IJoHS

International Journal of Healthcare Simulation

ORIGINAL RESEARCH

Perceptions of two versions of a large-group simulated patient encounter: a comparative analysis

Jill S Sanko[1,2,3], Gregory W Hartley[4], Elsa M Drevyn[4], Samantha Syms[5]

[1]*MGH Institute for Health Professions, Boston, MA, USA*
[2]*Nova Southeastern University College of Nursing, Davie, FL, USA*
[3]*Walden University, Minneapolis, MN, USA*
[4]*Department of Physical Therapy, Miller School of Medicine, University of Miami, Miami, FL, USA*
[5]*Gordon Center for Simulation & Innovation in Medical Education, Miller School of Medicine, University of Miami, Miami, FL, USA*

Corresponding author: Jill S Sanko, jillsanko@gmail.com

https://ijohs.com/article/doi/10.54531/SLPW1852

ABSTRACT

Background:
This paper presents comparisons of learner perceptions between an in-person and distance interprofessional educational activity.

Methods:
A retrospective comparative analysis of data collected during post-activity evaluations following two versions (in-person; distance simulation-based) of a large-group simulated patient (SP) interprofessional education (IPE) simulation depicting a complex patient was used.

Results:
The distance simulation-based encounter run in 2020 (the reformed event) was found to have more favourable opinions compared to the 2019 in-person one. The 2019 participants' responses were more indicative of neutral and negative feelings of the activity compared to the participants from the 2020 distance simulation-based encounter.

Conclusions:
This study demonstrates that large-group SP encounters can serve as appropriate platforms for IPE activities when in-person or at a distance. The findings of this study help to demonstrate how distance-simulation encounters used for IPE can be used to provide meaningful learning.

What this study adds

- Large-group simulated patient (SP) encounters can be used in both in-person and distance-simulation encounters to impart lessons around medical management of complex patients and as a method to provide interprofessional education (IPE).
- Distance-simulation encounters may be as meaningful as in-person encounters from the perspective of learners.
- Distance simulation can be considered to deliver IPE.

Background

In 2020, the COVID-19 pandemic forced educators to rethink teaching methods across entire curricula. Circumstances necessitated rapid alterations in methods of course instruction, including delivery of interprofessional education (IPE) in health professions programmes [1–3]. The outcomes of these swift changes are largely unknown. Novel solutions, coupled with opportune coincidence, established an environment ripe for leveraging technology and conserving resources, while continuing to meet the evolving needs of society and healthcare students. The purposes of this paper are to; (1) describe one institution's approach to reimagining an IPE event with nursing and doctor of physical therapy (DPT) students in the context of COVID-19, (2) provide an example of how this can be done effectively and (3) present data from comparisons of learner perceptions from both an in-person and a distance version of a simulation-based IPE activity. The manuscript describes the creation and utility of large-group encounters utilizing simulated patient (SP)/real patient (RP) methodology and the efforts made to ensure that conversion of existing in-person IPE activities to a distance-simulation encounter remained relevant to the needs of students and learning objectives. Distance simulation in the context of this study was defined as a simulation encounter delivered using a distance platform (in this case Zoom™; Video Communications, Inc., San Jose, CA, USA) to learners who were not physically present in an in-person learning space.

The primary aim for the retrospective comparison study was to provide initial evidence to support the notion that distance-simulation encounters for IPE education can be as impactful as in-person simulation-based education from the perspective of the learner. The research question of focus was: Are there learner perceptions of educational equivalence between in-person and distance-simulation modalities? The authors present the findings of an analysis of student perceptions using data collected from post-encounter evaluations.

Interprofessional education

Given shifts towards team-based healthcare, IPE is both prudent and required nearly ubiquitously in pre-licensure healthcare programmes [4–7]. In response to these requirements/recommendations to include IPE, the Interprofessional Education Collaborative's (IPEC) Core Competencies have been adopted by many organizations, including those representing nursing and physical therapy [8]. Among IPE's many benefits are improved transitions of care, heightened collaboration and enhanced communication which together can improve patient safety and foster interprofessional collaboration [9–11]. Institutions and educational programmes have approached IPE in a variety of ways including stand-alone didactic courses, integrated simulated learning experiences and team-based patient assessments as examples. Most involve at least some face-to-face interaction with real or simulated patients.

Use of real and standardized patient methodology in simulation-based IPE

Evidence clearly demonstrates that simulated IPE experiences are valuable across a wide variety of professions and clinical scenarios, including nursing and physical therapy [11]. Further, the use of both SP and RP methodologies in these encounters has been shown to benefit learning without significant differences in outcomes [12,13]. Moreover, including RPs (i.e. not simulated) in IPE experiences may provide benefits that extend beyond IPE competencies [11,14,15] which was the impetus for utilizing this learning opportunity in the development and implementation of the original large-group activity. We were fortunate to have the patient from which we framed our simulation storyline willing to be part of educating our students. Her medical history, social life, family situation and recent medical encounters formed the details and storyline of the scenario used. Research supports the use of authentic illness experiences and the 'patient's voice' because they may assist in creating more meaningful person-centred simulation education [15].

Following the initial write-up, the scenario using our RP's recent healthcare experiences and medical history was reviewed by the team for completeness and adherence to simulation education principles. The RP and her family member (daughter) were briefed on the flow of the activity and what their roles were in much the same way that an SP would be prepared. In this way our use of an RP methodology provided an easily replicable simulation should we not have the fortune to have the ability to use RP methodology each time we wanted to run the activity, a situation that arose during the COVID pandemic. Additionally, a recent scoping review demonstrated that when both RP or SP methodology is employed, support for the individual is important [15].

