

Interprofessional Education (IPE) and Pharmacy in the UK: a study on IPE activities across different Schools of Pharmacy

Article

Accepted Version

Patel, N., Begum, S. and Kayyali, R. (2016) Interprofessional Education (IPE) and Pharmacy in the UK: a study on IPE activities across different Schools of Pharmacy. *Pharmacy*, 4 (4). 28. ISSN 2226-4787 doi: <https://doi.org/10.3390/pharmacy4040028> Available at <https://centaur.reading.ac.uk/66882/>

It is advisable to refer to the publisher's version if you intend to cite from the work. See [Guidance on citing](#).

To link to this article DOI: <http://dx.doi.org/10.3390/pharmacy4040028>

Publisher: MDPI

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the [End User Agreement](#).

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

Interprofessional Education (IPE) and Pharmacy in the UK. A study on IPE activities across different Schools of Pharmacy.

Nilesh Patel¹, Shahmina Begum², Reem Kayyali²

¹University of Reading, Food Biosciences Building, PO Box 226, Whiteknights, Reading, Berkshire, RG6 6AP

²Kingston University, Penrhyn Road, Kingston upon Thames, KT1 2EE

Corresponding author: Dr Nilesh Patel; nilesh.patel@reading.ac.uk; 0118 378 4639

Keywords Interprofessional Education; Interprofessional learning; pharmacy; healthcare professionals

18

19

20 **ABSTRACT**

21 Interprofessional education (IPE) has been recognised internationally, as a way to
22 improve healthcare professional interaction and team working, in order to enhance
23 patient care. Since pharmacists are increasingly part of multi-professional healthcare
24 teams and are expanding their clinical roles, many pharmacy regulators have
25 stipulated IPE must be included in educational curricula. This study aimed to
26 examine how different Schools of Pharmacy (SOPs) in the UK implement IPE within
27 their pharmacy course. Information about IPE was mainly obtained through
28 interviews with staff from various SOPs. Nine telephone interviews were conducted
29 which were analysed using a thematic analysis approach in order to derive common
30 categories. These were identified as students, activities, barriers and facilitators and
31 benefits of IPE. It was found that teaching methods used for IPE varied across
32 SOPs. No standard strategy to deliver IPE was identified. Students were thought to
33 value the IPE experience, especially the interaction with other professionals. The
34 main barriers to implementing IPE arose from limited financial and organisational
35 support. In general many SOPs in the UK are undertaking IPE but challenges remain
36 in establishing it as a routine part of the course, something which seems to echo
37 difficulties in implementation of IPE both nationally and internationally.

38

40 INTRODUCTION

41 Internationally, the importance of healthcare professionals working together to create
42 an optimal health care system has been recognised. The World Health Organisation
43 (WHO) has noted that in order to better integrate care, strengthen quality and
44 improve patient safety, interprofessional education (IPE) is necessary [1]. IPE is
45 defined as occurring '*when two or more professions learn with, from and about each*
46 *other to improve collaboration and the quality of care*' [2]. Therefore the potential
47 benefits of getting different healthcare professionals together to learn from each
48 other and understand each other's roles in order to improve patient care and safety
49 has been a driver to implement IPE within professional curricula and practice.

50 In recent years it has become more evident that patient cases have become more
51 complex and the inclusion of more than one profession in their care has therefore
52 increased [3]. There are also increasing public reports about poor standards of
53 patient care across healthcare sectors in the UK with suggestions that better team
54 working and communication is need amongst healthcare workers. IPE is a possible
55 solution to some of these issues as interprofessional working has helped decrease
56 medical errors, improve patient satisfaction, patient care and knowledge and skills of
57 professionals [4]. Knowledge of different working practices, awareness of different
58 professional accountabilities, roles and competencies are pivotal in driving improved
59 healthcare [5, 6]. Working together for patients requires teamwork and an
60 appreciation of not only the types of services provided but of the providers
61 themselves [7, 8], which makes IPE more relevant.

62 The development of the understanding of the roles and responsibilities of all health
63 and social care professionals is undertaken at both undergraduate and postgraduate
64 levels through various activities ranging from university-based classroom activities,
65 forums and practice-based or workplace placements. In a recent review by [9] that
66 looked at IPE in the UK over the period 1997-2013 it was reported that at least two
67 thirds of UK universities with qualifying courses in health and social care included
68 IPE, outlining the growing importance of IPE. There is some suggestion that for IPE
69 to have biggest impact on healthcare professionals it should be incorporated early on
70 in their education [10-13].

71 In the UK, the pharmacy regulatory body, the General Pharmaceutical Council
72 (GPhC), makes it a requirement for Pharmacy (MPharm degree) courses to
73 demonstrate *'learning based on experience that provides education in*
74 *interprofessional practices and procedures with other healthcare professionals'* [14].

75 Nearly all MPharm courses in the UK are four years in length, and are commonly
76 described as Levels 4-7, or Parts 1-4. It is not clearly stipulated by the GPhC at
77 which level/part IPE should be undertaken, therefore there is likely to be variation in
78 when and how it is delivered. The requirement for Pharmacy courses to undertake
79 IPE is not unique to the UK. In the United States (US), the learning outcomes in the
80 Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards and
81 Guidelines were changed to include IPE and make it a priority and in the most recent
82 ACPE standards [15] IPE is now included as a standalone standard (Standard 11)
83 and describes the key elements in IPE education as being team dynamics, team
84 education and team practice. The importance of having IPE in pharmacy is not just
85 restricted to the UK or the US but has also been included in pharmacy curricula in
86 Germany, Poland, Australia and elsewhere [15-20].

