings〉 Accessed September 9, 2024.
24. Wilkinson E. MPharm clinical placements: a variable picture across Britain. *Pharm J.* 2024;312. https://doi.org/10.1211/PJ.2024.1.305707

25. O'Leary N, Boland P. Organization and system theories in interprofessional research: a scoping review. *J Interprof Care.* 2020;34(1):11–19. https://doi.org/10.1080/13561820.2019.1632815
26. Hean S, Green C, Anderson E, et al. The contribution of theory to the design, delivery, and evaluation of interprofessional curricula: BEME Guide No. 49. *Med Teach.* 2018;40(6):542–558. https://doi.org/10.1080/0142159X.2018.1432851
27. Hean S, Craddock D, Hammick M, Hammick M. Theoretical insights into interprofessional education: AMEE Guide No. 62. *Med Teach.* 2012;34(2):e78–e101. https://doi.org/10.3109/0142159X.2012.650740
28. Biggs JB. From theory to practice: a cognitive systems approach. *High Educ Res Dev.* 1993;12(1):73–85. https://doi.org/10.1080/0729436930120107
29. Freeth D, Reeves S. Learning to work together: using the presage, process, product (3P) model to highlight decisions and possibilities. *J Interprof Care.* 2004;18(1):43–56. https://doi.org/10.1080/13561820310001608221
30. Braun V, Clarke V, Hayfield N, Terry G. Thematic analysis. In: Liamputtong P, ed. *Handbook of Research Methods in Health Social Sciences.* Springer Singapore; 2019:843–860. https://doi.org/10.1007/978-981-10-5251-4_103
31. Person-centred care made simple. What everyone should know about person-centred care. The Health Foundation; 2016. 〈https://www.health.org.uk/sites/default/files/PersonCentredCareMadeSimple.pdf〉 Accessed April 3, 2025.
32. Kent F, Glass S, Courtney J, Thorpe J, Nisbet G. Sustainable interprofessional learning on clinical placements: the value of observing others at work. *J Interprof Care.* 2020;34(6):812–818. https://doi.org/10.1080/13561820.2019.1702932
33. Zhao D, Nagarajan S, Nisbet G. Informal learning opportunities matter: the interprofessional learning experiences of undergraduate speech pathology students. *IJPBLHSC.* 2015;3(2):17–31. https://doi.org/10.18552/ijpblhsc.v3i2.225
34. CHIC competency framework for advancing collaboration. Canadian Interprofessional Health Collaborative (CHIC). 〈https://cihc-cpis.com/new-competency-framework/〉 Accessed September 6, 2024.
35. IPEC core competencies for interprofessional collaborative practice version 3. Interprofessional Education Collaborative (IPEC). 〈https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf〉 Accessed September 6, 2024.
36. Shrader S, Zaudke J. Top ten best practices for interprofessional precepting. *J Interprof Educ Pract.* 2018;10:56–60. https://doi.org/10.1016/j.xjep.2017.12.004
37. Barr H. Interprofessional education- today, yesterday and tomorrow. Centre for the Advancement of Interprofessional Education. 〈https://www.caipe.org/resources/publications/caipe-publications/caipe-2002-interprofessional-education-today-yesterday-tomorrow-barr-h〉 Accessed September 6, 2024.
38. Hill E, Morehead E, Gurbutt D, Keeling J, Gordon M. 12 Tips for developing interprofessional education (IPE) in healthcare. *Med.* 2019;8:69. https://doi.org/10.15694/mep.2019.000069.1
39. Joynes VCT. Defining and understanding the relationship between professional identity and interprofessional responsibility: implications for educating health and social care students. *Adv Health Sci Educ Theory Pract.* 2018;23(1):133–149. https://doi.org/10.1007/s10459-017-9778-x
40. Depasquale C, Cunningham S, Jacob SA, et al. A cross-sectional study examining the nature and extent of interprofessional education in schools of pharmacy in the United Kingdom. *Int J Clin Pharm.* 2024;46(1):122–130. https://doi.org/10.1007/s11096-023-01655-0
41. Depasquale C, Arnold A, Cunningham S, et al. Exploring structures and processes supporting interprofessional education during experiential learning placements for student pharmacists. *Am J Pharm Educ.* 2024;88(10):101267. https://doi.org/10.1016/j.ajpe.2024.101267
42. Jebara T, Power A, Boyter A, Jacob SA, Portlock J, Cunningham S. Student pharmacist practice-based interprofessional education in Scotland: a qualitative study of stakeholders' views and experiences. *J Interprof Care.* 2023;37(1):73–82. https://doi.org/10.1080/13561820.2021.2011843
43. Skinner K, Simpson MD, Patton N, Robson K. Enablers and barriers to interprofessional work-integrated learning placements: a qualitative study of rural and regional allied health supervisors' perceptions. *Int J Work-Integr Learn.* 2021;22(1):83–93〈https://files.eric.ed.gov/fulltext/EJ1286254.pdf〉.
44. Grice GR, Thomason AR, Meny LM, Pinelli NR, Martello JL, Zorek JA. Intentional interprofessional experiential education. *Am J Pharm Educ.* 2018;82(3):6502. https://doi.org/10.5688/ajpe6502
45. Jones KM, Blumenthal DK, Burke JM, et al. Interprofessional education in introductory pharmacy practice experiences at US colleges and schools of pharmacy. *Am J Pharm Educ.* 2012;76(5):80. https://doi.org/10.5688/ajpe76580
46. Charles G, Bainbridge L, Gilbert J. The University of British Columbia model of interprofessional education. *J Interprof Care.* 2010;24(1):9–18. https://doi.org/10.3109/13561820903294549
47. Institute of Medicine. Measuring the impact of interprofessional education on collaborative practice and patient outcomes. The National Academies Press. 〈https://www.nap.edu/catalog/21726/measuring-the-impact-of-interprofessional-education-on-collaborative-practice-and-patient-outcomes〉 Accessed September 6, 2024.
48. Nisbet G, O'Keefe M, Henderson A. Twelve tips for structuring student placements to achieve interprofessional learning outcomes. *MedEdPublish.* 2016;5:109. https://doi.org/10.15694/mep.2016.000109
49. O'Carroll V, McSwiggan L, Campbell M. Practice educators' attitudes and perspectives of interprofessional collaboration and interprofessional practice learning for students: a mixed-methods case study. *J Interprof Care.* 2019;33(5):414–423. https://doi.org/10.1080/13561820.2018.1551865
50. Ong SY, Tan NCK, Knab MS, Farrell SE, Lim WS. Attitudes of clinician educators towards interprofessional education and collaboration: insights from two interprofessional scales. *J Interprof Care.* 2017;31(5):656–660. https://doi.org/10.1080/13561820.2017.1320275