Enablers and Barriers to an Online Interprofessional Education Programme: A Mixed Methods Study.

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Abstract.

Inter-professional education (IPE) and collaborative practice have emerged as requirements of many healthcare programmes with the key aim of promoting optimal patient care. This paper describes undergraduate students' perceptions and experiences of a bespoke five-week online digital cross-institutional IPE programme.

The programme was delivered via Curatr, a social learning platform that provides the tools to build and deliver engaging online courses and was underpinned by subtle gamification elements. A mixed method concurrent design was used, and data was gathered via focus groups and questionnaires.

In total, 232 students participated in the IPE programme with 131 (56% response rate) completing the online survey and 57 students participating in nine focus groups. All students reported that the programme had a positive impact on their learning, increasing their understanding of other professional roles, communication and teamwork. Strategies that enabled IPE included the Curatr platform and the interprofessional mix of students. Barriers that hindered learning included; limited group discussions, repetitive learning activities and a lack of clinical experience.

The experience of running an online, cross-institutional IPE programme presented unique opportunities and challenges. The findings indicate that the content and structure of the programme require further work to ensure that the material is relevant to as many disciplines as possible. Ensuring equal participation and support across disciplines is important to enhance both students' learning and the importance of IPE. Overall, students valued and recognised the relevance of the programme to their studies and future practice as health and social care professionals.

Keywords: Health and social care students; Inter-professional education; IPE; Medical students; Nursing students; Online digital IPE programme.

1. Introduction.

According to the World Health Organisation (WHO) (World Health Organization, 2010), Interprofessional Education (IPE) occurs when "*students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes*" (p.7). The purpose of IPE is to help develop the skills needed by health and social care workers to work collaboratively among different professions. Interprofessional collaboration is considered critical to providing effective care, given the complexity of patients' needs and the range of health and social care workers involved in the care of patients (Reeves et al., 2013). Failure among healthcare professionals to work collaboratively has been identified as a key contributing factor to recently reported care failures in the UK (Dyer, 2022). IPE recognises the need for health and social care professionals to be able to work together in teams to find creative solutions to challenging situations with a view to improving outcomes for patients. This approach is further supported by the WHO Framework on Integrated People-Centered Health Services, which highlights the need for five interwoven strategies to be implemented in order for health service delivery to become more people-centred and integrated (World Health Organization, 2016). Importantly, these strategies focus on the need for students to be encouraged to understand the roles and responsibilities of different professions as well as learn to communicate effectively within and between professional groups. Furthermore, within Ireland, health professional regulatory authorities such as the Nursing and Midwifery Board of Ireland (2016), the Irish Medical Council (2019) and CORU -Health and Social Care Professionals Council (2024) endorse the need for interprofessional learning, highlighting the importance of collaboration and communication between health and social care professionals.

The curricula at the undergraduate level tend to focus on single disciplines in isolation (Naumann et al., 2021). This can lead to graduates having limited knowledge about other professions and limited interprofessional collaboration skills (Aldriwesh, Alyousif, & Alharbi, 2022). In response there has been a move to support IPE within health and social care at the tertiary education level (Grace, 2021). Studies examining the impact and use of IPE programmes in tertiary settings reveal a number of positive outcomes, such as better skills for collaborative practice and problem solving, improved attitudes towards interprofessional collaboration and enhanced patient care (Lapkin, Levett-Jones, & Gilligan, 2013; Lehrer et al., 2015; Pullon et al., 2013; Reeves, Goldman, Burton, & Sawatzky-Girling, 2010; Wang, Shi, Bai, Zheng, & Zhao, 2015). Despite examples of successfully implemented IPE programmes (Guraya et al., 2021; Spaulding et al., 2021), IPE remains '*on the margins of curricula*' both internationally (Dunston et al., 2019) and within Ireland (O'Leary & Guinan, 2022). While IPE has traditionally been delivered face-to-face or blended, through a combination of online and classroom methods (Bogossian et al., 2023), there is a growing prevalence of online delivery (Evans, Ward, & Reeves, 2019) accelerated in response to the COVID-19 pandemic with the move to online

learning (Karpa, 2021; Lestari, Rahmawatie, & Wulandari, 2023). A scoping review on the use of information and communications technologies (ICT) in the delivery of interprofessional education reported that students were favourable to the use of ICT in the delivery of IPE with it leading to positive changes in attitudes and knowledge equivalent to traditional face-to-face IPE (Curran et al., 2015).

