INTERPROFESSIONAL EDUCATION:

The use of clinical simulation to support development of interprofessional skills and understanding: Perspectives from allied health students

K. Robson¹, T. Parnell², M. Smith-Tamaray³, K. Lustig², L. Hoffman², W. R. Davidson², C. Wells⁴ & K. Hayes⁴

Abstract

Introduction: Allied health professionals require skills in interprofessional collaboration to work effectively to achieve person-centred health outcomes. Simulated interprofessional experiences provide students with unique opportunities in a supported environment to develop the necessary skills required for future practice.

Methods: An exploratory cross-sectional study using a qualitative survey design was employed to understand the attitudes and perceptions of allied health students after completing a university based, cross-campus, interprofessional simulation experience.

Results: Over 200 students from four disciplines across three campuses of a regional Australian university were involved in a simulated experience that included a range of different interprofessional activities. Post-experience survey data from approximately 40% of students suggested that students perceived the experience had several positive learnings, including a better understanding of their own and other professions and the value of interprofessional collaboration and teamwork in client care; increased confidence, particularly in communicating with other healthcare professionals; and a broader understanding of healthcare, including eHealth. The results also highlighted the challenges of implementing a project across multiple disciplines and campuses and provided useful suggestions to further improve the experience.

Conclusion: The findings of this research suggest that carefully developed and authentic interprofessional experiences through simulation can provide allied health students with the opportunity to develop valuable skills in communication and teamwork as well as an emerging appreciation of the benefits of a coordinated team approach to personcentred healthcare.

Correspondence: Dr Kristy Robson krobson@csu.edu.au

¹ Three Rivers Department of Rural Health, Charles Sturt University, Albury, NSW, Australia

² Charles Sturt University, Albury, NSW, Australia

³ Australian Catholic University, Melbourne, Victoria, Australia

⁴ Charles Sturt University, Port Macquarie, NSW, Australia

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Introduction

Interprofessional collaboration is particularly important when clients have complex and/ or chronic healthcare needs and require input from multiple health professionals (Olson & Bialocerkowski, 2014; WHO, 2010). When preparing health students to meet their professional registration requirements, universities need to provide students with adequate learning opportunities in areas such as interprofessional education to develop their skills in collaborative healthcare (Ahpra, 2019; CAIPE, 2002; Greenstock et al., 2012; Nandan & Scott, 2014; WHO, 2010). Interprofessional education refers to learning experiences that occur when clinicians from two or more professions learn with, from and about each other to promote teamwork and quality healthcare (Zwarenstein et al., 1999). This approach to education, which is endorsed by the WHO, ensures health graduates are practice-ready and able to effectively collaborate with other health professionals in clinical practice (WHO, 2010).

While health students typically interact and learn with peers from other disciplines in the initial stages of their courses, this interaction may not be deliberately designed to simulate interprofessional collaboration, and for many health professionals, specific interprofessional education experiences are often only undertaken in the latter part of their degree (Nandan & Scott, 2014). The development of authentic skills in team collaboration and effective communication and an awareness of the roles of a broad range of other professions are essential elements of students' preparation for professional practice. These elements need to be deliberately scaffolded throughout courses to enable students to develop the necessary skills for effective interprofessional practice rather than relying on ad hoc experiences that may not occur until the latter stages of a degree. It has also been noted that interprofessional education opportunities can be difficult to guarantee for all students during clinical placements due to different clinical service models, staff availability and variable curricula and schedules (Boyce et al., 2009; Sunguya et al., 2014). To ensure all students are exposed to interprofessional education experiences, alternative approaches need to be considered.

One method of providing authentic and scaffolded interprofessional education to university students is via clinical simulation (Craig et al., 2014; Hewat et al., 2020; McNair et al., 2005; Olson & Bialocerkowski, 2014; Simonelis et al., 2011). Simulation is a guided teaching and learning strategy that replicates, amplifies or replaces all or part of a real experience (Gaba, 2004). Clinical simulation offers benefits for students through a low-risk learning environment, allowing them to make and learn from mistakes without causing harm to "real" clients, while providing experiences that may be difficult to source (Gough et al., 2012; Mori et al., 2015; Rodger et al., 2010; Wright et al., 2018).

These types of experiences can assist university programs to meet the interprofessional learning competencies required by professional accrediting bodies as well as university accreditation requirements (TEQSA, 2015). Clinical simulation also provides opportunities for students to practise contemporary healthcare skills, such as engaging in eHealth, which is defined as the use of electronic information and communication within the health sector (Gray et al., 2014) and includes, more broadly, telehealth, electronic health records and mobile health (WHO, 2016). Opportunities to access and develop eHealth skills may not be consistently available to all students during placements. Simulation can provide opportunities to build skill acquisition in this increasingly important area of practice.

