

A telehealth curriculum: A pre-post study of physiotherapy students' perceived knowledge, self-efficacy and intentions for future use

R. Martin¹, A. Mandrusiak¹, R. Lang¹, T. Russell² & R. Forbes¹

Abstract

Introduction: With the ever-increasing adoption of telehealth into clinical practice, the need for physiotherapists to be competent with these technologies is paramount. Given the lack of literature detailing effective approaches to prepare physiotherapists for telehealth practice, a telehealth curriculum has been designed, implemented and evaluated in an Australian physiotherapy program. This study aimed to evaluate the effect of the telehealth curriculum on the perceived knowledge, skills, self-efficacy and future intentions of physiotherapy students.

Methods: A cohort study was undertaken, with two research arms: 1) a pre- and post-test self-report survey of perceived knowledge, skills and self-efficacy against empirically derived telehealth competencies and 2) focus groups exploring effects of the curriculum on students' perceptions of telehealth and intentions for future use. Participants undertook a telehealth curriculum, including 19 hours of online modules and 6 hours of accompanying simulations. The curriculum was specific to the practice of telehealth in physiotherapy and aimed to provide knowledge and skills about telehealth fundamentals, technology and use in practice.

Results: From an eligible 117 participants, complete and matched pre-post surveys were obtained from 72 students (61.5%) and eight of these 72 students participated in focus groups. All six telehealth competencies were significantly higher following the intervention ($p < 0.001$). From the focus group data, two themes were generated: perceptions of telehealth following the curriculum and feedback regarding the curriculum structure.

Conclusion: This study demonstrates positive impacts of a telehealth curriculum involving online content and simulations on physiotherapy student perceived knowledge, skills and self-efficacy aligned with telehealth competencies. The study further supports the integration of telehealth curricula in pre-professional healthcare training.

Keywords: telehealth curriculum; pre-professional training; physiotherapy; self-efficacy; intentions for future use

¹ School of Health and Rehabilitation Sciences, The University of Queensland, St Lucia, Australia

² RECOVER Injury Research Centre, The University of Queensland, Herston, Australia

Correspondence

Romany Martin
romany.martin@uq.edu.au

Introduction

With the ever-increasing adoption of telehealth into clinical practice, driven by the COVID-19 pandemic (APA, 2020), and the demand for rural telehealth services (Wade & Stocks, 2016), the need for physiotherapists to be competent with these technologies is paramount. An identified barrier to the sustainable implementation of new technologies by health professionals is a reported lack of knowledge and skills (Ross et al., 2016). With a lack of staff training identified as a barrier to the uptake of telehealth (Almathami et al., 2020) and the importance of training in this field evident (Aungst et al., 2017; Cottrell et al., 2018; Pathipati et al., 2016), the need for physiotherapists to receive appropriate training to provide telehealth services is clear. This is of particular relevance within physiotherapy given the opportunities that telehealth presents to address the inequality experienced by rural populations in their access to physiotherapy services (Wade & Stocks, 2016).

Education and training for telehealth is undertaken in both pre-professional settings and through professional development (Edirippulige & Armfield, 2017). Within the clinical education setting, research has explored the use of telehealth as an innovative clinical education model and has demonstrated it to be an effective approach to both clinical education and telehealth skill acquisition (Dario et al., 2020; Fergus et al., 2020; Hong et al., 2020). Descriptive studies have explored telehealth curricula across multiple education providers in nursing and medicine (Ali et al., 2015), however research has not been undertaken within physiotherapy. This is despite the acknowledgment that telehealth curricula within physiotherapy pre-professional preparation is fundamental in the preparation of new graduates (Martin et al., 2021).

Descriptive literature exists within nursing and medicine that outlines teaching and learning approaches to prepare graduates for telehealth practice. Medical telehealth curricula feature a range of modes, including elective subjects (Bulik & Shokar, 2010) and a series of structured telehealth simulations (Mahabamunige et al., 2021). Most comprehensively, a 3-year longitudinal curriculum for internal medicine residents has been described. It features a theoretical component, didactic learning through in-person education and online modules, and experiential learning through remote monitoring of patients with chronic disease (Kirkland et al., 2019). Additionally, there have been telehealth curricula implemented in nursing that feature simulation for skills acquisition (Arends et al., 2021). Physiotherapists were included in a North American study that assessed the development of telehealth knowledge through an interprofessional simulation curriculum (Randall et al., 2016). The interprofessional telehealth curriculum, however, focused largely on interprofessional practice and was not specific to physiotherapy (Randall et al., 2016). Gonzalez-Caminal et al. (2021) reported on a physiotherapy specific telehealth simulation amongst 17 students, investigating the feasibility of the activity and collecting student and teacher experiences of online interactions with patients. The authors advocated for further research to establish pre- and post-

measure evaluations amongst larger student groups (Gonzalez-Caminal et al., 2021), however to our best knowledge, there is no other literature detailing the effectiveness of physiotherapy telehealth curricula.