Online learning can be delivered synchronously, where participants interact and engage in learning together in real time or asynchronously, according to their own schedule or as a hybrid using both synchronous and asynchronous approaches (Stanford University, 2021). Online learning can help to address some of the challenges of delivering IPE, such as difficulties in negotiating timetables and facilities (Abu-Rish et al., 2012; Davidson, Smith, Dodd, Smith, & O'Loughlan, 2008). Other challenges of delivering IPE include ensuring equal opportunities for learning among students from different disciplines who are at different stages in their programmes with different levels of clinical experience (Hood et al., 2014; Judge, Polifroni, & Zhu, 2015). Whether or not an IPE component is compulsory also affects the learning experience. On the one hand, Davidson et al., (2008) found that it was difficult to recruit and retain students where participation was not compulsory. On the other hand, Oandasan and Reeves (2005) noted that if IPE is offered as an elective, students may perceive that the content is not as important or as essential for their education. Similarly, even if it is compulsory, the level of credit awarded to IPE may signal the area as less important than others (Reeves, 2000).

Despite the growing interest in IPE, its implementation within universities and colleges remains a major challenge, particularly with large student numbers and the significant difficulties associated with synchronising timetables. This paper describes undergraduate students' experiences of a cross-institutional bespoke online IPE programme, which aimed to introduce health and social care students to IPE, with particular emphasis on the enablers and barriers to delivering an online IPE programme.

1.1 Overview of the online IPE programme.

An IPE programme was developed between two universities in Ireland (University A and University B), designed to promote collaborative practice between undergraduate health and social care disciplines. Promoting opportunities for students to learn and work collaboratively was central to this programme, which aimed to improve preparedness for teamwork and collaboration in clinical practice. It was delivered over five weeks across both universities between September and October 2015.

The programme was built around four key components: roles, responsibilities, interprofessional communication and teamwork. In total 232 students from the two universities participated. They were assigned to mixed interprofessional groups across both universities, consisting of twelve to fifteen students supported by a facilitator. During the programme, students were asked to

explore practice-based content, engage in interprofessional discussions, contribute ideas and resources and reach collaborative decisions. An example of a case-study which they had to address is presented in box 1 below.

Box 1. Example of a case study from the IPE programme

Students were presented with information about Mary, an 89-year-old woman with dementia who had been living in a nursing home for the past year. She was unmarried with no children. On numerous occasions, she expressed her unhappiness at having to stay in the nursing home and wished to return to her own home, a flat in south Dublin where she had lived for 60 years. Her friend arranged to meet with the nursing home manager to discuss Mary's discharge from the nursing home.

Further information was given to the students about the situation. They then had to decide what considerations would inform their decision about whether or not to discharge Mary home.

Students accessed the content on a weekly basis with progression based on completing the week's activities and an end-of-week "*gate*" question. For all students, apart from the medical students at one institution, the programme was worth 2.5 European Credit Transfer and Accumulation System (ECTS). These latter medical students undertook the programme on a voluntary basis as it was not possible to change the ECTS allocated within the curriculum.

The programme was delivered asynchronously over five weeks via the online social learning platform, Curatr. Curatr is a lightly gamified platform that allows learners to earn pre-determined "*experience points*" ("XPs") for their interactions. More engagement resulted in more XPs, which the Curatr platform automatically awarded. Students could track their progress on a built-in leaderboard. To evaluate students' understanding, each student was required to answer a weekly "*gate*" question in 250 words or less, with responses visible to peers and graded by facilitators prior to submission of the following week's question. Finally, a series of engagement '*badges*' – Outstanding, Gold, Silver, Bronze - were awarded for significant levels of engagement and peer collaboration. Student engagement was assessed across two main domains: peer interaction (original comments, responses to comments and upvoting (casting a vote showing approval for another student's online comment) and voluntary contributions (sharing additional resources with the group). Points from these interactions contributed to an overall score which equated to a final badge. If a student was awarded an engagement badge, then the associated points accrued to the student's overall XP score. Students were notified about the opportunity to earn engagement badges. However, the specific criteria for earning these badges were intentionally withheld. This approach was implemented to prevent students from manipulating

the system solely to obtain badges, rather than engaging genuinely in the learning process. The assessment strategy for the programme is outlined in Table 1.