Amid a pandemic, conducing large-group in-person activities was neither practical nor advisable, and given that our RP was unable to be available in a distance format, the authors sought a suitable surrogate to articulate her voice and share her story. Fortunately, SP methodology is a known proxy for RP methodology for realistic patient depictions to address interprofessional competencies and enhancing interdisciplinary collaboration skills [10,16]. Further, SP methodology is a known tactic for providing valuable patient perspective-based feedback to learners [17].

Large-group IPE

Some evidence is found in the literature supporting the effectiveness of large-group IPE experiences [18,19]. Often IPE activities are delivered in smaller interprofessional groups mimicking clinical practice, e.g. mock codes and team-based care situations (operative suite settings) [20]; however, there are instances where having larger groups makes sense. When large-scale activities are described in the literature students typically complete the activity within smaller subgroups [17,20]. This type of simulation-based education (small subgroups taking part in simulation experiences) can be resource-intensive, especially from a human capital stance. Further, during the COVID-19 lockdowns for both

public health and economic reasons these types of in-person activities generally did not occur. The original decision to create the large-scale activity was based on the findings in the literature and prior institutional successes with delivering large-group IPE. When the pandemic began, the team decided to convert the existing activity to a distance-simulation encounter to maintain curricular continuity during the lockdown(s) that occurred.

Simulated telehealth

Telehealth, a mode of healthcare delivery that is not new, was dramatically forced into the spotlight due to the COVID-19 pandemic. Telehealth, also called telemedicine, is defined as the provision of healthcare without an in-person visit via a computer, smart phone or tablet across the internet [21]. Nearly all types of healthcare providers abruptly found themselves conducting patient interviews, assessments and interventions in an online environment [22]. The reliance on online teaching in academia and telehealth in the clinic became a natural condition to mirror within simulation [2]. While some evidence exists in other professions, there was a paucity of literature on the use of tele-education as a mode of IPE delivery for nursing or physical therapy students [23–26]. However, research indicates that learning exists 'about, from and with' trainees in other professions, even if they do not physically train in the same location [27]. O'Shea and colleagues used a telehealth context to simulate assessment and intervention of an individual with diabetes while teaching a small group of nutrition and exercise physiology students [28]. While the students gained an understanding of interprofessional roles, technical difficulties (audio quality, video lag) plagued the encounter [28]. Given the frequency with which telehealth has been utilized by both patients and healthcare providers over the last 2 years, telehealth is bound to continue rapid expansion as a mode of healthcare delivery despite technical and accessibility challenges. For this reason, it is imperative that telehealth education be included in healthcare providers' training to ensure its proper usage and application [29].

Scenario fidelity

Content and realism of the clinical scenarios employed for IPE encounters are important considerations for educators. Managing older adults with multiple conditions (acute and chronic) who have complex biopsychosocial needs always represents a challenge for healthcare providers and society [30]. Managing non-communicable chronic disease is Medicare's single largest expense [30]. Moreover, ageing adults represent the fastest-growing demographic in the USA, yet fewer and fewer healthcare providers enter primary care or geriatrics [31,32]. Increasingly, nurses and physical therapists are being called upon to help meet these growing needs. Educating future healthcare providers in managing the chronically ill ageing population within the context of a primary care setting is required if a future workforce capable of meeting society's healthcare needs is desired [9,33,34]. The circumstances and challenge of the early days of the COVID-19 pandemic required educators to pivot quickly to develop curricular topics that met learning needs while adhering to community restrictions. To meet this need, the authors altered an existing IPE activity such that it was realistic for the times and designed to deliver education on the topics of interprofessionality, care of complex patients, and telehealth etiquette and strategies.

Methods

A retrospective comparative analysis of data collected during post-activity evaluations following two versions of a large-group IPE complex patient assessment activity was utilized. The analysis examined perceptions of students' experiences following participation in either a large-group in-person IPE experience using an RP and her caregiver in a simulated clinic visit environment (2019) or a large-group distance-simulation encounter of the same clinical scenario using an SP and simulated caregiver (2020) in a telehealth setting [8]. The learning objectives were identical for both versions of the activity and anchored to the IPEC Core Competencies [8] presented in Table 1. Post-activity distribution of course evaluations was made using e-mail following each encounter via a link to an electronic questionnaire housed in a secure online system (Qualtrics XM™, Provo, UT, USA). Completion of the survey was voluntary and anonymous. The study was exempted by the University of Miami's Human Subject's Research Institutional Review Board.

Measure

A 21-item post-activity questionnaire (modified from an existing tool developed by researchers for use post-IPE experiences) [35] was used to evaluate learner perceptions and opinions of the experience (Appendix A). The tool includes a single demographic question (student type), 11 Likert scale-scored (5-point scale—strongly agree to strongly disagree) questions and eight open-ended questions. The tool was not designed to elicit a single scale score or to specifically tap into a single construct. The open-ended questions solicited opinions on various aspects of what was learned using an interprofessional lens. The analysis of the findings from the open-ended questions is not included in this manuscript.

Scenario

A large-group SP scenario was created through a cross-profession collaboration. The scenario's back story and storyline were created using the medical history, medication regimen and recent experience of an individual known to the researchers (with permission). This opportunity allowed for the presentation of a detailed medical case based on actual medical complexity and recent healthcare system experiences and challenges. In 2019 the individual and her daughter (caregiver) were available to portray themselves and interact with students and were eager to do so. Both the individual and caregiver were trained for their educational roles in the same method as an SP would be and were utilized in the scenario in the same manner as SPs. Basic scripting was also supplied to maintain the educational integrity and ensure adherence to the objectives of the activity. In 2020 related to the COVID-19 pandemic

