

Partnering for Patti: Shaping future healthcare teams through simulation-enhanced interprofessional education

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Background: Simulation-enhanced interprofessional education (sim-IPE) is a growing component of undergraduate health curricula, preparing learners for the practice environment and, in doing so, redefining practice culture. The Canadian Interprofessional Health Collaborative (CIHC) has established a national competency framework of integrative competency domains focused on fostering core skills, attitudes, and values in an effort to evolve interprofessional collaboration (IPC). This framework serves as the foundational underpinning for IPE within all health professions. *Partnering for Patti* is a sim-IPE experience collaboratively developed by faculty from Bachelor of Nursing and Respiratory Therapy programs within two Atlantic institutions leveled for third-year nursing and respiratory therapy students. This event provides an opportunity for participants to enhance their knowledge of the six CIHC IPE domains, and improve their understanding of and appreciation for IPC. Within this context learners must work together, and rely on the expertise of both professional groups to critically think through and improve a declining client scenario. Once complete, debriefing and reflective journaling help participants solidify learning and deduce new frames of understanding. It has been hypothesized that this event enhances student knowledge of CIHC IPE domains, and creates a deeper appreciation for, and understanding of IPC. The primary objective of this research was to determine if participants' understanding of CIHC IPE domains improved, and if perceptions of their own and the other profession were reframed as a result of this innovation.

Methods: This article describes the educators' approach in setting up and delivering this learning experience and the results of this event through students' perceptions. This cross-sectional study used a descriptive mixed-methods design. Two data collection tools were used to explore changes in participants' perceptions and event feedback.

Results: Data analysis found that the majority of participants identified value in this IPE learning experience. Qualitative and quantitative findings suggest participants developed a deepened appreciation for IPC and an improved understanding of the CIHC IPE competency domains.

Discussion: The evaluative findings of this study support the value of *Partnering for Patti* as a novel IPE learning experience. Although it is unclear to what degree objectives were met, findings strongly support continued integration of this learning experience.

Key Words: clinical simulation; sim-IPE; interprofessional collaboration; CIHC IPE competency domains; respiratory therapy education; nursing education

Registered respiratory therapists (RRTs) and registered nurses (RNs) routinely work alongside one another in a variety of healthcare settings. Successful interprofessional collaboration (IPC) lays the foundation for optimal team functioning in the delivery of client-centered care [1, 2]. Strong collaborative relationships rely on tenets of role clarity, mutual respect, and open communication, fostered through opportunities for shared learning and growth within and between professions. Interprofessional education (IPE) [1] is a proven andragogical principle, transforming the culture of quality and safety within healthcare [3, 4]. Models of IPE create training synergies across disciplines, equipping learners with the collaborative skills necessary to respond to the complexities of modern healthcare environments [1, 5]. To ensure entry-level practitioners have these requisite competencies, Canadian regulatory bodies have recently mandated IPE within the undergraduate health curriculum [6, 7]. This call to action has resulted in the integration of IPE activities in undergraduate health programs across Canada [8]. These experiences incorporate innovative educational techniques providing opportunities for students to engage in IPE.

Simulation is commonly employed to ensure learners have equitable opportunities to meet essential learning objectives required for IPE. Simulation provides realistic and authentic learning experiences offering students standardized opportunities to engage in intentional learning in

a safe setting [9, 10]. Further to this, debriefing, as a formal collaborative reflective process within the simulation experience, allows learners to link concepts to practice and develop clinical decision-making skills [11]. The use of simulation is well supported as a valid form of learning and assessment in both nursing and respiratory therapy education, with many educational institutions and regulatory bodies accepting immersive simulation experiences as a portion of mandated clinical training [12-14].

Drawing on the work of Lioce et al. [15], specific objectives and participant performance measures guide the design of these activities. As such, simulation is intended as a tool to support, rather than control, the setup and delivery of learning experiences [15, 16]. To illustrate, debriefing is not solely driven by the simulation's events. Rather, overarching learning objectives serve as a template during these facilitated discussions, a noteworthy distinction between the learning and tools used to support this learning. Debriefing with good judgment results in retrospective reflexivity, which leads to the development of new frames of reference [17]. In this context, new frames discovered during debriefing are grounded in IPE and IPC and thereby improve praxis. Therefore, the goal of this research was to measure student learning around specific interprofessional concepts, including the development of new frames in how they perceive both their own and the other profession.

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Simulation-enhanced interprofessional education (sim-IPE) is an emerging model overlapping the pedagogy of simulation and IPE [18]. Defined as “the education of healthcare professionals with different but complementary knowledge and skills in a simulation environment that promotes a collaborative team approach” [19], sim-IPE has many applications. Broadly, sim-IPE creates a platform for early socialization with other health professions, allowing for the enhancement of role clarification, attitudes, and perceptions [4, 20].

The creation of engaging and effective interprofessional learning starts with a credible set of common objectives that align within and across disciplines [18]. The Canadian Interprofessional Health Collaborative (CIHC) has established a national framework designed to serve as the foundational underpinning for IPE curricula in all healthcare professions [1]. Integrative competency domains within this framework include: interprofessional communication, client-centered care, role clarification, team functioning, collaborative leadership, and interprofessional conflict resolution [1]. These competencies transcend skill level, care setting, and context; they focus on the development of foundational skills, attitudes, and values that together shape sound clinical judgments within the context of IPC [1].

