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Publications Mail Agreement 40012961
Return undeliverable Canadian addresses to:
Canadian Society of Respiratory Therapists (CSRT)
201 – 2460 Lancaster Road, Ottawa, Ontario, Canada K1B 4S5

65 Auriga Dr., Suite 203, Ottawa, ON K2E 7W6; Tel: 613-656-9846; wwwcdnsciencepub.com.

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Requests for subscriptions and changes of address: Membership, CSRT, Suite 201 – 2460 Lancaster Road, Ottawa, Ontario, Canada K1B 4S5.

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Le Journal paraît 4 fois l'an (en printemps, été, automne et hiver).

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The Canadian Journal of Respiratory Therapy (CJRT) is a quarterly, peer reviewed, open access publication. We strive to publish manuscripts that describe effective interventions that increase access to and quality of clinical respiratory health interventions, including the organization and delivery of care in hospitals, the community, and throughout the continuum of care by health care providers. Our goal is to generate evidence and discussion to support more effective and equitable access to respiratory therapy and care for patients in Canada and around the world. While many of our contributors are respiratory therapists, we welcome submissions from all related health professionals and researchers. >> View Guide for Authors

We are preparing a special issue of the Canadian Journal of Respiratory Therapy on the topic of Primary Care, to be published in October 2018. The focus of this issue will be the role of primary care in the diagnosis, prevention, treatment and screening of respiratory health issues. Our goal is to present research findings, reports on projects related to the basics of respiratory therapy, case studies, and editorial/opinion columns of the highest quality that inform respiratory therapists and members of the healthcare team on the role of RTs in primary care. We are also interested in papers with an international focus that cover primary care topics worldwide.

We invite respiratory therapists, as well as our interprofessional colleagues to submit papers on the topic of Primary Care, which may:

- focus on existing and emerging roles of respiratory care practitioners in primary care environments
- demonstrate the impact of primary care on achievement of outcomes relative to: respiratory disease burden, the underlying factors related to respiratory disease burden, and system performance
- share approaches to enhancing the coordination of, and access to, appropriate primary care services
- consider the use of collaborative care teams within primary care
- address a range perspectives achieving primary care goals, including innovative delivery models

What is primary health care?

Primary health care refers to an approach to health and a spectrum of services beyond the traditional health care system. It includes all services that play a part in health, such as income, housing, education, and environment. Primary care is the element within primary health care that focuses on health care services, including health promotion, illness and injury prevention, and the diagnosis and treatment of illness and injury. (Definition from Health Canada)

Submissions are due by February 1, 2018, through the CJRT website: https://www.cjrt.ca/. Questions? Contact the Managing Editor at editor@csrt.com.
Clinical simulation-based education has been rapidly adopted in respiratory therapy because it offers a safer environment in which learners can develop professional skills, both clinical and nonclinical, without the risk of causing harm to actual patients [1, 2]. When employed with a well-designed formative feedback mechanism, clinical simulation has been shown to be useful in addressing learning needs before and after entry to practice [3]. Recognizing that its utility to support learning is well established in the literature, there remains a great need for rigorous research that clarifies “how” and “when” simulation should be used in health professional education [1]. This issue of the Canadian Journal of Respiratory Therapy (CJRT) takes steps to respond to the need for deeper understanding about simulation by sharing some of the new and innovative ideas that are emerging from within our own profession.

The question of “when” simulation should be used prompts us to reflect on the ways we use it to support learning in different contexts, and at different points along the continuum of professional learning. In the article “The Effects of Introducing High Fidelity Simulation to Pre-Clinical Student Respiratory Therapists,” Wall shares the unique findings of his research that explores how simulation can be used to effectively support respiratory therapy learners’ transitions from didactic to clinical education portions of a respiratory therapy program. Also situated in the entry-to-practice educational context, Gordon et al. present a particularly timely discussion on the usefulness of simulation in supporting the development of interprofessional collaboration competencies in respiratory therapy and nursing students. Their findings, presented in “Partnering for Patti: Shaping future healthcare teams through simulation-enhanced interprofessional education,” suggest that using simulation to support interprofessional education will likely be a fast-growing area of both practice and research in the future.

One challenge we face as a profession is that limited access to adequate opportunities for learning in clinical environments has made assuring sufficient experiential learning opportunities for respiratory therapists increasingly challenging [4]. As is well known within our profession, these limitations appear to be particularly evident in high-criticality practice areas (e.g., pediatric critical care). In the article, “Simulation Use in pediatric student respiratory therapy training,” Reise and Correia explore how one organization is facing this challenge by implementing simulation within the pediatric critical care practice environment. Their research program seeks to address a question being asked by many educators and policy makers—how much can we rely on simulation to enhance, or replace, clinical learning. In the article, “The Effects of Introducing High Fidelity Simulation to Pre-Clinical Student Respiratory Therapists,” Wall shares the unique findings of his research that explores how simulation can be used to effectively support respiratory therapy learners’ transitions from didactic to clinical education portions of a respiratory therapy program. Also situated in the entry-to-practice educational context, Gordon et al. present a particularly timely discussion on the usefulness of simulation in supporting the development of interprofessional collaboration competencies in respiratory therapy and nursing students. Their findings, presented in “Partnering for Patti: Shaping future healthcare teams through simulation-enhanced interprofessional education,” suggest that using simulation to support interprofessional education will likely be a fast-growing area of both practice and research in the future.

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As many simulation practitioners have begun to more fully appreciate the relative importance of nonphysical simulation design elements (e.g., roles and responsibilities, division of labour), important questions have begun to arise with respect to the assumed value of expensive technological investments. Dieckmann et al. [5] have been at the forefront of recognizing clinical simulation as a social practice where participants interact with a complex network of learners, technology, and the environment. Findings like these are prompting a shift in thinking in simulation-based education design away from seeing the most lifelike technology as a prima-facie element in the learning environment.

Some of my own research has begun to unearth the impact that elements of simulation designs can have on social aspects of the environment. It appears that design elements that foster social aspects of simulation may play a substantially bigger role in influencing learner experience than do the physical aspects of simulation. “Towards an Enhanced Conceptualization of Fidelity for Instructional Design in Simulation-Based Respiratory Therapy Education” looks beyond the technological aspects of simulation to offer an innovative framework for infusing emerging theoretical understandings into our instructional design approaches. The framework prompts reflection on “how” we use simulation, and can be a useful tool to help educators foster the relationships that support effective simulation learning environments.

While this issue provides important insight for us to consider as we continually craft our simulation practices in respiratory therapy, there remains much work to be done. Recognizing that it is not the technology but, rather, the ways in which we employ technology that underlies our achievements in the use of simulation, we must strive for further clarification as to “how” and “when” it is best used in respiratory therapy. Pursuant to Lewin’s [6] contention that “There is nothing so practical as a good theory,” I believe that there exists much opportunity for expanded theorization in the field of simulation-based respiratory therapy education to optimize our practice.

As indicated in my previous editorial, I will be completing my term as Editor-in-Chief of the CJRT as I move into my new role with the Canadian Society of Respiratory Therapists (CSRT). It has been an honour to serve as the Editor-in-Chief and I sincerely thank the Journal’s editorial board for their support, and the CSRT for this tremendous opportunity. It is with great pleasure that I can announce that beginning in the new year, editorial leadership for the Journal will be provided by Justin Sorge. Justin brings to the Journal a wealth of knowledge, unique experiences, and a fresh perspective that will certainly serve our community well. I look forward to the valuable contributions to the practice of respiratory therapy that the Journal will continue to make under Justin’s leadership.

REFERENCES


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Simulation use in paediatric student respiratory therapy training

Catharine M. Walsh, MD, MEd, PhD, FRCP, Katherine S. Reise, RRT, BHSc, Roger Correia, BSc, RRT, MHS

At SickKids it is a perennial challenge for clinical leads and preceptors to ensure that student respiratory therapists (SRTs) acquire the entire scope of the paediatric skill set as set out by the 2016 National Competency Profile. As such, simulation has historically been used to supplement the clinical experience for SRTs at Sick Kids; however, the extent to which simulation-based education can replace clinical experience is not clearly established in the literature. At SickKids, we have created an alternative paediatric rotation where the percentage of time spent in the simulation environment is greater than in the traditional, clinical-based rotation. We hypothesize that there should be comparable levels of performance in a simulated setting between students in clinical and simulation-based rotations, as well as comparable measures of self-reported values for cognitive load, self-appraisal, and self-efficacy. Thus far, we have enrolled 59 students, with 54 completing postclinical rotation testing. Follow-up retention testing has been complicated by geographical factors. Following data analysis, we will publish our findings.

Key Words: paediatric care; respiratory therapy; clinical education; simulation; performance

Some of the most challenging clinical competencies to acquire for student respiratory therapists (SRTs) are competencies (skills) in the paediatric population. In Ontario, over the last decade, there has been a consistent struggle for paediatric hospitals to find paediatric training placements as respiratory therapy (RT) programs increase their class sizes and/or new academic centres launch RT programs. Competition for the limited paediatric sites is high. RT departments in paediatric hospitals have attempted to accommodate growing SRT numbers but in doing so have shortened the clinical placement and/or have added more SRTs into the environment. This has decreased the opportunities for SRTs to gain skills in less frequent events (such as intubation). Challenges that further compound the issue are: patient safety or improvement initiatives that may limit student involvement, the movement of the Canadian Medical Association to a competency-based objectives program [1], and the growth of interprofessional education requests at paediatric teaching hospitals. Competition for SRT clinical training in the paediatric population is a perennial challenge.

At SickKids (Toronto, Ontario), we are the busiest and largest paediatric centre in Canada. In the 41-bed critical care unit, 90% of patients receive a form of respiratory support; 50%-60% are supported by non-invasive or invasive ventilation [2]. SRTs spend 2 or 3 weeks at SickKids in paediatrics exclusively; those that complete 2 weeks of training at SickKids also complete additional paediatric training at Holland-Bloorview Kids Rehabilitation Hospital. Despite the large volume of patients and acuity, SRTs continue to struggle to complete the paediatric skills set out in the 2011 National Competency Profile. For many competencies, SRTs may encounter only one clinical opportunity to participate in care during their training. On occasion, skills can be missed due to no current opportunity and/or specific skills may not even be practiced at a site due to preferences in clinical management strategies. The reality is that low-frequency, high-stakes clinical skills and events require SRTs to be at the right place, at the right time, and with the right people. Guaranteeing clinical opportunities to practice all skills is simply not feasible. The 2016 National Competency Framework looks to address these limitations with iterative changes [3], though many of the paediatric skills still required to be evaluated in the clinical setting will continue to pose challenges.