Table 1: Learning objectives for large-group IPE patient encounter

By the end of this learning activity learners will be able to:	IPEC Core Competency[a]
Appreciate the team approach to care of medically complex individuals	Competency Domains 1 & 2 Subcompetencies in Values/Ethics and Roles/ Responsibilities.
Identify the roles and responsibilities of various members of the healthcare team including the patient as a member of the team	Competency Domains 1 & 4 Subcompetencies in Values/Ethics and Team/ Teamwork
Demonstrate effective communication between the healthcare team and the patient and family to ensure optimal patient outcomes	Competency Domains 1 & 3 Subcompetencies in Values/Ethics and Interprofessional Communication
Analyse all aspects of a patient's life in developing and identifying long- and short-term health-related goal setting	Competency Domains 2 & 3 Subcompetencies in Roles/Responsibilities and Interprofessional Communication
Discuss how polypharmacy potentially impacts health outcomes and safety	Competency Domains 2, 3 & 4 Subcompetencies in Roles/Responsibilities, Interprofessional Communication and Team/ Teamwork
Identify safety issues for patients considering disease, medications and home environment	Competency Domains 2, 3 & 4 Subcompetencies in Roles/Responsibilities, Interprofessional Communication and Team/ Teamwork
Develop a comprehensive plan of care considering all aspects of the patient's life circumstance including financial in partnership with the entire healthcare team including the patient and family	Competency Domains 1, 2, 3 & 4 Subcompetencies in Values/Ethics, Roles/ Responsibilities, Interprofessional Communication and Team/Teamwork
Appraise and critically evaluate a plan of care for completeness	Competency Domains 1, 2, 3, & 4 Subcompetencies in Values/Ethics, Roles/ Responsibilities, Interprofessional Communication and Team/Teamwork

[a]Interprofessional Education Collaborative [8].

the RP (individual) and her daughter were not available to participate in scenario delivery, thusly the patient was portrayed by a trained SP and the daughter was portrayed by one of the nursing faculty with significant simulation experience.

The scenario narrative was that of a mature adult female with multiple complex medical and social needs including diabetes, renal failure, recent falls and failure to thrive coupled with several social and financial challenges that impacted her healthcare. The healthcare setting for the 2019 year was a clinic; in 2020 the setting was a telehealth clinic. The shift in story venue was selected to maintain setting equivalence in the two versions of the scenario as well as contemporary relevance since many healthcare settings were switching to providing care using telehealth during the COVID-19 pandemic. Students were randomly assigned to mixed-profession groups of approximately five prior to participating in the activity. In general, groups consisted of three nursing and two DPT students. In 2019, a large auditorium space was used for the event. Students were instructed to sit with their pre-defined groups so that when it came time for them to work in their small groups they were already convened and could go straight to their work areas (smaller rooms). Group numbers, seating assignments and signage assisted students with locating their groups. In 2020, Zoom™ video conferencing was used to facilitate the activity. The same process was used to assign students to learning groups. In 2020, small groups were handled via breakout rooms within the Zoom™ platform.

Instructions were provided to the learners to orient them to how the activity would proceed. The activity started with all students congregated in an auditorium along with the RP and her caregiver (2019) or the main remote telehealth (Zoom™) 'room' with the SP and her 'caregiver' (2020). Faculty solicited student volunteers from each profession to take the history of the RP/SP while the remaining students listened carefully and took notes (large-group encounters do not easily lend themselves to having all participants take a health history; therefore, a solution is to call on a few volunteers carry out this task while others critically listen). Following completion of the history questions asked by the volunteers, observer students were invited to ask additional questions or to seek clarification of a provided answer. Since the RP (2019) preferred to converse in Spanish, questions and answers were translated between Spanish and English so that all learners could follow, and she could feel comfortable. This provided an additional opportunity for students to learn about working with patients who speak a language different than their own and the nuances of working through a translator. It should be noted that the setting of our institution is in an area of the USA where 75% of the population speaks a language other than English at home [36]; therefore, using a translator and navigating healthcare as a provider in settings where a

common language is not shared is woven into the curricula. Therefore, the vast majority of the students that took part in this activity were familiar with working with a translator. In 2020, the SP spoke English only; thus, we omitted this part of the scenario.

Following the history gathering, a detailed outline of the patient's medical history, current problems, medication list, and financial and social challenges was provided to students. Students then worked in their pre-assigned small groups in separate classroom spaces (2019) or breakout rooms (2020) to create detailed care plans using an electronic template (Appendix B), working to address the various identified needs of the patient from a multidisciplinary perspective. When the small group work allotted time had expired, students returned to the auditorium (2019) or main Zoom™ 'room' (2020). A spokesperson for each group was invited to share the plan their team created and to solicit feedback from faculty and peers regarding the appropriateness and comprehensiveness of their plan. Finally, a faculty-led debriefing was held. In 2020, the SP was invited to share feedback to the group during debriefing regarding her experience from the patient perspective. The SP's training was completed through the University of Miami Standardized Patient Training Program. In addition, the educational team spent time training the SP specifically for this activity. As part of this general and scenario-specific training the SP was taught to give feedback to the students focusing on her perception of how the learners interacted with her as a patient.

Sample

Key faculty and constitution of the make-up of the student participants were unchanged from 2019 to 2020. Nursing students enrolled in the School of Nursing and Health Studies IPE Seminar Course and DPT students enrolled in the School of Medicine, Department of Physical Therapy, Clinical Decision Making II course participated in both years' activity.

Statistical analysis

Descriptive statistics and Chi-square analysis were used to analyse data. Descriptive statistics were used to describe the proportions of reported agreement or disagreement with statements presented. A main goal of this work was to build an understanding around how students perceived large-group IPE. The COVID-19 pandemic gave us an additional opportunity to explore differences in these perceptions in a nearly identical encounter with the same student make-up.