Faculty and one undergraduate student from two Canadian Atlantic institutions with programs in nursing and respiratory therapy collaboratively designed a sim-IPE activity to support the development of this critical skill set. A shared commitment to develop local IPE learning opportunities to foster a culture of safe and comprehensive healthcare delivery was the impetus for this grassroots initiative. The event was spearheaded by faculty with expertise in simulation, and the close geographic proximity of the partnering institutions was also a significant factor supporting the success of this activity. The primary objective of this research was to determine if participants’ understanding of CIHC IPE domains improved and if perceptions of their own and the other profession were reframed as a result of this innovation.

METHODS

Event design

The sim-IPE experience *Partnering for Patti* was leveled to third-year students within Bachelor of Nursing (BN) and Respiratory Therapy (RT) programs, and used medium-fidelity sim-IPE to depict a client who, during a shift assessment, presented with an acute change in respiratory status. Ethical approval was obtained from the relevant institution’s Research Ethics Board. Both student respiratory therapists and student nurses were provided with study guides that included relevant literature and client data in preparation for the event. Informed consent was obtained from all research participants after the nature of the event was fully explained.

This learning experience required student respiratory therapists and student nurses to effectively work together to safely manage the care of this client. The scenario began by separating student participants by discipline. Each group received a separate discipline-specific shift report for the client. Student nurses then conducted a routine assessment, in which an acute change in the client’s status was noted. This change prompted student nurses and student respiratory therapists to collaborate to effectively meet the client’s needs. Participants were assigned either hands-on or active observer roles. For the majority of participants, this event was their first simulated learning activity related to IPE; however, as participants were upper-level students, they had prior exposure to the concept of IPE and interprofessional teams. The first iteration of this event was a pilot conducted during the previous academic year. Several of the student respiratory therapists involved in the current study also participated in the pilot event, whereas student nurses did not. The overarching goal of this learning experience was to enhance student knowledge of the six CIHC IPE domains with a more focused goal of sensitizing learners to IPC. This was done through the design of this sim-IPE experience by placing emphasis on the need to effectively communicate and understand the roles and scopes within and between participating professions to effectively improve the client’s health.

The event began with a prebriefing workshop designed to demonstrate how IPC influences client health outcomes. To articulate the need

for IPC and achieve buy-in for this IPE event from participants, the event was prefaced by a live faculty re-enactment of a critical real-life situation in which poor IPC and team dysfunction led to a client death; this skit was based on the documentary “Just a Routine Operation” [21]. Participants were then shown the video, detailing events of the situation from family members’ perspectives. This was followed by a facilitated group discussion to set the stage for the sim-IPE activity. In addition, key components of the event were reviewed in preparation for the simulation including functionality of the manikin and the responsibilities of students and faculty in promoting a safe learning environment, including the importance of maintaining confidentiality.

Immediately following the simulation, students participated in a structured debriefing session. The advocacy-inquiry model [17] guided the facilitated debrief, with a focus on the central CIHC IPE domains as the IPE learning objectives; to this end, educators consistently foregrounded IPC as the salient skill set, rather than technical discipline-specific skills. Lastly, students completed a post-simulation structured reflection assignment, following Johns’ model [22], whereby participants critically examined and reflected on their perceptions and experiences as they related to the events learning objectives. Table 1 shows a breakdown of the various components of the event and the number of clinical hours associated with each component.

Study design

The present cross-sectional study used a descriptive mixed-methods design, aligning with the study’s purpose to understand and evaluate the described event. Participants’ perceptions and feedback were required, as researchers sought to determine the degree to which learning objectives were achieved including both enhanced knowledge of CIHC IPE domains and a deeper appreciation for and understanding of IPC. Data collection tools included the Interprofessional Perception Scale (IPS) [23, 24], and an evaluation questionnaire developed specifically for this event.

Interprofessional perception scale

Within the present study, researchers used the 15-item IPS both pre- and post-event. This scale contains two parallel response blocks each comprised of characterizing statements that respondents identified as true or false for each represented profession. The IPS is designed to elicit perceptions of one’s own profession relative to another profession in the context of IPC [23–25]. Pre- and post-measurements provided researchers opportunities to explore participants’ understanding of skills, attitudes, and values within and between two professions to determine if there was an improvement in participants’ appreciation for and understanding of roles and scopes within and between disciplines.

Evaluation questionnaire

Researchers developed an evaluation questionnaire using the intended learning objectives of the event including CIHC IPE domains and IPC principals as a guiding framework. Specifically, this evaluative tool was designed to capture students’ perceived learning of these principles. This evaluation questionnaire employed a mixed-methods design, as complexities of measuring the impact of IPE require a mixed-methods approach to “yield insight into the ‘what’ and ‘how’ of an IPE intervention and its outcomes” [26]. There were nine five-point Likert-type

TABLE 1
Event layout

Phase	Explanation	Time allocated*
1	Study guide completion	3 h (independent work)
2	Prebriefing workshop	2 h
3	Briefing	10 min
4	Simulation	20 min
5	Debriefing	30 min
6	Reflection assignment	2 h (independent work)

*Total time represented: 8 clinical h

questions with possible answers ranging from “strongly disagree” to “strongly agree” and three open-ended qualitative questions designed to capture feedback related to this event.