Table 1: Overview of the assessment methods used for the online IPE programme.

Assessment component	Assessed	Total Points	Awarded
Course Experience Points (XP)	Level of engagement with the course content	45	Automatically
Gate questions	Understanding of content from each week of the programme	30	Manually
Engagement badges	Level of engagement with other students	25	Manually

2. Methods.

2.1 Research design.

Mixed method designs capitalise on the strengths of both quantitative and qualitative approaches (Creswell & Plano Clark, 2011). A concurrent mixed method design was used whereby quantitative data was collected using a survey and qualitative data collected through focus groups. The survey results enabled the collection of data from a larger population of participants while the qualitative data provided more in-depth insights. This combined approach provides a comprehensive understanding of students' experiences (Creswell & Plano Clark, 2011; Creswell, 2014).

2.2 Data collection.

2.2.1 Quantitative data.

A 42-item evaluation questionnaire was developed, tested and piloted by the research team for face and content validity and disseminated to all participating students (n=232) via the IPE online programme Curatr and SurveyMonkey. Students were asked to complete the questionnaire on completion of the programme.

2.2.2 Qualitative data.

Nine focus group interviews were conducted in-person by EB, DC, MP, TM, CC and CH across the two institutions using a qualitative descriptive approach (Sandelowski, 2000). The focus group protocol was developed and piloted by the research team and consisted of 5-6 key questions which focused on participants' experience of the programme; the impact, if any, on

their interprofessional learning; what was helpful/unhelpful about the process; what they learned; and any recommended changes. Data were collected post the five-week IPE programme in October and November 2015.

2.3 Data analysis.

2.3.1 Quantitative data analysis.

All the online survey responses (n=131) were analysed using descriptive statistics in SPSS (V22.0).

2.3.2 Qualitative data analysis.

The nine focus groups (n=57 participants) were audio recorded and transcribed verbatim. Once transcribed DC and PD used conventional content analysis to analyse the data (Hsieh & Shannon, 2005). NVivo 10 was used to support the management and analysis of the data.

2.4 Ethics approval.

Ethics approval was obtained from the Research Ethics Committee of each respective university.

3. Findings.

Two hundred and thirty-two students completed the online IPE programme from across the two universities. They were from the disciplines of social care (n=10), speech and language therapy (n=24), occupational therapy (n=32), general nursing (n=65), psychiatric nursing (n=14), midwifery (n=21), medicine (n=52) and physiotherapy (n=14).

One hundred and thirty-one students completed the evaluation questionnaire (Table 2). The majority were female (n=115) and from nursing. Most of the respondents were in their second year and from university A. Further information about the respondents is available in Table 2.

Table 2: Characteristics of the students who completed the evaluation questionnaire (n=131).

		n	%*
Age (years)	18-22	107	82
	23-27	9	7
	28-32	7	5
	>32	8	6
Gender	Male	16	12
	Female	115	88
Discipline	Medicine	22	17
	General Nursing	52	40
	Psychiatric Nursing	8	6
	Midwifery	8	6
	Physiotherapy	5	4
	Speech & Language Therapy	8	6
	Occupational Therapy	27	21
	Social Care	1	1
Year of course	1st year	26	20
	2nd year	104	79
	3rd year	1	1
University	University A	119	91
	University B	12	9

* Percentages are rounded to two decimal places, which may cause the total to slightly differ from 100%. This is due to rounding adjustments and does not affect the overall accuracy of the data.

In total, 57 students participated in nine focus groups (Table 3). The majority of participants were female (n=47) and aged between 18-22 years old. None of them had participated in an IPE programme previously. Most participants were from university A.

Table 3: Demographic characteristics of the student focus groups (n=57).

Age	Under 18 years	1	2
	18-22 years	40	70
	23-27 years	4	7
	28-32 years	2	4
	>32 years	10	18
Gender	Male	10	18
	Female	47	82
Previous participation in an IPE programme	Yes	0 57	0
	No		100
Year	1	14	25
	2	36	63
	3	7	12

* Percentages are rounded to two decimal places, which may cause the total to slightly differ from 100%. This is due to rounding adjustments and does not affect the overall accuracy of the data.