87 In addition the education of healthcare professionals increasingly relies on
88 demonstrating competency and mapping against competency frameworks. For IPE,
89 a US collaborative representing various healthcare courses, including pharmacy, has
90 created core competencies for interprofessional collaborative practice (IPEC) to
91 guide curriculum development across health professions schools [21]. In the UK
92 there is the Interprofessional Capability Framework, which has been developed to
93 serve a similar purpose [22]. These curriculum frameworks provide a foundation for
94 what students are expected to demonstrate in terms of knowledge, skills, values and
95 attitudes. However, there are limitations in using these frameworks for IPE [23].

96

97 In a study by Jones et al [24], it was noted that delivery of IPE was not homogenous
98 across pharmacy education programmes across the US, and that various barriers
99 had to be overcome to implement IPE effectively. This may also be the case in the
100 UK, but evidence is lacking as to how IPE is delivered and what the specific barriers
101 for SOPs in the UK are. Therefore, an investigation into the engagement with IPE in
102 UK SOPs was undertaken to achieve the following aims; to find out if IPE is
103 undertaken by SOPs in the UK, discover the types of IPE activities which are
104 undertaken and identify the barriers and benefits of IPE as perceived by pharmacy
105 staff involved in IPE.

106 **METHODS**

107 A purposive sampling technique was used to recruit participants for this exploratory
108 study. The primary purpose of the study was to gather data about types of IPE
109 activities undertaken within UK SOPs, and a secondary purpose of gathering data
110 that would explore pharmacy staff IPE experiences of IPE. Ultimately, it was hoped
111 that a best practice model of IPE (i.e. a standard way of complying with IPE

112 requirements) could be derived from the information obtained. A list of staff at
113 twenty-six Schools of Pharmacy (SoP) in the United Kingdom (UK) was compiled.
114 School of Pharmacy websites were used to collect contact details of staff that we
115 believed to be leading or associated with IPE, or the Head of the SoP when this was
116 not evident. Twenty-four SOPs were emailed a participant information sheet and an
117 invitation letter outlining the study aims and an invitation to provide a reflective
118 account of initiating and running IPE as well as what activities were undertaken. Two
119 SOPs were not contacted as data has already been collected about their IPE
120 involvement. A follow-up email was sent to the staff after two weeks. Invited staff
121 either replied back with redirection to another staff member, agreed to participate
122 (followed up with a convenient date and time for an interview) or declined to
123 participate. No further follow-up occurred for the non-responders.

124

125 All participants who agreed to be interviewed gave their informed consent for
126 inclusion before participating in the study. Interviews were conducted over the
127 telephone (during March-April 2013) using a semi-structured guide, and the
128 information recorded by hand by the researcher. The questions that were asked
129 came under the general themes of IPE activities (for example, do they undertake
130 IPE? what types of activities are undertaken? what topics are covered? is there an
131 assessed component to IPE?), staff/student involvement (for example, which
132 students are exposed to IPE? which staff are involved in teaching?), evaluation of
133 IPE (for example, what feedback is received from students?) and what are the
134 barriers and facilitators in undertaking IPE?. Each interview lasted approximately 30
135 minutes. All information was anonymised with each interviewee given a code to
136 prevent association to defined quotations. Transcriptions were analysed using a

137 thematic analysis approach, which was carried out using the methodology of Ryan
138 and Bernard [25]. Two researchers carried out the data analysis in various stages to
139 reduce the possibility of any researcher bias during the category development.
140 Categories were confirmed and verified by detailed line-by-line reading of the
141 transcripts, which were further refined and reduced until a final list of categories were
142 obtained and agreed by both researchers. At the end of the study the transcripts
143 were destroyed. Ethical approval was granted by the Science, Engineering and
144 Computing (SEC) Research Ethics Committee at Kingston University on 10th
145 January 2013.

146 **RESULTS**

147 Twenty six SOPs were identified from which information about IPE were sought.
148 However, only 34.6% (n=9) of the contacted SOPs agreed to participate in a
149 telephone interview. Three other SOPs had responded but declined to participate in
150 an interview. One SOP reported that at the time of the study no IPE was undertaken.
151 The written information provided by the two SOPs that did not participate in an
152 interview was incorporated, when relevant, to the categories derived from the
153 interviews.

154 Analysis of the data led to the derivation of four main categories; students, activities,
155 barriers and facilitators and benefits of IPE.

156

157 *1. Students*

158 It was noted that five SOPs run IPE for all levels of the MPharm degree and three
159 SOPs run it for only Level 7 of the MPharm. The rest of the SOPs provided IPE over
160 a mixture of levels. Fifteen traditional healthcare courses (HCC) were involved in IPE

161 across the investigated SOPs. These were medicine, nursing (including mental
162 health, paediatric and adult), midwifery, physiotherapy, radiography (including
163 diagnostics and therapeutic), paramedics, occupational therapists (OT), operating
164 department practitioners (ODP), speech and language therapists, dietetics, dentistry,
165 optometry, nutrition, podiatry and audiology. Medicine, nursing and midwifery
166 appeared to be common HCC's to undertake IPE with. Non-healthcare courses (non-
167 HCC) cited were psychology, occupational health, health science, health and social
168 care, vision science, social work (commonly encountered), applied biomedical
169 sciences, biology, police and youth and community work.