Data collection

To introduce the study, each participant was given a package containing a consent form, a pre- and post-IPS, and an evaluation questionnaire; participants were invited to submit the package upon completion of the event. Questionnaire data were only used if the consent form was complete. Although the learning activity was mandatory, at the outset of the IPE event participants were made aware of the option to abstain from completing any or all forms of data collection. All tools utilized for data collection were anonymous; no identifiable personal data were attached to responses. All participants were informed that investigators were affiliated with either the BN or RT programs. Collected data were stored in a locked cabinet within an office belonging to one of the authors.

Data analysis

IPS results were reported only for respondents who completed both pre- and post-event questionnaires. Pre- and post-IPS were analyzed via matched-pair *t* tests using R Studio software [27] to determine the overall effect on participant perceptions. In addition, descriptive analysis was completed to determine notable similarities and/or differences in subgroup responses for each IPS question, both before and after the event. IPS questions of interest for both represented professions were subject to risk ratio tests. The significance level was set at alpha (α) = 0.05.

The event’s evaluation questionnaire was analyzed both quantitatively and qualitatively. Ordinal Likert-scale responses were tabulated using Microsoft Excel software [28] and reported as a mean; a comparison of mean answers for both respondent groups was done via a two-mean Wilcoxon Signed Rank test also using R Studio software [27] to which the level of significance was also set at α = 0.05. Qualitative survey results were stratified by program and coded for content themes. Trends in responses were identified, and commonalities were compared among participant groups. The findings of the current study are divided into respondents’ views of their own and other professions, measuring attainment of learning outcomes, and generalized feedback regarding the event.

RESULTS

All *Partnering for Patti* participants (*N* = 60) were eligible for inclusion in this study (student nurses *n*1 = 51; student respiratory therapists *n*2 = 9). A convenience sample of 45 students completed some portion of the three surveys. Of the 37 student nurses and 8 student respiratory therapists who provided data, 44 respondents (73%) completed the consent form and some portion of the surveys. All 44 respondents completed a portion of both the pre- and post-event IPS and evaluation questionnaires. While specific demographic data were not collected for either cohort due to the need to maintain anonymity with a small number of participants, the majority of students from both groups were females between the ages of 20 and 30.

Respondents’ views of their own and other professions

Pre- and post-participation IPS responses indicated no significant change in student nurse respondents’ perceptions of their own profession when compared using matched-pair *t* tests (*p* = 0.322); both the pre- and post-IPS for student nurse respondents showed overwhelmingly positive perceptions of their own profession. Student nurse respondents’ perceptions of the RRT profession showed significant improvement (*p* = 0.011) when pre- and post-IPS responses were compared.

Student respiratory therapist respondents’ perceptions of the RN profession also showed an overall improvement when pre- and post-IPS were compared (*p* = 0.010). However, student respiratory therapist respondents’ perceptions of their own profession were slightly less positive post-event when compared with their pre-event IPS responses (*p* = 0.007). When analyzed, this was found to be primarily as a result of student respiratory therapist respondents completing all portions of the pre-IPS, while leaving some responses of the post-event IPS blank. Table 2 provides a summary of the aforementioned findings.

Using descriptive analysis, raw data were reviewed noting items that were different when comparing pre- and post-IPS results for each group. After identifying these items a more in-depth analysis was undertaken using risk ratio testing. Table 3 provides results of this analysis. As seen in Table 3, significant differences were revealed in the pre- and post-IPS responses of three specific questions. Student nurse respondents’ perceptions of the RRT profession, which significantly improved in the post-IPS, included “understand the capabilities of your profession” (*p* = 0.009) and “seldom ask your professional advice” (*p* = 0.010). The student respiratory therapist response item for the RN profession: “fully utilize the capabilities of your profession” also significantly improved in the post-event IPS (*p* = 0.035). The analysis revealed no significant differences in student nurse or student respiratory therapist participant responses for their own professions when comparing pre- and post-IPS surveys.

Measuring attainment of learning outcomes

In the Likert scale of the post-event evaluation questionnaires, 31 respondents (69%; (27, 53% of *n*1; 4, 44% of *n*2)), agreed or strongly agreed that the session met their expectations. Self-reported data for both groups were positive for the IPE domains reflected in the evaluation questionnaire. Table 4 compares student nurse and student respiratory therapist responses on mean five-point Likert scores for both groups. This analysis was done for each statement on the evaluation questionnaire; overall mean responses were positive for both groups. Four questions showed significant difference when responses of the two groups were compared using the Wilcoxon Signed Rank test. Questions

TABLE 2
Pre- and post-IPS comparison *t* tests

	Alternative hypothesis*	<i>p</i>
Student nurse answers about own profession	Less	0.322
Student nurse answers about other profession	Less	0.011
Student respiratory therapists answers about other profession	Less	0.010
Student respiratory therapists answers about own profession	Greater	0.007

*Positive answers after event compared with before event.

