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Collaboration from a Distance: Remote Simulation in Hybrid Healthcare Education

ORIGINAL RESEARCH

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ABSTRACT

Introduction: Simulation is an established method to teach interprofessional collaborative practice, but little is known about best practices when using simulation for remote learning activities in allied healthcare education. This mixed-methods study seeks to provide hybrid healthcare program educators with evidence regarding the effect of a remote simulation to address the topic of interprofessional collaboration.

Methods: Authors investigated student self-assessed competency, satisfaction, and self-confidence in response to a remote learning activity in which Doctor of Physical Therapy (DPT) students and licensed occupational therapists and speech language pathologists collaborated in a simulated pediatric case discussion via video-conferencing technology. The Interprofessional Collaborative Competency Attainment Survey-Revised and the Student Satisfaction and Self-Confidence in Learning scale were administered to 97 entry-level Doctor of Physical Therapy (DPT) students. One-on-one semi-structured interviews were completed to acquire student perception about the learning experience.

Results: Results confirmed a significant increase in self-assessed collaborative competency attainment and students reported general levels of satisfaction and self-confidence in learning related to the interdisciplinary, remote simulated experience. Qualitative responses revealed three main themes: (1) unique interaction in a structured simulation experience, (2) 'it was definitely a point of confirmation', a learning experience, and (3) collaboration.

Discussion: The use of remote healthcare simulation has the potential to improve interprofessional collaborative learning and practice among allied healthcare students. Faculty might consider the use of remote simulated experiences for the purpose of interprofessional learning in hybrid or online programs. Use of this teaching method within other groups of allied healthcare students should be examined.

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IMPLICATIONS FOR PRACTICE

1. Remote simulation can be an effective and satisfactory method of teaching interprofessional collaboration among allied healthcare students in hybrid programs.
2. Quantitative and qualitative findings offer evidence that entry-level DPT students in hybrid programs value remote simulation as a learning opportunity and were engaged in the educational process.
3. Faculty of hybrid allied health professional education programs may want to consider implementation of remote simulation for the purposes of interprofessional collaboration with the intent of readying students for practice.

INTRODUCTION

Physical therapist education has recently expanded to include hybrid curriculums to increase accessibility and allow students to achieve entry-level DPT degrees from a distance. Hybrid DPT education is defined by the Commission on Accreditation in Physical Therapy Education (CAPTE) as a program which includes 50% or more of coursework completed at a distance with each class delivered at least 50% online (Swisher, 2019). With the use of technology, hybrid learning programs include didactic online education delivered asynchronously or synchronously as well as periodic face-to-face lab immersions (Gagnon et al., 2020). Recently, Gagnon et al. (2022) provided a case report describing how a DPT program structure in a hybrid learning environment is feasible and may provide opportunities for innovation. While hybrid programs may diversify the delivery of healthcare education, there is limited evidence about effective learning methods for hybrid DPT curriculum.

As the landscape of higher education changes to include increased opportunities for distance learning (Seaman et al., 2018), faculty in allied healthcare education programs must respond with effective ways to engage students in innovative learning and assessment methods. Simulation-based education has been well-studied within medical and nursing professions (Alanazi et al., 2017; Hanshaw & Dickerson, 2020; Higgins et al., 2021; Moran et al., 2018) and is emerging as a viable method for physical therapy education (Donlan et al., 2020; Hough et al., 2019; Macauley, 2018; Mori et al., 2015; Sergakis et al., 2016; Silberman et al., 2013; Wellmon et al., 2017). The use of simulation allows physical therapy faculty to present scenarios which may occur infrequently in the clinic to students for purposes of learning, practice, and evaluation (Lioce et al., 2020; Sabus & Macauley, 2016). Currently, most of the simulation within physical therapist education literature is described as face-to-face delivery, however, a more distance-friendly option must be explored for emerging hybrid curricula.