170

171 Participants recognised the importance and benefits of pharmacy students working
172 with other courses not traditionally related to healthcare, for example social carers,
173 whose profession had been criticised in one London Borough for not safeguarding
174 against the abuse over an 8 month period of a 17 month old child ('Baby P').

175 *"Working with non-healthcare courses would be beneficial as the pharmacist role is*
176 *promoted and gives possible insight into patient perspective"* (**Participant A**).

177 *"Importance of social care is demonstrated by recent cases about safeguarding and*
178 *childcare like Baby P. Social care is important when addressing issues about asylum*
179 *seekers, vulnerable adults and children"* (**Participant Y**). *"Hospital scientists are*
180 *commonly neglected, but when in clinical settings medical staff are dependent on*
181 *them for test results. IPE allows appreciation of these non-healthcare courses"*
182 *(Participant X).*

183

184 When asked about what the students thought about working with other courses, a
185 few participants mentioned that pharmacy students were more comfortable and

186 confident when working with other healthcare students of a similar level and clinical
187 experience, especially when it came to showing others what they could do as
188 pharmacists. *“Students mixed in their preference; some prefer nurses due to their
189 vast amount of clinical experience. Some prefer medics as they get to showcase
190 their role as a pharmacist, due to medics underestimating the importance of a
191 pharmacist in patient care” (Participant A). “I find pharmacy students prefer to work
192 with students who have clinical experiences and do not like to work outside of the
193 clinical setting” (Participant Y). “Students felt scared and intimidated by the
194 postgraduate medics and nurses due to their breadth of knowledge and experience.
195 Doctors were more challenging whilst the nurses were ‘motherly’ or nurturing”
196 (Participant I).*

197

198 2. Activities

199 The majority of the SOPs run IPE activities once a year. Usually activities consume a
200 full day unless students are sent on a placement. Many of the SOPs follow up IPE
201 sessions with work for students to complete without the facilitator. The activities
202 themselves are undertaken either on campus, or off-campus.

203 Activities hosted by the different SOPs on campus have some structural similarities
204 to each other and tend to be lecture or workshop-based. These different types of
205 activities are outlined in table 1.

206

207 Table 1: IPE activities undertaken by SOPs.

Teamwork and personality traits	Many SOPs mentioned that they get students to examine their personality type using Myers-Briggs Type Indicator (MBTI)
--	---

	tests, their role and factors which can affect team performance using Belbin Team Roles as a way to promote the idea of team working. Typically this is done during an 'ice-breaking' session when the different healthcare profession students first meet.
Practice-based scenarios	In all cases there is some practice-based scenario involved in IPE. Students are typically divided into multidisciplinary groups to discuss a presented case or scenario and feedback to facilitators or professionals that may be involved in the case/scenario. The cases/scenarios may be on social care issues, professionalism, ethical dilemmas, health promotion, compromised patient safety, critical situation, and discharge meeting notes.
IPE days/conferences	A mixture of lectures and workshops occurring over a whole day. Generally, the day is based on a particular topic or disease. For example the start of the day usually includes an introduction to the topic (alcohol misuse, safeguarding children and vulnerable adults, drug charts, transfer of care and evidence-based medicines for prescribing were mentioned) with a video and brief lectures from healthcare professionals, patients or relevant organisations. These were then typically followed by mixed professional group workshops in the afternoon.
Peer teaching	This was mentioned by two SOPs whereby students from one profession teach other healthcare courses on topics within their specialism. For example in one SOP fourth year students teach

	physiotherapy students about the safe and effective use of medicines. In turn, they are taught by physiotherapy students about physical therapies. In another SOP, their students were taught by medicine and nursing students who themselves were trained in basic life support.
Buddy systems	In one SOP, first year MPharm students are introduced to other first year HCC students and are placed in mixed groups to complete tasks. During their time at university they are expected to remain within their group and organise their own meetings to undertake various tasks given to them, which has the added benefit of eliminating any timetabling problems.

208

209 With regards to off-campus events, many SOPs opt to send their students on
 210 placements (for example hospitals, nursing homes, GP practices) with other health
 211 and social care students. The students are required to complete activities related to
 212 their visit. Types of activities on placement include shadowing professionals for a
 213 day, observing interprofessional working in practice, going through case studies or
 214 ethical scenarios, and interacting with patients and/or carers.

215 Some SOPs summatively assess their IPE activities. For example some components
 216 of the activity are assessed in an end of year exam, or there is a reflective
 217 assignment or poster presentation or a portfolio to complete. One SoP uses
 218 objective structured clinical examinations (OSCEs) to assess IPE.