TABLE 3
Risk-ratio tests for IPS survey items of interest

IPS Survey Items	<i>p</i>
Student nurse responses about the RN profession	
Q3. Understand the capabilities of your profession	0.355
Q5. Sometimes encroach on your professional territory	0.207
Q9. Are very defensive about their professional prerogatives	0.110
Q11. Seldom ask your professional advice	0.417
Q12. Fully utilize the capabilities of your profession	0.964
Student nurse responses about the RRT profession	
Q3. Understand the capabilities of your profession	0.009
Q9. Are very defensive about their professional prerogatives	0.099
Q11. Seldom ask your professional advice	0.010
Q12. Fully utilize the capabilities of your profession	0.148
Student respiratory therapist responses about the RN profession	
Q3. Understand the capabilities of your profession	0.285
Q5. Sometimes encroach on your professional territory	0.652
Q7. Expect too much of your profession	0.157
Q9. Are very defensive about their professional prerogatives	0.074
Q12. Fully utilize the capabilities of your profession	0.035
Student respiratory therapist responses about the RRT profession	
Q5. Sometimes encroach on your professional territory	0.103
Q7. Expect too much of your profession	0.077
Q9. Are very defensive about their professional prerogatives	0.298

TABLE 4

Likert-scale Wilcoxon signed rank test results comparing student nurse and student respiratory therapist groups

Statement	Student nurses*		Student respiratory therapists*		P
	(n1 = 36)	+/- SD	(n2 = 8)	+/- SD	
1. My communication skills were improved by learning with students from another health profession	3.971	0.785	3.250	0.886	0.036
2. Learning with students from another health profession is likely to improve client centered care	4.69	0.598	4.25	0.707	0.111
3. This activity improved my understanding of the role of the other health profession included in the simulation	4.343	0.906	3.125	0.991	0.002
4. I felt that the students in the other health profession respected me	4.371	0.770	4.625	0.518	0.462
5. Learning with students from another health profession is beneficial to improving my teamwork skills	4.571	0.558	4	0.756	0.036
6. Learning with students from another health profession is likely to facilitate subsequent professional relationships in the practice environment	4.488	0.612	4.125	0.835	0.237
7. I would enjoy additional opportunities to learn with students from other health professions	4.2	0.933	3.25	1.165	0.016
8. I would prefer to learn only with students from my own profession	1.771	0.942	1.875	1.126	0.906
9. Overall this session met my expectations	4.029	1.0141	3.625	0.744	0.147

*Mean responses

TABLE 5

Qualitative responses: content analysis

Comments	Themes common to student nurses	Themes common to student respiratory therapists	Themes common to both
What they liked	Role clarification Challenging	—	Realistic Communication Collaboration
Suggestions to improve the event	More prediscussion with student respiratory therapists Less information before simulation Involvement of more professions Improve event timing	Second-year student respiratory therapists would benefit more from event	Increase case acuity Multiple simulations run concurrently
New approaches to practice	Increased confidence in calling for help Knowing you have a team to rely on for support Improved understanding of scope of practice	—	Role clarity
Final comments	Should not be weekend prior to exam Not on a Saturday Good experience	Did not feel it was helpful Better fit for second-year student respiratory therapists More simulations and smaller groups	—

showing differences in responses included “1. My communication skills were improved by learning with students from another health profession” ($p = 0.036$), “3. This activity improved my understanding of the role of the other health profession included in the simulation” ($p = 0.002$), “5. Learning with students from another health profession is beneficial to improving my teamwork skills” ($p = 0.036$), and “7. I would enjoy additional opportunities to learn with students from other health professions” ($p = 0.016$). For all four questions, responses were more positive for student nurse respondents when compared with student respiratory therapist respondents. As most student respiratory therapists participated in the pilot offering of this experience during the previous academic year, findings suggest this may have negatively contributed to student respiratory therapists’ responses.

Generalized event feedback

The qualitative component of the evaluation questionnaires asked four questions. Recurring words and/or phrases were identified for the student nurse and student respiratory therapist respondent groups and were characterized as common to each group and common to both groups as depicted in Table 5. While Table 5 gives a complete synopsis of respondents’ feedback, the emphasis here is on findings directly linked to learning outcomes rather than the setup and delivery of the event. However, constructive feedback related to the event itself will be considered in the development of future iterations of this activity.

In the open-ended questions of the post-event evaluation tool, participants were first asked “What did you like most about the simulation experience?” and from this question three common words and phrases emerged: “realistic,” “communicating within and outside their discipline,” and “collaborating with students from other healthcare disciplines.” While “realistic” emerged as a word commonly used, most participants offered little depth with their responses other than to say “it felt real.” For the identified term “communication”, researchers explored this finding through the lens of the CIHC framework [1], defining communication as an interaction between participants based upon mutual respect that involves active listening to aid in achieving a common health related goal. Statements such as “[the learning experience] gave experience working with other professions and made me aware of what I need to improve upon communication wise” suggests learning surrounding communication occurred. Similarly, collaboration is viewed as the co-creation of a climate in which shared leadership and decision making are utilized to achieve optimal client care [1]. One participant valued “working with others from other disciplines and collaborating as a team.” This idea also surfaced under “final comments,” where one student respiratory therapist explained that they “appreciate learning with and getting introduced to BN students we could potentially get to work with in the hospital someday.”