Theoretical models that support the use of simulation as a teaching and learning method do not require that student and faculty members be co-located (McCoy et al., 2017). Like face-to-face simulation, remote simulation design requires well-established objectives, appropriate fidelity, student resources, educational content, trained faculty, and evaluation (International Nursing Association for Clinical Simulation and Learning [INACSL] Standards Committee, 2016; McCoy et al., 2017; Papanagnou, 2017). Additionally, execution of a successful remote simulation requires resources such as telecommunication equipment, internet access, and software for telecommunication (McCoy et al., 2017). While kinesthetic and psychomotor tasks can be taught from a distance, research has shown remote simulation to be better suited for the development of cognitive and behavioral skills. (Diaz & Walsh, 2021; McCoy et al., 2017; Thomas et al., 2021).

The use of remote simulation to address interprofessional collaboration has been used in nursing and medicine (Jiménez-Rodríguez et al., 2020; Yang et al., 2021), and has recently emerged in physical therapy education. Andrea, Kupczynski, and McCraney (2022) described the use of remote simulation as a mode for interprofessional collaboration within an entry-level pediatric physical therapy course. Eighty-four students from an accelerated, DPT program reported an increase in collaborative competency attainment as well as satisfaction and self-confidence in the simulated learning experience, regardless of age, race, or gender (Andrea, Kupczynski, et al., 2022). As there is a paucity of evidence supporting the use of remote simulation within hybrid DPT programs, there is ample space to examine the use of such a learning method within the unique learning environment.

This mixed methods study builds on the previous research by exploring the use of remote simulation within an accelerated, hybrid, entry-level DPT program. In addition to quantitative survey data, qualitative data was collected to explore student perception of remote simulation as a learning modality. To mimic realistic and quality care in pediatric rehabilitation, the remote simulation paired DPT students with licensed occupational therapy and speech language pathology clinicians for an 'every-day' collaborative conversation amongst an interdisciplinary team. The purpose of the study was to provide hybrid allied health program educators with evidence regarding the effect of an interdisciplinary, remote simulation among pediatric physical therapy students. Three research aims were investigated. The first aim was to determine if there was a difference in student-perceived collaborative competencies before and after an interdisciplinary, remote simulation among students in a pediatric physical therapy course in a hybrid DPT program. Secondly, demographic data was compared to determine if age, race, or gender influenced student satisfaction and self-confidence in learning with the use of an interdisciplinary, remote simulation. Finally, qualitative methods were used to explore students' perceptions about the use of simulation to learn interprofessional communication and care in pediatrics.

METHODS

Prior to the start of the study, the research project was determined to be exempt by Baylor University's Institutional Review Board (IRB Reference # 1881067). All students in a hybrid, entry-level pediatric physical therapy course at a private university participated in a synchronous remote, interdisciplinary simulation as a standard of learning. The simulated situation involved collaboration with a licensed occupational therapist and speech language pathologist about a shared pediatric patient via video-conferencing technology. Participation in the study was optional and did not affect the student's grade or standing in the class.

PARTICIPANTS

A convenience sample of entry-level DPT students in a hybrid, accelerated program was used for the primary sampling. All first-time students in the stand-alone pediatric physical therapy course were eligible to participate in the study. Students who were retaking the course were excluded from the study but were expected to participate in the simulated learning activity for educational purposes. The pediatric physical therapy course was delivered via a hybrid model in which asynchronous and synchronous didactic information were delivered online and lab was delivered in a 3-day face-to-face lab.

INSTRUMENTATION

Quantitative

Two self-report survey instruments were used in this study: The Interprofessional Collaborative Competency Attainment Survey- Revised (ICCAS-R; Schmitz et al., 2017) (Appendix A) and the Student Satisfaction and Self-Confidence in Learning scale (National League for Nursing [NLN], 2005). Both instruments are self-report measures and have been validated to assess outcomes related to healthcare simulation (Franklin et al., 2014; Schmitz et al., 2017).