Given the importance of preparing physiotherapists for telehealth practice and the lack of literature detailing effective approaches, a telehealth curriculum has been designed, implemented and evaluated in an Australian physiotherapy program. The curriculum was designed by multiple stakeholders and telehealth experts and aimed to prepare physiotherapy students for all aspects of providing telehealth care. The design had a specific focus on enhancing student self-efficacy through incorporating opportunities for direct experiences, feedback and observation of telehealth skills (Bandura, 1997). Self-efficacy has been identified as the strongest single predictor of academic achievement and performance in undergraduate students, and it is a significant predictor of clinical performance (Jones & Sheppard, 2011, 2012; Robbins et al., 2004). Thus, self-efficacy has the potential to influence an individual's effort, commitment to learning and participation in learning experiences. It is hypothesised that individuals with lower self-efficacy are likely to avoid a task, whereas those who are more self-efficacious will invest more effort and persistence for successful completion (Bandura, 1997).

In recognition of the need to evaluate the efficacy of a novel curriculum and, additionally, the need to disseminate novel practices for the progression of all physiotherapy programs, a study designed to evaluate the curriculum was undertaken. This study aimed to:

- evaluate the effect of a telehealth curriculum on the perceived knowledge, skills and self-efficacy of physiotherapy students to undertake telehealth
- explore the effect of a telehealth curriculum on students' perceptions about telehealth and their intentions for future telehealth use.

Methods

A single cohort pre-test post-test design was used. This study was approved by The University of Queensland Institutional Human Research Ethics Committee (approval number 2020002213).

Participants

Second-year undergraduate physiotherapy students enrolled at The University of Queensland were recruited for participation. Telehealth had been embedded in this course since 2017, however the comprehensive curriculum described in this paper was embedded into the course timetable in 2020. This study is an evaluation of the second iteration of the curriculum undertaken in 2021. In response to feedback from teaching staff, minor changes were made to refine the 2021 iteration, including the modification of some module names and the instructions for curriculum completion. Completion of the curriculum was compulsory, however involvement in the evaluation components was

voluntary, and students provided informed written consent to participate in the research evaluation study. Students were assured that their participation and performance within the study would not influence their final course grades.

Curriculum

The curriculum was designed as an initiative between the Centre for Research in Telerehabilitation and the Centre for Online Health at the University of Queensland to address the need to better prepare healthcare students for telehealth practice. The telehealth curriculum is part of a broader program designed to be implemented across audiology, dentistry, nursing, nutrition and dietetics, occupational therapy, physiotherapy, speech pathology, pharmacy and psychology courses within a single institution. The modules within the physiotherapy curriculum were implemented based on the perceived needs of students as determined by the school following a review of the literature.

The curriculum consists of 19 hours of online learning facilitated through the edX® platform, with 6 hours of associated face-to-face simulations unique to each health discipline. Each pre-professional health program that includes the curriculum is invited to select online modules from the suite available to tailor the curriculum to the needs of their students. The physiotherapy learning objectives for the online modules are outlined in Figure 1, and a complete outline of the physiotherapy curriculum is outlined in Figure 2.

The physiotherapy cohort in this study received the three online modules (Figure 2) with additional simulations during face-to-face practical classes, which featured opportunities to practise conducting telehealth and to use other technologies relevant to telehealth. Each practical class was 2 hours in length and included approximately 40 students, one main lecturer and two tutors. In each of these practicals, students were invited to engage with a client via telehealth to practise conducting an assessment, provide physiotherapy treatment and respond to the unique need of the patient via telehealth. The opportunities for students to engage with a patient via telehealth were achieved through peer role play and simulation with standardised patients portrayed by actors. Additional opportunities to engage with telehealth relevant technologies, for example, remote monitoring, were also provided. The practical classes were structured to include student preparation, the