Statistically, the way to appreciate true difference is through proportion analysis of the responses using Chi-square analysis rather than a side-by-side comparison of percentage differences. To carry this out, responses for each item were recalculated such that percentages for positive (agree and strongly agree), neutral (neither agree or disagree) and negative (disagree and strongly disagree) were aggregated into new ordinal-level data variables appropriate for Chi-square analysis. This data analysis approach was guided by the method suggested by Campbell and Altman et al. [37,38]. Since the tool used to collect the learners' responses was not designed to produce a single scale score or measure a single construct each item in the measure was treated as its own micro-measure and analysed singly to complete the comparisons. Utilizing this approach allowed exploration of micro construct analysis and avoided the issue of appearing that data mining for a statistical quest was occurring.

Results

Descriptive statistics: 2019 in-person encounter

One hundred three students participated in the activity (Table 2). Survey response rates were strong with a 79% overall response rate (93.20% rate DPT; 61.40% rate nursing). More than 80% (80.77%) of respondents strongly agreed or agreed that the objectives of the activity were met. Just under three-quarters of the respondents strongly agreed or agreed that their expectations were achieved (72.60%). The majority of the respondents (67.54%) felt that the activity offered a worthwhile learning experience. Over 90% of the participants indicated that they enjoyed learning alongside students from another profession (44.70% strongly agreed, 47.37% agreed). Over 75% felt that the experience assisted them in gaining knowledge about the care of medically complex patients (27.27% strongly agreed; 48.05% agreed).

When asked about the activity's ability to assist in development of a deeper appreciation for the value of interprofessional teams more than 83% (83.12%) of the respondents indicated that the activity achieved this goal (32.47% strongly agreed; 50.65% agreed). Moreover, over 90% of respondents indicated that the activity also met the goal of deepening the appreciation for the value of having the patient/patient's family included as an integral member of the healthcare team (45.45% strongly agreed; 45.45% agreed). Over 60 percent of respondents (66.23%) strongly agreed, (25.97%) or agreed (40.26%) that the activity would change the way they will interact with other members of the healthcare team. Over three-quarters (76.32%) of the participants would recommend the activity to other healthcare students (35.53% strongly agreed; 40.79% agreed). A vast majority, 84.41% agreed (45.45%) or strongly agreed (38.96%) that it was helpful to do team-based exercises with students studying in other healthcare professions.

Finally, in alignment with IPE goals and perspectives one survey question asked about perceptions of learning from the other profession. When nursing students were asked about having learned from their DPT peers during the activity, 84.62% indicated a favourable perception of having learned from them. Likewise, when DPT students were asked about having learned from their nursing peers, 78.43%

Table 2: *N* of participants and survey respondents

Year	Nursing *N* (*n* survey responses)	PT *N* (*n* survey responses)	Total *N* (*n* survey responses)
2019	44 (27)	59 (55)	103 (82)
2020	77 (73)	59 (55)	136 (128)

indicated a favourable perception of having learned from them.

Descriptive statistics: 2020 distance encounter

One hundred thirty-six students participated in the activity (Table 2). Survey response rates were robust with a 94.1% overall response rate (93.20% rate DPT; 94.80% rate nursing). Over 94% (94.31%) of the of respondents strongly agreed or agreed that the objectives of the activity were met. Similarly, over 86% of respondents strongly agreed or agreed that their expectations were met. Data showed that the overwhelming majority (92.80%) felt that the activity offered a worthwhile learning experience. Over 90% of the participants indicated that they enjoyed learning alongside students from another profession (63.2% strongly agreed, 28% agreed). Ninety per cent felt that the experience assisted them in gaining knowledge about the care of medically complex patients.

When asked about the activity's ability to assist in development of a deeper appreciation for the value of interprofessional teams over 95% (95.16%) of the respondents indicated that the activity achieved this goal (66.94% strongly agreed; 28.23% agreed). Similarly, when asked about whether the activity met the goal of deepening the appreciation for the value of having the patient/patient's family as an important member of the healthcare team, the vast majority indicated this aim was also met (63.71% strongly agreed; 29.03% agreed). Over 87% of respondents agreed (37.40%) or strongly agreed (50.41%) that the activity would change the way they will interact with other members of the healthcare team in the future. Over 87% of the participants would recommend the activity to other healthcare students (59.64% strongly agreed; 27.87% agreed). Subsequently, 94.31% agreed (34.15%) or strongly agreed (60.16%) that it was helpful to do team-based exercises with students studying in other healthcare professions.

Finally, when nursing students were asked about having learned from their DPT peers during the activity, 94.20% indicated a favourable perception of having learned from them. Likewise, when DPT students were asked about having learned from their nursing peers during the activity, 88.89% indicated a favourable perception of having learned from them.

Comparisons

Largely, the distance simulation-based encounter run in 2020 was found to have more favourable opinions compared to the 2019 in-person simulation which was found to have more neutral and unfavourable opinions of the activity. Table 3 depicts the complete findings of the question-by-question comparisons. A greater percentage of students participating in the 2020 distance simulation-based encounter in comparison to the 2019 in-person simulation reported that they strongly agreed or agreed with the questions asked as part of the post-activity evaluation survey. An exception to this broad finding was with the question asking about having enjoyed learning alongside students from another profession. For this question, findings were approximately the same. Students participating in the 2019 activity (92.11%) reported in a favourable way (strongly agreed/agreed) compared to the students taking part in the 2020 activity (91.20%), $p = 0.823$.

Overall, the 2019 participants' responses were more indicative of neutral feelings of the activity compared to the participants who took part in the 2020 distance simulation-based encounter. Two questions were found to have statistically different proportions; (1) the question asking about developing a deeper appreciation for the value of interprofessional teams and (2) the question asking about feelings towards interacting with other members of the healthcare team as a future healthcare provider. Data from the question asking about developing a deeper appreciation for the value of interprofessional teams demonstrated a greater number of students answering neutrally in the 2019 (11.69%) activity compared to those participating in the 2020 (2.42%) activity, $p = 0.007$. Likewise, the question asking about feelings towards interacting with other members of the healthcare team as a future healthcare provider was found to have a greater number of students reporting feeling neutral following participation in 2019 (18.18%) activity compared to the 2020 (8.13%) activity participants, $p = 0.034$.