Modified from the seven-point Likert-type format of the original Interprofessional Collaborative Competency Attainment Survey (MacDonald et al., 2010), the psychometrically validated ICCAS-R is a 20-item measure that employs a five-point qualitative scale and is administered in a retrospective, pretest-posttest manner (Schmitz et al., 2017). One additional question regarding the degree to which learners perceive their change in collaborative competence was added to the ICCAS-R, however it is not included in the calculation of the total score. High internal consistency ($\alpha = 0.96$) of all 20 items on the ICCAS-R has been reported (Schmitz et al., 2017). The measure is divided into six subscales that reflect constructs relevant to interprofessional collaborative practice: communication, collaboration, roles and responsibilities, collaborative patient-centered approach, conflict management and team functioning (McDonald et al., 2010; Schmitz et al., 2017). Participants were asked to reflect upon both their previous level of competency and current level of competency of interprofessional collaboration after the completion of the simulation-based learning experience.

The Student Satisfaction and Self-Confidence in Learning (SSSCL) scale was administered as a one-time posttest after the simulated learning experience in this study. The SSSCL scale originated in the nursing profession. It includes two subscales to measure student *satisfaction* and *confidence in learning* associated with simulation-based education (NLN, 2005). The instrument contains 13 items and uses a five-point Likert-type rating scale (1 = strongly disagree, 5 = strongly agree), with higher total scores indicating more satisfaction and self-confidence (NLN, 2005). The SSSCL has excellent overall internal consistency with a Cronbach's alpha of 0.92 (Franklin et al., 2014).

Qualitative

An interview tool was developed to provide qualitative data from the student perspective on the topics of interprofessionalism and participant experience with simulated learning (see Appendix B). The tool was created using the ICCAS-R survey as a guide. A consensus of the interview tool was reached among all investigators.

PROCEDURE

All students in the hybrid pediatric physical therapy course participated in an interdisciplinary, remote simulation as a standard for education. Using a previous research study as a procedural model (Andrea, Kupczynski, et al., 2022), students were informed of the study and the informed consent one week prior to the learning activity. Student preparation for the simulation-based learning experience included review of patient care information, videos of patient presentation, video description of clinician roles (occupational therapist and speech language pathologist), and a peer learning activity. During the simulation, one student was the participant while the others were active observers. Due to a cohort size of 97 students, the class was split into groups of 25 students or fewer to allow for optimal debriefing. Within 48-hours of the simulated learning activity, participants who opted into the study completed the online survey which included items related to demographic information, previous interprofessional collaboration experiences, the ICCAS-R, the SSSCL scale, and two open-ended questions to gather exploratory information regarding student perception of interdisciplinary simulation and interprofessional collaboration in pediatric physical therapy. Following the completion of the course, participants who completed the survey had the opportunity to partake in one-on-one qualitative semi-structured interviews via the teleconferencing platform, Zoom. Three investigators (CA, AB, JC) conducted interviews using an interview tool for standard prompts and extemporaneous probing questions to explore relevant topics as appropriate (Appendix B). A total of 12 interviews were audio recorded with a hand-held digital recorder, transcribed, and deidentified. Survey data remained anonymous. Transcription software was reviewed for accuracy by the interviewing investigator and member checks were performed for confirmability of the interview and transcripts.

DATA ANALYSIS

Quantitative

Primary data from survey responses were downloaded from SurveyMonkey and analyses were completed using SPSS (27.0). The total score of the ICCAS-R and each of the six subscale scores were summated for the pretest and posttest responses of each participant. Retrospective pretest to posttest mean scores of the ICCAS-R subscales were examined for significance using paired samples t-tests. Student Satisfaction and Self-Confidence in Learning scale scores were summed and analyzed using bivariate analyses (Pearson's r correlations, one-way analysis of variance, independent samples t-test) to determine the relationship based on demographic information (age, race, gender). An alpha level of .05 was used for all statistical tests.

Qualitative

Each investigator analyzed the interviews in the same sequence using a hermeneutic phenomenology approach, with emphasis on the analysis, moving back and forth between the part and the whole through a process known as the hermeneutics circle. The investigators then met to perform thematic triangulation to determine the essential experiences expressed by the participants, and to determine the point of thematic saturation. Following the triangulation, participants were requested to participate in a member check to determine if the themes reflected their experience.