Figure 1

Learning Objectives of Telehealth Curriculum

Online Module Learning Objectives

1. Demonstrate an understanding of how contemporary digital technologies can impact upon physiotherapy practice
 2. Demonstrate an understanding of how to modify contemporary physiotherapy practice to incorporate delivery of services using digital technologies
 3. Demonstrate an ability to deliver physiotherapy services via contemporary digital technologies
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Figure 2*Telehealth Curriculum*

Activity	Content		Duration
Online learning modules	Fundamentals of telehealth	<ol style="list-style-type: none"> 1. What is telehealth? 2. Drivers, benefits & challenges of telehealth 3. Client & clinician perspectives 4. Who pays for telehealth? 5. Medico-legal considerations 	7 hrs
	Telehealth technology and equipment	<ol style="list-style-type: none"> 1. Network fundamentals 2. Videoconferencing systems 3. Asynchronous telehealth: mHealth, websites, portals & dashboards 4. Electronic medical records 5. Wearables 6. AI: Clinical applications 7. AI: Image classifiers 8. Virtual and augmented reality 9. Optimising video consultations 10. Maintaining security 11. Framework for technology selection 	8 hrs
	Telehealth for healthcare professions	<ol style="list-style-type: none"> 1. Physiotherapy: Application 2. Physiotherapy: Research 3. Physiotherapy: Technical considerations 4. Indigenous health: Application 5. Indigenous health: Research 	4 hrs
Workshops	Simulation	<ol style="list-style-type: none"> 1. Overview of planning for a telehealth session 2. Considerations for telehealth physiotherapy (group of 6 students) 3. Preparing for a telehealth session (pairs) 4. Practise delivering a telehealth session (pairs with another pair) 5. Feedback 	2 hrs
	Simulation	Station-based practical (~ 20 min per station) <ol style="list-style-type: none"> 1. Nintendo Wii and virtual reality 2. Evidence-based practice & finding research 3. Consumer-grade activity monitors 4. Case-based learning: Clinical application and appropriateness 5. Case-based learning: Evaluating appropriate technology 6. Evaluate and pitch technology 	2 hrs
	Simulation	<ol style="list-style-type: none"> 1. Preparation for rural telehealth simulation 2. Simulation with standardised patient actors 3. Debrief regarding rural telehealth simulation 	2 hrs

simulation or role play and a debrief and critical reflection in line with pedagogical recommendations for healthcare simulation (Jaye et al., 2015). The inclusion of these practical classes is supported by research that advocates for physical practice of telehealth as the best method for pre-professional preparation (Martin et al., 2021).

Outcome measures

The primary outcome measure was a self-report survey using previously established, empirically derived telehealth competencies for clinical physiotherapists (Davies et al., 2021). These competencies detail the knowledge and skills required of physiotherapists to undertake telehealth, featuring a total of 89 competencies under seven domains. These seven domains were converted into items by one of the lead researchers (RM) prior to consultation with the research team, who identified that six of the seven items could be feasibly measured by the survey. These six items were included in the self-reported survey that was designed to measure perceived knowledge, skills and self-efficacy. The research team designed the items in line with Bandura's scale construction guidelines (Bandura, 1997), which indicated that respondents should be allowed to indicate their perceived level of confidence in specific competencies (Jones & Sheppard, 2011). For the specific self-efficacy items (item 4 and item 5), the term "confidence" was used alongside each competency as is consistent with self-efficacy measurement design (Bandura, 2006). A 5-point Likert scale was created for participants to respond to these statements, with response options "poor" to "excellent" for the perceived knowledge and skills items and "strongly disagree" to "strongly agree" for the self-efficacy items.

Pre-measures of perceived knowledge, skills and self-efficacy were collected via an online survey at the start of the first week of the telehealth curriculum. To ensure that participant data remained deidentified, each student created a unique code for the pre- and post-measures to be matched. The post-measure was collected via a hard-copy survey distributed in class at the completion of the curriculum.