Three main themes were identified from the questionnaire and focus group data: students' overall perceptions of the programme; enablers of IPE; and barriers to IPE. Further descriptions of each theme are presented below. The quotes are denoted according to whether they emanated from the questionnaire or focus group (e.g. FG1, FG2, EG1, EG2 etc.).

3.1 Students' overall perceptions of the IPE programme.

Students described gaining benefit from their participation in the IPE programme and expressed an overall positive reaction toward the online experience.

"…I liked how it was online, different from everyday lectures, I liked the set goals that had to be reached each week" [EG1]

They agreed/strongly agreed that the programme was relevant to their education (80.9%/n=106) and relevant for their practice (86.9%/n=113), noting that it was the only time during their on-campus studies that they could interact with students in other cognate disciplines.

"I thought it was a very good programme, being able to discuss issues with other health care professionals is a vital skill to have. We have no interaction with other healthcare students in college, so this was a good chance to do this" [EG1]

Students agreed/strongly agreed that it improved their understanding of interprofessional learning (87.8%/n=115) and collaborative practice (84%/n=110).

"It allows you to get a feeling of how clinical scenarios work, and how one should collaborate with other healthcare professionals, even if only in a virtual sense" [EG9]

They also agreed/strongly agreed it made them think more about their roles and responsibilities and how these can influence interprofessional practice (88.5%/n=116) and to think more about the perspective of their discipline and how this can impact on collaborative practice (86.9%/n=113).

"Overall, IPE is a platform for future health professionals like us to fully understand the roles and responsibilities of other health professionals. It is an alternative way for us to communicate and express our opinion and learn. I will strongly recommend to others" [EG2]

For the majority of students, the IPE programme improved their understanding of the perspectives and roles of other health/social care disciplines and how this may impact interprofessional practice (88.5%/n=115 agreed/strongly agreed).

Many agreed that it prepared them for situations in clinical practice when they would need to voice their opinion and provide a rationale to other health and social care disciplines (62%/n=80 agreed/strongly agreed). It also provided them with a new way of looking at issues relevant to their practice (77.5%/n=100 agreed/strongly agreed) and developed their critical thinking (65.4%/n=85 agreed/strongly agreed) and other skills.

"This programme really helped to improve my reasoning abilities as well as expanding my view on what the responsibilities of other disciplines are" [EG4]

Students also agreed/strongly agreed that the online programme had a lot of potential to contribute to IPE (89.2%/n=116) and felt it was overall a positive experience (69.5%/n=89).

3.2 Enablers of IPE.

Students identified a number of components in the programme that enabled IPE. These included online learning and Curatr and the interprofessional mix of students.

3.2.1 Online learning and Curatr.

Most students were satisfied with the Curatr system. Students agreed/strongly agreed that navigating the site was easy (81.7%/n=107); the interface was easy to log on to (90.8%/n=118);

that the technical support person responded quickly to problems (90.9%/n=110) and that the facilitators were always available to support learning online (88.4%/n=114). Significantly, 68.8% (n=88) of students agreed/strongly agreed that Curatr was a suitable platform for the delivery of IPE. Some felt that the online system offered flexibility to complete the programme in their own time, provided a greater opportunity to express opinions in comparison to face-to-face lectures, and gave them more scope for reflection than face-toface lectures.

"When you're in a class, if you're given a question you have to answer it there and then, whereas it was good to have that time to think about it before you answered" [FG1]

Students felt that the online system enabled the breaking down of hierarchical barriers as everyone had their own space and opportunity to express their viewpoints in a safe environment. *"Sometimes sitting in a lecture is like, you're in with seventy to eighty people and you can't really talk, like you'd be a bit embarrassed or whatever to put up your hand and be giving [your] opinion. Whereas with this, you were able to talk to other people and express what you wanted to say" [FG5]*

"The balance of power outside [in clinical practice] is not the same…but here [on IPE programme] you are with peers" [FG6]

Most students (79.4%/n=104) agreed/strongly agreed that the case scenarios were very relevant to their learning. Furthermore, many students (61.1%/n=80) agreed/strongly agreed that the workload was appropriate. However, most students (80.9%/n=106) also agreed/strongly agreed that the learning activities were repetitive as were the gate questions (74.8%/n=98). As students progressed through the IPE programme on Curatr they could gain a maximum of 45 XP points for engaging with the weekly material and completing required tasks. The Curatr system automatically awarded these points and students could track their progress on a leader board. Some students in the focus groups indicated how they liked the XP points and followed the leader board, as it motivated them to participate and compete with their peers.