RESULTS

QUANTITATIVE

Seventy-six entry-level DPT students participated in the study by completing survey responses related to collaborative competency attainment, satisfaction, and self-confidence for a 78.4% return rate. Table 1 presents descriptive statistics of the study sample (n = 76) which include the following areas: Age, gender, race, and previous academic, clinical education, and work interprofessional experience. Participant majority were women (68.4%) and of white descent (77.6%). The mean age of the participants was 26.5 years old.

Data were analyzed for assumptions of normal distribution, homogeneity, linearity, and influence of outlier scores to validate the use of parametric tests. Table 2 and Table 3 detail the reliability information of the ICCAS-R and SSSCL Scale total scales and subscales in this study.

CHARACTERISTICS	*n*	%	*M*	*SD*
Gender				
Female	52	68.4		
Male	24	31.6		
Age (years)			26.5	4.70
Race				
White	59	77.6		
Hispanic/Latino	6	7.9		
Black/African American	3	3.9		
American Indian/Alaska Native	1	1.3		
Asian	6	7.9		
Native Hawaiian/Pacific Islander	0	0		
Other	1	1.3		

Table 1 Demographic Characteristics of the Participants.

Note. M = Mean; SD = Standard deviation.

ICCAS-R	N OF ITEMS	PRE-CRONBACH'S α	POST-CRONBACH'S α
Communication	5	.797	.793
Collaboration	3	.838	.856
Roles and Responsibilities	4	.816	.857
Collaborative Patient/ Family-Centered Approach	3	.801	.809
Conflict Management/ Resolution	3	.82	.837
Team Functioning	2	.852	.804
Total	20	.944	.947

Table 2 Internal Consistency of ICCAS-R Subscales and Total (n = 76).

SSSCL SCALE	N OF ITEMS	CRONBACH'S α
Satisfaction with Current Learning	5	.794
Self-confidence in Learning	8	.866
Total	13	.871

Table 3 Internal Consistency of SSSCL Scale Subscales and Total (n = 76).

DOMAIN	M (SD)	MEAN DIFF. (SD)	*t*(df)	*p*
Communication			–11.3(75)	*p* < .001
Pretest	2.86(0.57)	0.68(0.53)		
Posttest	3.54(0.49)			
Collaboration			–11.62(75)	*p* < .001
Pretest	2.77(0.74)	0.91(0.68)		
Posttest	3.68(0.60)			
Roles and Responsibilities			–13.36(75)	*p* < .001
Pretest	2.87(0.62)	0.85(0.55)		
Posttest	3.71(0.57)			
Collaborative Patient/Family-Centered Approach		0.80(0.60)	–11.63(75)	*p* < .001
Pretest	2.78(0.66)			
Posttest	3.58(0.61)			
Conflict Manag./ Resolution			–10.17(75)	*p* < .001
Pretest	3.34(0.70)	0.56(0.48)		
Posttest	3.90(0.62)			
Team Functioning			–11.26(75)	*p* < .001
Pretest	2.63(0.74)	0.88(0.68)		
Posttest	3.51(0.68)			

Table 4 Paired Samples T-Test Analysis of Pretest to Posttest Change in ICCAS-R Scores (n = 76).

Interprofessional Collaborative Competency Attainment

Table 4 demonstrates that there was a significant change in mean scores between the retrospective pretest and posttest responses of the six subscales of the ICCAS-R, which indicates that the participants perceived a significant improvement in self-perceived abilities of interprofessional collaborative skills in response to participation in the remote, interdisciplinary simulated learning experience.

Satisfaction and Self-Confidence

The mean overall SSSCL scale score was 4.08 with a standard deviation of 0.47. The mean satisfaction in learning subscale score was 4.18 (SD = 0.62) and the mean self-confidence in learning scale score was 4.04 (SD = 0.45). As seen in Table 5, students showed general levels of satisfaction and self-confidence in learning related to the interdisciplinary, remote simulated experience based on the frequencies of *agree* and *strongly agree* responses.

