


ORIGINAL ARTICLE

Interdisciplinary interprofessional education using an online learning environment called values exchange: A qualitative investigation

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Abstract

Introduction: Interprofessional education (IPE) is implemented throughout the curricula of student healthcare professions as it is understood to provide positive impact on patient outcomes in the clinical environment. There are different methods to provide IPE such as through online learning or traditional face-to-face methods. However, there is a lack of research surrounding the use of Online Learning Environments (OLEs) to teach IPE. **Methods:** In a pilot study, seventy-one undergraduate radiography students and twenty Master of Pharmacy students engaged in an ethical scenario using the OLE, Values Exchange (Vx). Following the activity, students were invited to complete an open-ended response question. Fourteen students responded and these data were used for qualitative analysis. **Results:** A thematic analysis of the students' open-ended responses found the emergence of three major themes, namely; understanding the roles of other healthcare professionals, developing self-reflection skills and, preparing for the clinical environment. Students suggested that additional time allocated for undertaking the study would benefit their engagement in the activity. Students would benefit from added engagement in the Vx task in both the short and long term for IPE. **Conclusion:** Students are receptive in utilising contemporary approaches such as OLEs in furthering their IPE. Positive interpretations and suggestions by both radiography and pharmacy students in this study demonstrate how Vx as an OLE teaching tool can be used effectively. OLEs can overcome barriers that exist in face-to-face education experiences. OLEs should be considered for greater use within academic curricula of healthcare professions, but only if they have been evaluated for effectiveness.

Introduction and Background

The healthcare setting is a complex environment where professions work collaboratively for optimal patient outcomes.^{1,2} Interprofessional collaboration, implemented effectively, allows for safe and quality patient care.^{1–4} Poor interprofessional communication decreases patient satisfaction^{1,3–6} and can lead to delayed treatment, injury

or even death.⁵ Interprofessional education (IPE) is therefore vital across health professions to enhance patient outcomes.^{4,7} While many universities have developed IPE programs within their curricula,⁸ Lapkin et al.⁹ found there are few collaborative IPE experiences offered across Australian and New Zealand universities.⁹ O'Hara et al.¹⁰ highlight the barriers that exist in implementing IPE, such as clashes between university

class schedules and differences in professional requirements. Applying an interprofessional collaborative approach improves healthcare workers' awareness of each other's professions and skill sets.³ The World Health Organisation acknowledges that interprofessional education enhances collaborative practices which optimise quality healthcare services.¹¹ Additionally, when these collaborative interactions are applied, there is a noted improvement in group decision-making and overall quality of care.³

The use of online learning environments (OLEs) to teach IPE to student healthcare professionals has seen a growth in recent years,^{12,13} and has special relevance in the current climate, whereby the presence of COVID-19 has prompted educators to be innovative in using technology in their teaching. OLEs are suggested to be as effective as traditional face-to-face teaching methods^{10,12,13} and are increasingly utilised as a method to teach IPE amongst healthcare professionals.^{10,13–15} OLEs provide an opportunity for innovative approaches to IPE, with a reduction in logistical challenges within academic curricula and can support student involvement.¹⁶ They act as a diverse functional tool for education as they incorporate flexibility in access, can provide quality content in relation to the selected profession(s) and are adaptable depending on the users' requirements.¹⁷ When using OLEs, educators should aim to provide equal or improved results in comparison to traditional face to face learning methods.¹⁷ Values Exchange (Vx) is an OLE which facilitates ethical reasoning through engagement in ethical scenarios within a wider network. It uses a process-oriented approach with final responses not viewed as 'correct' or 'incorrect' but focusses on the underlying decision making process.^{16,18} Vx is used as a teaching and assessment tool, using scenarios that relate to the real-life setting.¹⁹ Previous studies have assessed the use of Vx as an education tool for individual health professions^{16,20} but no research has explored an interprofessional setting.