"If there wasn't an XP point system I probably wouldn't have done half of it to be honest" [FG2]

"The leader board was quite straightforward and you could see exactly what points you're on" [FG9]

3.2.2 Interprofessional mix of students.

Overall, students liked the mix of disciplines within their online group with some commenting on how nice it was when students from other disciplines responded to their comments.

'I kind of liked after a while how people…I noticed people were actually kind of listening, reading my comments because then they'd say oh I actually never knew.' [FG2]

The mix of disciplines was particularly rewarding for lesser-known disciplines. For example, social care students felt their role was relatively unknown and interacting with students from other disciplines helped clarify and promote their role.

"…in my head I thought they {the social care students} were social workers…I didn't know . . . until I was told…it was good to know the difference" [FG7]

Other students reported that communicating and interacting with students from other healthcare disciplines was empowering and gave them the courage to later voice their opinions in the real world of practice.

"When you have the courage of discussing with others even from different fields you see that what you are saying is accepted, it gives you the courage to bring it out in the outside world, which I did recently in the workplace" [FG6]

3.3 Barriers to IPE.

Students also identified a number of key barriers, which hindered their experience in the IPE programme. These included limited group discussions, repetitive learning activities and lack of clinical experience.

3.3.1 Limited group discussions.

Given the large number of general nursing students (n=65) involved in the programme, it was inevitable that these students were often the largest discipline in any group. General nursing students commented on this imbalance and would have liked more diversity.

"Just seemed to be all nurses in our group and there was one OT and there was one speech and language . . . so maybe if there was one from every discipline" [FG9]

Midwifery students also expressed concern regarding the constituency of their learning groups as they felt that they did not comprise disciplines that they would routinely work alongside in practice.

"In reality I didn't see like any professions that we could realistically be working alongside in practice" [FG7]

As the medical students at one institution did not receive academic credit for taking the programme, they engaged less (only 64% of them gained more than half of the available XP points). Some students felt that the lack of participation by their medical colleagues lowered group morale, prompting them to question the discipline of medicine's commitment to IPE and teamwork. Just over half of the students (51.1%, n=67) agreed/strongly agreed that the lack of participation and involvement of some professions hindered their learning.

"'Some of the med students didn't take part. I think, it was optional for them…which lowered morale I think for everyone" [FG7]

The fact that medical students were not receiving credits (ECTS) for completing the programme may explain their limited online discussions and participation. This was identified by most students as an important area requiring review with 85.4% (n=111) of survey respondents agreeing or strongly agreeing that it is important that students receive credits for participation in the programme.

The majority of students felt that the way in which participation in group discussions evolved negatively impacted on their learning and overall experience. Firstly, because students had a Sunday night deadline to complete weekly tasks and gate questions, many only engaged just before the deadline. This resulted in limited interaction and discussions, and it was clear that this was very frustrating for students; however, they were unsure how this could be rectified.

"…I used to like to get it done on a Monday…And then people wouldn't be commenting until Sunday night. So I couldn't comment on other people…." [FG7].

"…there's no way to get around that when some people are doing it at 11 on a Sunday and you know you've participated already. But I can't see any way around that, I think that's going to happen regardless of the system" [FG2].

Secondly, some students felt that lack of engagement was due to competing priorities including home life, work and college life.

"… a lot of that does come down to the fact that we were really pressed for time and really stressed about pretty much everything" [FG2]

Thirdly, students commented on being focused on doing just the minimum, or on putting up their individual comments, trying to get all available XP points rather than engaging in meaningful group discussion.

"… you're just like no I'm just going to get by, like everything was just getting enough points to get the gate question" [FG9]

Finally, students reported that communicating online and via text, was difficult and they would prefer a traditional face-to-face style of communication. It was not surprising, therefore, that some students commented that whilst online was good as an introduction to IPE, face-to-face sessions would best enable group discussions.