Following the completion of the curriculum, students were invited to participate in focus groups about their perceptions of telehealth and their intentions for future telehealth practice. An initial approximation of the required sample size was undertaken for planning and was directed by the power required to inform the development of meaningful results (Malterud et al., 2016). If interested in participating, students were asked to provide their email for focus group recruitment on a separate page at the end of the hard-copy survey. This could then be detached to ensure participant deidentification. Students who provided their emails were then contacted by RM to organise a mutual time for focus group participation. Focus groups were undertaken via the videoconferencing software Zoom (Zoom Video Communications, Inc., 2020). The program was also used to simultaneously record the focus groups to facilitate verbatim transcription. The use of Zoom for focus groups has been established as an economical and effective approach (Archibald et al., 2019). A focus group guide was developed by the researchers, who all

have previous experience in designing and undertaking qualitative research. The guide was informed by a review of the literature relating to telehealth training and telehealth perceptions amongst health providers and included the questions “What are your perceptions of telehealth?” and “What are your intentions for telehealth application in your future clinical practice?” RM facilitated all focus groups.

Data analysis

Quantitative statistical analysis was conducted using SPSS (Version 27). Student characteristics were analysed by frequency. Regarding the survey items, nonparametric analysis was chosen as the Likert scale data were treated as ordinal (Likert, 1932). Descriptive statistics of scores for each item and subscale and overall scores were presented as median (M), interquartile range (IQR) and frequency of positive responses. Wilcoxon signed-rank tests evaluated differences in pre- and post-test responses. Significance threshold was set at $p < 0.05$.

For the qualitative data, thematic analysis was chosen with the aim of identifying and making sense of patterns of meaning across the dataset (Braun & Clarke, 2021; Bunniss & Kelly, 2010). The focus group data was transcribed with the assistance of a free online transcription program (Otter, 2022) before being checked by RM for accuracy. The transcripts were then subject to thematic analysis with an inductive approach, as described by Braun and Clarke (2006), as the themes identified were strongly linked to the data. Two independent analyses were undertaken by the lead researchers (RM/RF) to ensure reflexivity in the interpretation of the data. RM and RF immersed themselves in the data, reading through all transcripts multiple times during the process of transcription and after completion of transcription. Annotations and initial notes were made on the transcripts during the transcription process, which then informed initial themes and subthemes.

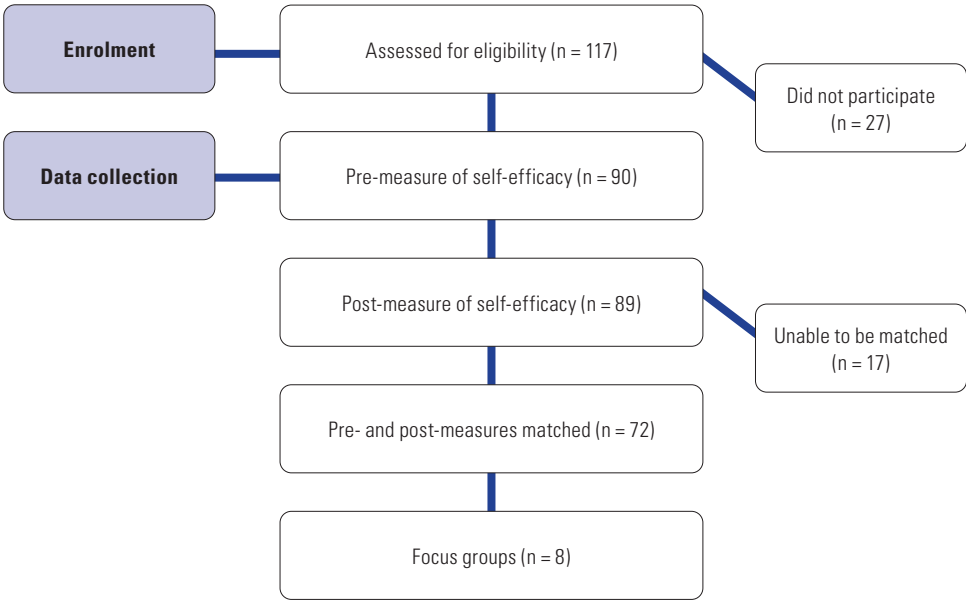
Multiple actions were taken to ensure the transparency of the qualitative analysis, including adherence to the focus-group guide, two independent analyses by experienced researchers, team discussion to explore differences in interpretation and ensuring that the first lead researcher (RM) was not known to the students. Both lead researchers undertook the reflective process of epoché to ensure that their interpretation of the raw data was not influenced by their preconceived beliefs or previous experiences (Carpenter & Suto, 2008). The first lead researcher (RM) was an early career physiotherapist with substantial experience in qualitative research and experience in private and public clinical settings. The second lead researcher (RF) was a physiotherapist and lecturer with a doctorate and significant experience in clinical practice. These factors were reflected upon by the researchers in order to maintain their own reflexivity throughout the analysis (Varpio et al., 2017).