Given the role of RTs in high-stakes clinical situations and in life-sustaining treatments, it is a natural fit for simulation to have a key role in SRT education and to be used to better prepare SRTs for clinical duties. For nursing students, simulation has been shown to provide an avenue in which students can safely encounter situations where patient safety is compromised, and where they can foster the development of patient safety competencies [4]. Many institutions offering an RT program have made simulation an essential component of their training to prepare for clinical practice; a literature review has shown that the use of simulation in paediatrics has been successfully integrated in curriculums that lead to increased opportunity for trainees to deliberately practice skills and foster mastery learning across a spectrum of clinical situations [5]. The next progressive step would be to have greater integration of SRTs in simulation training during their clinical practice at the in-situ (hospital) level. At SickKids, simulation has been used as an education tool during SRT paediatric training for 10 years, typically in a half-day session at the mid-point of the clinical rotation. The session is hosted largely in keeping with key recommendations from the practice guideline Advisory group recommendations on the use of clinical simulation in respiratory therapy education, which are: fostering a safe place to make mistakes, establishing trust within the circle of participants, and encouraging rich debriefing discussion [6]. The session is often perceived to add additional value by both instructors and SRTs alike. From the instructor standpoint, the Canadian Association of Schools of Nursing guidelines highlight why simulation is most beneficial for specialty rotations: planned, predictable, and controlled by the instructor; delivered consistently from one student to another within a learning group; communication can be practiced among a limited number of healthcare providers; and allows students to make errors and learn from them without harm to patients [7]. For SRTs, many enjoy it as an experience that promotes additional areas for clinical review and self-reflection. These experiences are captured on an 18-item survey questionnaire and 4 open-ended questions that students complete following their simulation-based education session [8] as well as feedback that is received from academic institutions who send their students to Sickkids. Often, SRTs comment that their clinical experience allows them to apply a better “perceived reality” to the scenarios and role-play in a more genuine manner than they could previously at their school.

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Simulation use in paediatric student respiratory therapy training

Considering the limits of clinical time and success with simulation training at SickKids, a 2-week program was created for SRTs that uses a larger proportion of in-situ simulation. This has been provided for SRTs who otherwise would not have a major paediatric centre placement when maximum clinical training capacity was reached at SickKids. In the first week, SRTs are integrated into the clinical environment intermittently and complete a structured paediatric curriculum that integrates simulation at both low-fidelity and high-fidelity levels. The curriculum and simulations were designed with attentiveness to ensure that the 2011 competencies were broadly being addressed. This training model applies the principles of just-in-time-training that promote higher levels of learner engagement [9], learner confidence, and performance once working with patients [10]. The training provided in week 1 allows faster integration of the SRTs during week 2 into the clinical training environment and subsequent achievement of competencies. Specifically, for low-frequency, high-stakes skills that are challenging to achieve in a clinical rotation, simulation is an alternative method to provide training to SRTs for paediatric skills.

In medical education and training, simulation is now a widely accepted educational strategy used to supplement the curriculum of students and trainees; however, the impact of simulation on clinical performance, and educational strategy used to supplement the curriculum of students and mentors of competencies. Specifically, for low-frequency, high-stakes skills that are challenging to achieve in a clinical rotation, simulation is an alternative method to provide training to SRTs for paediatric skills.

The training provided in week 1 allows faster integration of the SRTs during week 2 into the clinical training environment and subsequent achievement of competencies. Specifically, for low-frequency, high-stakes skills that are challenging to achieve in a clinical rotation, simulation is an alternative method to provide training to SRTs for paediatric skills.

The literature related to simulation in RT practice is limited to respiratory therapists participating in simulations as an emergency response in the context of a team. At SickKids, we saw an opportunity to evaluate and compare SRT performance at the end of the 2 differing clinical training models previously described: a simulation-based training and a traditional, clinically based training model. Our study aims to measure performance of these 2 groups in basic paediatric airway management skills in a simulated setting; knowledge with respect to airway management using multiple-choice questions; and perceived self-efficacy, cognitive load, and self-appraisal.

We chose to evaluate SRTs in airway skills since these skills are among the more likely paediatric skills that RTs working in a general hospital would be expected to perform and the ones that potentially have the greatest risk of adverse patient outcomes if not performed adequately. To date, we have enrolled 59 participants and completed simulations with 54 of them immediately after their clinical rotation. We have followed up with retention data collection with approximately half of the students; a significant obstacle and factor has been securing both time and travel for students to complete the retention (many students are located more than 200 km from SickKids). We hypothesize that the SRTs who complete a simulation-based paediatric training curriculum will demonstrate comparable performance to SRTs who receive clinical-based training when evaluating basic paediatric airway management skills, as well as similar knowledge, self-efficacy, cognitive load, and self-appraisal. We hope that the results open the door to additional study and acceptance that simulation must be considered an alternative and acceptable training method, particularly for low-frequency skills. Simulation time replacing clinical time becomes an irrelevant point of discussion if the clinical opportunities are encountered inconsistently or rarely by SRTs in their clinical training course. There is little reason to presume that the outcomes achieved in other health professions would not result in similar outcomes with SRTs.

DECLARATION OF INTEREST

The authors report no conflicts of interest.

REFERENCES

8. The Learning Institute. Simulation program evaluation. The Hospital for Sick Children. 2017. Available at: https://surveys.sickkids.ca/surveys/?s=3DTMLT4TLc8
Simulation Specialists: setting the stage for a new role for Respiratory Therapists in education?

Jessica Bernard BSc. (Hons), RRT

Simulation education utilizes simulated patients and environments to enhance learning, confidence, critical thinking, and communication skills, preparing learners for clinical practice [1, 2]. Immersive simulation requires learners to engage in scenarios as if they were occurring in the real world; thus, it is important that environments, procedures, and patient simulators are as realistic and comprehensive as possible [3].

Over the course of my time at a multidisciplinary postsecondary institution, I have recognized that simulation education roles in Canada are often occupied by nursing professionals. Despite this trend, it is my belief that the proficiencies that respiratory therapists possess translate well into simulation education, specifically into the role of "Simulation Specialist." Simulation education provides a stage on which we can demonstrate our extensive scope of practice and promote respiratory therapy as a profession. A consistent respiratory therapy presence on the simulation team has the ability to increase team interprofessionalism, enhance team effectiveness, and support learner outcomes. I believe that respiratory therapists’ clinical knowledge, interprofessional skills, innovation, technological savviness, and responsiveness in dynamic situations are attributes that when combined create exceptional simulation specialists.

This commentary is drawn from my experiences. Recognizing that the simulation specialist role may differ greatly across postsecondary institutions and hospitals, it is important to define my current position.

As a respiratory therapist, I have become accustomed to explaining my role to colleagues and friends and I now find myself explaining not one, but two career paths. I jokingly, but not inaccurately, describe the simulation specialist role as working in educational theatre. Part screenwriter, director, technical advisor, camera operator, casting director, special effects creator, and actor, a simulation specialist is involved in all steps of immersive simulation from scenario development to delivery.

Simulation environments and equipment vary among institutions but even those with the most ideal facilities and latest technology may not be optimizing the potential of these resources. Simulation specialists need to possess a specific body of knowledge pertaining to the functionality of simulators and audio-visual equipment, which helps to maximize resource performance and aids in the creation of realistic environments. Instructor readiness to facilitate simulation-based learning requires learners to engage in scenarios as if they were occurring in the real world; thus, it is important that environments, procedures, and patient simulators are as realistic and comprehensive as possible [3].

As part of their role, simulation specialists often incorporate the application of mock injuries (moulage), simulated bodily fluids, and even scents into scenarios in preparation for case delivery. During delivery, the operational components of the role include driving audio-visual and simulator software, manipulating vital signs, providing verbal responses in accordance with learner intervention, and even acting as a confederate within the simulation environment. A simulation specialist’s skill set, coupled with clinical knowledge, allows for informative contribution to the construction and revision of scenarios, while optimizing the immersive learning environment. Singh et al. [5] demonstrated that immersive simulated learning environments increase clinical and technical skills as well as instill confidence in learners. Having an understanding of the simulation specialist role and its importance to the simulation education team, I will now explore the proficiencies respiratory therapists bring to it.

As respiratory therapists, we work in a variety of settings with diverse patient populations giving us an understanding of patient presentation and pathological evolution [6, 7]. Although specialized in the respiratory and cardiopulmonary systems, our in-depth curriculum and propensity for peer learning instill an enhanced knowledge base in all physiological systems. Furthermore, out of necessity for our various patient populations, we often maintain additional certifications such as Neonatal Resuscitation Program and Advanced Cardiac Life Support. As a simulation specialist, this clinical knowledge supports development, preparation, and delivery of scenarios—supporting efforts to maintain accuracy and realism during simulations. For example, from an acting perspective, knowing how a pediatric patient presents in respiratory distress helps guide our performance when voicing the patient. From a special effects vantage, understanding the physical ramifications of a motor vehicle accident supports the recreation of injuries using moulage. Moreover, during case delivery an understanding of clinical practice allows simulation specialists to identify areas of excellence and improvement in learner performance. These observations of learner performance supplement those recognized by faculty, helping add depth and focus to postsimulation debriefs.

Respiratory therapists work as part of a diverse, interprofessional team. We are expert providers of care in the areas of oxygenation, ventilation, and resuscitation and are often called upon to mentor multidisciplinary staff and students [6]. Similarly, simulation specialists work alongside a diverse team of simulation professionals, faculty, and learners. In my experience, simulation specialists as a consistent presence in simulation are looked upon to educate peers and learners in simulation education pedagogy as well as clinical practices. Opportunities to review skills with peers and learners prior to scenario delivery gives way to interprofessional teaching and learning. Simin et al. [8] demonstrated that interprofessional learning improves collaboration, teamwork, and competency in skills, creating clinically prepared learners. Respiratory therapists bring their interprofessional experiences to the role of simulation specialist as well as diversify the simulation team simply by being a part of it.