Total SSSCL scale scores and individual *Satisfaction* and *Self-Confidence in Learning* subscale scores were examined to determine if there was a significant relationship based on student age, race, and gender. There was a non-significant negative correlation between SSSCL scale total score and age $r(74) = -0.073$, $p = .532$. Likewise, there was no significant relationship between SSSCL scale total scores based on race [$F(5, 70) = 1.56$, $p = 0.184$] or gender $t(74) = -0.57$, $p = 0.573$. Upon analysis of subscale scores, student perceived satisfaction scores were not significantly related to age ($r(74) = -0.036$, $p = .757$), race [$F(5, 70) = 2.10$, $p = .076$], or gender ($t(74) = -0.09$, $p = .930$). Similarly, student perceived self-confidence in learning scores were not significantly related to age ($r(74) = -0.092$, $p = .429$), race [$F(5, 70) = 1.179$, $p = .328$], or gender ($t(74) = -0.88$, $p = .380$).

QUALITATIVE

Saturation for thematic analysis was reached at the 7th interview, with continuation to the 9th interview for thoroughness. Three themes were revealed in this study; "Unique interaction in a structure simulation experience", "'It was definitely a point of confirmation', a learning experience", and "Collaboration" emerged from the student responses.

Theme 1: Unique interaction in a structured simulation experience

Many participants discussed how the organization and structure provided throughout the simulated learning experience created a well-constructed learning environment. By having two professionals interact with a

SURVEY ITEM	STRONGLY DISAGREE (1) N (%)	DISAGREE (2) N (%)	UNDECIDED (3) N (%)	AGREE (4) N (%)	STRONGLY AGREE (5) N (%)
Satisfaction with Current Learning					
1. The teaching methods used in this simulation were helpful and effective.		3(3.9)	5(6.6)	42(55.3)	26(34.2)
2. The simulation provided me with a variety of learning materials and activities to promote my learning the medical surgical curriculum.		2(2.6)	4(5.3)	46(60.5)	24(31.6)
3. I enjoyed how my instructor taught the simulation.	1(1.3)	2(2.6)	4(5.3)	40(52.6)	29(38.2)
4. The teaching materials used in this simulation were motivating and helped me to learn.			11(14.5)	38(50)	27(35.5)
5. The way my instructor(s) taught the simulation was suitable to the way I learn.	2(2.6)	4(5.3)	6(7.9)	39(51.3)	25(32.9)
Self-confidence in Learning					
6. I am confident that I am mastering the content of the simulation activity that my instructors presented to me.		5(6.6)	15(19.7)	41(53.9)	15(19.7)
7. I am confident that this simulation covered critical content necessary for the mastery of medical surgical curriculum.		2(2.6)	11(14.5)	37(48.7)	26(34.2)
8. I am confident that I am developing the skills and obtaining the required knowledge from this simulation to perform necessary tasks in a clinical setting.		3(3.9)	8(10.5)	38(50.0)	27(35.5)
9. My instructors used helpful resources to teach the simulation.		2(2.6)	4(5.3)	46(60.5)	24(31.6)
10. It is my responsibility as the student to learn what I need to know from this simulation activity.			6(7.9)	39(51.3)	31(40.8)
11. I know how to get help when I do not understand the concepts covered in the simulation.		1(1.3)	2(2.6)	39(51.3)	34(44.7)
12.I know how to use simulation activities to learn critical aspects of these skills.		3(3.9)	4(5.3)	44(57.9)	25(32.9)
13. It is the instructor's responsibility to tell me what I need to learn of the simulation activity content during class time.	2(2.6)	19(25.0)	21(27.6)	30(39.5)	4(5.3)

Table 5 Frequencies of SSSCL Scale Scores (n = 76).

single student in the hybrid environment, it allowed others to observe interactions common in the pediatric setting. Some referred to this experience as being like "a fly on the wall". Overall, participants expressed that this structure created a safe space for learning to occur:

> *Participant 10: "it was very well organized in reference to the structure and I think that was also kind of conducive to the learning environment"*

> *Participant 1: "I appreciated being able to see not only physical therapy in the pediatric course, but also how other disciplines contribute to the pediatric specialty and also understanding that."*

> *Participant 8: "[I] thought that it would be a more formal interaction, whereas whenever the student was talking with the other professionals it was more informal, which I think makes it less scary."*

> *Participant 7: "I felt a little bit more like a fly on the wall. But that was really helpful."*

Some participants said that the introduction videos were informative and helpful as pre-activities. The videos gave a sense of having a foundation of the knowledge needed to participate in the experience. In having some initial foundational knowledge, they were provided multiple points of learning, making the experience richer.