The impetus for this pilot study was previous research by the primary author. In that study several students suggested the interprofessional aspect of the platform could be further developed by incorporating responses from other professions to allow for different perspectives.¹⁶ In response, Vx was used to facilitate an interprofessional learning experience between radiography and pharmacy students.

The aim of this study is to explore the significance of providing IPE through an OLE of Vx in the academic curriculum of allied health students, with particular reference to radiography students in Australia and pharmacy students in England.

Method

Study design

Ethical approval was received from Monash University and Sussex University for the study. An exploratory, interpretive approach was taken. This method is useful for exploring areas of practice where there is limited understanding²¹ or existing research, such as in the use of OLEs for IPE. Participants were introduced to a shared ethical scenario, 'Loyalty to Whom', through the Vx Community homepage (Fig. 1). Academic staff from Monash and Sussex Universities collaboratively created the scenario so that it would be relevant across the radiography and pharmacy student groups involved in the study. Seventy radiography students and nineteen pharmacy students completed the Vx activity. Upon completion of the activity, participants were invited to complete a survey constructed for this project. The survey included eight Likert scale questions in relation to statements about the Vx activity and one open-ended question about the Vx activity. An open-ended question was used in an effort to reduce response bias, an important consideration in exploratory qualitative studies.²¹ Only the qualitative data from this open-ended question was used for analysis in this project (Fig. 2). Both the Likert questions and the open-ended question are included in the supporting documents so that the reader can be aware of the full survey when reading this work.

The quantitative data collected during the survey is not reported in this article. The purpose of this article is to report on what the student experience with the learning activity was, which the quantitative data did not contribute to. Instead this was done through the use of the single open-ended question, which provided students with the opportunity to consider the most pertinent points to reflect on without directing them in any particular orientation.

Description of participants

This study included first year radiography students from Monash University and second year post-graduate pharmacy students from Sussex University. Students with different educational levels were selected as a means of observing how students at different levels of education interact in an IPE activity. Students in the UK were chosen to test if the use of OLEs could overcome logistical challenges of participating in IPE.¹⁶ The selection of students in this study was also a pragmatic one. Both Universities already used Vx and a community of practice existed between the authors surrounding the use of Vx in education, making it possible to facilitate the activity.

You are a recent graduate. Since then you have been informally mentored and supported by Justin, who is a senior practitioner in his mid-40s. You have appreciated Justin's guidance and have, on two occasions, had a post-work drink with him.

At both meetings you have had a few drinks before going home, leaving Justin alone.

You respect Justin's expertise but you do feel rather sorry for him, and wonder why he is happy to sit on his own in a bar. You know he's having some problems at home but he has not divulged too many details.

Three or four times in the past month you have smelt alcohol on John's breath in the morning, and think that on one occasion he was slurring his words. He seems uncharacteristically highly strung and has lost his temper with colleagues a few times in this period.

From the work 'grapevine' you know Justin's wife has ailing parents and is spending more and more time travelling to look after them. Word is Justin's been feeling put out to say the least. Recently his wife has been talking about having the parents move in with them and this has caused a lot of friction at home.

As a friend and colleague would it be better just to say nothing for now or report your suspicions to Justin's line manager and/or HR and/or the Regulatory Board?

Here is some information from the UK: <https://www.theguardian.com/money/blog/2008/oct/21/workandcareers>,
<https://www.gov.uk/whistleblowing>

Here is some information from Australia: <https://www.safeworkaustralia.gov.au/drugs-alcohol>,
<https://www.smh.com.au/national/drinking-on-the-job-what-is-acceptable-20130624-2ortu.html>

Here is an article on a whistle-blowing incident in Australia: <https://www.whistleblowingwomen.com/qldhealthnurses.htm> This affair ended with compensation for the whistle-blower, who suffered considerable distress during the affair. Generally speaking, whistle-blowers experience many negative effects: <https://www.orangewebsite.com/articles/risks-of-being-a-whistleblower/>

In Australia it is mandatory for registered health professionals to report 'notifiable conduct', 'if they have formed a reasonable belief that a registered health practitioner has behaved in a way that constitutes notifiable conduct': <https://www.ahpra.gov.au/notifications/make-a-complaint/mandatory-notifications.aspx>

It is proposed that you should report your suspicions about Justin's drinking

Figure 1. Shared ethical scenario, 'Loyalty to Whom', in Vx.