Role clarity was noted recurrently in question one; however, it was identified more often by student nurse participants. One student nurse stated “I liked that it involved other students from another profession as

it gave me the chance to learn what they do.” Role clarification was equally noted for both participant groups in question three: “How has this learning activity assisted you in developing new ideas and/or approaches to incorporate interprofessional communication concepts into your practice?” In addition, a unique finding for student nurse responses to question three was an increase in confidence when asking for assistance. Participants stated, “I feel more confident calling for help and using the [healthcare] team as support,” and “I am not as nervous to call [a] RT or ask for help from other professions”.

Question two asked “How would you suggest improving this simulation experience?” Multiple respondents from both participant groups identified “a more acute case” as a means of improving the IPE event. A student respiratory therapist respondent summarized this by stating “it was too basic for our level of critical care skills.” Although both groups made similar comments, there was a greater emphasis on this point by student respiratory therapists when compared with student nurse respondents. This may be as a result of student respiratory therapists having prior exposure to this event during the pilot and critical care clinical experience, in contrast to student nurse respondents who had no prior exposure to this learning experience and no critical care training. As one student respiratory therapist commented “being in clinical for the last year made me more then [sic] prepared. I feel second years would benefit more. I did last year.” These findings are also supported by anecdotal observations made by facilitators during both the simulation and debrief. It was during these components of the learning experience that some participants focused on discipline-specific technical elements of care as opposed to identified learning objectives for this event. The evaluation ended with an opportunity for respondents to give their final comments. While these comments were generally positive for student nurses, overall student respiratory therapists’ feedback spoke to the redundancy of participating in the same activity for the second time. However, student respiratory therapists did tend to value the utility of this experience at the second-year level:

I don’t feel like this helped me at all. I would have benefited more from the shift I missed. This was great practice in my second year. It was terrifying but got me out of my comfort zone and was a safe way to learn to interact with a patient and RN.

A conclusive finding was that, although there were mixed views, both groups identified value in this learning experience.

DISCUSSION

The evaluative findings of this study support the value of *Partnering for Patti* as a novel sim-IPE learning experience. Anecdotally, perceptions of researchers engaged in this experience were generally positive. Respondent feedback, through both the IPS and evaluation questionnaires, supports success in achieving the learning objectives of this event, including both enhanced knowledge of CIHC IPE domains and a deeper appreciation for and an understanding of IPC. Although it is unclear to what degree learning objectives were met, research findings strongly support that respondent’s knowledge of CIHC IPE domains improved, and that participant perceptions of their own and the other participating profession were positively affected, demonstrating a deeper appreciation for and an understanding of IPC; therefore, researchers conclude that continued integration of this learning experience is supported by the data. To this end, this study offers healthcare educators practical implications in both the setup and use of simulation as a tool to support IPE.

Qualitative analysis indicates an improved understanding of CIHC IPE domains; content analysis suggests communication, collaboration, and role clarity were key elements of learning and are consistent with current literature on the benefits of IPE [29, 30]. Student nurses’ perceptions of the RRT profession improved globally after the event as did student respiratory therapists’ perceptions of the RN profession. Through this we feel that student respiratory therapists and student nurses were positively reframing their perceptions about the other profession. Similarly, while the Likert scale questionnaire lacks psychometric testing, quantitative findings from this mixed-methods design suggest the overarching goal of this activity was met, supporting the notion that

participants developed a deepened appreciation for IPC. However, it is important to acknowledge that while Likert responses were generally positive, student nurse responses were more positive when compared with student respiratory therapist responses. As a result, we are unsure of the depth of learning that occurred within and across the two involved groups. Overall, there appears to be an association between qualitative and quantitative results within the evaluation questionnaires. This association further supports the validity of the research findings as well as the use of a mixed-methods design.

Understanding the goal of this research was to measure student learning around specific interprofessional concepts; researchers employed sim-IPE best-practice guidelines [18] as a framework guiding the evaluation of student learning in this context. Following the work of Decker et al. [18], valid and reliable tools were sought to assess how participation in this event improved interprofessional competencies. In doing so, researchers sought to evaluate the development of new frames through exploring changes in perception. Content validity of the IPS has been established through the direct nature of the questions posed and validated through repeated use [23, 24, 31–34]. Test–retest reliability has been confirmed through use of this scale for multiple health disciplines within various studies [23, 24, 31, 33, 34]. However, it is important to note that validity and reliability were not tested with the current study’s cohort. Globally, empirical findings of IPE are most often positive; yet, common criticisms of this research include variation in assessment and outcome measures and a lack of adequate psychometric development and testing of evaluation tools [4, 35, 36]. Outcomes of other recent studies exploring changes in perception generally found improved perceptions of other professions post-event; however, these studies varied widely in audience, activity type and delivery, overarching objectives, leveling of the educational experience, study methodology, and assessment tools [37–39].