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Equipped with the ability to improvise with supplies at hand, respiratory therapists are often viewed as the “MacGyvers” of the medical world. From repairing torn pilot lines to discovering yet another use for pink (waterproof) tape, we are resourceful and innovative with the materials available to us. Although simulation technology has come a long way, technological barriers remain and difficulty replicating certain aspects of healthcare persist. For instance, without circulating blood volume, how can we communicate a dynamic oxygen saturation for a simulated patient in a prehospital environment? Or, how can we simulate partial closure of a tracheostomy stoma during a tracheostomy change on a simulator with a static stoma site? When faced with these situations, simulation specialists, like respiratory therapists, are forced to be innovative and creative, utilizing equipment already on hand in unique ways or trial new solutions. As more academic programs adopt simulation education as a learning tool, more questions regarding simulation delivery will arise. Respiratory therapists have the opportunity to be pioneers in simulation, using innovation and resourcefulness to drive simulation education in new and exciting directions.

The propulsion of simulation education is dependent on the relationship between innovation and technology. Respiratory therapists have a long history of inventively implementing technology into our practices [9]. Generally, we are routinely operating and troubleshooting technological devices, as well as integrating them into our patient care. Our technological savviness allows us to switch between interfaces with relative ease and operate several pieces of technology simultaneously.

Familiarity and comfortability with technology is advantageous in the simulation specialist role. Equipped with knowledge surrounding the capabilities and limitations of technological resources, simulation specialists are liberated in the exploration of what the future of simulation offers. Recently, by maximizing our technological solutions, my simulation team has trialed mobile simulations that occur outside the simulation laboratory. Within the confines of our institution, we have created a travelling educational theatre group, allowing us to deliver scenarios in the homecare setting, outdoors, and even in the back of an ambulance. As a result, situations such as patient transports that were previously difficult to emulate are not only possible, but more immersive than ever. The technical savviness displayed by simulation specialists ensures that scenarios occur with minimal interruption and that simulation education evolves alongside technology.

As respiratory therapists, we work in fast-paced, dynamic environments. One scenario you may relate to is when a trauma patient arrives, one of the three pages on your hip goes off, and there is a code blue called overhead. At times like this, it is imperative that respiratory therapists use critical thinking and situational awareness to evaluate, prioritize, and react appropriately [6]. In simulation, the decisions we make do not affect patient outcomes, but learner outcomes instead. During case delivery, simulation specialists must simultaneously operate camera angles and system software while collaborating with faculty to manipulate the simulator’s physiological and verbal response in accordance with learner intervention. If you have worked in simulation, you know that things rarely go as planned. From learners asking unanticipated questions to simulators losing power during a scenario, simulation specialists are forced to react, troubleshoot, and improvise quickly to ensure learning outcomes are met. During a simulation, my team was forced to hit the ground running with this concept, quite literally. In an attempt to maintain the radio frequency connection between a simulator and its controlling tablet, we were forced to chase an ambulance through a parking lot. Pursuing emergency vehicles is not necessarily part of the job description, but as they say, the show must go on.

It has been my experience that simulation specialists add value to the simulation education team. Armed with a unique skill set, respiratory therapists make exceptional simulation specialists in postsecondary institutions that provide simulation for a variety of programs. Respiratory therapists bring strength and diversity to the simulation team with their clinical knowledge, interprofessionalism, innovation, technological savviness, and responsiveness in dynamic situations. By pushing the boundaries of simulation, respiratory therapists play an imperative role in creating immersive learning environments. These environments allow learners to focus on the educational objectives set out for them and gain competence and confidence before entering clinical practice. In the future, it would be valuable to evaluate the characteristics desired for simulation specialist positions across institutions. This would provide additional perspective on the desirability of respiratory therapists in this role.

The diversification of the simulation team to include simulation specialists provides an opportunity to expand respiratory therapists’ presence in interprofessional education. In doing so, respiratory therapists have the ability to help forge the future of simulation as well as the simulation specialist role itself. As Shakespeare once wrote “all the world’s a stage,” and although it is not currently the case for simulation education, with respiratory therapists at the helm of the simulation specialist role, this may not be as impossible as it seems.

DECLARATION OF INTEREST

The author reports no conflicts of interest.

REFERENCES


[Accessed 3 September 2017]
Simulation—an invaluable tool in the respiratory therapist’s tool kit

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On a daily basis, respiratory therapists use both literal and figurative tools to accomplish their specialized mission in healthcare. Whether it is diagnostic equipment, therapeutic equipment, or technologies for furthering learning, respiratory therapists rely on a wide variety of tools. For many reasons, simulation can be an invaluable tool to respiratory therapists across all practice settings.

Some people may envision a room with a mannequin and healthcare professionals practicing life-saving interventions when they hear the term simulation. While this is a common and longstanding conception of simulation, the field of simulation has evolved considerably beyond this and the opportunities it presents the profession have expanded concurrently. As such, this commentary will present and discuss simulation as a modality rather than as one specific activity. I hope to highlight some of the areas where simulation holds great potential in enhancing respiratory therapy practice.

A TOOL FOR SOLVING PROBLEMS AND OPTIMIZING CARE

When approached as a modality rather than a specific activity, simulation provides a tool to objectively approach problems or challenges that health professionals face in providing care. Simulation, in this sense, refers to replicating clinical care or an existing process as realistically as possible. By placing the focus of the simulation on process, system, and environmentally oriented aspects, both participants and observers gain critical insights into issues that need to be addressed and opportunities for optimization arise.

Perhaps even more exciting is the opportunity to build knowledge and understanding regarding clinical spaces, workflow, and care processes that do not yet exist. Using simulation to test drive a new clinical space or to formulate or trial a proposed care process can be very rewarding.

In my work at McMaster Children’s Hospital, I have been involved in conducting simulations for the purpose of learning about process, system, and environmentally oriented aspects in our care environments. McMaster Children’s Hospital has a long history of using simulation to gain critical insights into new clinical spaces and for the development and optimization of care processes. Following construction of and prior to opening our current Pediatric Intensive Care Unit (ICU), a full-day comprehensive, multidisciplinary simulation was undertaken. By setting up the new unit as a fully simulated ICU, we were provided with priceless insights into how patient care would “look and feel” once our real patients were admitted. From this, we were able to identify and address multiple latent threats to patient safety and were provided with the opportunity to make reconfigurations and adjustments within the space before actual care ever took place there.

With the development of our new Pediatric Emergency Department, simulation activities started as part of the design phase, and continued with extensive process-focused or system-focused simulation in our new department prior to moving in. Through these simulations, multiple improvements in patient safety, care processes, and workflow were realized.

Most recently, early this summer, we held simulations in a patient room of our newly established Pediatric Complex Care Unit. The goal of this unit is to improve care and service delivery by cohorting our tracheostomy and chronic ventilation patients who do not require ICU care. The goal of the simulations was to establish the optimal configuration for these patient rooms and the necessary supplies within. These simulations involved the participation of physicians, nurses, respiratory therapists, infection control practitioners, management, business clerks, as well as parents of children with tracheostomy. Through two days of simulation, we gathered data and insights, made adjustments through rapid Plan–Do–Study–Act cycles, and repeated our simulation clinical cases to test our adjustments and continue towards an optimized solution.

A TOOL FOR ENHANCING INTERPROFESSIONAL COMPETENCIES AND COLLABORATION

Regardless of clinical environment or context, simulation can provide a medium for the development and refinement of interprofessional competencies. Interprofessional simulation provides the opportunity for teams to practice and improve their teamwork and communication skills. Furthermore, simulation has been shown to provide a medium for healthcare providers to explore collaborative ways to improve communicative aspects of clinical care.

A TOOL TO PRACTICE SKILLS

While simulation has historically focused on the learning and practice of resuscitation skills, respiratory therapists now have the opportunity to harness simulation as a means to practice the complete range of clinical skills and procedures within the respiratory therapist’s scope of practice.

By using simulation in its various forms, respiratory therapists have the opportunity to practice clinical skills without the presence of an actual patient and at a time that can be scheduled or predicted. Respiratory therapists can use simulation to advance their procedural skills, approaching mastery-level proficiency without any risk to an actual patient. Furthermore, simulated practice allows for just-in-time rehearsal of a given skill, like a respiratory therapist perfecting the insertion of a chest tube when assigned to an ICU patient who is at high risk of developing the need for an urgent chest tube.

For a moment, consider elite athletes, elite musicians, elite dancers, and the like and think about the amount of time that they spend in planning and practicing. With the advent of simulation, respiratory therapists now have the opportunity to practice clinical skills, approaching mastery-level proficiency without any risk to an actual patient. Furthermore, simulated practice allows for just-in-time rehearsal of a given skill, like a respiratory therapist perfecting the insertion of a chest tube when assigned to an ICU patient who is at high risk of developing the need for an urgent chest tube.

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Can J Respir Ther Vol 53 No 4 Fall 2017
practice, both individually and as a team. If we truly desire to bring the same degree of excellence to our patients, how could we believe that we do not need to practice with the same diligence and intensity? Respiratory therapists may not need to practice skills and situations that occur every day in our given area of practice, but what about things that are not encountered frequently? As key members of the healthcare community, respiratory therapists can play a crucial role in advancing and promoting the need to practice within our teams and beyond.

It is understood that the types of skills practiced, and the frequency at which those skills are practiced, should be influenced by each individual therapist’s learning goals and needs [6]. Practice setting and scope will also be a key factor in influencing skills practice, as well as institutionally mandated requirements. Whether practicing individually or as a team, using simulation to practice skills that are high acuity in nature and that are infrequently used, may yield the most gain for practicing respiratory therapists.

A TOOL FOR THE EVALUATION AND ASSESSMENT OF CLINICAL COMPETENCIES

Since its inception, the predominant use of simulation has been for training purposes. In recent years we have seen an evolution towards the use of simulation as a mechanism for evaluating and assessing the clinical competency of individual clinicians [7].