Well-designed simulated clinical experiences can ensure exposure to, and practise of, interprofessional skills as well as standardised student experiences (Banks et al., 2019; Imms et al., 2017; Olson & Bialocerkowski, 2014; OTC, 2020). Early opportunities to participate in clinical simulation with students from other health professions may also facilitate greater understanding of health professional roles and enhance communication and confidence when working in a team. These outcomes can better prepare students for clinical placement activities, including interprofessional collaboration, to optimise client outcomes (Craig et al., 2014; McNair et al., 2005; Mori et al., 2015; Stone, 2006; Wright et al., 2018). While simulated learning activities have traditionally been conducted within a single discipline, there is scope for student learning to be extended further by incorporating an interprofessional component to improve collaboration (King et al., 2013; Weaver et al., 2014). Limited research has been undertaken that specifically focuses on undertaking interprofessional simulation experiences that incorporate eHealth elements in the initial years of undergraduate study for allied health students.

The purpose of this research was, therefore, to explore the perspectives, learnings and experiences of allied health students who participated in a large, multi-campus, interprofessional clinical simulation experience that involved elements of eHealth. The rationale for providing the experience was to provide authentic educational opportunities for students to enhance learning and engagement, to develop skills for interprofessional practice and to assist in preparation for subsequent clinical placements.

Methods

Two hundred and seventeen allied health students from the disciplines of occupational therapy, physiotherapy, podiatry and speech-language pathology at a multi-campus, regional Australian university completed a cross-campus interprofessional clinical simulation experience in August 2019. The interprofessional simulation experience was embedded as a compulsory learning experience for students within profession-specific subjects and consisted of approximately 8 hours of face-to-face interprofessional learning activities spread across 3 days. The students also participated in simulated discipline-specific, workplace learning activities that were scheduled throughout the week and

used intentionally crafted scenarios to support participation in the interprofessional experiences. Examples of discipline-specific activities included occupational therapy home assessments and assessment of mobility. These scenarios were collaboratively developed by the academic team to replicate real-world practice.

The interprofessional simulation learning activities included an initial orientation to the simulated health service, a clinical handover session and a referral discussion session, using virtual and face-to-face case conferences and a debriefing and evaluation session. Technologies such as Skype and videoconferencing were used to replicate an eHealth (WHO, 2016) approach to healthcare and to facilitate cross-campus conversations. Students were provided with online and face-to-face support to develop the skills and knowledge required to work within their interprofessional teams. This support and guidance was provided by academics and local allied health practitioners from the four disciplines.

The orientation session involved all students from each discipline, with eHealth technology used to link the three campuses for this session, which was facilitated by academics from the four disciplines. For the clinical handover session, students were paired with a student from a different discipline to their own, and they discussed the handover information either face to face or online, depending on geographic location. During this activity, students used the introduction, situation, background, assessment, recommendation (ISBAR) structure to verbally handover relevant details of the simulated client they had worked with during discipline-specific activities. This approach is used in many healthcare settings and has been endorsed by the WHO (2011). Following the verbal handover, students documented the interaction and prepared a letter of referral to another health professional who would be involved in the client's healthcare. Supervisors were available for students to consult with, and opportunity was provided for students to critique their partner's handover. The case conference activity involved groups of six to eight students with a supervisor facilitating two to three groups, each with a combination of face-to-face and online participants depending on geographic location. Each group included students from at least three of the four disciplines and students on at least two of the three campuses. The number of students from each discipline varied due to different cohort sizes for each discipline. At the case conference, students presented information relevant to the simulated clients they had been working with during discipline-specific simulation activities. Supervisors provided feedback and asked prompting questions to ensure the groups developed an appropriate plan of action. The final interprofessional activity required students to reflect on, discuss and evaluate their performance and learning over the 3 days.

Study design

This exploratory cross-sectional study used a qualitative survey design to understand the attitudes and perceptions of allied health students after completing the interprofessional

simulation experience. To explore the phenomenon of interest (student-based interprofessional simulation), a constructivist-interpretative paradigm was adopted to frame the research (Lincoln & Guba, 2000). Considering that individuals construct experiences and meanings differently (Schwandt, 1994), this approach was employed to enable co-construction of knowledge and understanding of the phenomenon between participants and researchers.

Participants and recruitment

Students in second year from the disciplines of occupational therapy, physiotherapy and podiatry and third year from the discipline of speech-language pathology who participated in the simulation experience were invited to participate in this study via email from an external research assistant employed to support administration of the experience. The research assistant was not involved in the delivery of the simulation experience. The email was sent to all students who participated in the interprofessional simulation experience and included a participant information sheet specifically about the research project and a link to complete the online survey if they wished to.