Open-ended Question.

We would like to hear from you regarding the activity. Considering this was a pilot study, what aspects of the activity were useful for your learning, do you think it has potential as a tool for interprofessional learning? Please feel free to add any other comments overleaf thanks.

Figure 2. Open-ended question from survey.

Data collection

Students were invited to participate by a post on the Learning Management System (Moodle). Participants were provided with an explanatory statement pertaining to the study and could withdraw from the study without consequence at any stage. Responses were anonymous. Participation was voluntary and completing the survey implied consent.

Ethical scenario engagement

"Think Screens", unique to Vx, guided the students through a structured process of ethical reasoning (Fig. 3).

Students answered questions surrounding their emotions, values and reasoning behind their choices to justify their responses to the scenario.¹⁹ Users were provided with flexibility in that no response was deemed 'correct' or 'incorrect' but instead their decisions were justified.¹⁹

Data analysis

Responses from the open-ended question were manually transcribed into Microsoft Word before they underwent analysis. The responses were examined using a six-step thematic analysis as outlined by Braun & Clarke²² (Fig. 4). This approach provided an appropriate method for exploring open-ended responses and is well-regarded across

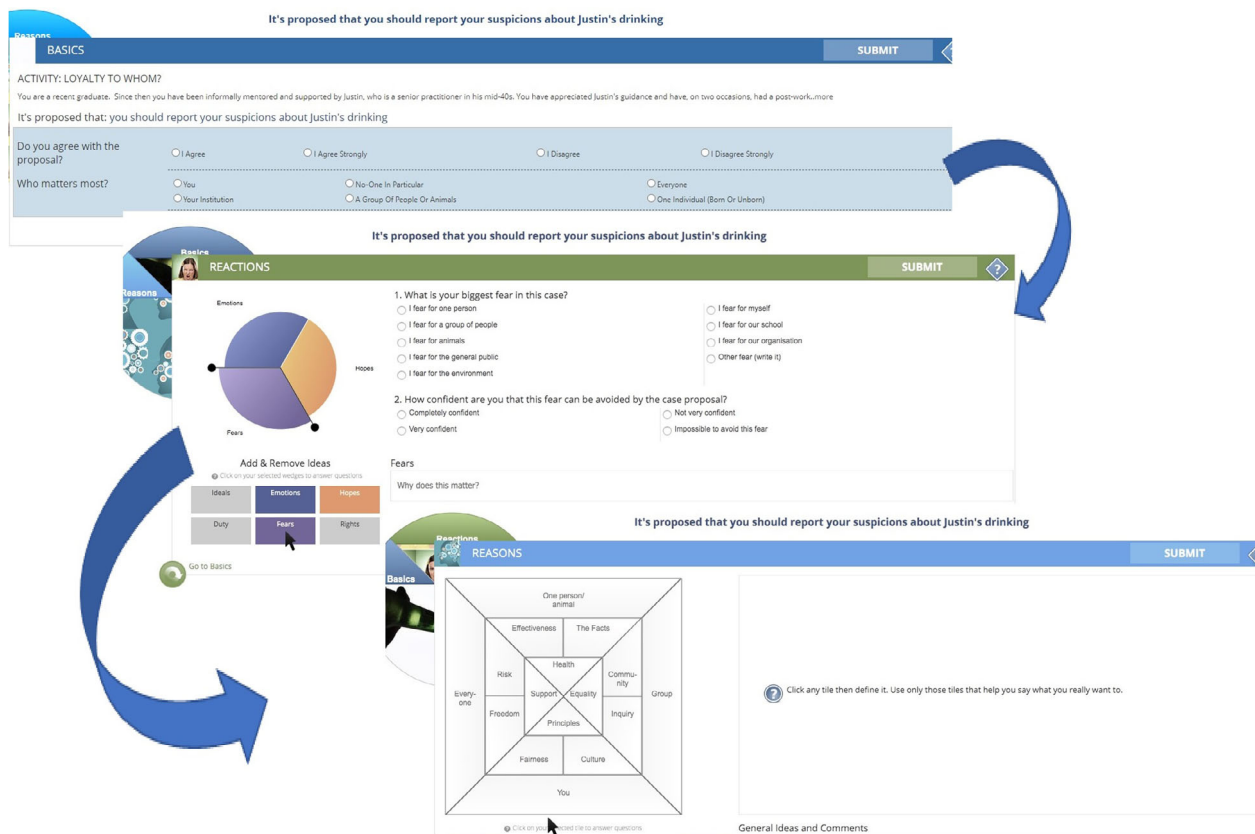


Figure 3. Think screens used to guide students through the scenarios.