"I didn't like the online discussions; I found it was kind of difficult to talk to people through it online, like just through typing, it would have been better to talk to people face to face" [FG2]

3.3.2 Repetitive learning activities.

Most students (80.9%, n=106) agreed/strongly agreed that the learning activities were repetitive. However, when questioned specifically on the case scenarios, most students responded positively (79.4%/n=104) that these were very relevant to their learning. Around half of the students in the focus groups considered the case scenarios unrelated to their discipline. This was particularly the case with student midwives who reported that they found it difficult to apply the content to their practice.

"Some of the case studies just didn't relate and we couldn't answer the questions properly, like dementia, we're midwives, we don't know about dementia…just a few things weren't, like set to midwives' kind of a thing and it is just frustrating to try and answer it and then go and learn all about something that we might never come across again" [FG 7]

However, others reported that whilst it was sometimes challenging and time consuming when they were unfamiliar with the topic, it forced them to look it up and thereby enhanced their learning.

'There were 1 or 2 that I found hard, that as like as physio I'm not sure what I could do. Then like I'd have to research it and I kind of, it helped me to actually learn more things a physio can do…' [FG1]

At the end of each week, students were asked to respond to a "*gate*" question, where they could reflect in more depth on the week's activities and materials. Completing the gate questions was an individual piece of work that was graded by the group facilitator. Most students agreed/strongly agreed that the gate questions were repetitive (74%/n=98) as they felt that they continually seemed to focus on IPE and its importance.

"And the gate questions were all so similar … all trying to tell how great IP was" [FG7]

"I didn't find them [gate questions] difficult or anything but like (A) said, it just felt like you know one week you're answering a question and then you were answering it again, and you're trying to avoid saying the exact same thing you did again but you kind of end up doing that anyway" [FG2]

Accessing Curatr from mobile devices was also problematic and frustrating for a few student groups, which hindered engagement, particularly when the online programme overlapped with nursing clinical placements.

"If you could use your phone to do it, you could only do it on a computer, you couldn't access posts or post from your phone" [FG7]

3.3.3 Lack of clinical experience.

It was not possible within this study to offer the IPE programme to students at a similar stage of their education and with similar levels of clinical experience. The student groups that participated were mostly comprised of year 1 (n=64) and year 2 students (n=157) with the only exception being social care students who were in year 3 (n=10). This meant that some students occasionally found it difficult to answer some of the questions due to the early stage of their career or lack of clinical exposure.

"I think it was a little bit hard so early on in our course because we hadn't really done any, I suppose practical things about different diseases and things. So maybe like if you had done work experience or done a bit more of the course that would have been more useful. You would have got more out of it" [FG1]

"Some of the students were like 'I've never been on placement', so then they were like I don't actually know what we do…" [FG8]

Some students, however, reported that the lack of direct clinical experience did not always hinder learning. They stated that they researched the topic, drew upon their own experiences or learned from the clinical experiences shared by others online in their group.

"I thought listening to people's experiences on placement was good, we hadn't done an awful lot so that was kind of tough to write about but then reading other people's [experiences] was good" [FG2]

4. Discussion.

This study explored the experience among students, from different health and social care disciplines in two universities of a 5-week online asynchronous IPE training programme. Overall, the students had a positive experience of the programme with many agreeing that it improved their understanding of IPE and collaborative practice and that the programme helped them to think about their professional roles and responsibilities. Whilst students at times struggled with the format, overall, the results suggest that an online IPE programme may be part of the solution to the timetabling challenges that have previously been identified (Abu-Rish et al., 2012; Davidson et al., 2008).

In terms of enablers, the online platform, Curatr, was well received by students, who liked its self-paced learning approach. The platform was easy to use, and any technical issues were addressed quickly. The interprofessional mix of students is critical to the success of an IPE

programme. Consistent with the literature, creating balanced groups when there are varying numbers of students from different disciplines and experience levels proved challenging (Hood et al., 2014; Judge et al., 2015). Every effort was made to create groups with a disciplinary and institutional mix of students. Students appreciated the opportunity to learn from each other and felt an increased sense of confidence to speak and be heard. They were particularly delighted to set their peers straight on their discipline's roles and responsibilities, also strengthening insights into their own field of practice. It was rewarding to see that students understood the benefit of interprofessional groups and were eager to hear more from their colleagues. This finding aligns with Dow & Thibault's (2017) assertion that, despite the challenges associated with Interprofessional Education (IPE), its benefits justify the effort invested resulting in health and social care students who can better manage complex and uncertain situations.