Students from the different disciplines had had varying degrees of workplace learning and simulation experience prior to this simulation experience. Both the speech pathology and podiatry students had not completed any external workplace learning or simulation but had been involved in on-campus clinic workplace learning. Physiotherapy students had no previous external or internal workplace learning experience but had completed 8 hours of simulation experiences. Occupational therapy students had completed 75 hours of external workplace learning and 4 hours of simulation prior to this experience.

Data collection

An online survey tool was used as part of the post-experience evaluation to enable students to reflect on their experiences of being involved in the interprofessional simulation program. The survey was developed by the research team and included openended questions asking participants what they had learnt from the experience, what they would like to know more about, what impact the experience had on them and what were the perceived challenges they experienced during the program. Students had up to 1 week following completion of the simulation experience to complete the online post-experience evaluation survey. See Appendix 1 for survey questions.

Data analysis

Interpretation of the data set was undertaken through a process of thematic analysis using the six stages outlined by Braun and Clarke (2013). The process included: 1) becoming familiar with the data, 2) generation of initial codes, 3) identifying themes, 4) reviewing the potential themes, 5) defining the identified themes and 6) writing up the findings. Throughout the data analysis phase, the research team undertook an iterative process of researcher triangulation to review and code the data to improve the auditability

and credibility. This was achieved using a structured process where initial codes were independently generated by two members of the research team (MST and LH) based on context, interpretation and core meaning, using an inductive approach to participants' responses within the survey to enable identification of key ideas and patterns. These codes were then independently reviewed by three additional research team members (KR, TP and KL) and collectively agreed upon to further support confirmability and reflexivity with the data set and to enhance the trustworthiness of the thematic analysis phase (Nowell et al., 2017). While each of the members of the research team was also involved in aspects of the development of the simulation, to increase trustworthiness of the findings, the two researchers who initially undertook the review of the de-identified data had the least amount of involvement in the overall design and implementation of the experience.

Ethics approval was granted by Charles Sturt University Human Research Ethics Committee, approval number H19233.

Table 1

Participant Details

Discipline	Number of Students Who Completed the Survey	Gender			Age					
		М	F	Other	17- 24	25- 34	35- 44	45- 54	55- 64	Did not answer
Occupational therapy	32 (of 53; 60%)	4	28	0	25	0	2	4	1	0
Physiotherapy	31 (of 130; 24%)	8	22	1	24	5	1	1	0	0
Podiatry	9 (of 18; 50%)	3	6	0	5	3	1	0	0	0
Speech and language pathology	12 (of 16; 75%)	0	12	0	9	1	1	0	0	1

Results

Eighty-four of 217 students (39%) who participated in the interprofessional simulation experience completed the post-experience evaluation survey. Table 1 provides details of survey participants across each allied health discipline.

Four overarching themes emerged from the analysis of the open-ended responses in the survey. These themes were: 1) expanding an understanding of what others do, 2) the collaborative process in healthcare, 3) developing authentic clinical skills and 4) navigating the challenges within a simulated experience.

Theme 1: Expanding an understanding of what others do

Participants described how the interprofessional simulation experience enabled them to gain a greater perspective of the roles, responsibilities and scope of practice of other allied

health professions. This experience also provided participants with an opportunity to explore how the health system works and how interprofessional practice can work within this system:

Broadened my knowledge on the other disciplines. As well as how we would interact in the "real world". (Physiotherapy student 1)

While participants highlighted the value of learning about the roles of other health professions, there was a level of frustration expressed by some participants that others had a limited viewpoint of their discipline's scope of practice:

Nobody understands the role of a speech pathologist or how they are involved in many cases. (Speech-language pathology student 1)

As the participants were mainly in the second year of their degrees, the lack of awareness around others' roles and scope of practice was not necessarily unexpected by the facilitators of the program but did seem to be a surprise to the participants:

I was surprised by how naive we all were about each other's professions and how we could provide better care as a team. (Podiatry student 1)

The experience was also seen by the students as effectively enabling them to advocate for their own profession and expand the perception of others regarding how they could contribute to the overall management of a patient:

I learnt that other professions have very valuable inputs in client management. It is important to listen to what they have to say. (Physiotherapy student 2)

Participants indicated that their increased awareness of the other professions would enable them to gain a better understanding of how to facilitate care in a more holistic way:

It will help me consider what the other professions are doing with the same patient and what other professionals I could ask to get more in-depth knowledge about a certain aspect of the client. (Physiotherapy student 3)

Some participants identified that understanding the role of all professions and how they could contribute to client care became a challenge when specific disciplines were not represented within their interprofessional group or when there was not time to explore this in detail:

I would have liked to know more about what occupational therapists/podiatrists actually do, and how we could work together. (Physiotherapy student 4)

Generally, participants highlighted that the simulated experience fostered a realisation that the context of healthcare was broader than just their own profession. They also perceived that this new knowledge would enhance their ability to work with other health professionals to achieve better health outcomes for clients.