219 *3. Barriers and facilitators*

220 All interviewees mentioned that the UK pharmacy regulator (GPhC) requires SOPs
 221 to undertake IPE in order to be accredited, with one mentioning that these

222 requirements are not the same for some of the other healthcare profession courses.
223 IPE involvement was also thought to be hindered by the fact that not all universities
224 and therefore SOPs have access to a wide range of healthcare courses, or there is
225 competition with nearby SOPs. *“Differing standards and requirements for healthcare
226 professional courses make the emphasis on IPE differ between the courses.
227 Therefore, MPharm staff are more likely to try and incorporate IPE into their course
228 due to the strict GPhC requirements, which regulate the course. Currently there are
229 no requirements for nursing and medicine to incorporate IPE into their course. Also,
230 these courses do not have strict regulations on their content as MPharm”*
231 **(Participant A)**. *“Unfortunately, cannot involve other healthcare professional courses
232 as the degrees do not take place in the university and nearby universities have their
233 own pharmacy courses. This leads to a considerable difference in IPE teaching”*
234 **(Participant Y)**. However it should be noted that both the Nursing and Midwifery
235 Council [26] and the General Medical Council [27] state that they expect students to
236 engage in IPE during their education.

237

238 In addition, timetabling IPE events within the pharmacy course and with other
239 healthcare courses was seen as particularly problematic. *“Both schools of teaching
240 have hectic timetables, which make it difficult to organise formal slots in both
241 timetables for IPE sessions”* **(Participant A)**. *“It’s a nightmare with another
242 university. Especially trying to find time when medics and pharmacy students are
243 free. Medics are taught on a rotation basis between September and July, whereas
244 pharmacy students are taught between September and March”* **(Participant S)**.

245

246 In terms of facilitating sessions, most SOPs stated that pharmacy practice staff is
247 mainly tasked with running all IPE activities, with often only one member of staff
248 responsible for the organisation. The presence or lack of an IPE organisation
249 structure was seen to vary between SOPs and was cited for many as making
250 organising IPE problematic when no clear structure was in place. Particular
251 examples of where there seemed to be a formal organisation of IPE include one
252 SOP that reported that they had teams dedicated to IPE, where an IPE lead
253 overlooks all the teams for each year group. The team consists mainly of pharmacy
254 practice staff and some non-pharmacy related staff, medical practitioners and
255 lecturers to show that interprofessionalism is practiced as well as taught. Similarly,
256 another SOP had a steering group to strategise IPE, an organisation group that
257 ensures day-to-day running which includes an IPE champion who communicates
258 with the coordinators and ensures IPE achieves the objectives for the SoP, an IPE e-
259 learning group that develops online IPE activities and an IPE research group that
260 undertake research and write reports about IPE. One participant stressed the
261 importance of having an “*expert*” administrative staff member who is able to organise
262 the logistics of the day and the placements.

263 During the course of discussion around the area of IPE activities, comments about
264 funding arose. In the main, IPE was funded by the participating courses. Of interest
265 was that sources of funding were sought by some SOPs. These included higher
266 education grants, Health Education England (HEE) funding, supplementary funding
267 from the government and one SOP was awarded £1000 from an internal funding bid.
268 One SOP stated that their IPE was funded by a service level agreement with
269 collaborative hospitals whereas another discussed a future collaboration with the

270 police force whereby the police force would fund the session under '*knowledge*
271 *impact*' as part of the police knowledge fund.

272 4. *Benefits of IPE*

273 A uniform agreement amongst interviewees was that IPE is beneficial. Each SoP
274 highlighted benefits that they felt their students gained from IPE during their time at
275 university and after they had left. Some participants commented on improvement in
276 skills and knowledge of their students when working with other healthcare
277 professionals. "*...vital skills in people and mannerism are developed and improved*
278 *during IPE sessions*" (**Participant F**). "*IPE provide students with an opportunity to*
279 *increase clinical knowledge and ability to understand the social aspects of a patient*"
280 (**Participant S**).

281 Many SOPs stated that IPE has provided students with a better understanding of the
282 roles of other professionals in patient care, not only the common ones they are likely
283 to encounter. "*...allows medics to understand the role of a pharmacist*" (**Participant**
284 **W**). "*...use knowledge and develop relationships for effective patient care. Break*
285 *down barriers between professionals*" (**Participant C**). "*...allows interaction with*
286 *under-represented professionals in patient care like Operating Department*
287 *Practitioner*" (**Participant F**).

288

289 **DISCUSSION**

290 There is little published data on IPE conducted within SOPs in the UK. Most of the
291 studies examining pharmacy involvement in IPE are from the US and elsewhere,
292 with much of the focus and perspectives being from the medical and nursing
293 professions [28]. Therefore this study is one of the first in the UK to provide a

294 snapshot of IPE in some SOPs, with the degree to which IPE is seen to occur across
295 the SOPs varying greatly. In an environment of multidisciplinary team working,
296 knowledge about other professionals will ideally make it easier to redirect and
297 correctly identify the professional needed to meet the needs of the patient. Findings
298 from the study have shown that a large number of professions and non-healthcare
299 professions have been involved in IPE. For some of these professions their
300 importance to pharmacy may not be apparent, for example, the police, biomedical
301 science students and social workers. However, healthcare is quite complex and
302 involves many different people and so students should at least be aware of the roles
303 of not only those people directly involved in the care of patients (medics and nurses,
304 which some participants suggested their students were wanting to be more engaged
305 with) but some of the others mentioned above. In addition, for those participants who
306 mentioned difficulties in setting up IPE due to lack of available professions, thinking
307 more widely of other people involved in the care of people with healthcare needs
308 may be of benefit (as one or two SOPs have already done).