On the whole, participants of the 2019 in-person simulation were found to have a greater proportion of student participants who expressed unfavourable perceptions of the activity. This sentiment was expressed in many of the questions including: (a) having gained knowledge about care of medically complex patients, $p = 0.004$; (b) changing the way they would interact with other members of the healthcare team as a future healthcare provider, $p = 0.01$; (c) whether they would recommend the activity to another student, $p < 0.001$; and (d) asking DPT students about learning from nursing students, $p = 0.004$, or asking nursing students about learning from DPT students, $p = 0.006$.

Discussion

In the throes of a pandemic educators across the globe scrambled to alter curricula to provide students with meaningful learning opportunities. Educators tasked with instructing healthcare students and working to keep the pipeline of healthcare students moving towards graduation were challenged more so in having to alter educational activities that normally occurred in-person to formats to comply with mandates and ensure the safety of students and faculty. For many, this meant innovating. For the authors, this meant finding a way to carry out an annual IPE simulation activity without using in-person instruction. Upon setting out to do this, the challenge was not focused solely on whether the activity could be delivered using a remote format, but also whether it could be done while preserving the opportunity that simulation-based IPE activities provide to learners.

Findings support the notion that not only can high-quality, meaningful simulation-based IPE learning occur using a distance-simulation approach, but that the perceptions of these alterations can be quite positive [18,39,40]. By and large the data from the students who participated in the 2020 distance simulation-based (distance

Table 3: Comparison of 2019 in-person encounter to 2020 web-based encounter

Year	Question[a]	Favourable % (*n*)	Comparison %, diff, χ^2, DF, *p*	Neutral % (*n*)	Comparison % diff, χ^2, DF, *p*	Unfavourable % (*n*)	Comparison %, diff, χ^2, DF, *p*
2019	Objectives were met	80.77% (*n* = 63)	7.23%, χ^2 = 1.94, DF 1, *p* = 0.159	11.54% (*n* = 9)	6.74%, χ^2 = 3.172, DF 1, *p* = 0.075	7.69% (*n* = 6)	6.89%, χ^2 = 6.816, DF 1, *p* = 0.009
2020		88.08% (*n* = 110)		4.80% (*n* = 6)		0.80% (*n* = 1)	
2019	Expectations were met	46.58% (*n* = 34)	40.09%, χ^2 = 35.62, DF 1, *p* <0.001	1.37% (*n* = 1)	0.54%, χ^2 = 0.129, DF 1, *p* = 0.720	12.33% (*n* = 9)	10.66%, χ^2 = 9.54, DF 1, *p* = 0.002
2020		86.67% (*n* = 104)		0.83% (*n* = 1)		1.67% (*n* = 2)	
2019	Worthwhile experience	67.53% (*n* = 52)	25.27%, χ^2 = 21.63, DF 1, *p* <0.001	5.19% (*n* = 4)	1.19%, χ^2 = 0.158, DF 1, *p* = 0.691	2.60% (*n* = 2)	0.6%, χ^2 = 0.06, DF 1, *p* = 0.808
2020		92.08% (*n* = 116)		4.00% (*n* = 5)		3.20% (*n* = 4)	
2019	Enjoyed learning alongside other students	92.11% (*n* = 70)	0.91%, χ^2 = 0.05, DF 1, *p* = 0.823	3.95% (*n* = 3)	3.25%, χ^2 = 0.885, DF 1, *p* = 0.347	3.95% (*n* = 3)	2.35%, χ^2 = 1.070, DF 1, *p* = 0.301
2020		91.20% (*n* = 114)		7.20% (*n* = 9)		1.60% (*n* = 2)	
2019	Gained knowledge	75.32% (*n* = 58)	15.0%, χ^2 = 8.15, DF 1, *p* = 0.004	10.39% (*n* = 8)	3.94%, χ^2 = 1.00, DF 1, *p* = 0.317	14.29% (*n* = 11)	11.06%, χ^2 = 8.370, DF 1, *p* = 0.004
2020		90.32% (*n* = 112)		6.45% (*n* = 8)		3.23% (*n* = 4)	
2019	Deeper appreciation for value of IP teams	83.12% (*n* = 64)	12.04%, χ^2 = 8.01, DF 1, *p* = 0.005	11.69% (*n* = 9)	9.27%, χ^2 = 7.23, DF 1, *p* = 0.007	5.19% (*n* = 4)	3.58%, χ^2 = 2.090, DF 1, *p* = 0.148
2020		95.16% (*n* = 118)		2.42% (*n* = 3)		1.61% (*n* = 2)	
2019	Deeper appreciation for value of patient/family as members of the IP team	30.91% (*n* = 70)	1.83%, χ^2 = 0.22, DF 1, *p* = 0.642	6.49% (*n* = 5)	0.84%, χ^2 = 0.060, DF 1, *p* = 0.808	2.60% (*n* = 2)	0.99%, χ^2 = 0.238, DF 1, *p* = 0.626
2020		92.74% (*n* = 115)		5.65% (*n* = 7)		1.16% (*n* = 2)	
2019	Changed future interactions with members of the healthcare team	66.23% (*n* = 51)	21.57%, χ^2 = 1.94, DF 1, *p* <0.001	18.18% (*n* = 14)	10.05%, χ^2 = 4.501, DF 1, *p* = 0.034	14.29% (*n* = 11)	10.22%, χ^2 = 6.683, DF 1, *p* = 0.010
2020		87.80% (*n* = 108)		8.13% (*n* = 10)		4.07% (*n* = 5)	
2019	Team-based exercises were helpful	84.42% (*n* = 65)	9.89%, χ^2 = 5.36, DF 1, *p* = 0.021	0.00% (*n* = 0)	4.88%, χ^2 = 3.84, DF 1, *p* = 0.050	2.60% (*n* = 2)	1.79%, χ^2 = 1.022, DF 1, *p* = 0.312
2020		94.31% (*n* = 116)		4.88% (*n* = 6)		0.81% (*n* = 1)	
2019	Would recommend the activity	76.32% (*n* = 58)	11.38%, χ^2 = 4.34, DF 1, *p* = 0.037	9.21% (*n* = 7)	2.27%, χ^2 = 0.253, DF 1, *p* = 0.615	14.47% (*n* = 11)	13.65%, χ^2 = 15.25, DF 1, *p* < 0.001
2020		87.70% (*n* = 107)		11.48% (*n* = 14)		0.82% (*n* = 1)	
2019	Activity enabled me to learn from PT students (asked of nursing students only)	84.62% (*n* = 22)	9.58%, χ^2 = 2.22, DF 1, *p* = 0.126	3.85% (*n* = 1)	1.95%, χ^2 = 0.142, DF 1, *p* = 0.706	11.54% (*n* = 3)	11.54%, χ^2 = 8.136, DF 1, *p* = 0.004
2020		94.20% (*n* = 65)		5.80% (*n* = 4)		0.0% (*n* = 0)	
2019	Activity enabled me to learn from nursing students (asked of PT students only)	78.34% (*n* = 40)	10.46%, χ^2 = 2.10, DF 1, *p* = 0.148	17.65% (*n* = 9)	8.39%, χ^2 = 1.59, DF 1, *p* = 0.208	17.65% (*n* = 9)	15.80%, χ^2 = 7.53, DF 1, *p* = 0.006
2020		88.89% (*n* = 48)		9.26% (*n* = 5)		1.85% (*n* = 1)	