In undergraduate nursing education, we are seeing the beginnings of a move towards the inclusion of increasing amounts of simulation for summative evaluation purposes [8]. Various health professional bodies and academic institutions are advocating for or have implemented simulation as a substitute for a portion of clinical training hours that were traditionally accomplished through an actual clinical placement. Furthermore, simulation is being used more and more to address clinical competencies that could not be acquired during a particular clinical practicum because of no clinical opportunity to acquire the competency in question. Instead of being subject to the luck of the draw, simulation can fill in the gaps created by clinical variability to ensure that all required competencies can be achieved and demonstrated. In July, the Royal College of Physicians and Surgeons of Canada launched the first stages of a novel approach to how it assesses specialist physicians for credentialing based specifically on the achievement of a set of competencies required for the practice of medicine. In July, the Royal College of Physicians and Surgeons of Canada launched the first stages of a novel approach to how it assesses specialist physicians for credentialing based specifically on the achievement of a set of competencies rather than being defined by the traditional time-based criteria [9]. This provides one more example of this trend towards the increasing measurement of competencies in health professionals.

Whether medicine, nursing, or respiratory therapy, such competency assessments can only take place within two contexts: during actual clinical practice or simulated clinical practice. If health professions use simulated clinical hours as a valid substitute for clinical placement hours, then it stands to reason that this will naturally lend itself to an overall increase in summative evaluations accomplished through simulation.

Recent studies and ongoing research are beginning to advise us how best to use simulation for evaluative purposes. The literature suggests that simulation will be increasingly used as an evaluative tool across the professional lifespan [8]. From the graduation requirements of our health profession educational programs, to licensure requirements for entry to practice, to initial and ongoing credentialing by employers, healthcare professionals can expect to see increasing use of simulation for evaluation and assessment of clinical competencies [7].

A TOOL FOR EDUCATING OUR PATIENTS AND THEIR FAMILIES

Simulation is most often considered in terms of its use for the education of health profession trainees and for professional development amongst registered professionals. Despite these two groups as its target population, simulation can be extremely valuable as a modality for educating health profession trainees and for professional development amongst healthcare simulation professionals yet another tool to accomplish this.

Respiratory therapists can harness the power of simulation across all practice settings. Simulation simply refers to replicating clinical care or practice settings. Simulation simply refers to replicating clinical care or practice settings. Simulation simply refers to replicating clinical care or practice settings. Simulation simply refers to replicating clinical care or practice settings. Simulation simply refers to replicating clinical care or practice settings.

Simulation is increasingly used as an objective means for assessing and evaluating healthcare competencies. When providing meaningful, effective education to our patients and their families, simulation offers health professionals yet another tool to accomplish this.

Simulation can be used to enhance interprofessional competencies and collaboration. Simulation creates a means for healthcare professionals to learn and practice skills without any risk of harm. We will see simulation increasingly used as an objective means for assessing and evaluating healthcare competencies. When providing meaningful, effective education to our patients and their families, simulation offers health professionals yet another tool to accomplish this.

The author reports no conflicts of interest.

REFERENCES


Towards an enhanced conceptualization of fidelity for instructional design in simulation-based respiratory therapy education

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Despite the apparent centrality of fidelity to clinical simulation instructional design and practice in respiratory therapy education, it remains one of most contested constructs in the simulation literature. Fidelity has been described as educationally under-theorized resulting in an emphasis often being placed on technological sophistication rather than theory-informed design, particularly in respiratory therapy. This article critically examines various conceptualizations of fidelity in the field of clinical simulation in an effort to inform its instructional design practices. We adopt the perspective that a shift in the theoretical lens from individualistic to a more socio-cultural orientation may better support our understanding of learning in simulation environments. The instructional design framework (IDF) developed by the Canadian Network for Simulation in Healthcare provides a solid pedagogical foundation on which to base clinical simulations design. The IDF has also been a platform upon which designers can frame the characteristics of simulation environments. We propose an enhanced IDF informed by contemporary education theory describing the joint learning relationship that exists between learners and technology-enhanced learning environments. The enhanced IDF includes each of the interdependent design elements in the original model and incorporates a socio-culturally informed conceptualization of fidelity. The framework will be useful in fostering the relationships that support an effective clinical simulation learning environment. This will be of particular value to practitioners, researchers, and theorists in the clinical simulation-based respiratory therapy education field.

Key Words: simulation; education; fidelity; respiratory therapy; instructional design

BACKGROUND

Long established as an approach to training in aviation and other industries, the use of clinical simulation in the education of health professionals has expanded remarkably in recent decades [1–3]. The usefulness of learning within simulated environments as a means of improving clinical and nonclinical skills and reducing risks to patients has become well established in the literature [3–6]. While clinical simulation has been a useful tool for improving technical skills for decades, its prominence as a strategy for development of competencies related to patient safety and teamwork is more recent [1, 7, 8]. Technological advances in simulation have further prompted its adoption to address the relative scarcity of opportunities to practice many clinical procedures in clinical settings and the risk that practicing on patients may entail [6].

Respiratory therapy is a competency-based profession, where practice occurs in clinical settings. Respiratory therapy education, therefore, necessarily occurs in both the classroom and in clinical practice environments, through which students are required to learn the skills, attitudes, and behaviours of professional practice. Clinical simulation-based education has, in part, been rapidly adopted by respiratory therapy educational programs because it offers an authentic environment for learners to develop professional skills without the risk of causing harm to actual patients [9].

Clinical simulation employs a technology-enabled leaning environment (TELE) to help replace or amplify real experiences with guided immersive experiences that are intended to replicate some degree of the real world [2]. It is often assumed that clinical simulation leads to valuable learning experiences because of its effectiveness in replicating real-life scenarios [1]. Fidelity is a common measure for the degree of realism and is typically considered an essential aspect of the technology that has substantial impact on learning [10, 11]. For simulation to be immersive and replicate the real world, it seems logical that a high degree of realism, or likeness to real life, would be essential.

Despite the apparent centrality of the concept of fidelity to clinical simulation in respiratory therapy education, the concept has been used inconsistently, while at the same time it is widely considered in the simulation literature [9, 12]. Moreover, clinical simulation has remained educationally under-theorized with emphasis placed on technological sophistication rather than theory-informed design [6, 9]. As no consistent conceptualization of fidelity in clinical simulation is evident in the literature, the relationship between learning and fidelity therefore remains not well understood [4, 11].

Some frameworks for instructional design in clinical simulation propose best practices for practitioners in which the contested concept of fidelity features prominently [e.g., 11, 13]. Building on a narrative review of the clinical simulation literature [14], this article offers a critical examination of emergent conceptualizations of fidelity in an effort to inform instructional design practices in the field of respiratory therapy education.

Shahoumian et al. [6] suggested that a shift in the theoretical lens from individualistic to a more socio-cultural orientation may best support our understanding of the learning that occurs in simulation environments. By adopting a socio-cultural perspective, it is recognized that learning is embodied, relational, and situated in social and cultural contexts. The perspectives offered in this paper are informed by the position of Jonassen et al. [15] who suggested a refocus in the debate between objectivist and instructionist conceptions of learning that exist in the field of instructional design for environments enhanced with technology. Jonassen et al. [15] posited that learning is contextual and that the experience of the learner is based on their experience with the environment. This idea that learning is distributed between the learner,
the technology, and the context is supported by contemporary theories of knowledge building and distributed cognition [16–18]. Consistent with this perspective we contend that in the context of clinical simulation in respiratory therapy, instructional design should focus on supporting learner cognition with TELE rather than simply expecting that learning occurs as a result of technology.

DIFFERENTIATING FIDELITY ALONG TECHNOLOGIC LINES

In outlining a future vision of simulation, Gaba [2] offered 11 dimensions that represent key attributes of clinical simulation. These dimensions provided a broad view of the design considerations of simulated environments, encompassing the purpose, educational level, and discipline of the participant, and the aspects of environment being simulated. Within these dimensions technology is identified as a key attribute, which can be differentiated along a continuum spanning from role playing (at the lowest end), to electronic patients (e.g., mannequins), to realistic replication of the clinical environment (at the continuum’s highest end) [2]. While the term fidelity is not explicitly used to describe aspects of simulation here, the continuum represents technology-centric perspectives that have emerged in the field of clinical simulation. In particular, technology-centric perspectives on learning have previously been identified and problematized in the context of respiratory therapy clinical simulation practices [9]. The idea that the most lifelike technology may lead to the best learning outcomes might be implied in such perspectives, and indeed the correlation between the learning performance measures and the types of technology has also emerged as a subject of quantitative inquiry in the field [e.g., 19, 20]. It is most concerning that inquiry focusing on the qualities of the technology as a causal determinant of learning may fail to recognize the importance of learner experience with the environment. Our review of the literature suggests that clinical simulation practice is often being informed by literature that takes such a technology-centric perspective on learning.

In their systematic review of the effectiveness of clinical simulation Issenberg et al. [21] sought to identify the design features that best support cognitive and affective change and learning related to skills acquisition and professional competence. Of those included studies that reported on simulator fidelity, the degree of realism with which the simulator replicated complex clinical situations was found essential for improving learners’ perceptual skills or response to critical incidents. It should be noted that investigations included in the analysis defined high-fidelity as simulation technology that is responsive to user demands as opposed to those that simply remain static [3]. While seemingly encouraging, these results were based on a body of literature characterized by a narrowly defined conceptualization of fidelity and were not designed to sufficiently explain how or why learning occurred.

Following the results of their more recent meta-analysis on clinical simulation McGaghie et al. [10] presented best practices that educators “should know and use” (p. 51). Amongst these best practices McGaghie et al. [10] promoted the idea that the fidelity of the simulation technology needs be closely matched with educational goals of any given clinical simulation. For example, low-fidelity technology (e.g., simple task trainer, which are devices that simulate a single body part) may be used for learning procedural skills, whereas high-fidelity technology (e.g., lifelike full-body mannequins or virtual reality simulations with a high degree of realism) is best used for complex clinical events. The promotion of such design practices may be highly influential in cultivating the objectivist perspectives on fidelity that prevail in the field. Uncritical acceptance of these perspectives has likely been at the expense of adoption of more theory-informed design principles [6].

An analysis by Cook et al. [22] that considered the impact of various designs of computerized virtual patient simulation on learning offers additional insight. The findings of this analysis are in contrast with some of those commonly held conceptions in the field regarding the impact of fidelity on learning. While overall, the use of virtual patients was demonstrated to be associated with large positive effects, the analysis identified associations across a number of studies indicating neutral or negative associations of learning outcomes with increasing patient fidelity [22]. Such findings should lead us to question “whom, in what contexts, and for what outcomes greater realism is beneficial” [22].