the health and social sciences.²³ Codes were derived from data fragments within the text that reflected themes.²⁴ This initial analysis was conducted separately by the primary author and one of the secondary authors, both of whom arrived at similar findings albeit with some further refining of the themes to discard outliers and come to a consensus. The final themes were then decided and another secondary author checked the themes and the representative quotes from the data to enhance the reliability.

Results and Discussion

Nine radiography students and five pharmacy students responded to the open-ended question. This was a response rate of 16%. All of the responses were included in the analysis. When analysing the qualitative data, student groups were only separated for documenting the data. For the remainder of the analysis, the datasets from both groups were combined as the goal was not to directly compare the two groups.

Three major themes were uncovered. The themes, with their related codes, are displayed in Figure 5.

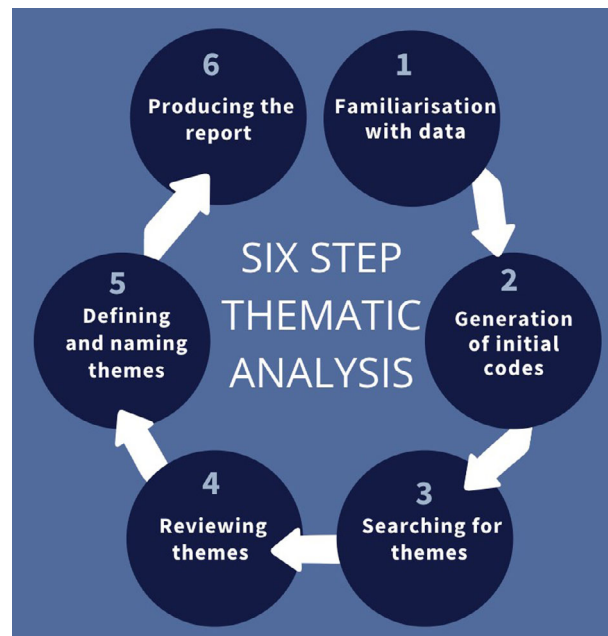


Figure 4. Braun and Clarke six-step thematic analysis.²²

Theme 1: Understanding the roles of other healthcare professionals

Limited understanding of other professions' roles and skillsets exist in healthcare environments.²⁵ Within radiology alone, several professions work collaboratively including radiographers, radiologists, nurses, medical physicists and administrative staff.²⁶ Radiographers also interact with professions beyond the radiology department such as in the intensive care and emergency departments. Therefore, it is important that radiographers, and radiography students, understand the importance of working collaboratively in providing effective care. The results obtained in this study suggest that Vx was able to act as an education tool to facilitate students' knowledge of another profession and vice versa. Increased understanding of other healthcare professionals and their roles was frequently suggested by students after engaging in the collaborative ethical scenario.