In terms of engagement, there were more nursing students than any other discipline, creating some imbalance. At the same time, some students had completed clinical placements whereas others were in their first academic semester, which meant that not only could they not comment on the basis of their experiences in clinical settings, they also did not yet have a strong sense of their profession. Nevertheless, inexperienced students were able to learn from students with greater clinical experience, and many conducted research to learn more about clinical practice, which extended their understanding of their own discipline. Whilst it is challenging to create case studies and scenarios that apply to students from disciplines ranging from midwifery to speech therapy, it was positive to see students actively seeking ways to contribute to discussions. In addition, this active learning more likely enhanced learning that will endure (Allsop, Young, Nelson, Piatt, & Knapp, 2020). The inclusion of case studies that appeal to a broader range of professionals is an important consideration for the future.

The lack of involvement of some of the medical students, who were not receiving credit, skewed online discussions. As outlined by Grant et al., (2011) institutional policies for academic credit within the curricula for engagement in IPE are required if implementation is to be fully successful. Ensuring that all students receive credit for participation is important, both in terms of their own motivation to engage as well as in relation to the broader perception of the value of IPE. Of concern in this study, was the perception of some students that the lack of engagement by medical students meant that the discipline of medicine was less committed to IPE. The lack of "*buy-in*" from all parts of an institution is a significant barrier that has also been identified in the literature (Bogossian et al., 2023). Lack of engagement was not limited to medical students. A number of participants across various disciplines appeared to contribute only the minimum effort required to accumulate experience points (XP). Furthermore, many students left engagement with their group until the last possible moment, which meant that the discussion tended to occur

on a Sunday when other students were typically offline. Shifting deadlines to mid-week could potentially improve group interactions.

A few students reported problems with mobile phone devices and connectivity, indicative of technology at that time. In the years since this study was conducted, internet connectivity has become more stable and accessible in urban and rural areas alike (OECD, 2020). Furthermore, 4G and the development of 5G technologies have also enabled more efficient and faster online interactions (Bernstein, 2020). The rise of responsive design in learning management systems (LMS) has also improved device compatibility ensuring that online platforms can be accessed across a wide range of devices, including laptops, tablets, and smartphones (LambdaTest, 2023**).** Furthermore, technical support has become more robust, with most online learning platforms for example Blackboard and Canvas offering 24 hour help desks, detailed frequently asked questions (FAQs,) and live chat functions to assist students with technical issues (Blackboard, 2024; Canvas, 2024). The infrastructure supporting online IPE has improved significantly enabling the provision of more consistent and inclusive educational experiences for students (Ford & Gray, 2021).

Since the original study in 2015, the Curatr e-learning platform itself has undergone extensive enhancements to improve user engagement, learning outcomes, and scalability. These updates have culminated in its evolution into the Learning Pool platform, which has expanded its capabilities while maintaining the core strengths required for complex learning environments such as IPE. One of the major improvements, as outlined by Rob Carter of Learning Pool (Personal Communication October 16th, 2024) is the integration of the Experience API (xAPI), which enables the platform to capture and track detailed data about learner experiences, activities, and performance across diverse contexts, including formal, informal, mobile, and social learning environments. This capability provides educators and organisations with a broader view of the entire learning journey, making it possible to offer more personalised and adaptive learning experiences.

In addition to the xAPI integration, the platform's gamification features have also been significantly enhanced by incorporating game-like mechanics that enhance engagement, drive collaborative learning, boost motivation, and promote knowledge retention. Another crucial advancement is the platform's ability to seamlessly integrate blended learning models. This means that online content can now be effectively combined with in-person sessions, providing a more flexible, hybrid learning experience. Learners can engage with both digital resources and direct interactions with their peers and instructors, supporting more comprehensive learning approaches that are essential for IPE programs. Curatr's evolution into the Learning Pool platform has also increased its capacity to support a wide range of e-learning use cases from healthcare, higher education, and corporate training environments. The platform's

integration of several key features: adaptive learning capabilities, advanced data analytics, and scalable blended learning approaches, ensure that the system remains highly relevant and well-suited to address the complex interactive requirements of interprofessional education (IPE). Additionally, the platform's flexibility allows it to support a diverse range of e-learning and blended learning scenarios.