Other critiques of the traditionally accepted construct of fidelity as either a high or low replication of reality are focused on its overemphasis on the technological aspects of simulation to the detriment of the broader instructional design [1]. Such a conceptualization also fails to recognize fidelity as a multidimensional construct [23]. This pervasive adoption of a technologically centered perspective throughout the health professions might be best contextualized by McGaghie et al. [10] who stated “medical education technology shapes and channels medical education policy as research advancements inform new ways to educate and evaluate doctors.” Educators should be concerned with how adopting such a conceptualization may negatively influence the instructional design of clinical simulations.

A CRITICAL LOOK AT AN INSTRUCTIONAL DESIGN FRAMEWORK FOR CLINICAL SIMULATION

In effort to account for the fact that clinical simulation is a complex concept, an instructional design framework (IDF) was developed by the Canadian Network for Simulation in Healthcare (CNSH) [11]. The IDF is intended to provide a solid pedagogical foundation on which to design the characteristic of a variety of clinical simulations. The IDF describes clinical simulation design as existing within four levels, where each encompasses a set of specific characteristics and where each progressive level constitutes the foundation for the next. The framework reveals the principal mode of delivery of instruction (level 1), the simulation mode used for teaching and learning (level 2), the instructional method (level 3), and the presentation (level 4) [11]. The concept of fidelity is embedded with level 4, or presentation, which refers to how the simulation activity is shaped and designed in ways other than through instructional methods (e.g., choice of media) [11].

Indeed the IDF addresses a wide variety of factors that may impact the clinical simulation learning environment and that are worthy of consideration in a design. The authors note that the IDF fills a void in the area of clinical simulation, and that it is hoped that it will “serve as a catalyst for the simulation community ... to engage in a discussion about the educational characteristics of simulation and to encourage future research in this field” [11]. Heeding those words it seems reasonable that the conceptualization of fidelity presented within the IDF be evaluated, particularly in light of the limitations of earlier conceptualizations already noted. The IDF defines fidelity as “the realism of the experience” [11], a conceptualization that has been adopted from the aviation industry [12]. Given its prominence in the framework as an “intrinsic characteristic of simulation ... that can affect learning” [11], we carefully consider its origins and applicability to the clinical simulation context.

Responding to calls for a reconceptualization of fidelity in simulation, the Fidelity Implementation Study Group (FISG) presented their expert recommendations on a new taxonomy for use in the field of aviation [12]. Recognizing the subjective limitations of traditional low to high definitions of fidelity, Gross [12] identified the need to develop a more objective measure to accurately describe the construct. Fidelity was thus redefined as “the degree to which a model or simulation reproduces the state and behaviour of a real world object or the perception of a real world object ... in a measurable or perceivable manner” [12]. The new definition further explains that any description of fidelity should be made in relation to the measures, standards, or perceptions used to evaluate it. What becomes problematic then is determining how those quantitative measures, standards, or perceptions should be determined and described. Gross [12] contends that to address such measurement issues a definition of the real world must be established that enables comparison between it and the simulation.

Recognizing that using the real world as a comparative is too cumbersome and complex of a measure to be useful, more commonly understood and practical measures need to be employed. Gross [12] suggested that in the field of aviation the minimal characteristics of real-world features that are needed for a given educational experience should be used as a proxy fidelity referent. Gross [12] expounded on the means of determining realism in aviation by contending that there are specific dimensions and features upon which to base any comparative analysis of fidelity with the
real world. These proxy referents include: physical fidelity, visual fidelity, audio fidelity, motion, environment, temporal fidelity, behaviour, and aggregation. The FISG also suggested that analysis of fidelity should be based in two metrics: resolution and accuracy [12]. Resolution refers to the whether the referent is reproduced in the simulation and accuracy to the degree in which the referent is reproduced in the simulation.

Chiniara et al. [11] extrapolated the ideas proposed by Gross [12] to the CNSH framework for simulation in healthcare. Chiniara et al. [11] suggested that, for example, using a task trainer such as a lifelike arm might provide sufficient fidelity to recreate the experience of inserting an intravenous line. However, if the goal of the educational session was to include interaction with the patient, the fidelity of the simulation would, therefore, be insufficient. Moreover, Chiniara et al. [11] adapts the referents proposed by the FISG for use in the CNSH framework suggesting that physical, environmental, and temporal fidelity are appropriate measures on which to base comparisons of simulated environments with the real world. While the CNSH framework brings a variety of complex environmental design factors to the fore, the conceptualization of fidelity contained within it remains problematic. Specifically, the measurements and referents proposed by Chiniara et al. [11] are technology-centred and thus do not acknowledge the integrated nature of learning, technology, and the environment. This technologically centric approach to practice echoes that which has previously been noted to persist within the field of simulation-based respiratory therapy education [9]. A further reconceptualization of fidelity might therefore focus less on the attributes of the simulation technology and more on the attributes of the respiratory therapy learner and their experience with the technology [14].

MOVING BEYOND TECHNOLOGICAL CONCEPUTALIZATIONS OF FIDELITY

Maintaining focus on the technological attributes of the simulation design may come at the unfortunate cost of deemphasising the understanding that learning is situationally dependent [14]. In the field of respiratory therapy education, we might therefore broaden our conception of simulation technology as “multiple sets of affordances that are predicated on the perceptions of users and the context in which they are used” [15]. In doing so we should be prompted to think of the design features of simulation technology, including fidelity, as an integrated part of a learning environment. We propose an enhanced IDF for clinical simulation in respiratory therapy (see Figure 1) that incorporates a reconceptualization of fidelity, recognizing that what makes simulation lifelike or immersive is multidimensional, contextual, and perceptible. In the following, we elaborate on basic premise of this enhanced IDF, including blending multiple modes of realism, the interdependence of design elements, and the joint learning system.

Blending multiple modes of realism

Starting from the middle of Figure 1, we argue for an augmented conceptualization that recognizes the phenomenal, semantic, and physical aspects of fidelity as a means of discerning reality in designing clinical simulation environments. Laucken [24] forwarded three modes that she theorizes are each necessary to understand any situation that we encounter: physical thinking, semantical thinking, and phenomenal thinking. Recognising clinical simulation as a social practice, Dieckmann et al. [25] adopted Laucken’s theory to frame how one experiences a sense of reality in this context where participants interact with a complex network of learners, technical artifacts, and the environment. The physical mode concerns characteristics that are measurable (e.g., the weight of an infant mannequin). In this way physical fidelity might be described as the reality of simulator equipment, measurable elements of the environment, or physical aspects of movements of such characteristics [25]. The semantical mode concerns those parts of the simulation experience that are “facts only by human agreement” [25]. Semantical fidelity describes “concepts and their relationships ... presented as text, pictures, sounds,
or events” [25]. Semantical fidelity is therefore assured only when the information presented is interpretable as realistic (e.g., when a simulated patient’s heart stops beating it is also made to stop breathing as is natural). The third mode of reality is concerned with participants’ understanding of how the simulation event relates to another real situation, clinical practice for example (e.g., team interaction within a simulated trauma scenario feels lifelike despite obvious physical differences compared with real life). This phenomenal fidelity depends on the “emotions, beliefs, and self-aware cognitive states of rational thought” [25] experienced by participants in simulation.

Diekmann et al. [25] contended that a sense of phenomenal reality is more closely associated with the degree of semantic fidelity as opposed to physical fidelity. Participants therefore most readily accept limitations in physical fidelity compared with any lack of semantic fidelity, given that they understand how the simulation relates to their clinical practice and that it is plausible. By examining the perceptions of a group of clinical simulation participants regarding their learning experiences Shahoumian et al. [6] found that the complexity inherent in clinical simulation has begun to surface indicating that “individualistic learning theories are unable to capture the whole learning process in this versatile environment.” Interestingly, participants reported that their learning was most related to aspects of phenomenal fidelity as evidenced by the strong influence of collaboration, peer engagement, and reflection [6]. These findings echo a recent paradigm shift noted by Bleakley [26] in medical education—a movement from predominantly pedagogy-informing learning theories that are individualistic in nature and focused on autonomy (e.g., adult learning theory) towards social learning theories that are focused on collaboration.

In building on the three modes of realism proposed by Diekmann et al. [25], Rudolph et al. [27] noted that “skillful blending of the three ... will allow our trainees to ‘suspend disbelief’ that this is a situation with real relevance to them.” Advancing the idea that this reconceptualization might influence instructional design in clinical simulation, Rudolph et al. [27] also noted participant engagement is based on no single element of realism but assures that no single element "violates their expectations in a way that disrupts their engagement." These understandings call on us, in the field of respiratory therapy education, to reframe...
our conceptualizations of fidelity in clinical simulation. An augmented conceptualization that recognizes the phenomenal, semantic, and physical aspects of fidelity as a means of discerning reality will be useful in designing respiratory therapy simulation environments, including the use of available media that sufficiently address reality based on contextual needs. To that end we suggest incorporation of this conceptualization of fidelity into a redesigned and enhanced IDF for respiratory therapy, based on the CNSH model [11].

Interdependent design elements
The enhanced IDF proposed here includes the four levels of instructional design from the CNSH model (i.e., instructional medium, simulation modality, instructional method, presentation) but represents each as interdependent parts of the design, rather than as being discrete and existing along a priori scale. The enhanced IDF also incorporates a socio-culturally informed conceptualization of fidelity adopted from Dieckmann et al. [25] as a central design element. As such, each design element of the framework can be seen to relate to any aspect of fidelity (phenomenal, semantic, and physical). Recognition of this relationship can prompt designers to consider the relevance of each design element in facilitating sufficient realism for a given context and to ensure that no one element violates learner expectations. In doing so, fidelity needs to no longer be considered as a phenomenon to be compared with an external set of measurable proxy referents. Rather, it may be seen as a learner-centered lens through which other design elements may be contextually considered by the instructional designer. Further extending on the work of Chinniara et al. [11], who presented two charts to assist in the selection of appropriate media and simulation modalities, Figure 2 offers a guide to the design of presentation elements and fidelity based on the enhanced IDF.