Theme 2: The collaborative process in healthcare

Participants perceived that the interprofessional experience helped them to gain an understanding of the patient from difference perspectives while supporting their overall appreciation of person-centred care. Participants also noted the benefits of health professionals working together to increase meaningful outcomes for clients:

How important multi-disciplinary teams can be to target client goals and needs. (Speech-language pathology student 2)

By having to work together on a client scenario, participants indicated they were able to appreciate the need to balance their own discipline's intervention goals with those of other disciplines and collaboratively prioritise what would be in the best interests of the client:

How all the health professionals would work together beyond assessment, i.e., intervention measures and how to balance these demands on the client. (Speechlanguage pathology student 3)

The ability to work collaboratively also enabled participants to identify commonalities in scope of practice between disciplines whilst still providing individual discipline perspectives to the client scenario to broaden intervention considerations:

How some areas were overlapped between disciplines plus how wide ranged they could be at the same time. (Podiatry student 2)

Participants also indicated that this new shared understanding between disciplines meant that they were able to work collaboratively and efficiently together to manage client care through the sharing of responsibility:

Delved into the similarities and differences of scope of practice for each profession. This provided me with an insight into how we can work as a team to effectively manage a patient. (Occupational therapy student 1)

Participants reported that as a result of their increasing understanding of the role collaboration plays in the delivery of efficient and effective healthcare that achieves positive wellbeing outcomes, they would be inclined to instigate a collaborative approach to patient care:

[I am] more likely to refer to other allied health professionals now. (Podiatry student 4)

Theme 3: Developing authentic clinical skills

The opportunity for students to practise clinical skills in the simulation before undertaking significant periods of workplace learning was highlighted as a positive aspect to being involved in the simulated experience. Participants reported that the experience enabled them to develop confidence when interacting within a larger healthcare team:

More confident during case conference, choosing information to communicate and requesting information from other disciplines, working towards patient goals. (Physiotherapy student 6)

Participants also indicated that the simulated experience resulted in increased consideration of other health professionals' contributions to the client's overall management plan:

I think it will improve my outlook and perspective on the treatment of my patients. It will enable me to envision more questions in my assessment keeping in mind the other professions and their treatment plans. (Physiotherapy student 7)

The opportunity to work with a range of other disciplines within a simulated environment enabled students to develop confidence in advocating for their profession's role in client care:

It will make me contribute more readily to interprofessional discussions as a speechlanguage pathology student and be able to explain my role and how it will help the client to manage their respective difficulties. (Speech-language pathology student 4)

Participants also noted how the simulated experience enabled them to practise specific skills they felt would be useful when they transitioned into their future workplace learning experiences:

It will positively influence clinical practice as I have had experience in handovers and case conferences. (Occupational therapy student 2)

The ability to practise a range of authentic clinical skills was highly valued by participants, who articulated that they perceived this simulated opportunity would support a transition into formal clinical placement.

Theme 4: Navigating the challenges within a simulated experience

Despite the benefits highlighted by participants, there were several logistical challenges identified. Feedback on the structure of the interprofessional simulation experience suggested that for some participants, having a large group of up to eight students made it difficult to ensure all students were provided with an opportunity to voice their opinion, and as such, having smaller working groups may have been preferable:

Smaller groups would be useful ... as it is hard for everyone to have equal participation. (Occupational therapy student 3)

Other participants indicated that they would have preferred additional time for the handover and case conference sessions to further support their understanding of the complete client journey:

Extending the length to a week-long simulation experience would be beneficial, and potentially adding an intervention aspect amongst the disciplines to work on in an interprofessional manner. (Speech-language pathology student 5)

There were challenges noted by participants related to the cross-campus approach. These included the simulated eHealth elements, such as virtually linking with participants

across different geographic locations, as well as variations in information provided to each discipline. In addition, some participants reported differences in student preparedness to engage in the interprofessional activities:

In the activities that required cross-campus learning, it was difficult to connect and also difficult with everyone trying to do case conferences in a big room. It also seemed like other campuses did not do the work required for the session, for example, in the case conference, students from other campuses were giving copious amounts of irrelevant info. In our group, we prioritised info for what was important. Just made it difficult to stay on task and get everything done. (Physiotherapy student 9)

The logistics of having facilitators and students in different locations was also highlighted as a challenge because participants perceived that there was a lack of communication and inconsistency in information provided to students across the three locations:

The communication between supervisors, subject coordinators and students could be improved so students know exactly what is meant to happen and when, in advance. (Occupational therapy student 4)

Participants highlighted that greater consistency in the information provided about the client scenarios, which incorporated clear triggers involving each of the disciplines, would have further enhanced the experience, particularly given that the students were still relatively novice in their clinical exposure:

Case studies should be developed to include all allied health disciplines. Case studies should also be standardised so that all information provided is the same, as we had some conflicting information between cases. (Physiotherapy student 10)

Participants also indicated that they would have preferred more opportunities to prepare before the interprofessional experiences and that the timing of the event should be reviewed to maximise engagement in the experience:

Allocate more time and organisation to the activity to better prepare students and facilitators of the events. The time of event should not be before mid-session break where most students have "checked out" already. (Physiotherapy student 11)

Discussion

This qualitative study explored students' experiences of being involved in a cross-campus, interprofessional clinical simulation experience. The findings suggest that the opportunity for allied health students to undertake simulated interprofessional learning activities early in their professional course resulted in students perceiving that they had developed knowledge and skills that will be useful for practice, including understanding the challenges associated with elements of practice such as eHealth. These outcomes included the students' perception that they had gained a greater understanding of their own and other professions, built knowledge of the broader health context and developed greater

confidence in undertaking authentic clinical skills, such as teamwork, communication and collaboration. The findings also highlighted some of the challenges faced when developing and implementing learning activities across multiple disciplines and campuses, and the potential impact of these difficulties on student learning.

Authentic interprofessional learning experiences are critical for the development of skills and knowledge necessary to prepare students for the workplace (Banks et al., 2019; Guraya & Barr, 2018; King et al., 2016), with simulation an effective approach to begin this skill acquisition (Nandan & Scott, 2014; OTC, 2020). The students involved in this interprofessional simulation experience perceived that the ability to practise interprofessional skills in a simulated way developed their understanding of how to undertake cross-discipline collaboration and communication when they start clinical placement. They also perceived that they had a clearer understanding of their own discipline-specific roles and responsibilities. This finding aligns with previous research (Banks et al., 2019; King et al., 2016). Greater knowledge in managing conflict through effective communication was shown to improve between the pre- and poststudent surveys in a study undertaken by King et al. (2016), who explored the use of interprofessional simulation among nursing, physiotherapy and respiratory therapy students. Additionally, Banks et al. (2019) found that simulation-based interprofessional education can assist students to develop an understanding of their own and other professions, which fosters a more collaborative healthcare culture.

The findings of this research suggest that students perceived the early introduction to interprofessional learning to be a useful strategy to develop knowledge and skills to prepare them for intensive workplace learning placements and contribute to further interprofessional learning experiences in later stages of their studies. Early introduction of interprofessional skill acquisition for health students has also been advocated for by health professionals undertaking clinical supervision (Skinner et al., 2021). The Centre for the Advancement of Interprofessional Education (2002) recommended the continual development of interprofessional practice skills through engagement in a dynamic process where students have opportunities to regularly learn about and from each other. It is, therefore, important that interprofessional experiences are scaffolded throughout courses to consolidate learning and develop transferable skills relevant to practice rather than engaging students in a one-off experience in the final years of a student's educational program.

The interprofessional simulation experience presented here was conducted across three geographically dispersed campuses and, thus, students were required to effectively engage with each other using eHealth approaches, including videoconferencing, virtual meeting rooms and Skype. The use of eHealth approaches has gradually gained momentum, however up until 2020, the uptake of this approach to health service delivery by allied health practitioners had been relatively limited (Iacono et al., 2016). The COVID-19 pandemic during 2020 and 2021 has highlighted the importance and value of eHealth

approaches (Fisk et al., 2020; Thomas et al., 2020). Indeed, the increase in health consultations provided by digital technology in Australia between February and April 2020 increased from 0.2% to 35% (Thomas et al., 2020). Fisk et al. (2020) have proposed that following the pandemic, there is a need for eHealth services, including telehealth, to continue to be developed as an integral, rather than "alternative", form of healthcare. Thomas et al. (2020) have also suggested that the use of telehealth post-pandemic is likely to remain higher than it was pre-COVID-19. For these services to be effectively and efficiently delivered, skills in eHealth must be "integrated within the training curricula for both health and social care professionals and practitioners" (Fisk et al., 2020, p. 9). Through participation in this simulation experience, students were able to engage with eHealth options. They experienced firsthand the impact on communication when liaising online and the benefits and the challenges encountered when technology fails. Pleasingly, many students demonstrated the ability to work together as a team to resolve technical issues. These problem-solving skills will be critical as they move into the future health workforce.

The development and implementation of new teaching and learning experiences is rarely without challenges and, specifically, it has been recognised that the integration of interprofessional education presents many barriers (Mladenovic & Tilden, 2017). Thoughtful review that considers feedback from multiple stakeholders, including students, is essential for ongoing development of quality experiences. Feedback from students can assist in the authentic evaluation of learning experiences, complement quality assurance of subjects and learning content, and contribute to changes for future offerings (Secret et al., 2016). The aspirational project presented in this paper encountered numerous difficulties, many of which were highlighted in student feedback. One of the most significant challenges faced was the logistics of coordinating a large group of students, from four different courses, situated across three different regional campuses. The competing demands of the four courses, coupled with the varied availability of resources on the different campuses, required extensive and collaborative planning and, based on student feedback, will require further consideration to ensure the ongoing development and success of this experience.