[a]See Appendix A for full question wording.

simulation) activity demonstrated that the distance-simulation version of a previously run large-group patient encounter was a success, met expectations, learning needs, and provided learners with a valuable forum from which to learn alongside students from another profession and develop important IPE knowledge and skills.

These study findings may have implications for both delivery of in-person and distance simulation-based learning. In 2019 we successfully designed and implemented a large-group simulation-based patient encounter that had demonstrated impact on perceptions of learning. This is relevant to educators since when SP/RP methodology is used as part of healthcare simulation it can be labour-intensive and time-consuming relative to the small numbers of students which can typically be cycled through at any one time. This innovative take on traditional simulation utilizing SP/RP methodology allowed for a large throughput of learners (>100) in a condensed period of time (about 3 hours) with approximately three faculty members plus one SP/RP.

In 2020, the COVID-19 pandemic presented us with the additional challenge of providing an IPE experience to a large number of students without holding the activity in-person. With a few minor alterations, we were able to transform a patient-based experience to one that could have similar numbers of students participating, provide a meaningful IPE learning exchange and meet learning objectives while adhering to pandemic-related safety protocols. This demonstration of a successful conversion from an in-person to distance IPE learning opportunity at one university may provide limited evidence for equality between some in-person and distance-simulation activities. The findings of this study indicate that a distance-simulation approach can be utilized by educators to facilitate positive outcomes among large groups of learners from multiple professions who are unable to convene in person or may not be geographically conveniently situated. Should these findings hold true more broadly, the opportunity to provide unique learning opportunities using SP methodology and simulation among large groups of learners who may be geographically separated could have profound educational and financial impacts.

Limitations

This study had several limitations including using a single university's students from two different cohorts in its nursing and physical therapy programmes. Additionally, there was not a measure of learning, but rather a measure and comparison of perceptions of learning. It is possible that a measure of a specific set of learned knowledge or skills might have produced different findings. Further research is needed to determine the impact of the delivery format and whether the large-group approach is able to offer the acquisition of knowledge or skills in the same way as smaller group simulation. Finally, it is not clear if the stress and routine of a mostly virtually delivered nursing/DPT curriculum at the height of the pandemic impacted feelings of this activity or if some unidentified aspect of the in-person event impacted the findings. It is possible that the novelty of being able to learn with others using simulation differently from other courses could have changed participants' perceptions of the activity in either year. It is also conceivable that the methodological approach of using a trained SP versus an RP, or the use of a translator (in 2019) could have impacted perceptions of the activity. The authors acknowledge the clear limitations regarding the number of potential variables (i.e. language, type of patient, setting); however, given the sparse number of studies comparing in-person versus distance-simulation encounters in the literature, we believe this study adds to what is known about the potential of distance simulation and large-group simulation.

Conclusion

The findings of this study may support the tactic of large-group RP/SP encounters as an appropriate platform to carry out meaningful IPE activities regardless of whether the delivery method is in-person or distanced. Students participating in both delivery formats were found to have positive perceptions of the learning opportunity. The findings of this study were comparable to the findings of a recently published study using a similar large-group IPE simulation methodology, thus adding to what is known about this approach [41]. While these results are promising, much more work exploring the impacts of large-group and distance simulation is warranted.

Declarations

Authors' contributions

All authors have made contributions to the conception, design, data collection, analysis, and write up of this study.

Funding

None declared.

Availability of data and materials

None declared.

Ethics approval and consent to participate

None declared.

Competing interests

None declared.