The joint learning system
We contend that the learner, activity, and environment develop relationships as the joint learner system in learning situations, which we should consider in the instructional design process. Knowledge-building theory is predicated on the idea that knowledge is a social product, created by members of a community, and that it adds some type of value to that community [17]. Extending this to TELE, Kim and Reeves [28] offered a relevant lens through which learning with clinical simulation in respiratory therapy can be viewed. Their enhanced perspective sees technology as forming part of a joint learning system along with the learner and activity [28]. Kim and Reeves [28] explained that a relationship exists between the learner and the technology that grows over time. “Learning... is not a process that happens only at the beginning but is rather an ongoing process; learners discover more affordances of tools and even refine their own abilities as they master the tools and develop more effective distributive relationships.” Viewed in this way, fidelity may also be considered as providing insight into the relationship between the learner and the clinical simulation environment, highlighting the importance of also fostering a relationship that can support enhanced fidelity. The enhanced model not only incorporates a renewed conceptualization of fidelity as a central design element, but it also identifies the learner within the joint learning system. This inclusion highlights those relationships within the joint learner system that need to be key considerations in the instructional design process. We contend that the inclusion of this reconceptualization of fidelity as a design element can therefore be useful in fostering the relationships that support effective clinical simulation learning environments in respiratory therapy.

CONCLUSION
In respiratory therapy, fidelity is frequently conceptualized as the degree of realism of the technology in clinical simulation, and higher physical fidelity often felt to lead to the best learning outcomes. Informed by educational theory, this paper identified a commonly held technologically centered conceptualization of fidelity and examined the limitations of literature that suggest high physical fidelity alone relates to more effective learning. This paper also discussed alternate conceptualizations of fidelity, and noted that taking a socio-cultural perspective can better inform those conceptualizations and our understanding of how we depict and theorize the learning that occurs in clinical simulation.

A conceptualization of fidelity was promoted that encompasses three modes of thought: physical, semantic, and phenomenal. This conceptualization may be quite useful in respiratory therapy if viewed as a lens through which we can understand the joint relationship that exists between the learner and the clinical simulation environment. The proposed IDF for respiratory therapy builds on earlier iteration developed by the CNSH. The framework, augmented by a socio-cultural informed definition of fidelity and informed by educational theory on knowledge-building in TELE, may be of value to practitioners, researchers, and theorists in the field of simulation-based respiratory therapy education.

DECLARATION OF INTEREST
The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

REFERENCES
The effects of introducing high-fidelity simulation to preclinical student respiratory therapists

David Wall RRT, BSc, MEd


Introduction: This action research study examines the use of high-fidelity simulation (HFS) in a 3-year Respiratory Therapy advanced diploma program offered at a community college located in southwestern Ontario. It seeks to identify if the use of preclinical experiential learning offered through various HFS scenarios had an impact on learners’ ability to transition into clinical practicum. The experiential learning theory provided the framework that guided this study as it sought to determine the effect, if any, of HFS on confidence and student anxiety.

Methods: A mixed-method research approach to data collection was used to assess both qualitative and quantitative data. A presimulation, Likert-type questionnaire was completed by 20 participants and utilized to identify learning styles and anxiety with experiential learning activities. The qualitative component of the study involved a focus group exploring four participant’s impressions of how HFS affected their ability, anxiety, and competence in preparation for their clinical rotation. Finally, following the focus of action research, the researcher’s observations and journaling were used as a method to improve the future delivery and practice of simulation at the researcher’s institution.

Results: The results of this research project suggest that learners have an increased level of confidence following simulation participation, but that their anxiety levels have not changed when thinking about transitioning into clinical practicum.

Conclusion: Ongoing research focusing on how this model affects student respiratory therapists’ abilities and performance in clinical practicum is needed.

Key Words: respiratory therapy; simulation; confidence; anxiety; experiential learning; critical thinking

INTRODUCTION

Despite the reality of larger class sizes, limited clinical sites, and growing knowledge base and competency profile, preceptors, clinical educators, and employers are asking educators to do more to prepare students for the profession of respiratory therapy. This demand for higher level students and graduates deserves attention and dedication by educators to match expectations with diverse and innovative learning modalities.

There is little argument that clinical education has merit and is a vital component of many healthcare professions’ training. The increasingly complex roles of today’s healthcare clinicians require a much higher level of critical thinking and clinical judgment [1]. To achieve this level of thinking, learners require a chance to apply their knowledge and skills in a setting that is relevant to their practice. Kolb’s experiential learning theory suggests that effective learning entails the possession of four key concepts: concrete experience, reflective observation, abstract conceptualization, and active experimentation [2]. One of the key issues still facing experiential education theory and critical pedagogy is its implementation within the postsecondary classroom [3]. Historically, dissemination of knowledge to university and college students came primarily in the form of lectures, without regard to how students learn. Paulo Freire [4] identified this practice as oppressive by nature because it loses touch with lived experiences and supports a hegemonic education by way of learner’s assimilation to the instructor’s dominance. Although education has evolved, there still seems to be a trend with the major focus being on banking education [4] through lecture format as opposed to being learner-centered:

...the established routines that treat lectures as the main medium for communication and education are still strong. Lectures as educational episodes are still likely to represent among the most robust methodologies used by institutions to educate their students, [4]

There seems to be a lack of congruence between the pedagogical theories that are espoused and the actual classroom practices that are employed. Breunig’s clinical study asserts that experiential learning is an important aspect of becoming a healthcare professional because it creates lived experiences to offer meaning in context [3]. It is therefore appropriate for educators to find a learner-centered training tool that can form a significant experiential learning component for students prior to their entry into the clinic.

The purpose of this action research study was to discover what could be learned from incorporating high-fidelity simulation (HFS) as an educational tool to preclinical student respiratory therapists (SRTs); to understand if it can be used to relieve or decrease students’ anxiety prior to entering into the clinical component of the program and to identify what impact this learning model has on student confidence.

The questions that guided this research study were designed to explore the concepts of the experiential learning theory as described by Kolb [2] and to identify if a simulated experience can prepare learners for clinical learning. Through this exploration the researcher attempted to identify how to purposefully engage with learners to create a learning opportunity that can be reinforced with focused reflection. These concepts were used to generate conclusions that can contribute to the knowledge of incorporating experiential learning into the researcher’s pedagogy. The research questions explored were:

(1) What effect, if any, does participation in a high-fidelity respiratory therapy simulation have on clinical preparedness as presented by learner confidence?
(2) What effect, if any, does participation in a high-fidelity respiratory therapy simulation have on student anxiety as students prepare for clinical?

METHODS

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was discussed with the SRT class, identifying intentions and objectives. A letter of informed consent was required to participate in this study. This study was performed using the principles of action research, which is a method used most notably for improving practice. It involves: planning, acting, observing, and reflecting [5]. In the context of this study, the action research approach supports the researcher as a practitioner seeking a way to understand and improve the quality of education provided. As an educator, the researcher identified a problem with SRTs having difficulty transitioning from the classroom into the clinical environment. It was therefore the goal to identify a plausible solution for this problem. The unit of analysis was second-year SRTs at a college in southwestern Ontario, and the concept to be studied was the use of HFS as a tool to bridge the gap between the didactic portion of the program and the clinical practicum.

Data collection and analysis
The method of data collection included a participant survey, participant interviews, and self-journaling completed by the researcher. By discovering what the group of participants perceive and experience, the researcher could adjust the course delivery to align it with what was observed and concluded to be required.

A process called triangulation was utilized to cross-reference multiple sources of data collection (see Table 1). At the beginning of the semester, following REB approval, a short questionnaire was administered to the SRT class utilizing a web-based tool that allowed for anonymity. The survey consisted of six Likert-like questions, enabling the SRT to describe their current perception of how they best learn, their perception of transferring into a clinical learning model, and their overall perception of preparedness with moving to a clinical practicum.

A focus group, consisting of any student who volunteered, was asked open-ended questions as a second source data. This focus group was conducted in the final week of the course to understand the impact of this learning methodology. An unaffiliated research assistant conducted the interview to blind the researcher according to protocol. To maintain confidentiality of the subjects, the focus group was conducted in a separate lab on campus. In addition, an audio recorder was used for data collection and accuracy of transcription. The transcribed data were analyzed by the researcher through a manual coding process to identify emerging and repetitive themes. During the focus group, students were asked to elaborate on what they experienced in the HFS course. Open-ended questions addressed the SRT’s perceived satisfaction, confidence, and anxiety level with transitioning to clinical learning. The collected data were used to define how well the HFS program is suited to preparing a learner for a transitional change in learning theory, and how HFS has affected the SRT’s self-perceived anxiety and confidence.

The final data source was the researcher’s observation and journaling, which was used to record the discoveries along the way. Each week, students participated in simulated scenarios that enabled the researcher to observe progression from start to finish of the course. All consenting individuals were observed during the scenario and debrief sessions. This data source heightened the awareness to the concepts that evolved as the research progressed. It noted expectations of the students during the HFS scenario and prebrief, and one 4-h observation shift at a clinical site in the previous semester. It was thought that this new course could be used to evaluate the experiential learning theory, the critical pedagogy with course delivery, and the student’s preparedness.

The course delivery was achieved using a variety of patient simulators with programmable physiologic responses to intervention. A controlled environment made to resemble various areas of a hospital that the SRTs will be scheduled to rotate through during their clinical practicum was created (emergency room, intensive care unit, medical inpatient wards, delivery room, operating rooms, etc.). Each SRT had 2 h/week in the simulation lab; this included both active participation and passive observation. Active participation was experienced as either the member in the decision-making role or as an assistant. Students were assigned to various roles that rotated weekly to ensure an equitable experience throughout the semester. As the scenarios progressed, the SRTs were given tasks to perform that would be expected of them in their clinical practicum. A senior member of the healthcare team (senior RT, RN, MD, played by a faculty member) was available for them to utilize and seek guidance from. These individuals acted as a simulation confederate to ensure that an appropriate level of fidelity was maintained.