It is necessary to acknowledge the limitations of the research presented in this paper. The results presented reflect feedback from students who opted to participate in the post-experience survey; there was no obligation for students to complete the evaluation survey. It is possible that the optional nature of the survey has resulted in a limited representation of student perceptions. No pre-experience student survey was implemented and, thus, comparison of responses regarding expectations, and perceptions of knowledge and skills developed, was not possible. The use of focus groups or individual interviews may have also facilitated the collection of more in-depth data regarding student experiences and, thus, will be considered for future research related to this experience. The learning experience presented in this paper was the first attempt to create an interprofessional,

cross-campus, simulation experience that incorporated eHealth for undergraduate students from four different disciplines. It is possible that some of the difficulties and challenges raised by students in their survey responses were the result of inexperience on the part of the organisers. The generalisability of the results is also limited as the data collected was based on one simulation event conducted at a single regional Australian university. Whilst the authors recognise the value of student feedback in contributing to the ongoing development of the interprofessional simulation experiences, it must be noted that the results of this survey study are based on the students' perceptions of the experience rather than a measurement of the impact of the learning experience. As such, future research could focus on measuring the impact of such experiences before and after the program and investigating how these experiences later influence students' ability to undertake interprofessional practice whilst on clinical placement.

Conclusion

The interprofessional clinical simulation experience described in this paper provided students with opportunities to work on authentic practice scenarios with students from their own and other disciplines, with the support and guidance of both allied health academic staff and clinicians. Analysis of the results of the post-experience evaluation survey completed by students suggests that the interprofessional simulation experience facilitated students' understanding of their own profession within the context of a specific scenario as well as their understanding of the role of other professions within the broader health context. The results of this study suggest that providing allied health students with the opportunity to participate in simulated, interprofessional learning experiences early in their student journey was perceived as a valuable way to facilitate greater knowledge and awareness regarding how to engage in interprofessional practice and to develop the skills to be an effective team member. The use of eHealth technology can both enhance and complicate simulation experiences but is an important skill for allied health professionals to develop, with further research in this area warranted. Carefully developed and authentic interprofessional simulation experiences provide allied health students with the opportunity to develop valuable skills in communication and teamwork and expand their appreciation of the benefits of a coordinated team approach to person-centred care.

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References

- Australian Health Practitioner Regulation Agency (Ahpra). (2019). *Registration standards*. https://www.ahpra.gov.au/Registration/Registration-Standards.aspx
- Banks, S., Stanley, M. J., Brown, S., & Matthew, W. (2019). Simulation-based interprofessional education: A nursing and social work collaboration. *Journal of Nursing Education*, *58*(2), 110–113. https://doi.org/10.3928/01484834-20190122-09
- Boyce, R. A., Moran, M. C., Nissen, L. M., Chenery, H. J., & Brooks, P. M. (2009). Interprofessional education in health sciences: The University of Queensland health care team challenge. *Medical Journal of Australia*, 190(8), 433–436. https://www.mja.com.au/system/files/ issues/190_08_200409/boy11141_fm.pdf
- Braun, V., & Clarke, V. (2013). Successful qualitative research: A practical guide for beginners. Sage.
- Centre for the Advancement of Interprofessional Education (CAIPE). (2002). *Interprofessional learning: Today, yesterday and tomorrow*. https://www.caipe.org/resources/publications/caipe-publications/caipe-publications/caipe-publications/caipe-publication-today-yesterday-tomorrow-barr-h
- Craig, P. L., Barnard, A., Glasgow, N., & May, E. (2014). Evaluating the health "hubs and spokes" interprofessional placements in rural New South Wales, Australia. *Journal of Allied Health, 43*(3), 176–183. https://www.ingentaconnect.com/content/asahp/jah/2014/00000043/00000003/ art00011
- Fisk, M., Livingstone, A., & Pit, S. W. (2020). Telehealth in the context of COVID-19: Changing perspectives in Australia, the United Kingdom, and the United States. *Journal of Medical Internet Research*, 22(6), 1–13. https://www.jmir.org/2020/6/e19264/
- Gaba, D. M. (2004). The future vision of simulation in health care. BJM Quality & Safety, 13 (Suppl. 1). https://doi.org/10.1136/qshc.2004.009878
- Gough, S., Hellaby, M., Jones, N., & MacKinnon, R. (2012). A review of undergraduate interprofessional simulation-based education (IPSE). *Collegian*, 19(3), 153–170. https://doi.org/10.1016/j.colegn.2012.04.004
- Gray, K., Dattakumar, A., Maeder, A., Butler-Henderson, K., & Chenery, H. (2014). *Advancing ehealth education for the clinical health professions*. Office for Learning and Teaching, Department of Education. http://hdl.handle.net/20.500.11937/37743
- Greenstock, L. N., Brooks, P. M., Webb, G. R., & Moran, M. (2012). Taking stock of interprofessional learning in Australia. *Medical Journal of Australia*, 196(11), 707–707. https://doi.org/10.5694/mja11.10919
- Guraya, S. Y., & Barr, H. (2018). The effectiveness of interprofessional education in healthcare: A systematic review and meta-analysis. *Kaohsiung Journal of Medical Sciences*, 34(3), 160–165. https://doi.org/10.1016/j.kjms.2017.12.009
- Hewat, S., Penman, A., Davidson, B., Baldac, S., Howells, S., Walters, J., Purcell, A., Cardell, E., McCabe, P., Caird, E., Ward, E., & Hill, A. (2020). A framework to support the development of quality simulation-based learning programmes in speech–language pathology. *International Journal of Language & Communication Disorders*, 55(2), 287–300. https://doi.org/10.1111/1460-6984.12515