309 Generally, many of the participants felt students were gaining an understanding of
310 their role and the role of other professionals in patient care. Indeed a recent literature
311 review undertaken by The Royal College of Nursing's found that IPE enabled
312 students to have a positive attitude and perception of other professionals'
313 contribution to a patient care pathway [29]. A report on new medical, nursing and
314 pharmacy graduates' reflections on their experiences of IPE during their
315 undergraduate degree found that they valued IPE and regarded their experiences as
316 positive [30]. Also from our own study IPE was thought to give pharmacy students an
317 opportunity to promote their role as a pharmacist, which was thought to be under-
318 rated by other professionals.

319 A common feature seen for many of the SOPs is exposing the students to IPE for
320 one academic year only and usually in the early years, although some did prioritise
321 IPE to final year students (Level 7). Those SOPs that included IPE in the early years
322 of the course tended to cover team working skills and learning about the roles of
323 other professionals through ice-breaker sessions. Having IPE only in the final year
324 may have been because these students are considered mature and better equipped
325 in terms of clinical knowledge to be able to effectively interact with other healthcare
326 professionals. However, IPE was rarely undertaken across all years, which some
327 participants said was because of difficulties in finding appropriate professional
328 partners and timetabling of the events. A couple of SOPs do seem to have overcome
329 these barriers either because of the organisational support they receive or close
330 vicinity to other professional courses.

331 The type of IPE activities undertaken by SOPs also varies considerably (Table 1).
332 These range from what might be considered as multiprofessional (for example just
333 having students from different professions sitting together in a lecture theatre) to truly
334 interprofessional (by working very closely and interacting with other professions).
335 Use of patient/case scenarios was common across all SOPs and this seemed to
336 allow a variation of topics to be covered, although the main theme seemed to be
337 around patient safety. Other examples of activities included buddy groups,
338 conferences and placements. Peer learning was also mentioned, something which
339 has been used with success elsewhere with physical therapy students teaching
340 pharmacy students about ambulatory devices [31].

341 Some of these IPE activities are not dissimilar to those done elsewhere. For
342 example, Odegard et al [32] examined IPE initiatives undertaken at the University of
343 Washington, which included introductory seminars, lecture-based courses, student-

344 operated clinics, and an interprofessional objective structured clinical evaluation
345 (OSCE). MacDonnell et al [33] reported on pharmacy, medical and nursing students
346 working together to diagnose and treat patients, whilst Rotz et al [34] reported on
347 having pharmacy and medical students participate in an interprofessional
348 experiential course series. Activities not highlighted in our study, but could be of
349 interest to pharmacy courses are the use of interprofessional training wards [35], or
350 e-learning, the latter of which when the study was undertaken would have been less
351 used within universities, although it's not without its challenges for implanting in IPE
352 [9, 36].

353 There has been recent increased emphasis on patient and public involvement in
354 both teaching and research, therefore one could argue that an important criterion for
355 effective IPE is involving patients and clients in the design, teaching, participation
356 and assessment of programmes [37, 38]. One SOP set up an IPE conference day
357 where patients, carers and service users were able to tell students their story. The
358 service users were given a unique insight into the workings of a healthcare team
359 when deciding on their care pathway and healthcare students were given a chance
360 to understand the importance of involving the patient as much as possible in the
361 treatment plan.

362 Some SOPs included a form of assessment of IPE, but we were unable to determine
363 the rationale for why they did this. However one possible reason would be to ensure
364 student engagement with IPE. Indeed Barr et al [9] reported that students value IPE
365 more when it was assessed and that in the absence of some form of summative
366 assessment IPE was given a lower priority by students, and interestingly, also by
367 teachers.

368 What is evident across the different SOPs is that there is no standardised way in
369 delivering IPE despite their being a capability framework to follow. A conceptual
370 framework does exist for developing a strategic plan for IPE (the Leicester Model),
371 which has been adopted in various settings [39-41]. As one participant suggested, it
372 is useful to have a dedicated IPE lead, a strategy group, and engagement from all
373 staff, not only the pharmacy practice team in order for IPE to be easy to deliver.
374 Indeed Barr et al [9] also mentioned that having an IPE coordinator was important for
375 alignment of timetables and other logistical issues along with backing from line
376 managers and institutional endorsement. This type of thinking is also echoed by
377 Brazeau [42] who reported that in order to develop an effective IPE programme,
378 investment in terms of time and money are needed, as well as a top down
379 administrative support and leadership approach. Thus University support would be
380 instrumental to overcome some of these barriers.

381 The general lack of investment in interprofessional research and in evidence
382 regarding the effects of IPE may compound this issue of organisational support
383 further. However it is noteworthy to mention a systematic review on the effectiveness
384 of IPE by Reeves et al [43], which states that there has been some useful progress
385 being made in relation to strengthening the evidence base for IPE, but in order to
386 provide a greater clarity of IPE and its effects on professional practice and
387 patient/client care, rigorous mixed method studies of IPE are required to be
388 undertaken.