The events of this research were deliberate and premeditated to resemble the involvement of all members of the scenario to their likeness as if it were a real event. To encourage learner participation prior to the scenarios, a prebrief was given by the facilitator emphasizing the objectives and various personnel available in the scenario. Every member of the scenario including the simulation technologist, the two SRTs, and the simulation confederate were given the same prebrief prior to the start of the scenario. A conscious effort was made to establish a safe learning environment that allowed for active learning. This proved to be an important aspect of the experiential learning theory, since the design was looking to offer a lived experience. The importance of optimizing environmental and psychological reality so that the experience could be conceptualized into a clinical setting was crucial. As this abstract conceptualization was one of the desired outcomes of the course, any emphasis in the reality of the simulated experience were documented and investigated for ways to improve.

Learners were encouraged to explore feasible options within the SRTs scope of practice. During the prebrief, pertinent information regarding the scenario was addressed and key participants were identified. The participants were then assigned roles: either active participants (decision maker or assistant) or passive observer (students not in the sim lab and deliberately observing the actions and patterns of their peers). The active participants were tasked with technical and clinical management of the situation. Some scenarios were video recorded with the consent of the participants. These recordings were beneficial for review during debriefing with the participants. Through journaling, self-reflection, and observation performed by the researcher, the combination of real-time observation and the video recorded scenarios aided the ability to discern and recognize areas to improve upon for future delivery. The recordings were also available for the participants to view, offering students an opportunity to observe themselves for critical analysis and self-reflection, fitting with Kolb’s experiential learning theory [2].

Following each scenario, the observing facilitator and the participants of the scenario, including the SRTs, gathered to reflect on the actions and scenario just experienced. The intent of these sessions was to allow the SRT time to incorporate the actions from the simulated event to create a meaningful experience to serve as stepping-stones for

<table>
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<th>TABLE 1</th>
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| **Summary of data collection methods**
| **Participant** | **Data collection method** | **Total number of data entries** |
| Second-year SRTs | Questionnaire | 20 |
| Second-year SRTs | Focus group | 4 |
| Self | Observation/journaling | 49 |

SRTs, student respiratory therapists.
The Effects of Introducing High-Fidelity Simulation

A defining condition of being human is that we have to understand the meaning of our experience. For some, any uncritically assimilated explanation of an authority figure will suffice. But in contemporary societies we must learn to make our own interpretations rather than act on the purposes, beliefs, judgments, and feelings of others. Facilitating such understandings is the cardinal goal of adult education. Transformative learning develops autonomous thinking. (p.5)

This action research plan focused on engaging students and educators in active learning to allow learners to identify and connect with themselves, their peers, and their practice in hopes of promoting confidence with decision making and reducing anxiety when transitioning into a clinical learning model. Eric Jensen [7] states:

While the old academic model addressed primarily the intellectual aspects of learning, the prevailing model suggests that we learn with our mind, heart and body. This more holistic view underscores the importance of considering all of the learner’s issues. (p. vi)

RESULTS

From the data collected, key themes were identified and related back to the primary research questions. How did they rank their learning preferences? Figure 1 demonstrates the preferred learning practices of the sample of SRTs.

This distribution of learning preferences was surprising, as well as reassuring. Malcolm Knowles' assumptions of adult learners describe a move from dependency towards increasingly self-directedness as a normal maturation process [8]. This assumption tends to build on the idea that adult learners strive to develop understanding and competence to achieve immediate application of knowledge. However, this assumption appears to be skewed in our sample population (n = 20), since 50% of the SRTs identified self-directed learning as their least preferred method. In this context, self-directed learning was defined as proactively initiating and enhancing self-identified areas of weakness and taking active steps to improve [9]. This distribution did not distinguish between informal and formal educational settings; therefore, further research is required to identify if this population is aligned with Knowles' assumption [8].

The results showed that 65% (n = 20) of the SRTs identified HFS and practical labs as their preferred learning opportunities. Although at the time of the survey the SRTs had limited exposure to HFS in the previous semester (approximately 60 min overall), they still perceived it as a desirable learning opportunity. Knowles' description of adult learners may bring more understanding to the actual learning continuum identified in the SRT sample population. Both HFS and practical lab settings offer an opportunity for adult learners to relate to the learning, to experiment, and to make meaning of theory. It can be interpreted that in the sample of SRTs surveyed, the preference for accumulating experience and actively experimenting can build a resource for their learning. This desire for performance-centered learning encourages the continued use of HFS as an experiential learning tool in the SRT curriculum [8]. Continuing with this interpretation of adult learner's preference for active experimentation [2], it can be extrapolated that adult learners who desire the practical lab and HFS setting predominantly fit into the converging and accommodating concepts of Kolb’s learning styles and experiential learning model. These types of students like the “doing” of learning, which fits with the idea of learning being the process whereby knowledge is created through transformation of experience [2].

This concept led to curiosity about how the students perceived themselves in transitioning and adapting into a clinical learning model that offers active learning concerned with satisfying real-life problems. As they identified their preference for hands-on, performance-centered learning, what self-perception do they have on their anxiety of transitioning into an experiential learning model, and how does that anxiety affect their learning?

As identified in Figure 2, SRTs demonstrate varying levels of anxiety about entering a clinical learning model. This presimulation distribution identifies the median of the participants scored as “moderately” to “quite anxious” with respect to the transition, and the mode scored as

<table>
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<th>SRT Learning Preferences</th>
<th>In Class (theory)</th>
<th>Self-directed</th>
<th>Practical (Lab)</th>
<th>High Fidelity Simulation</th>
<th>Clinical Observation</th>
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<tr>
<td>1</td>
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FIGURE 1
Learning model preferences by surveyed SRT participants (1 = most preferred, 5 = least preferred).
“moderately anxious.” There is no doubt that transitioning into a real-world setting—where decisions, actions, and knowledge generate real outcomes on patients’ lives—is a daunting experience for new clinical learners. Students were asked how anxiety affected their learning, and 77.78% responded that it encourages preparation. One participant commented that “Anxiety tells me I need more preparation, it tells me how ready I am for this sort of scenario and what my understanding is going in.” However, 11.11% of the participants responded that anxiety hinders their learning and participation. One student commented further, stating “I’m not sure I would say it absolutely hinders my learning, but it definitely reduces my performance and makes me make mistakes.”

Another SRT commented “Anxiety affects my learning to a point of being scared of messing up.”

To further investigate the cognitive and affective components at play in the SRT sample population, the students were surveyed using the same Likert question with perceived anxiety, but instead of transitioning to a clinical learning model, it was asked what the perceived anxiety was transitioning into simulated learning (see Figure 3). The mode remained the same, as both learning models (clinical learning and simulated learning) invoked a moderate amount of anxiety. However, the median responses varied slightly towards the side of being less anxious to transition into a simulated learning environment than a clinical learning environment. As previously noted by one student, being afraid to make mistakes can affect learning. The simulation lab likely offers a less anxious transition since it is intended to be a safe learning environment where consequences of misguided actions or interventions have no true-to-life effects on patients and can potentially serve as an opportunity to learn from and reflect upon those mistakes. “I don’t have to worry about hurting or killing anyone when I have made a mistake in sim. I have learned so much from it that is becoming critical for me, the mistakes I have made have engrained themselves in my memory and my hope is that my future actions will be reminiscent of those experiences” (Student participant, Focus Group).

This focused analysis demonstrates what previously was observed and experienced with SRTs transitioning into clinical learning. Anxiety and confidence play a major role in feeling safe and actively engaging in all taxonomies of learning. It is for this reason that the experiential learning theory helps enable the transition, by allowing learners to understand why they are anxious, to evaluate their actions and learning while anxious, and to work through their anxiety to encourage a positive learning opportunity.

Following the HFS course, a focus group was asked to analyze their experience with simulation. The intent was to understand if through the process of experience, reflection, experimentation, and conceptualization that occurred during the HFS course, was there a change (positive or negative) in self-perception of anxiety and confidence. The researcher...
was curious how the SRTs perceived simulation without having any real-world hospital experience. Knowing that adult learners pull from lived experiences as a resource, was it fair to put them into a simulated scenario without having lived experience? The response to this open question was overwhelmingly "yes." One student commented:

Even though I don’t have real hospital experience yet, it has helped me realize my weaknesses. The perfect sim for me was when the patient I had didn’t want the procedure I needed to do…I never expected that, it forced me to work through communicating with the patient why the procedure was beneficial and discussing options for them to take. I guess I never expected that to happen, since we always just learn the procedures, but this forced me to think about why I was doing the procedure and what was important to the patient. Even without real hospital experience, I now see that I have to work on communicating effectively with my patients.

This is where the abstract conceptualization piece of the experimental learning theory becomes evident. When a learner who has never been in a real-life situation can adapt their understanding of skill, knowledge, and judgment to what may be expected, that realization can then assist the learner in preparation.

Any doubts about how useful simulation could be without real world experience were quickly put to rest after the first week of the course. The observation of what these learners were immersing themselves into was immediately obvious during the first few debriefing sessions. The learners were truly using reflective practice and observation to improve their understanding of how concepts are aligned and how their knowledge can be used. One student commented on this by saying:

Sometimes sim is hard because we don’t know what a real RT would have done in that situation, but during the debrief it becomes clear what we did right, what we could have touched on, and what we didn’t think of at all, I find this to be the most useful part of simulation, it makes me think about a hospital situation even without being in the hospital.

One of the questions in the focus group discussed how the SRT uses the experiences gained in the HFS environment to influence their learning and actions. The intent of this question was to identify if a concrete experience is truly occurring, one that can hold meaning and build a rich bank of resources for students to draw from. The common theme that emerged from this question was that the experience encouraged critical thinking, as noted in these two examples from the transcription of the focus group:

“…every sim has brought something to me that I couldn’t learn in any other class,” and

“there are times I now know will go differently when I see them in a hospital because I’ve been able to think it through in simulation...”

Throughout the focus group, the major discussion revolved around “was the experience beneficial in decreasing anxiety and increasing confidence” (see Table 2). Overall, the results indicate that the learners have an increased level of confidence following simulation participation, but that their anxiety levels have not changed when thinking about transitioning into clinical practice.

### DISCUSSION

Utilizing an action research design, the intent of this research was to understand if HFS can be used as an educational tool to help relieve or decrease anxiety and improve confidence prior to entering into the clinical component of the program. The following research questions were formulated:

1. What effect, if any, does participation in a high-fidelity respiratory therapy simulation have on clinical preparedness as presented by learner confidence?
2. What effect, if any, does participation in a high-fidelity respiratory therapy simulation have on student anxiety as students prepare for clinical!