A number of students pointed out they acquired added understanding of the opinions and perspectives of members of another profession. One radiography student expressed an appetite for additional discussion surrounding the activity. They felt they would "appreciate more time allocated for this activity with the chance of discussion of their different perspectives. That would be a true analysis by understanding the two sides of the argument" (Student A).

Busari et al.³ found a focus group method leading into a discussion allowed participants to produce jointly formulated responses to challenges, demonstrating a collaborative approach. However, focus group methods that require participants to be present (online or in person) at the same time cannot always be achieved due

to logistical challenges. Vx can avoid this challenge due to the synchronous and asynchronous discussion possible via its chat functionality. It is also accessible from any location worldwide. This study demonstrates the ability to bring radiography students from Australia and pharmacy students from the United Kingdom together in a shared activity that provided benefit to their IPE, showing that distance was not a factor in achieving collaboration on an IPE activity. OLEs can provide adjacent IPE learning experiences without attempting to replace conventional and effective methods such as discussions, focus groups and face-to-face collaboration but provide suitable alternatives and make the most of innovative technology in overcoming challenges. The Vx activity created an "invaluable experience to be able to look at other people's opinions as well as our own" (Student B). Furthermore, one of the students acknowledged the benefit of collaborating not just with other health care professionals but "it was good to see other responses from other healthcare professionals from different locations" (Student C). Student C's response highlights that Vx provided an opportunity for engaging with other healthcare professionals who may be located anywhere.

An added benefit to education through the OLE is the populated statistics that occur as students respond to cases. This feature permits students to view other students' responses and gain access to statistical responses. These are features that are not as easily created without e-learning resources and enable students to learn about each other and their responses. Students saw merit to the e-learning design, with Student D suggesting that "the stats are quite useful as they definitely outlined how our opinions changes. Overall the program has been quite useful for brainstorming". Another student mentioned how "it is nice to be able to review other people's responses statistically and case by case in text" (Student E). This is particularly notable as students prefer different methods of learning whether that be visual, verbal, physical or logical methods.²⁷ The e-learning environment facilitated learning for both the mathematical learner through the statistical layout of the data, as well as for the visual learner. Student E's comment on "text" is interesting to note as it was also identified through many of the student responses, they were able to "see", "review" and "look at" other professionals' attitudes and roles. These words pivot around visual learning, suggesting that IPE online may have a benefit for different learning styles.

Expanding on the importance of observing the opinions and roles of others, Student F reported that "it gave me the chance to observe and realise the attitudes of other people towards patients" (Student F). This student has linked the attitudes of others in relation to the patient – highlighting an understanding of a patient-

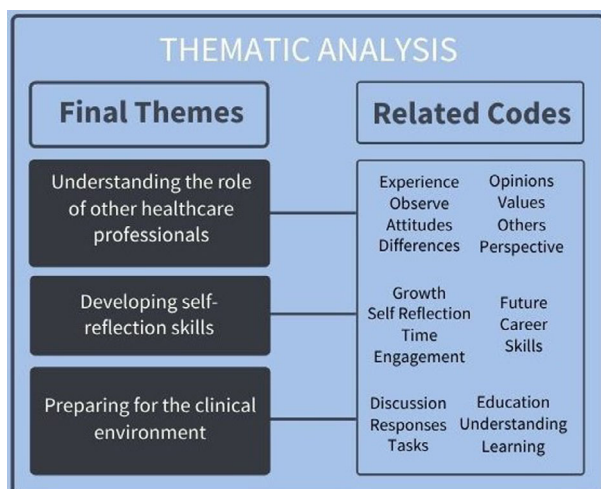


Figure 5. Major themes and related codes.

centred approach. The greater awareness shown not just for the roles of other professionals but the ability to put these roles into context where the patient is at the centre of the thought process is providing patient-centred care. O'Daniel and Rosenstein²⁸ emphasise the importance of an interdisciplinary approach in relation to the patient, as it provides the advantage that all disciplines have a shared goal to address their patient's clinical needs. This joint effort by all specialised professions involved allows for longer lasting and more effective patient interventions in ensuring quality care.³