Results

Participant flow through the study is outlined in Figure 3.

Figure 3

Flow of Study Participants



Participants

From the 117 eligible students who were approached, 90 completed the pre-survey. Of the 90 students who completed the survey, 56% (50/90) were female, and the majority (79/90, 88%) were aged between 18 and 24 years, with a further 10 (11%) aged 25–34 and one aged between 45 and 54. Whilst 89 participants completed the post-survey, only 72 were able to be matched due to inconsistent codes between pre and post surveys. The characteristics of the 72 participants included in the pre- and post-survey analysis are presented in Table 1.

Perceived knowledge and self-efficacy

Wilcoxon rank-sum tests assessed differences between male and female responses in the pre- and post-survey analysis. No significant differences were found and, subsequently, the data were treated as a single cohort for analyses. All six items of the scale were significantly higher following the intervention ($p < 0.001$). Further results are outlined in Table 2, which details the number of participants who rated their knowledge higher at the post-test measure.

Table 1

Demographics of Participants Who Are Included in the Pre-Post Survey Analysis

<i>Gender</i>	
Male	28/72 (38.9%)
Female	44/72 (61.1%)
Non-binary/third gender	0/72 (0%)
Prefer not to say	0/72 (0%)
<i>Age</i>	
Under 18	1/72 (1.4%)
18–24	62/72 (86.1%)
25–34	8/72 (11.1%)
35–44	0/72 (0%)
45–54	1/72 (1.4%)
55 or older	0/72 (0%)

Table 2

Comparison of the Pre-Post Perceived Knowledge, Skills and Self-Efficacy Amongst the 72 Respondents

Item	Pre	Post	P-Value	Frequency of Positive Change Responses
	Median (IQR)	Median (IQR)		
1. My knowledge of the legal requirements of telehealth is:	2 (1 to 3)	3 (3 to 4)	< 0.001	(69.4%) 50/72
2. My knowledge of patient confidentiality and digital security when using telehealth is:	3 (2 to 3)	4 (3 to 4)	< 0.001	(61.1%) 44/72
3. I feel I could maintain patient safety during a telehealth consultation.	3 (3 to 4)	4 (4 to 4)	< 0.001	(48.6%) 35/72
4. I feel confident that I have the technology skills required for telehealth.	3 (2 to 4)	4 (3.75 to 4)	< 0.001	(56.4%) 41/72
5. I feel confident that I could conduct an assessment and diagnosis via telehealth.	2 (2 to 3)	4 (3 to 4)	< 0.001	(70.8%) 51/72
6. I feel I could conduct an effective physiotherapy consultation via telehealth.	2 (2 to 3)	4 (3 to 4)	< 0.001	(76.4%) 55/72

Focus groups

Two focus groups with a total of eight students (two male, six female) were conducted with a mean focus group length of 41 minutes. The adequacy of the final sample size was evaluated continuously during the focus-group data collection and was considered

appropriate based on the richness of data achieved from the sample size (Malterud et al., 2016). After analysing the transcripts, two themes—each with two subthemes—were generated from the data.

Theme one: Perceptions of telehealth following the curriculum

Understanding value and challenges of telehealth

There was universal acknowledgment from the participants that the curriculum had instilled in them the value of telehealth, both currently and into the future, as the needs of the population change. The benefits of telehealth were acknowledged to be enabling continuity of care and increasing the accessibility of services. Participants voiced that the curriculum guided them to see “how useful it can be” and how telehealth will “become more prevalent” (P3):

I think that the continuity of care is really, really important. ... They can kind of keep them on track. ... I think it's very beneficial on that aspect. (P2)

So definitely ... can make things a lot more accessible. It's something I think we'll have the right tools, we'll have more practice to be able to do it. (P5)

Participants explained that prior to the curriculum, they were unaware of telehealth for physiotherapy services:

It was just something that I've never really considered. But obviously, ... you hear about telehealth, but I hadn't ever really considered if you are working in private practice, potentially you may be doing telehealth. (P5)

Similarly, participants voiced that they were more aware of the challenges of service delivery via telehealth. This was attributed largely to the simulations via telehealth in the later parts of the curriculum, which highlighted that it was “different trying to build rapport over Zoom” (P2) and that “reception” (P1) can present challenges. Mostly, students acknowledged the challenge of physiotherapy via telehealth being the adaptation of usual skills required for assessment and management:

I think it is something that's quite difficult, especially for physiotherapists being a very physical kind of health professional. ... Some of our diagnoses require knowing certain feel[ing]s of muscles or bones or such, and I can imagine that would be quite difficult to try and get proper treatment via telehealth, despite it being an option nowadays. (P4)

But I'm also now very aware of the limitations, when [P4] was saying like, he can't do any kind of manual therapy or palpation, it's very hard to do anything like that over telehealth. (P7)

If it was like a physical consult, you might be able to, ... offer ... more sympathetic expressions, but over the phone, it's ... kind of hard. (P6)

Increased intentions for future telehealth use

Participants reported that the curriculum had increased their intentions for future telehealth use, which they reflected was due to their understanding of the benefits of telehealth and their increased self-efficacy for telehealth service delivery:

I think I would use it just when necessary, rather than as an everyday occurrence in terms of supporting older people, older generations, housebound. (P1)

Theme two: Feedback regarding the curriculum structure

Simulation viewed positively for skills integration

Participants acknowledged that the practical simulation sessions were beneficial for the integration of skills into practice. Whilst initially a challenge for participants, they found the simulations to be “the best part” (P3) of the curriculum and voiced that it “was a good chance to really practise the things that were being talked about in lectures” (P6):

It did freak me out to do it [telehealth], which is really a strange way to like, just to actually do it. (P1)

I think I covered a lot of the theory, which is really good. And then being able to use that and start implementing it. ... It's just, it's hard to remember all that information unless you're applying it. So, I think that session that we did this week [simulation using standardised patients portrayed by paid actors] was really good for that just to start to, you know, try and see how it fits in. (P2)

Suggested improvements

Whilst the whole telehealth curriculum was reflected upon positively, participants reported that the online modules were unnecessarily onerous and covered topics such as “need a good camera” and “bandwidth” (P3), which they viewed as unnecessary. Participants felt that the content would benefit from being compacted into smaller modules:

If there was a way to kind of compress that a little bit ... one of the modules took, like, 15 hours if you did it properly as well. ... I think if there ... might be an opportunity to find a more effective way to deliver the theory for people to actually do it properly. (P3)

Participants unanimously voiced that an example of a complete telehealth consult may have been beneficial to their learning:

It'd be really interesting to see how a full telehealth consult ... actually works with a physio and a patient. ... I'd be really interested to see, you know, how they get around some of those barriers. (P5)

Discussion

This study has examined the effect of a telehealth curriculum on physiotherapy students' perceived knowledge, skills, self-efficacy and intentions for future telehealth use. The findings demonstrate significantly higher perceived knowledge, skills and self-efficacy amongst students after receiving the curriculum when measured against empirically derived competencies for telehealth in physiotherapy (Davies et al., 2021). Students felt that the curriculum increased their understanding of and intentions to use telehealth, whilst also increasing their awareness of the challenges of using telehealth in practice. Students were satisfied with the curriculum, reporting that the capstone simulations were beneficial for the practical integration of their new knowledge and skills. Overall, the findings imply that an online asynchronous module of study with associated practical simulations can enhance physiotherapy students' perceived knowledge, skills and self-efficacy for the use of telehealth.

Following the completion of the curriculum, the students scored significantly higher across all of the telehealth competencies (Davies et al., 2021). Arends et al. (2021) evaluated the use of a telehealth curriculum amongst nurse practitioner students, evaluating their confidence against competencies using a 4-point Likert scale ranging from very unprepared to very prepared. Similar to the results of this study, the nurse practitioner students demonstrated a significant increase in confidence relating to each of the competencies after the curriculum (Arends et al., 2021). The effectiveness of curricula that included both theoretical content and opportunities for experiential learning to increase students' self-efficacy for telehealth is supported by this study. The opportunity for the physical practice of telehealth has been established as vital for pre-professional training (Martin et al., 2021), and the results of this study support this assertion. Given the known contribution of simulation towards best teaching and learning of clinical skills (Forbes & Mandrusiak, 2020), these findings encourage higher education providers to incorporate experiential learning into healthcare curricula.