389
390 Limitations to this study include that the interviews were not recorded and some of
391 the information was derived from written documents. In addition we were unable to
392 ascertain if data saturation was achieved, partly as we were unable to speak to all

393 the SOPs or complete a full thematic analysis. The low response rate may be
394 because the study was undertaken during the academic term when staff is busy
395 teaching, or that there was more than one SOP at the time the study was undertaken
396 that did not provide IPE. Information provided by the interviewees on the benefits of
397 IPE was anecdotal and not based on acquired evidence. This does highlight that
398 more robust and rigorous research is required to draw conclusions on the effects of
399 IPE on professional working and its impact on patients as currently these are limited
400 and provide only evidence to support the positive outcomes of IPE events [29, 44,
401 45]. However the current study does provide a snapshot of what IPE was undertaken
402 at the time the study was undertaken.

403 **CONCLUSION**

404 There are a range of activities which are being used for IPE within UK SOPs, which
405 this study is one of the first to explore. None of the UK SOPs have a common
406 standardised approach to IPE which makes it difficult to compare and contrast IPE
407 practices and define a best practice model of IPE. For many SOPs, if IPE is to be
408 beneficial certain barriers need to be overcome and there are lessons to be learnt
409 from looking at good IPE practices seen within the UK and also internationally.
410 Further research is needed to evaluate how IPE is undertaken and perceived by
411 pharmacy students in the UK and in the effectiveness of IPE on promoting better and
412 safer work practices.

413 **Acknowledgements:** Funding for this study was obtained from the Student
414 Academic Development Research Associate Scheme (SADRAS) of Kingston
415 University.

416 **Author contributions:** Patel and Kayyali conceived and designed the research
417 project; Begum performed the interviews and analysed the data. Patel put together
418 the manuscript for publication.

419 **Conflicts of Interests:** The authors declare no conflict of interest.

420

421

422 REFERENCES

- 423 1. Framework for Action on Interprofessional Education & Collaborative Practice
424 (WHO/HRH/HPN/10.3) (2010). Geneva: World Health Organization. Available
425 online: http://www.who.int/hrh/nursing_midwifery/en/ (accessed 29th June
426 2016)
- 427 2. Centre for the Advancement of Interprofessional Education (CAIPE). Available
428 online: <http://www.caipe.org.uk/resources/defining-ipe/> (accessed on 29th June
429 2016).
- 430 3. Barr, H. Interprofessional Education. In *A Practical Guide for Medical*
431 *Teachers*, 4th ed.; Dent, J.; Harden, R., Eds.; Elsevier Health Sciences:
432 London, UK, 2013; pp. 187-192.
- 433 4. Reeves, S.; Goldman, J.; Oandasan, I. Key factors in planning and
434 implementing interprofessional education in health care settings. *J Allied*
435 *Health* **2007**, *36*, 233–235. PMID 18293805
- 436 5. Dow, A.; Salas, E.; Mazmanian, P.E. Improving quality in systems of care:
437 solving complicated challenges with simulation-based continuing professional
438 development. *JCEHP* **2012**, *32*, 230-235, DOI 10.1002/chp.21150.

- 439 6. McNair, R.P. The case for educating health care students in professionalism
440 as the core content of interprofessional education. *Med Educ*, **2005**, 39, 456–
441 464. DOI 10.1111/j.1365-2929.2005.02116.x
- 442 7. Hall, P.; Weaver, L. Interdisciplinary education and teamwork: a long and
443 winding road. *Med Educ*, **2001**, 35, 867–875. DOI 10.1046/j.1365-
444 2923.2001.00919.x
- 445 8. Mickan. S.M.; Rodger, S.A. Effective health care teams: a model of six
446 characteristics developed from shared perceptions. *J Interprof Care*, **2005**, 19,
447 358–370. DOI 10.1080/13561820500165142
- 448 9. Barr, H.; Helme, M.; d'Avray, L. Review of Interprofessional Education in the
449 United Kingdom 1997-2013. <http://caipe.org.uk/resources/publications/>
450 (accessed 18th August 2016).
- 451 10. Barr, H.; Koppel, I.; Reeves, S.; Hammick, M.; Freeth, D. *Effective*
452 *interprofessional education: development, delivery and evaluation*, 1st ed.;
453 Blackwell: London, UK, 2005.
- 454 11. World Health Organisation. Transforming and scaling up health professionals'
455 education and training: World Health Organisation 2013. Geneva: World
456 Health Organisation. http://www.who.int/hrh/resources/transf_scaling_hpet/en/
457 (accessed 29th June 2016).
- 458 12. Cant. R.; Leach. M.; Hood. K. Factors affecting Australian medical students'
459 attitudes to interprofessional education; validity of the Readiness for Inter-
460 professional Learning Scale-Med. *JIEP*, **2015**, 1, 90-96.
461 <http://dx.doi.org/10.1016/j.xjep.2015.10.002> (accessed 20th August 2016).