References

1. Jones TA, Vidal G, Taylor C. Interprofessional education during the COVID-19 pandemic: finding the good in a bad situation. Journal of Interprofessional Care. 2020 Aug 18;34(5):633–646.
2. Langlois S, Xyrichis A, Daulton BJ, et al. The COVID-19 crisis silver lining: interprofessional education to guide future innovation. Journal of Interprofessional Care. 2020 Aug 18;34(5):587–592.
3. Khalili H. Online interprofessional education during and post the COVID-19 pandemic: a commentary. Journal of Interprofessional Care. 2020 Sep 2;34(5):687–690.
4. Commission on Accreditation in Physical Therapy Education (CAPTE). Standards and required elements for accreditation

of physical therapist education programs. 2020. CAPTE. Available from: https://www.capteonline.org/.
5. Accreditation Council for Pharmacy Education (ACPE). Accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree. 2015. ACPE. Available from: https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf.
6. Commission on Collegiate Nursing Education (CCNE). Standards for accreditation of baccalaureate and graduate nursing programs. Washington, DC: CCNE. 2018. Available from: https://www.aacnnursing.org/ccne-accreditation/resource-documents/ccne-standards-professional-nursing-guidelines.
7. Liaison Committee on Medical Education (LCME). Standards for accreditation of medical education programs leading to the MD degree, standards and elements [Internet]. 2022 [cited 2022 Sep 13]. Available from: https://lcme.org/publications/
8. Interprofessional Educational Collaborative. Core competencies for interprofessional collaborative practice: 2016 update. Washington, DC: Interprofessional Education Collaborative. 2016.
9. Richmond A, Burgner A, Green J, et al. Discharging Mrs. Fox: a team-based interprofessional collaborative standardized patient encounter. MedEdPORTAL: The Journal Of Teaching And Learning Resources. 2017 Feb 8;13:10539.
10. Koo LW, Idzik SR, Hammersla MB, Windemuth BF. Developing standardized patient clinical simulations to apply concepts of interdisciplinary collaboration. Journal of Nursing Education. 2013 Dec 21;52(12):705–708.
11. King J, Beanlands S, Fiset V, et al. Using interprofessional simulation to improve collaborative competences for nursing, physiotherapy, and respiratory therapy students. Journal of Interprofessional Care. 2016 Sep 2;30(5):599–605.
12. Schwartz VS, Rothpletz-Puglia P, Denmark R, Byham-Gray L. Comparison of standardized patients and real patients as an experiential teaching strategy in a nutrition counseling course for dietetic students. Patient Education and Counseling. 2014 Nov 18;98(2):168–173.
13. Ay-Bryson DS, Weck F, Heinze PE, Lang T, Kühne F. Can psychotherapy trainees distinguish standardized patients from real patients: a pilot study. Zeitschrift fur Klinische Psychologie und Psychotherapie. 2021 Aug 4;49(3):182–190.
14. Charrette AL, Sullivan KM, Kucharski-Howard J, Seed S, Lorenz L. Physical therapy and pharmacy interprofessional education in the context of a university pro bono physical therapy setting. Journal of Interprofessional Care. 2020 May 3;34(3):315–323.
15. Ní Chianáin L, Fallis R, Johnston J, Mcnaughton N, Gormley G. Nothing about me without me: a scoping review of how illness experiences inform simulated participants' encounters in health profession education systematic review. BMJ Simulation & Technology Enhanced Learning. 2021 Jun 17;7:611–616.
16. Anders PL, Scherer YK, Hatton M, Antonson D, Austin-Ketch T, Campbell-Heider N. Using standardized patients to teach interprofessional competencies to dental students. Journal of Dental Education. 2016 Jan;80(1):65–72.
17. Soklaridis S, Romano D, Fung WLA, et al. Where is the client/patient voice in interprofessional healthcare team assessments? Findings from a one-day forum. Journal of Interprofessional Care. 2017 Jan 2;31(1):122–124.
18. Bartlett JL, Kinsey JD. Large-group, asynchronous, interprofessional simulation: Identifying roles and improving communication with student pharmacists and student nurses. Currents in Pharmacy Teaching and Learning. 2020 Jun 1;12(6):763–770.
19. Bloomfield JG, Schneider CR, Lane S, Stehlik P, Frotjold A. Evaluating a large-scale introductory interprofessional education workshop for developing interprofessional socialisation in medical, nursing and pharmacy students: a quasi-experimental pre-test post-test study. Nurse Education Today. 2020 Jul 5;99. Available from: https://doi.org/10.1016/j.nedt.2021.104777.
20. West C, Landry K, Graham A, et al. Conceptualizing interprofessional teams as multi-team systems—implications for assessment and training. Teaching and Learning in Medicine. 2015 Oct 2;27(4):366–369.
21. What is telehealth? [Internet]. NEJM Catalyst. 2018 [cited 2022 Oct 24]. Available from: https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0268
22. Fang J, Liu YT, Lee EY, Yadav K. Telehealth solutions for in-hospital communication with patients under isolation during COVID-19. Western Journal of Emergency Medicine. 2020 Jun 23;21(4):801–806.
23. Scott A, Dawson RM, Mitchell S, Catledge C. Simulation-based interprofessional education in a rural setting: the development and evaluation of a "remote-in" telehealth scenario. Nursing Education Perspectives. 2020 May/Jun;41(3):187–189.
24. Porter Lipscomb C, Zupec J. Use of telehealth experiences to facilitate interprofessional education. American Journal of Health-System Pharmacy. 2020 May;77(10):734–738.
25. Lempicki KA, Holland CS. Web-based versus face-to-face interprofessional team encounters with standardized patients. Currents in Pharmacy Teaching and Learning. 2017 Dec 18;10(3):344–351.
26. Candelario D, Cunningham K, Solano LA, Pabst A, Srivastava S. Description of a transitions of care and telemedicine simulation lab activity. Currents in Pharmacy Teaching and Learning. 2019 Nov;11(11):1184–1189.
27. Quesnelle KM, Bright DR, Salvati LA. Interprofessional education through a telehealth team based learning exercise focused on pharmacogenomics. Currents in Pharmacy Teaching and Learning. 2018 Aug;10(8):1062–1069.
28. O'Shea MC, Reeves NE, Bialocerkowski A, Cardell E. Using simulation-based learning to provide interprofessional education in diabetes to nutrition and dietetics and exercise physiology students through telehealth. Advances in Simulation. 2019 Dec 20;4(S1):1–8.
29. Chike-Harris KE, Durham C, Logan A, Smith G, DuBose-Morris R. Integration of telehealth education into the health care provider curriculum: a review. Telemedicine and e-Health. 2020 Apr 3;27(2):137–149.
30. Buttorff C, Ruder T, Bauman M. A multiple chronic conditions in the United States. Santa Monica, CA: Rand Corporation. 2017. Available from: https://www.rand.org/content/dam/rand/pubs/tools/TL200/TL221/RAND_TL221.pdf.
31. United States Census Bureau. 65 and older population grows rapidly as baby boomers age [Internet]. 2020 [cited 2022 Sep 13]. Available from: https://www.census.gov/newsroom/press-releases/2020/65-older-population-grows.html
32. National Center for Health Workforce Analysis. National and regional projections of supply and demand for geriatricians:

2013-2025. 2017. American Geriatrics Organization. Available from: https://www.americangeriatrics.org/sites/default/files/inline-files/State%20of%20the%20Geriatrician%20Workforce_10%2001%2018.pdf.
33. Ward LD, Bray BS, Odom-Maryon TL, et al. Development, implementation and evaluation of a longitudinal interprofessional education project. Journal of Interprofessional Education and Practice. 2016 Jun;3:35–41.
34. Reilly JM, Aranda MP, Segal-Gidan F, et al. Assessment of student interprofessional education (IPE) training for team-based geriatric home care: does IPE training change students' knowledge and attitudes? Home Health Care Services Quarterly. 2014 Oct 2;33(4):177–193.
35. Sanko J, Mckay M, Shekhter I, Motola I, Birnbach DJ. What participants learn, with, from and about each other during inter-professional education encounters: a qualitative analysis. Nurse Education Today. 2020 Mar 5;88(January):104386.
36. United States Census Bureau. Language other than English spoken at home in Miami-Dade County, Florida [Internet]. 2020 [cited 2022 Sep 13]. Available from: https://data.census.gov/cedsci/table?g=0500000US12086&tid=ACSST5Y2020.S1601
37. Campbell I. Chi-squared and Fisher–Irwin tests of two-by-two tables with small sample recommendations. Statistics in Medicine. 2007 Aug 30;26:3661–3675.
38. BMJ Books. Statistics with confidence: confidence intervals and statistical guidelines. 2nd edition. Altman D, Machin D, Bryant T, Gardner M, editors. London: Wiley. 2000. 254 p.
39. Begley K, O'Brien K, Packard K, Castillo S, Haddad AR, Johnson K. Impact of interprofessional telehealth case activities on students' perceptions of their collaborative care abilities. American Journal of Pharmaceutical Education. 2019 May;83(4):6880.
40. McCutcheon LRM, Alzghari SK, Lee YR, Long WG, Marquez R. Interprofessional education and distance education: a review and appraisal of the current literature. Currents in Pharmacy Teaching and Learning. 2017 Jul;9:729–736.
41. Hitchcock LI, Shorten A, Bosworth P, Galin S, Edmonds T, Harada C. Using a standardized patient model for interprofessional team training in social work. Advances in Social Work. 2020 Jun 1;20(2):355–370.

APPENDIX A

Large group patient questionnaire Likert-scale and open-ended questions
1. The objectives of this activity were met[+]
2. My expectations for this activity were met[+]
3. The activity was a worthwhile learning experience[+]
4. I enjoyed learning alongside students from another discipline[+]
5. I have gained knowledge about care of medically complex patients[+]
6. I now have a deeper appreciation for the value of interprofessional teams[+]
7. I now have a deeper appreciation for the value of the patient/patient's family as important members of the healthcare team[+]
8. This activity has changed the way I will interact other members of the healthcare team as a future care provider[+]
9. It was helpful to do team-based exercises with students studying another healthcare discipline[+]
10. I would recommend this activity to other healthcare students[+]
11a. This activity enabled me to learn from the physical therapy students[*+]
11b. This activity enabled me to learn from the nursing students[**+]
12a. What are the lessons you learned **about** the **Nursing students**?[** ++]
12b. What are the lessons you learned **about** the **Physical Therapy students**?[* ++]
13a. What are the lessons you learned **from** the **Nursing students**?[** ++]
13b. What are the lessons you learned **from** the **Physical Therapy students**?[* ++]
14. Having participated in this activity, what do you feel was the benefit of a team approach in devising a plan for this patient's care[++]
15. Having participated in this activity, share what you learned about each team member's role[++]
16. Having participated in this activity, share what you learned about regarding the patient's/family's role in the patient's care[++]
17. During the activity what was your communication strategy as part of the team?[++]
18. Reflecting on your role as a member of the team during the activity, what might you differently in the future to be a more effective team member?[++]
19. What did you enjoy most about this activity?[++]
20. Please use the space below to make any comments about the activity which you would like to share with the course directors, including suggestions for improvement++

All questions are answered by all participants, except for: *Questions that are answered by Nursing students only, **Questions that are answered by Doctor of Physical Therapy students only; [+]Responses based on a Likert Scale: Strongly agree/Somewhat agree/Neither agree nor disagree/Somewhat disagree/Strongly disagree; [++]Responses open ended.

APPENDIX B

Plan guide template

Notes:	
Initial impression:	
Plan:	
Goals:	
3–5 medical diagnoses:	
3–5 nursing diagnoses:	
3–5 PT diagnoses:	
Key concerns:	
Unknowns:	
Goals:	
3-5 Short term goals:	
3-5 Medium term goals:	
3-5 Long term goals:	
Community resources needed:	
Critique of plan:	