On the pre-measure, the mean student response was below neutral (below 3 on the 5-point Likert scale) for three items: "knowledge of the legal requirements of telehealth", "conduct an assessment and diagnosis via telehealth" and "conduct an effective physiotherapy consultation via telehealth". There were three competencies that the students were neutral towards in relation to their perceived knowledge, skills and self-efficacy before embarking upon the curriculum. These were "patient confidentiality", "patient safety" and "technology skills", which are hypothesised to be concepts that students were exposed to in other units of study, as they are not unique to telehealth. The first three competencies mentioned feature telehealth specific knowledge, which was featured throughout the online modules and reinforced during the practical sessions. The requirement of telehealth curricula to include telehealth-specific technical knowledge is reflected in effective curricula across other disciplines (Arends et al., 2021; Kirkland

et al., 2019). The inclusion of telehealth-specific technical skills must be maintained in future curricula rather than encouraging students to proceed with usual practice via videoconference (Almathami et al., 2020).

Students perceived that the inclusion of telehealth training in their program was an inevitability given the value of telehealth services within physiotherapy care. Similar perceptions have been voiced by new-graduate physiotherapists, who felt that pre-professional training in telehealth would have been beneficial to their current careers (Martin et al., 2021). Similar opinions are held by students studying psychology, who have reported that the telehealth training that was incorporated into their programs was in congruence with the goals and values of their training program and professions (Dopp et al., 2021). The inclusion of telehealth content into healthcare curricula has been acknowledged as the way of the future, however progress has been delayed due to a lack of external pressure (Edirippulige et al., 2018). Edirippulige et al. (2018) proposed that until accrediting bodies recognise the requirement for competency in telehealth, the implementation of appropriate content was unlikely, due to already crowded curricula (Edirippulige et al., 2018). The positive reception of the curriculum in this study supports the inclusion of telehealth content in health professional training and encourages other professions to consider the inclusion of similar telehealth knowledge, skills and attributes appropriate to their contexts.

Regarding the delivery format of the curriculum, students voiced that they valued the asynchronous nature of the online content. There was a perception amongst some students, however, that the volume of content could be reduced without compromising learning outcomes. This is supported by recent literature regarding online learning for digital health implementation, which recommends that simple, easily accessible learning packages are best to support the uptake of training (Pote et al., 2021). Additionally, the students were satisfied with the format of the simulation practicals, voicing that they were beneficial for the integration of their theoretical skills. Simulation has been established to increase self-efficacy within other physiotherapy practice contexts (Forbes et al., 2018), with this study supporting the use of simulation to enhance self-efficacy in the use of telehealth.

Students felt that whilst the curriculum has increased their intentions to use telehealth in the future, they were now more aware of the challenges of telehealth service delivery. Similarly, medical students voiced that they were confronted by the initial challenges of building rapport via telehealth, however they perceived that this resolved following their engagement in their curriculum (Mahabamunuge et al., 2021). Following completion of the curriculum, the physiotherapy students in this study acknowledged the benefits of telehealth services. This, alongside their increased self-efficacy, likely contributed to their intentions for future telehealth use. Many health professional students have expressed plans to use telehealth in their future careers (Theoret & Ming, 2020), however little is known about the long-term impact of curriculum on clinical uptake. Further research

is warranted to discern the long-term effect of telehealth curricula on the established challenges in telehealth adoption (Ross et al., 2016).

Limitations

There are several limitations present within the study. Firstly, the authors recognise that there may be a selection bias present in the focus groups. Students who have an overly positive or overly negative experience may be more likely to self-select for participation. Additionally, the study was not able to control the teaching and learning that occurred outside of the specific intervention, and this may have impacted on the results of the post-survey. The loss of some survey data from the pre-post measure due to the inability to match the deidentified surveys may have influenced the conclusions drawn from the results and is considered a limitation of the study. Furthermore, students included in the study were enrolled at a single university, which may impact the generalisability of the results. The study did not consider students' previous exposure to telehealth or their previous exposure and capabilities with videoconferencing software, which may have impacted the results of the study. Finally, whilst the results demonstrate statistically significant change, it is outside the scope of the study to comment on the clinical significance of these changes, which presents as an area for future research.

Conclusion

This study supports the effectiveness of a telehealth curriculum involving online content and practical simulations on physiotherapy students' perceived knowledge, skills and self-efficacy, as well as their intentions for future use of telehealth. There is a need for further research to understand the long-term impact of such curricula and their influence on clinical practice and patient care.

Conflicts of interest and funding

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