In review, the two research questions guiding this study were addressed and clearly answered. The introduction of a HFS course in a pre-clinical SRT curriculum increases participants’ confidence and perception of preparedness, but did not affect anxiety with respect to transitioning into a clinical learning model. The self-perceived emotional responses to the effects of anxiety on learning challenge the diverging and assimilating concepts of Kolb’s learning styles and experiential learning model [2]. It emphasizes the importance of feeling oriented in the learning and the need for students to have reflective practice. Without clear expectations, preparation, and confidence, it can be concluded that SRT’s anxiety increases, regardless of the learning opportunity. This is not to say that the experiential learning model used and demonstrated throughout this research was not warranted or useful. In fact, the overall perception of the students who participated in the surveys and focus groups were that without the HFS course, they would have felt disadvantaged. The theme of improved confidence was central to the learner’s perception for the need of this style of learning. Having the ability to act as a clinician and debrief and reflect in a safe learning environment with the freedom to explore management strategies demonstrated the effectiveness of the experiential learning theory with respect to self-awareness and confidence. One participant reported “The thought of not having simulation, I think that makes me even more anxious.” This result is not unlike the findings of Sportsman et al. [10], where simulation participation also didn’t improve anxiety with participants, but clinical competence and performance were two metrics perceived to have improved.

Finally, through observation and journaling, the researcher identified a number of areas for improvement. It may be unrealistic to think that decreasing a learner’s anxiety can occur without true real-world experience. Therefore, the focus can shift to providing scenarios that offer realistic opportunities to create meaning and improve learner confidence. The experiential learning theory does not have to be isolated to the HFS course; these adult learners were proving that concrete experiences, reflective observation, abstract conceptualization, and active experimentation are desired throughout the learning continuum. The focus needs to switch

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<td>Focus group comments on anxiety and confidence</td>
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| “I feel more confident in myself but still nervous to go to the hospital, since I haven’t done it before.” |
| “I feel anxious with the idea of going into a new environment, when it comes to doing what I have learned in simulation I feel more confident but anxiety is still there.” |
| “My anxiety level has not changed one bit, I think I can feel like I can deal with it better though now after my sims. In sims sometimes, in my head I’m freaking out, but on the outside I’m not showing it. Sims have helped harness my anxiety but definitely [did] not decrease it.” |
| “I feel as though anxiety will always be there, it’s not going to be cured. But you have to put pressure on yourself because you realize that it is about dealing with a human life. Personally, I don’t think it has helped with my anxiety. Anxiety for neonatal has not changed possibly even got worse, I am scared and very anxious for that population, the sims with kids in it made me realize that even more. I think I will be anxious in my job for the rest of my life.” |
| “My confidence is improved it has shown me how to pick myself up when something happens. The evaluation decreased my confidence but that really helped me try to figure out how to deal with that, which I think is even more important, since I am going to have to deal with things on the job as well.” |
| “The way the sims are setup are perfect for building our confidence. The facilitators put critical errors into evaluations but even if a student makes one, they may have to redo it or discuss it, but it shows us its ok to make mistakes, and more importantly to learn from those mistakes so that we can improve our confidence.” |

Note: These quotes are a sample of comments on confidence and anxiety levels post high-frequency simulation course.
to promptly supporting that and trying to offer a learner-centered environment. The HFS course has become more about the learning experience; the psychological and environmental fidelity became the most important features to create realism, since that is what is encouraging the experience to have meaning for the learners. That is what the reflective practice became associated around; how the patient presented; what they said, did, looked like; what sights, sounds and smells were experienced; and what emotions were triggered. This is what ultimately made the meaning for the learner. Without the proper fidelity, the scenario can be misleading. With students who are participating in simulation prior to clinical learning models, the facilitators have to be extremely careful that the scenarios and environments in which they are creating are as realistic as possible, since the learners will draw from this as through a lived experience.

Limitations
There are limitations to the data collected and the external validity for the population. Because each college and program has varying uses of simulation, budget, and personnel, the findings at this institution may not translate throughout the entire population. However, since each school offering the Respiratory Therapy program in Canada is mapped to the national competency profile, there likely are similarities and commonalities that can be extrapolated.

CONCLUSION
This study has proven important to the population studied, the program, and the institution. It addressed the notion that providing an HFS course prior to the transition into a clinical learning model can have beneficial outcomes if done correctly. Although the HFS course did not effectively reduce learners anxiety, it did address and identify another key feature of adult learning; lifelong learning. Throughout the focus group data it became clear that the HFS course had multiple incidental learning opportunities. This unplanned learning spoke to the level of maturity and commitment of the learners and their desire to succeed. Through use of Kolb’s experiential learning theory, students were given an opportunity to extend their simulated experience into a meaningful experience to satisfy their learning needs. This ultimately led to an improvement in confidence in the learners’ self-perception of skill, knowledge, and overall competence. Overwhelmingly, the SRTs were satisfied with the HFS course, with the most abundant and repetitive comment being “we want more simulation.” This opportunity to explore the HFS course proved beneficial at a program level to identify if optimizing and providing more time for active learning models could be implemented.

This study starts to shed light on the gap in current literature. HFS doesn’t have to be isolated to the high-risk, low-incident procedures and it most definitely doesn’t have to be limited to clinicians with real-world experience. Although both are important for continual learning, HFS has proven to be a beneficial use of the experiential learning model that deepens a learner’s awareness of self and others. The significance of this can translate into supporting the notion to move away from an oppressive model into a learner-centered one.

DECLARATION OF INTEREST
The author reports no conflicts of interest.

ACKNOWLEDGEMENTS: The author would like to thank his advisor, Dr. Debra Walker.

REFERENCES
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 interprofessional competence 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 levered for thirdyear nursing and respiratory therapy students. This event provides an opportunity for participants to enhance their knowledge of the six CIHC IPC 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 IPC 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 IPC 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 IPC 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 IPC 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 Lieco 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 health 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>
<thead>
<tr>
<th>TABLE 1</th>
<th>Event layout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase</strong></td>
<td><strong>Explanation</strong></td>
</tr>
<tr>
<td>1</td>
<td>Study guide completion</td>
</tr>
<tr>
<td>2</td>
<td>Prebriefing workshop</td>
</tr>
<tr>
<td>3</td>
<td>Briefing</td>
</tr>
<tr>
<td>4</td>
<td>Simulation</td>
</tr>
<tr>
<td>5</td>
<td>Debriefing</td>
</tr>
<tr>
<td>6</td>
<td>Reflection assignment</td>
</tr>
</tbody>
</table>

*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 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 n1 = 51; student respiratory therapists n2 = 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 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 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 n1; 4, 44% of n2)), 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

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**TABLE 2**

<table>
<thead>
<tr>
<th>Alternative hypothesis</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student nurse answers about own profession</td>
<td>Less 0.322</td>
</tr>
<tr>
<td>Student nurse answers about other profession</td>
<td>Less 0.011</td>
</tr>
<tr>
<td>Student respiratory therapists answers about other profession</td>
<td>Less 0.010</td>
</tr>
<tr>
<td>Student respiratory therapists answers about own profession</td>
<td>Greater 0.007</td>
</tr>
</tbody>
</table>

*pPositive answers after event compared with before event.

**TABLE 3**

<table>
<thead>
<tr>
<th>IPS Survey Items</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student nurse responses about the RN profession</td>
<td>Q3. Understand the capabilities of your profession 0.365</td>
</tr>
<tr>
<td>Q5. Sometimes encroach on your professional territory 0.207</td>
<td></td>
</tr>
<tr>
<td>Q9. Are very defensive about their professional prerogatives 0.110</td>
<td></td>
</tr>
<tr>
<td>Q11. Seldom ask your professional advice 0.417</td>
<td></td>
</tr>
<tr>
<td>Q12. Fully utilize the capabilities of your profession 0.964</td>
<td></td>
</tr>
<tr>
<td>Student nurse responses about the RRT profession</td>
<td>Q3. Understand the capabilities of your profession 0.009</td>
</tr>
<tr>
<td>Q9. Are very defensive about their professional prerogatives 0.099</td>
<td></td>
</tr>
<tr>
<td>Q11. Seldom ask your professional advice 0.010</td>
<td></td>
</tr>
<tr>
<td>Q12. Fully utilize the capabilities of your profession 0.148</td>
<td></td>
</tr>
<tr>
<td>Student respiratory therapist responses about the RN profession</td>
<td>Q3. Understand the capabilities of your profession 0.285</td>
</tr>
<tr>
<td>Q5. Sometimes encroach on your professional territory 0.652</td>
<td></td>
</tr>
<tr>
<td>Q7. Expect too much of your profession 0.157</td>
<td></td>
</tr>
<tr>
<td>Q9. Are very defensive about their professional prerogatives 0.074</td>
<td></td>
</tr>
<tr>
<td>Q12. Fully utilize the capabilities of your profession 0.035</td>
<td></td>
</tr>
<tr>
<td>Student respiratory therapist responses about the RRT profession</td>
<td>Q5. Sometimes encroach on your professional territory 0.103</td>
</tr>
<tr>
<td>Q7. Expect too much of your profession 0.077</td>
<td></td>
</tr>
<tr>
<td>Q9. Are very defensive about their professional prerogatives 0.298</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 4
Likert-scale Wilcoxon signed rank test results comparing student nurse and student respiratory therapist groups

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

*Mean responses

TABLE 5
Qualitative responses: content analysis

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

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”.

(questions continued)

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 when 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 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 participants’ 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 Hawthorn-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-report 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 Partnership for Rutsi 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.

ACKNOWLEDGEMENTS: Authors would like to thank faculty who volunteered to assist in the planning and execution of this event in 2016: Christy Bishop, Rob Boulay, John Doucet, Denise Hubble, Laura Janes, Emily Macdonald, Shaun McCarville, and Heidi Mew. The team would also like to extend sincere gratitude to Dr. Liwen Zou, Assistant Professor of Statistics at UNB Saint John, for her statistical expertise and guidance with data analysis and interpretation. Finally, the team would like to thank the CIRT editors for their generous comments and support during the review process.

REFERENCES

13. 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


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