Participant 10: "just that interaction of watching those videos kind of gave me a great introduction and then by the time the simulation actually started, I had that brief foundational knowledge."

Participant 3: "I thought it was a unique… kind of like [how] interprofessional communication looks in the management of one single patient."

Participant 9: "I think just watching it happen was really rich…really powerful…"

Theme 2: 'It was definitely a point of confirmation', A Learning Experience

Participants agreed that the experience created an episode of validation in their learning and understanding, and assisted in their professional growth related to understanding the value of interprofessionalism.

Participant 1: "so I think that that was definitely helpful overall specifically for pediatrics…but just overall being able to confirm that and see OK, I am on the right track here….it was definitely a point of confirmation"

Participant 7: "I feel like I already had a little bit of an idea of the interprofessional collaboration… thought this is interesting from like more of a pediatric perspective…further[ing] my understanding of people's roles."

Many participants expressed how this experience improved their understanding of interprofessional behaviors. The experience also created a sense of realism in the learning environment. Using licensed therapists in the experience provided opportunities for students to see professional passion, which validated the experience.

Participant 1: "This is what they do and what they enjoy, …it gave more reality to the situation."

Participant 4: "I thought it was a good representation of how it goes on in real life based off my clinical experiences."

Participant 11: "So, I thought it was really fun, particularly because I felt like I was back in my pediatric rotation that I did at my first clinical rotation and I think it really did mirror what happens there very well."

Participant 11: …"it was very similar to the experience I had so the validity of that is pretty good."

Theme 3: Collaboration

This experience provided an authentic demonstration of a team working and interacting together for the benefit of the patient. A participant explained that the experience helped them see the finer details of collaboration in a healthcare setting.

Participant 9: "It kind of showed me how you approach other disciplines in a productive way… and helped… refine that kind of collaboration setting."

The collaborative experience was often discussed by participants, and how they saw different disciplines sharing information about the patient to learn from one another. Some participants felt that observing this level of collaboration was a new experience in their education.

Participant 2: "It was good to be able to observe and see how the whole process works in terms of three different disciplines coming together to discuss a singular case and singular patient and the different approaches and how they work in that situation."

Participant 3: "I mean, we had our first clinical rotation and I was able to have some communications with doctors, but it was usually over faxing notes, and over the phone, and stuff like that. [In the] pediatric setting, you have speech, OT, PT all communicating with one another. I haven't really been exposed to that…"

TRIANGULATION

The ICCAS-R results and qualitative data indicated that students experienced a gain in collaborative healthcare skills. Students also learned through observation of modeled interdisciplinary care. All ICCAS-R subscales showed improved scoring related to self-perceived interprofessional collaborative competencies. Students' responses during the qualitative interviews reflected an increased understanding of roles, responsibilities, and team functioning among pediatric physical therapists, occupational therapists, and speech language pathologists as reported in the theme "*Collaboration*".

All three tools (ICCAS-R, SSSCL, Qualitative Interviews) supported the findings of overall satisfaction of the simulation experience. As indicated by the SSSCL scale results and qualitative responses specifically in the theme "'*It was definitely a point of confirmation', A Learning Experience*," participants expressed improved levels of self-confidence and spoke to the authenticity of the simulated learning experience.

DISCUSSION

Hybrid education continues to be elevated as a contemporary alternative to in-person classroom delivery methods (Gagnon et al., 2020; Veneri et al., 2014). As physical therapist education evolves in this new paradigm of learning, continued research must evaluate the effectiveness of alternative hybrid-based methods of instruction. Although the use of simulated-based learning from a distance is limited within physical therapy literature, parallel healthcare fields can be used as a model to design and implement simulated learning in hybrid programs. This study offers a unique teaching strategy which allows physical therapy students to interact with other healthcare professionals in a structured learning activity without being co-located, and may serve as a viable method for future hybrid education opportunities.