In this study, both the IPS and evaluation questionnaire employed counterbalanced questions to capture outliers and reduce response bias, thus increasing the validity of both tools [40]. While the evaluation questionnaire was designed expressly for this activity, comparison of participant responses between cohorts was found to be similar, which provides increased confidence in the use of the evaluation tool. In addition, the mixed-method design provided an internal validity check [26] as it offered an opportunity to compare qualitative and quantitative responses; there was a positive correlation between qualitative findings when compared with quantitative results.

A salient research implication is the importance of appropriately leveling this educational experience. Educators in this study considered prior learning of the student cohort, the framework of the CIHC IPE competency domains, as well as the IPE mandates and entry level expectations of the respective regulatory bodies to guide the setup and delivery of this learning experience. In doing so, the criticality in making sure the simulation scenario aligned with both specified competencies and student ability cannot be overstated. To illustrate, for many of the third-year student respiratory therapy participants, this was their second time engaging in *Partnering for Patti*. The decision to include them for a second iteration was in response to anecdotal student feedback received after the initial pilot during the previous winter term, indicating the event was more suited to third-year student respiratory therapists. Outside of simulated practice, second-year student respiratory therapists had no exposure to caring for clients in the clinical environment and, as a result, felt ill prepared to participate in this first iteration. Research findings from the current study suggest that the second exposure may have negatively influenced student respiratory therapist perceptions and lessened the impact of intended learning outcomes. In contrast, this was the first exposure to *Partnering for Patti* for student nurses; feedback suggests a more positive impact as learning outcomes were more pronounced. This further validates findings of this study, as one would expect the student nurse outcomes to be more evident. Similarly, results suggest that the achievement of learning outcomes varied when comparing student respiratory therapist and student nurse responses, indicating that the depth of learning likely varied between participant groups. While confounding factors likely contributed to this, the setup and delivery of this learning experience will continue to evolve in response to this feedback.

Findings also highlight the importance of foregrounding learning objectives at the outset. This points to yet another practical implication as students often strayed from the main purpose of this sim-IPE event. This occurred during times where case acuity or participants' abilities to solve physical or task related problems in response to the client's condition became the priority both within the simulation and during the debrief rather than collaboration and effective team communication; these challenges are supported by Norsen and Spillane [41] as well as Robertson and Bandali [42]. It is also noted that while the sim-IPE scenario was not intended to be a life threatening situation, both the prebrief live re-enactment skit and video documentary were scenarios in which the client had very poor health outcomes and ultimately died. Subsequently, this approach may have altered participant's expectations in a way that was not intended.

Strengths and limitations

One of the strengths of the present study was the 68% rate of survey completion among event participants, which is higher than the baseline response rate of 50%–60% required for adequate analysis [43]. As noted by O'Rourke [44], while there is no absolute answer in relation to response rates, the higher the rate the more likely the findings are to be representative of the study population and therefore more generalizable.

The IPS was not employed to the full scope of the tool, which we feel may have negatively impacted the researcher's ability to deeply explore learning experiences. The IPS offers up to three levels of analysis: "data regarding how a professional views another professional (Level I), whether he or she thinks that members of the other profession agree or disagree with the view (Level II), and whether they understand that perception (Level III)" [23]. In this study, the IPS was only utilized to examine respondents' perceptions of their own and the other participating profession (Level I), as such, elicited data were not as in depth as what the tool was originally constructed to obtain. However, previous applications of the IPS were noted to require complex statistical transformations to extract minimal variance, yielding limited utility [44]. Extracting only direct perspectives (Level I), and not meta perspectives (Level II), or meta-meta perspectives (Level III), allowed for a less complex statistical analysis [23, 24].

We acknowledge that tools utilized for data collection may not reflect all aspects of student learning. Evaluation mechanisms were structured around the event's learning outcomes. The IPS was utilized to capture growth in perspective as a result of the simulation experience, whereas the evaluation survey was utilized to determine if desired IPE outcomes were achieved. This evaluative approach may have marginalized findings regarding the extensiveness of the learning experiences.

The primary limitation of the study was the total sample size of participants eligible for recruitment ($N = 60$). Beyond this, the smaller sample size of student respiratory therapist participants in comparison with the student nurse participants may affect generalizability. However, it is widely recognized that some health professions (such as nursing) have substantially larger class sizes; thus, producing groups that have an even distribution of professions is an ongoing challenge in IPE, largely due to time and resource constraints [4].

In addition, having respondents complete the post-surveys immediately following the sim-IPE and having program faculty facilitate the event and evaluative research may have caused a Hawthorne-like effect [40]. Researchers minimized this by ensuring respondents' understanding of measures taken to protect their anonymity.

Lastly, as self-report was used to capture changes in respondents' perceptions of both their own and other professions as well as their understanding of IPE competencies self-response bias may have been reflected in the data; however, three methods of triangulation (data source triangulation, investigator triangulation, and theory triangulation) were employed to mitigate this potential, thus improving the credibility of reported findings [40].