- 462 13. Hind, M.; Norman, I.; Cooper, S.; Gill, E.; Hilton, R.; Judd, P, Jones, S.C.
463 Interprofessional perceptions of health care students. *J Interprof Care* **2003**,
464 17, 21-34. DOI 10.1080/1356182021000044120
- 465 14. General Pharmaceutical Council. Future Pharmacist. Standards for the
466 education and training of pharmacists. Available online:
467 [https://www.pharmacyregulation.org/sites/default/files/GPhC_Future_Pharmac](https://www.pharmacyregulation.org/sites/default/files/GPhC_Future_Pharmacists.pdf)
468 [ists.pdf](https://www.pharmacyregulation.org/sites/default/files/GPhC_Future_Pharmacists.pdf) (accessed on 29th June 2016).
- 469 15. Accreditation Council for Pharmacy Education. Accreditation Standards and
470 Guidelines for the Professional Program in Pharmacy Leading to the Doctor of
471 Pharmacy Degree. Available online: [https://www.acpe-](https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf)
472 [accredit.org/pdf/Standards2016FINAL.pdf](https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf) (accessed on 29th June 2016).
- 473 16. Altin, S.V.; Tebest, R.; Kautz-Freimuth, S.; Redaelli, M.; Stock, S. Barriers in
474 the implementation of interprofessional education programs – a qualitative
475 study from Germany. *BMC Med Educ* **2014**, 14, 1-9, DOI 10.1186/1472-6920-
476 14-227.
- 477 17. Cerbin-Koczorowska, M.; Michalak, M.; Skotnicki, M.; Waszyk-Nowaczyk, A.
478 Partnership - is it even possible? Different attitudes of medical and pharmacy
479 students toward interprofessional cooperation. *Farmacia* **2014** 62, 1171-1180.
480 Available online: [http://www.revistafarmacia.ro/201406/art-13-](http://www.revistafarmacia.ro/201406/art-13-Cerbin_M_1171-1180.pdf)
481 [Cerbin_M_1171-1180.pdf](http://www.revistafarmacia.ro/201406/art-13-Cerbin_M_1171-1180.pdf) (accessed on 29th June 2016).
- 482 18. Croker, A.; Fisher, K.; Smith, T. When students from different professions are
483 co-located: the importance of interprofessional rapport for learning to work
484 together. *J Interprof Care* **2015**, 29, 41-48. DOI
485 10.3109/13561820.2014.937481.

- 486 19. Wilby, K.J.; Al-Abdi, T.; Hassan, A.; Brown, M.A.; Paravattil, B.; Khalifa, S.I.
487 Attitudes of pharmacy and nutrition students towards team-based care after
488 first exposure to interprofessional education in Qatar. *J Interprof Care* **2015**,
489 *29*, 82-84. DOI 10.3109/13561820.2014.933949.
- 490 20. Lee, B.; Shinozaki, H.; Boupavanh, K.; Tokita, Y.; Makino, T.; Matsui, H.;
491 Saitoh, T.; Tozato, F.; Watanabe, H. A plan for embedding an
492 interprofessional education initiative into an existing programme in a
493 Southeast Asian university. *J Interprof Care* **2016**, *30*, 401-403. DOI
494 10.3109/13561820.2016.1149156
- 495 21. Interprofessional Education Collaborative. *Core competencies for*
496 *interprofessional collaborative practice. 2016 update.*
497 <https://ipecollaborative.org/Resources.html> (accessed 23rd August 2016).
- 498 22. Walsh, C.L.; Gordon, M.F.; Marshall, M.; Wilson, F.; Hunt, T. Interprofessional
499 capability: A developing framework for interprofessional education. *Nurse*
500 *Educ Pract* **2005**, *5*, 230–237. <http://dx.doi.org/10.1016/j.nepr.2004.12.004>
- 501 23. Thistlethwaite, J.E.; Forman, Matthews, D.; Rogers, L.R.; Steketee, G.D.;
502 Yassine, C. Competencies and Frameworks in Interprofessional Education: A
503 Comparative Analysis. *Academic Medicin* **2014**, *89*, 869-875. DOI
504 10.1097/ACM.0000000000000249
- 505 24. Jones, K.M.; Blumenthal, D.K.; Burke, J.M.; Condren, M.; Hansen, R.;
506 Holiday-Goodman, M.; Peterson, C.D. Interprofessional Education in
507 Introductory Pharmacy Practice Experiences at US Colleges and Schools of
508 Pharmacy. *Am J Pharm Educ.* **2012**, *76*, 80. DOI 10.5688/ajpe76580.
- 509 25. Ryan, G.W.; Bernard, H.R. Techniques to Identify Themes. *Field Methods*
510 **2003**, *15*, 85–109. DOI 10.1177/1525822X02239569.