The purpose of this research was to evaluate the effectiveness of a remote, simulated learning experience with the aim of providing faculty with a method for teaching interprofessional competencies within a pediatric physical therapy course. Although pediatric physical therapy is a subspecialty, interprofessional competencies have been acknowledged as an important learning construct in all of healthcare and are characteristic of competent clinicians (Interprofessional Education Collaborative, 2016; World Health Organization, 2010). Training students to work within a healthcare team is a universal skill, regardless of patient population, and is a necessary component within entry-level DPT programs. The quantitative results of this study support previous literature that has endorsed the use of simulated-based learning to address self-assessed interprofessional collaborative competency attainment in physical therapy education (Andrea, Kupczynski, et al., 2022; Marion-Martins & Pinho, 2020; Sizemore et al., 2021). The qualitative results further substantiate that this type of realistic and structured learning activity is a valuable training tool.

Student interaction and engagement has been shown to be a significant factor in establishing student satisfaction in higher education (Muzammil et al., 2020) and is considered a necessary ingredient for student retention and outcomes (Coates, 2005; McClenney et al., 2012). As physical distance between students and faculty can create challenges in engaging the online learner (Bollinger & Halupa, 2018), special attention is needed to develop collaborative active learning techniques to create a satisfying learning experience (Bagriacik Yilmaz & Banyard, 2020). In this study, findings of the SSSCL scale along with student interview responses corroborated that students were satisfied with, and confident in, a remote, simulated learning experience to address interprofessional collaboration within a DPT curriculum. For hybrid learning, remote simulated learning experiences are prime for creating engaging interaction by using tools for contemporary web conferencing with breakout room technologies and matching course design to facilitate student interaction (Shadat et al., 2017). In addition to the innovative technique of the simulated-based learning activity, students reported value in working with professionals as embedded participants. This sentiment aligns with previous reports of collaboration with professionals during learning activities intended for interprofessional collaboration (Andrea, San Lucas, et al., 2022).

The researchers acknowledge that two of the three investigators of the study were instructors in the pediatric course in which the remote simulated learning experience was embedded. While attempts to mitigate potential biases due to the dual role of the investigators was addressed by scheduling interviews after the completion of the course and randomization of the interviewers, the results of this study may still be biased. Additionally, participation in this study was voluntary. Therefore, the students that volunteered to participate in the study may reflect those who are academically motivated and may skew the results toward satisfaction and positive feedback.

CONCLUSION

Interprofessional collaborative practice is an essential factor of quality healthcare. Healthcare students must be taught the nuances of collaboration prior to entering the workplace to create practice-ready clinicians. Simulation is an established method to address interprofessional collaboration within the academic setting but has traditionally been used in brick-and-mortar programs. With the influx of hybrid healthcare education, faculty must provide efficacious interprofessional learning opportunities from a distance. The findings of this study support the use of remote simulation as a teaching strategy to address interprofessional collaboration among healthcare students. Future research may explore the use of remote simulation to address content areas of DPT education other than interprofessional collaboration. Additionally, there is an opportunity to expand simulation such as this into other disciplines to promote generalizability over multiple professional practice areas.

DATA ACCESSIBILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, CM, upon reasonable request.

ADDITIONAL FILES

The additional files for this article can be found as follows:

- **Appendix A.** The Interprofessional Collaborative Competency Attainment Scale (Revised). DOI: https://doi.org/10.61406/hipe.290.s1
- **Appendix B.** Semi-structured Interview Tool. DOI: https://doi.org/10.61406/hipe.290.s2

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

C. M. Andrea: Conceptualization, investigation, methodology, data curation, writing-original draft.

J. E. Cook: Formal analysis, investigation, methodology, writing-original draft.

A. H. Boddy: Formal analysis, investigation, resources, writing-original draft.

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