CONCLUSION

IPE learning opportunities are needed within post-secondary healthcare programs across Canada. The dissemination of the *Partnering for Patti* sim-IPE event coupled with the understanding of students' experiences through the results of this evaluative research may be useful in recreating this teaching

innovation in other institutions. To this point, the impetus for this ongoing work is the positive anecdotal and empirical data from students and faculty.

We continue to work collaboratively as educators and learning partners, and moving forward we plan to evolve this work to include the addition of other health professions. Throughout this collaboration, we have had the fortune of learning with, from, and about one another and as a result have role modeled both IPE and IPC within our local education and practice communities.

DECLARATION OF INTEREST

The authors report no conflicts of interest.

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REFERENCES

- Canadian Interprofessional Health Collaborative. A national interprofessional competency framework. CIHC; 2010. Available at: https://www.cihc.ca/files/CIHC_IPCompetencies_Feb1210.pdf
- Derbyshire JA, Machin A. Learning to work collaboratively: nurses' views of their pre-registration interprofessional education and its impact on practice. *J Nurs Educ Pract* 2011;11(1):239–44. doi: 10.1016/j.nepr.2010.11.010.
- Nisbet G, Hendry G, Rolls G, Field M. Interprofessional learning for pre-qualification healthcare students: An outcomes-based evaluation. *J Interprof Care* 2008;22(1):57–68. doi: 10.1080/13561820701722386.
- Rudd AB, Estis JM, Pruitt B, Wright T. Examining undergraduate nursing student's professional stereotypes in an interprofessional education simulation experience. *J Res Interprof Pract Educ* 2016;6(1):1–20.
- Abu-Rish E, Kim S, Choe L, Varpio L, Malik E, White AA, et al. Current trends in interprofessional education of health sciences students: A literature review. *J Interprof Care* 2012;26(6):444–51. doi: 10.3109/13561820.2012.715604.
- The National Alliance of Respiratory Therapy Regulatory Bodies. National Competency Framework for the Profession of Respiratory Therapy: Part I – Entry to Practice National Competency Framework; 2016. Available at: <http://www.csrtr.com/download/ncf-part-entry-practice-2016/?wpdmdl=15595> (Accessed January 20, 2016).
- Canadian Association of Schools of Nursing. National nursing education framework final report. CASN; 2015a. Available at: <http://www.casn.ca/wp-content/uploads/2014/12/Framwork-FINAL-SB-Nov-30-20151.pdf>
- Canadian Interprofessional Health Collaborative. Situational analysis: Current state of interprofessional education in Canada. CIHC; 2008. Available at: http://www.cihc.ca/files/CIHC_SituationalAnalysisIPE_May2008_Final.pdf
- Jeffries PR. A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nurs Educ Perspect* 2005;26(2):96–103.
- Lewis R, Strachan A, Smith MM. Is high fidelity simulation the most effective method for the development of non-technical skills in nursing? A review of the current Evidence. *Open Nurs J* 2012;6:82–9. doi: 10.2174/1874434601206010082
- Scherer YK, Myers J, O'Connor TD, Haskins M. Interprofessional simulation to foster collaboration between nursing and medical students. *Clin Simul Nurs* 2013;9(11):e497–505. doi: 10.1016.2013.03.001.
- Hayden JK, Smiley RA, Alexander M, Kardong-Edgren S, Jeffries PR. Supplement: The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *J Nurs Regul* 2014;5(2):C1–S64.
- Canadian Association of Schools of Nursing. Practice domain for baccalaureate nursing education. Guidelines for clinical placements and simulation: A companion document to the CASN national nursing