Notably across the two separate groups in the study, common codes of 'profession', 'others' and 'opinions' were found. Analysing these responses indicated that it was not just within one group that students had thoughts regarding the importance of other professions, it was consistent across both groups of students. These findings show that the two student groups shared similar patterns of awareness and a greater understanding of the importance of the roles of other professions after engagement in the Vx activity. These findings are similar to that of other studies that suggest in order for optimal collaborative interactions and high quality of patient care there needs to be sharing of knowledge and skills.³ However, knowledge sharing and education of health professionals can only be effective if it is a contribution of effort from all professions involved. Therefore, education in a sole healthcare profession will not be enough; all healthcare professions should be incorporating collaborative IPE activities to produce positive results. Lack of collaboration and understanding between health professions could lead to suboptimal patient care, poor team cohesion, problems individually in a profession, loss of motivation and workload as well as loss of information which could have sustained effects on patient care.³

Theme 2: Developing self-reflection skills

The codes of growth, future and self-reflection were combined together to become the theme of developing self-reflection skills. Reflective practice is part of accreditation requirements of many healthcare disciplines. Reflective practice has the ability to help individuals in more than solely identifying areas of strengths and weaknesses. It provides an opportunity for additional learning through self-discovery and growth, including for one's beliefs, attitudes and values that relate to professional practice.²⁹ Reflection is considered an important strategy in interprofessional learning and therefore should be implemented for a coherent patient care approach.³⁰

An increase in students' clarity of their own professional identity was noted. Student G suggested the

activity "*helped us to understand our comprehensive role as radiographers*" and watched their "*opinion/attitude changes with experience*" (Student G) as they completed the activity. This reflection on the student's own role is just as important as with the understanding of other professions' roles. Without the ability to self-reflect and become self-aware of their own role, students may find themselves getting lost and be unable to productively work in an interdisciplinary environment, thereby increasing the possibility of a negative effect on patient outcomes.

Student H reported value from participating in the Vx activity, mentioning that they "*learnt a lot and would like to do more*" (Student H). This indicates an increased desire for interaction. Lawn et al.¹³ mention how information processing is different with online learners, as they suggest students learning online have significant differences in abstract conceptualisation and reflection, whereas face-to-face learners are more likely to learn through doing.¹³ This is where the blended learning approach would be of value, combining both face-to-face and online learning. Online learning can allow for a safe space for reflection and exchanging ideas where the aspect of reflection is strongly emphasised in order to reinforce the skills learnt in the activity.¹³

Theme 3: Preparing for the clinical environment

The third theme was preparing for the clinical environment, which relates to students' preparation for clinical placements in the healthcare setting via effective learning employed in their academic programme. In allied health courses, workplace integrated learning is conducted across each year of students' degrees in order to build up hands on experience.³¹ However, students embarking on their first clinical rotations with no prior field experience can feel overwhelmed with the unknown, and disparity exists between theoretical knowledge and its application in practice.³¹ In order to mitigate these gaps and to prepare healthcare students for situations they may encounter in the clinical environment, online resources and simulations of workplaces have been created to facilitate learning prior to embarking on placements. Vx was used as an online tool to mimic a complex case scenario that required interprofessional collaboration situated in an in-depth thought-provoking environment. Student I noted that they "*found the experience very interesting as it prepares us for possible situations that we may come across in our professional career*" (Student I). These scenarios are designed to challenge students; however, students are prompted to justify their views and reasoning rather than be concerned