- Iacono, T., Stagg, K., Pearce, N., & Hulme Chambers, A. (2016). A scoping review of Australian allied health research in ehealth. BMC Health Services Research, 16, Article 543. https://doi.org/10.1186/s12913-016-1791-x
- Imms, C., Chu, E. M. Y., Guinea, S., Sheppard, L., Froude, E., Carter, R., Darzins, S., Ashby, S.,
 Gilbert-Hunt, S., Gribble, N., Nicola-Richmond, K., Penmand, M., Gospodarevskaya, E.,
 Mathieu, E., & Symmons, M. (2017). Effectiveness and cost-effectiveness of embedded simulation in occupational therapy clinical practice education: Study protocol for a randomised controlled trial. BMC, 18, Article 345. https://doi.org/10.1186/s13063-017-2087-0
- King, J., Beanlands, S., Fiset, V., Chartrand, L., Clarke, S., Findlay, T., Morley, M., & Summers, I. (2016). Using interprofessional simulation to improve collaborative competences for nursing, physiotherapy, and respiratory therapy students. *Journal of Interprofessional Care*, 30(5), 599–605. http://doi.org/10.1080/13561820.2016.1189887
- King, A. E. A., Conrad, M., & Ahmed, R. A. (2013). Improving collaboration among medical, nursing and respiratory therapy students through interprofessional simulation. *Journal of Interprofessional Care*, 27(3), 269–271. https://doi.org/10.3109/13561820.2012.730076
- Lincoln, Y. S., & Guba, E. G. (2000). Paradigmatic controversies, contradiction, and emerging confluences. In N. K. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 163–188). Sage. https://zepkaadm.files.wordpress.com/2021/09/guba-lincoln-2005.pdf
- McNair, R., Stone, N., Sims, J., & Curtis, C. (2005). Australian evidence for interprofessional education contributing to effective teamwork preparation and interest in rural practice. *Journal of Interprofessional Care*, 19(6), 579–594. https://doi.org/10.1080/13561820500412452
- Mladenovic, J., & Tilden, V. (2017). Strategies for overcoming barriers to IPE at a health sciences university. *Journal of Interprofessional Education & Practice*, 8, 10–13. https://doi.org/10.1016/j.xjep.2017.05.002
- Mori, B., Carnahan, H., & Herold, J. (2015). Use of simulation learning experiences in physical therapy entry-to-practice curricula: A systematic review. *Physiotherapy Canada*, 67(2), 194–202. https://doi.org/10.3138/ptc.2014-40E
- Nandan, M., & Scott, P. A. (2014). Interprofessional practice and education: Holistic approaches to complex health care challenges. *Journal of Allied Health*, 43(3), 150–156.
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1–13. https://doi.org/10.1177/1609406917733847
- Occupational Therapy Council (OTC) (Australia and New Zealand). (2020). Occupational Therapy Council accreditation standards: Explanatory guide—use of simulation in practice education/fieldwork. https://www.otcouncil.com.au/wp-content/uploads/Explanatory-notes-for-simulation-in-practice-education-updated-March2020.pdf
- Olson, R., & Bialocerkowski, A. (2014). Interprofessional education in allied health: A systematic review. *Medical Education*, 48(3), 236–246. https://doi.org/10.1111/medu.12290
- Rodger, S., Bennett, S., Fitzgerald, C., & Neads, P. (2010). *Use of simulated learning activities in occupational therapy curriculum.* The University of Queensland. https://espace.library.uq.edu.au/view/UQ:341892
- Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In Y. S. Denzin & N. K. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Sage.