- education framework. CASN; 2015b. Available at: <http://www.casn.ca/wp-content/uploads/2015/11/Draft-clinical-sim-2015.pdf>
14. Charania I, Weiss K, West AJ, Martin S, Ouellet M, Cook R. Advisory workgroup recommendations on the use of clinical simulation in respiratory therapy education. *Can J Respir Ther* 2016;52(4):114-17.
 15. Lioce L, Meakim, C, Fey, M, Chmil, J, Mariani, B, Alinier, G. Standards of best practice: Simulation standard IX: Simulation design. *Clin Simul Nurs* 2015;11:309-15. doi: 10.1016/j.ecns.2015.03.005.
 16. Lioce L, Reed C, Lemon D, King M, Martinez P, Franklin A, et al. Standards of best practice: Simulation standard III: Participant objectives. *Clin Simul Nurs* 2013;9:S15-18. doi: 10.1016/j.ecns.2013.04.005.
 17. Rudolph JW, Simon R, Dufresne RL, Raemer DB. There's no such thing as "nonjudgmental" debriefing: A theory and method for debriefing with good judgment. *Simul Healthc* 2006;1(1):49-55. doi: 10.1097/01266021-200600110-00006.
 18. Decker SI, Anderson M, Boese T, Epps C, McCarthy J, Motola I, et al. Standards of best practice: Simulation standard VIII: Simulation-enhanced interprofessional education (sim-IPE). *Clin Simul Nurs* 2015;11(6):293-7. doi: 10.1016/j.ecns.2015.03.010.
 19. Healthcare simulation dictionary. Society for Simulation in Healthcare: Lopreiato JO, Downing D, Gammon W, Lioce L, Sittner B, Slot V, et al; 2016. Simulation-Enhanced Interprofessional Education; p. 34.
 20. Interprofessional Education Collaborative Expert Panel. Core competencies for interprofessional collaborative practice: Report of an expert panel. Interprofessional Education Collaborative; 2011. Available at: <http://www.aacn.nche.edu/education-resources/ipcreport.pdf> (Accessed January 3, 2017).
 21. Laerdal Medical. (Youtube). Just a routine operation. Available at: <https://www.youtube.com/watch?v=JzlvgtPl0f4>; 2011 (Accessed March 16, 2016).
 22. Johns C. Framing learning through reflection within Carper's fundamental ways of knowing in nursing. *J Adv Nurs* 1995;22:226-34. doi: 10.1046/j.1365-2648.1995.22020226.x.
 23. Ducanis AJ, Golin AK. The interdisciplinary healthcare team. Rockville, MD: Aspen Systems; 1979.
 24. Golin AK, Ducanis AJ. The interdisciplinary team. A handbook for the education of exceptional children. Germantown: Aspen Systems; 1981.
 25. Reeves S, Lewin S, Espin S, Zwarenstein M. Interprofessional teamwork for health and social care. Oxford: Wiley-Blackwell; 2010.
 26. Institute of Medicine. Measuring the impact of interprofessional education on collaborative practice and patient outcomes. Washington, DC: National Academies Press; 2015. Available at: https://www.nap.edu/login.php?record_id=21726&page=https%3A%2F%2Fwww.nap.edu%2Fdownload%2F21726
 27. R Studio for Mac OS X. [2017]. (Version 3.3.2). [Computer Software].
 28. Microsoft Excel [2017]. (Version 15.32). [Computer Software].
 29. Gould PR, Lee Y, Berkowitz S, Bronstein L. Impact of a collaborative interprofessional learning experience upon medical and social work students in geriatric health care. *J Interprof Care* 2011;29(4):372-3. doi: 10.3109/13561820.2014.962128.
 30. Shoemaker MJ, Platko CM, Cleghorn SM, Booth A. Virtual patient care: An interprofessional education approach for physician assistant, physical therapy and occupational therapy students. *J Interprof Care* 2014;28(4):365-7. doi: 10.3109/13561820.2014.891978.
 31. Benson, L, Ducanis, A. Nurses' perceptions of their roles and role conflicts. *Rehabil Nurs* 1995;20(4):204-11. doi: 10.1002/j.2048-7940.1995.tb01628.x.
 32. Thannhauser, J, Russell-Mayhew, S, Scott, C. Measures of interprofessional education and collaboration. *J Interprof Care* 2010;24(4):336-49. doi: 10.3109/13561820903442903
 33. Canadian Interprofessional Health Collaborative. An inventory of quantitative tools measuring interprofessional education and collaborative practice outcomes. CIHC; 2012. Available at: <http://rcc.brandeis.edu/pdfs/Canadian%20Interprofessional%20Health%20Collaborative%20report.pdf>
 34. Lim KH. Collaboration between disciplinary teams caring for elders in Korean community settings [dissertation]. Tuscon, AZ: University of Arizona; 2008.
 35. Zhang C, Thompson S, Miller C. A review of simulation-based interprofessional education. *Clin Simul Nurs* 2011;7(4):117-26. doi: 10.1016/j.ecns.2010.02.008.
 36. Paterson D, Shivananda S, El Helou S, Fusch C, Mukerji A. Impact of interprofessional education on noninvasive ventilation in a tertiary neonatal intensive care unit. *Can J Respir Ther* 2016;52(3):81-4.
 37. Tolleson S, Ismail N, Gill A, Dello Stritto R, Hatfield M, Teal C, et al. Changes in pharmacy students after experiencing interprofessional education activities. *JRIPE* 2016;6(1):15.
 38. Estis J, Rudd A, Pruitt B, Wright T. Interprofessional simulation-based education enhances student knowledge of health professional roles and care of patients with tracheostomies and Passy-Muir valves. *J Nurs Educ Pract* 2015;5(6):15. doi: 10.5430/jnep.v5n6p123.
 39. Ruebeling I, Pole D, Breitbach AP, Frager A, Kettenbach G, Westhus N, et al. A comparison of student attitudes and perceptions before and after an introductory interprofessional experience. *J Interprof Care* 2013;1(5):13.
 40. Babbie E. Social research for consumers. Belmont: Wadsworth; 1982.
 41. Norsen L, Spillane LL. Partnering in interprofessional education to design simulation programs to promote collaboration and patient safety. *Creat Nurs* 2012;18(3):109-13. doi: 10.1891/1078-4535.18.3.109.
 42. Robertson J, Bandali K. Bridging the gap: enhancing interprofessional education using simulation. *J Interprof Care* 2008;22(5):499-508. doi: 10.1080/13561820802303656.
 43. O'Rourke TW. The importance of an adequate survey response rate and ways to improve it. *Am J Health Stud* 1999;15(2):107-9.
 44. Luecht RM, Madsen MK, Taugher MP, Petterson BJ. Assessing professional perceptions: design and validation of an interdisciplinary education perception scale. *J Allied Health* 1990;19(2):181-91.