about a correct or incorrect answer. Vx uses ethical scenarios that contain thought provoking and confronting issues that are realistic to see in the day to day healthcare setting. By using realistic scenarios students are then able to reflect on how they may respond if confronted with this or a similar scenario in person. Student J mentioned how they “*found that the values exchange case studies were useful in applying ethical studies and soft skills and its application in scenarios that we may likely come across as a student or radiographer. It was interesting and enlightening to be able to consider the limits and flexibility of the radiographer’s role and scope of practice and something I personally consider as very important and interesting*” (Student J). This suggests that Vx correctly provided students with scenarios that they felt unprepared for prior to engagement. Now that they have been exposed to a once unknown ethical dilemma, they have been given an opportunity to reflect on and develop a greater understanding of dealing with ethical scenarios as they arise. Students developed a sophisticated values-based decision-making framework, set in real-life scenarios which they can confidently apply to a range of future experiences.

Interestingly, Student K mentioned they saw value in “*develop(ing) some empathy for patients*”. According to Wilkinson et al.³² empathy is an important element of the staff to service user relationship in providing quality patient care. It is therefore important that health care students develop this ability. A lack of experience was noted by Student L in this regard and stated the Vx activity was useful “*especially to see the growth and change at people’s ideas and feelings. Going from a place of no experience to having been exposed to the environment allows for the entire cohort to see how they learn*” (Student L). Student L went on to mention that a more “*controversial topic could be interesting to see over the entire four-year period*” of their radiography degree. This comment highlights that students are thinking translationally across their academic studies and clinical experiences, looking for ways to move from isolated to interconnected learning experiences. Vx can support this deeper and more sophisticated type of learning that students are seeking.

Limitations

A low participation rate in the open-ended response was a limitation of this study. However, the responses collected still provide valuable insight into students’ perceptions of OLEs and their effectiveness for teaching IPE that could be explored in future studies. While the study was a pilot study, the findings could be applied to the use of OLEs for IPE in health professions education

more broadly. In this study undergraduate radiography students and post graduate pharmacy students were brought together, both finding the activity helped in their understanding of the importance IPE in each of their contexts. Less pharmacy students were included in the study which could limit the usefulness of the data. However, the goal of the study was not to directly compare the two groups, and both groups’ responses contributed to the themes that emerged. Given this, it could be expected that other healthcare professionals would benefit in the same way from the use of OLEs in IPE. Time between the Vx activities and the survey was a constraint mentioned by students. This increase in time was due to logistical constraints such as semester breaks and the time awaiting ethics approval for the study.

Future Recommendations

Several students mentioned in the study that they would have preferred more discussion and engagement in conversation. Future development of IPE would benefit by having an increased number of engagement activities across multiple weeks.

Further qualitative and quantitative research analysis on using OLEs such as Vx incorporating other healthcare professions would allow for a greater understanding of how technology can impact IPE in the current era. A focus group session may be an appropriate platform for further investigation of students’ responses rather than only written word. Furthermore, a future study which aims to compare different healthcare professions would be useful to observe if different professions perceive the usefulness of OLEs in IPE.

In order to increase participation, it would be useful to allocate some time in the classroom for students to complete the survey, as well as post reminders to students via Moodle.

Conclusion

The results from this project will facilitate improved understanding of how technology can be effectively used to positively impact IPE within academic curricula. This is especially important in the current climate whereby the presence of COVID-19 has prompted educators to be innovative in how they use technology in their teaching. Previous studies on the use of OLEs in IPE have used single healthcare professions however limited studies combined healthcare professions. There was no previous literature available regarding the medical imaging profession on teaching IPE through e-learning. By exploring open-ended responses by the students in a thematic analysis we were able to demonstrate how the

online resource of Vx prepared students to work in the clinical setting whilst developing skills such as self-reflection and a greater understanding of the roles of other health professionals. Students will be able to implement these new skills and knowledge in the interdisciplinary clinical environment for optimal patient outcomes. It is important that educators within the academic setting recognise the ability to utilise OLEs to teach IPE and that these types of e-learning resources can prove useful when there are barriers that currently prevent IPE, such as timetabling of different professions or availability for a health professional to attend and teach.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1 Supporting Information