The current study, conducted in 2015, revealed that some students felt they missed opportunities for in-depth face-to-face discussions. This finding suggests that future programmes could incorporate synchronous discussion tools. It's worth noting that at the time of this study, as well as our own research, most online interprofessional education (IPE) primarily utilised asynchronous discussion systems (Curran et al., 2015). This context is important for understanding the limitations and potential areas for improvement in relation to online IPE platforms of that era. Since then, there has been an increase in synchronous online IPE (Evans & Perry, 2023) allowing for better interaction between students and facilitators. Accessibility to online education has also improved in recent years making it more inclusive for a broader range of learners. An additional factor has been the implementation of Universal Design for Learning (UDL) principles, which foster the development of flexible learning environments that cater for diverse learning needs (CAST, 2018). Adaptive technology has enhanced online education by personalising the learning experience, allowing content to be customised according to each learner's abilities and preferences (Christodoulou & Angeli, 2022). However further infrastructure improvements and digital tools are needed to ensure equitable access, particularly for those from low-income households and rural areas (European Commission, 2020).

Hayward et al., (2021) recommend using a combination of synchronous and asynchronous methods for the successful implementation of IPE online. Students in the current study discussed a preference for having the opportunity for face-to-face communication and synchronous online IPE as they felt that this could enable more interactive group communication, albeit virtually. The adoption of blended delivery is supported in a recent systematic review focused on IPE teaching and learning approaches used in university based undergraduate curricula (Aldriwesh et al., 2022). Although the authors report the effectiveness of various online elearning tools, they emphasise that e-learning works best when blended with other face to face learning activities. The authors also report that the most frequent pedagogical approaches used to deliver IPE were established approaches such as problem-based learning, which requires students to work in groups to propose solutions to real-world complex problems (Barrows, 1996); simulation-based education, which uses simulated scenarios in a controlled environment that imitate real-life clinical experiences (Motola et al., 2013) and synchronous or asynchronous learning via e-learning digital platforms. The approach to delivering IPE outlined in the current study could be further enhanced and

expanded by integrating the strengths of real time face-to-face interactions with the flexibility of asynchronous self-paced learning.

Limitations and Strengths

Limitations of this study include overrepresentation of females and students aged 18–22 years old due to the sampling methods available. Despite the underrepresentation of males and older students, findings still have a high degree of generalisability as females in Ireland represent a large proportion (84.4%) of health and social care professionals (Central Statistics Office, 2016). The sample was also dominated by nursing students from one university, which may have influenced findings. Responses may also have been impacted by self-selection bias. Study design was based on a post-intervention survey and focus groups did not include a control group. Future research should aim for more balanced participation.

A key strength of our study is the wide mix of professions that participated in the IPE programme. A review of IPE in European undergraduate medical education found that while there is a growing interest in integrating IPE into medical education (Colonnello, Kinoshita, Yoshida, & Bustos Villalobos, 2023), the target learners in more than half of the studies were medical and nursing students while other disciplines such as allied health and social care professions were under-represented. It is important to ensure that the mix of professions is achieved across all IPE participant groups. Finally, despite being conducted in 2015, this study provides valuable insights into the enablers and barriers of online IPE programmes which are still relevant today.

5. Conclusion.

Our study found that students valued and recognised the relevance of the IPE programme for their studies and future practice as health and social care professionals. In addition, the crossinstitutional aspect demonstrated the potential to create meaningful national level conversations between health and social care students from different universities. This was enabled by the online aspect of the programme which allowed students to engage with other students from different professional disciplines whom they would not otherwise have met until they entered the real world of practice.

Although the technology used supported IPE, further work is needed to ensure that course content is consistently relevant to all disciplines. To improve IPE delivery, increased scaffolding for group work, the inclusion of face-to-face teaching, broader participation from diverse professional backgrounds across groups, and more tailored case studies are recommended to further enhance relevance and engagement. In addition, strong support at institutional level and active engagement of key stakeholders from all professional disciplines is required if equal

engagement from students across disciplines is to be achieved. In this study, the IPE programme inspired inter-professional communication and collaboration and helped students to think about what their specific role would be as a member of a wider interprofessional clinical team in a manner which would not otherwise have been available to them prior to graduating.

IPE is therefore a critical educational component for health and social care students.

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