- 511 26. Nursing and Midwifery Council. Standards for Education. Available online:
512 <https://www.nmc.org.uk/education/standards-for-education/> (accessed on 29th
513 June 2016)
- 514 27. General Medical Council. Promoting Excellence: standards for medical
515 education and training. Available online: [http://www.gmc-](http://www.gmc-uk.org/education/standards.asp)
516 [uk.org/education/standards.asp](http://www.gmc-uk.org/education/standards.asp) (accessed on 29th June 2016)
- 517 28. Lapkin, S.; Levett-Jones, T.; Gilligan, C. A cross-sectional survey examining
518 the extent to which interprofessional education is used to teach nursing,
519 pharmacy and medical students in Australian and New Zealand Universities. *J*
520 *Interprof Care* 2012, 26, 390-396. DOI 10.3109/13561820.2012.690009
- 521 29. Clifton, M., Dale, C., Bradshaw, C. Impact and Effectiveness of Inter-
522 professional Education in Primary Care: An RCN Literature Review. The
523 Royal College of Nursing Primary Care Educators Forum, London; 2007.
524 Available online:
525 https://www2.rcn.org.uk/__data/assets/pdf_file/0004/78718/003091.pdf
526 (accessed on 29th June 2016)
- 527 30. Gilligan, C.; Outram, S.; Levett-Jones, T. Recommendations from recent
528 graduates in medicine, nursing and pharmacy on improving interprofessional
529 education in university programs: a qualitative study. *BMC Med Educ* **2014**,
530 *14*, 52. DOI 10.1186/1472-6920-14-52.
- 531 31. Sadowski, C.A.; Li, D.; Jones, C.A. Interprofessional Peer Teaching of
532 Pharmacy and Physical Therapy Students. *Am J Pharm Educ* **2015**, *79*, 155.
533 DOI10.5688/ajpe7910155.
- 534 32. Odegard, P.S.; Robins, L.; Murphy N.; Belza, B.; Brock, D.; Gallagher, T.H.;
535 Lindhorst, T.; Morton, T.; Schaad, D.; Mitchell, P. Interprofessional initiatives

- 536 at the University of Washington. *Am J Pharm Educ.* **2009**, 73, 63. PMICD:
537 PMC2720359.
- 538 33. MacDonnell, C.P.; Rege, S.V.; Misto, K.; Dollase, R.; George, P. An
539 Introductory Interprofessional Exercise for Healthcare Students. *Am J Pharm*
540 *Educ* **2012**, 76, 154. DOI 10.5688/ajpe768154
- 541 34. Rotz, M.E.; Duenas, .GG. "Collaborative-ready" students: Exploring factors
542 that influence collaboration during a longitudinal interprofessional education
543 practice experience. *J Interprof Care* **2016**, 30, 238-241 DOI
544 10.3109/13561820.2015.1086731
- 545 35. Dando, N.; d'Avray, L.; Colman, J.; Hoy, A.; Todd, J. Evaluation of an
546 interprofessional practice placement in a UK in-patient palliative care unit.
547 *Palliat Med.* **2012**, 26, 178-84. DOI 10.1177/0269216311400479.
- 548 36. Solomon, P.; Baptiste, S.; Hall, P.; Luke, R.; Orchard, C.; Rukholm, E.; Carter,
549 L.; King, S.; Damiani-Taraba, G. Students' perceptions of interprofessional
550 learning through facilitated online learning modules. *Med Teacher* **2010**, 32,
551 391-398. <http://dx.doi.org/10.3109/0142159X.2010.495760> (accessed 20th
552 August 2016),
- 553 37. Furness, P.; Armitage, H.; Pitt, R. An evaluation of practice-based
554 interprofessional education initiatives involving service users. *J Interprof Care*
555 **2011**, 25, 46-52. DOI:10.3109/13561820.2010.497748
- 556 38. Westberg, S.M.; Adams, J.; Thiede, K.; Stratton, T.P.; Bumgardner, M.A. An
557 interprofessional activity using standardized patients. *Am J Pharm Educ.*
558 **2006**, 70, 34. PMCID: PMC1636934.

- 559 39. Anderson, E.S.; Lennox, A. The Leicester Model of Interprofessional
560 Education: Developing, delivering and learning from student voices for 10
561 years. *J Interprof Care* **2009**, *23*, 557-573. DOI 10.3109/13561820903051451
- 562 40. Kinnair, D.J.; Anderson, E.S.; Thorpe, L.N. Development of interprofessional
563 education in mental health practice: Adapting the Leicester Model. *J Interprof*
564 *Care* **2012**, *26*, 189-197. DOI 10.3109/13561820.2011.647994
- 565 41. Lennox, A.; Anderson, E.S. Delivering quality improvements in patient care:
566 the application of the Leicester Model of interprofessional education. *Qual*
567 *Primary Care* **2012**, *20*, 219-226. PMID 22828677.
- 568 42. Brazeau, G.A. Interprofessional education: More is needed. *Am J Pharm*
569 *Educ.* **2013**, *77*, 184. DOI 10.5688/ajpe779184.
- 570 43. Reeves, S.; Zwarenstein, M.; Goldman, J.; Barr, H.; Freeth, D.; Koppel, I.;
571 Hammick, M. The effectiveness of interprofessional education: Key findings
572 from a new systematic review. *J Interprof Care* **2010**, *24*, 230-241. DOI
573 10.3109/13561820903163405.
- 574 44. Hammick, M.; Freeth, D.; Koppel, I.; Reeves, S.; Barr, H. A best evidence
575 systematic review of interprofessional education. *Med Teach* **2007**, *29*, 735-
576 751. DOI 10.1080/01421590701682576.
- 577 45. Reeves, S.; Perrier, L.; Goldman, J.; Freeth, D.; Zwarenstein, M.
578 Interprofessional education: effects on professional practice and healthcare
579 outcomes (update). *Cochrane Database of Syst Rev.* **2013**, *3*. DOI
580 10.1002/14651858.CD002213.pub3.