- Secret, M., Bentley K. J., & Kadolph, J. C. (2016). Student voices speak quality assurance: Continual improvement in online social work education. *Journal of Social Work Education*, 52(1), 30–42. https://doi.org/10.1080/10437797.2016.1112630
- Simonelis, J., Njelesani, J., Novak, L., Kuzma, C., & Cameron, D. (2011). International fieldwork placements and occupational therapy: Lived experiences of the major stakeholders. *Australian Occupational Therapy Journal*, 58(5), 370–377. https://doi.org/10.1111/j.1440-1630.2011.00942.x
- Skinner, K., Simpson, M. D., Patton, N., & Robson, K. (2021). Enablers and barriers to interprofessional work-integrated learning placements: A qualitative study of rural and regional allied health supervisors' perceptions. *International Journal for Work Integrated Learning*, 22(1), 83–96. https://www.ijwil.org/files/IJWIL_22_1_83_96.pdf
- Stone, N. (2006). The rural interprofessional education project (RIPE). *Journal of Interprofessional Care*, 20(1), 79–81. https://doi.org/10.1080/13561820500380790
- Sunguya, B. F., Hinthong, W., Jimba, M., & Yasuoka, J. (2014). Interprofessional education for whom? Challenges and lessons learned from its implementation in developed countries and their application to developing countries: A systematic review. PLoS ONE, 9(5). https://doi.org/10.1371/journal.pone.0096724
- Tertiary Education Quality and Standards Agency (TEQSA). (2015). *Higher Education Standards Framework 2015*. Australian Government. https://www.teqsa.gov.au/how-we-regulate/acts-and-standards/higher-education-standards-framework-2015
- Thomas, E. E., Haydon, H. M., Mehrotra, A., Caffery, L. J., Snoswell, C. L., Banbury, A., & Smith, A. C. (2020). Building on the momentum: Sustaining telehealth beyond COVID-19. *Journal of Telemedicine and Telecare*, 28(4) 301–308. https://doi.org/10.1177/1357633X20960638
- Weaver, S. J., Dy, S., & Rosen, M. A. (2014). Team-training in healthcare: A narrative synthesis of the literature. *BMJ Quality and Safety*, 23, 359–372. http://doi.org/10.1136/bmjqs-2013-001848
- World Health Organization (WHO). (2010). Framework for action on interprofessional education and collaborative practice. https://www.who.int/publications/i/item/framework-for-action-on-interprofessional-education-collaborative-practice
- World Health Organization (WHO). (2011). Patient safety curriculum guide: Multi-professional edition. https://www.who.int/publications/i/item/9789241501958
- World Health Organization (WHO). (2016). Global diffusion of eHealth: Making universal health coverage achievable. https://www.who.int/publications/i/item/9789241511780
- Wright, A., Moss, P., Dennis, D. M., Harrold, M., Levy, S., Furness, A. L., & Reubenson, A. (2018). The influence of a full-time, immersive simulation-based clinical placement on physiotherapy student confidence during the transition to clinical practice. *Advances in Simulation*, *3*, Article 3. https://link.springer.com/article/10.1186/s41077-018-0062-9
- Zwarenstein, M., Atkins, J., Barr, H., Hammick, M., Koppel, I., & Reeves, S. (1999). A systematic review of interprofessional education. *Journal of Interprofessional Care*, 13(4), 417–424. https://doi.org/10.3109/13561829909010386

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Appendix 1

Preparing allied health students for clinical practice: A cross campus interprofessional clinical simulation project

Student Survey

Participant demographics

- 1. What is your age in years?
- 2. What is your gender?
- 3. Please indicate what allied health course you are enrolled in at Charles Sturt University:
- 4. Have you undertaken any interprofessional learning activities within your course of study?
- 5. Have you undertaken any clinical simulation activities in your course of study before?
- 6. Have you undertaken formal workplace learning or clinical placement as part of your course before now?

Student and team characteristics

- 7. How many students were in your interprofessional team?
- 8. How many students in your team were from the following courses (occupational therapy, physiotherapy, podiatry, speech pathology)?
- 9. Which campuses were members of your interprofessional team located at?
- 10. Please indicate the profession of your clinical facilitator:
- 11. Was your clinical facilitator from the same discipline as you?

Interprofessional learning

- 12. What were the benefits of participating in this interprofessional clinical simulation?
- 13. What did you learn during this interprofessional clinical simulation?
- 14. Was there anything you learnt that you were surprised by?
- 15. Was there anything you wanted to learn more about?
- 16. What potential influence will this interprofessional simulation experience provided have on your clinical practice?

Feedback on interprofessional simulation

- 17. What were the strengths of the interprofessional simulation experience?
- 18. What were the weaknesses of the interprofessional simulation experience?
- 19. How can the interprofessional simulation experience be improved in future years?
- 20. Please add any other comments and/or suggestions.