

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

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**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 Friere [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

Approval from research ethics boards (REB) at both the institution where research was conducted and at Yorkville University was sought and granted (protocol #13-12-17-1). Following REB approval, the study

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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 data source. 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 potential changes for future utilization of HFS in preclinical training.

### Participants and setting

Convenience sampling was used to select voluntary participants from enrolled students in the HFS course. This nonprobability technique was

deemed appropriate for this research because it is focused on the institution, program, and students the researcher works with. All students enrolled in the second-year course were notified about the nature of the study; every student who consented to participate had data collected from them. Overall, 20 students participated in a questionnaire, and four students responded to the invitation to participate in a focus group.

This study involved using an HFS lab as a way to introduce SRTs to a mock clinical environment. The researcher designed a 15-week course in the fourth semester of the curriculum that was developed to deliver an experiential learning opportunity. The participants had limited exposure to simulated learning, with each student participating in one simulated 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 de-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-research, and reflection 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 1**  
**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.*

development, growth, and transformation. Although not the focus of this action research study, in this regard simulation can also be an expression of the transformative learning theory, as described by Mezirow [6]:

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 preference, and did that fit with the understanding of basic adult learning assumptions? 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

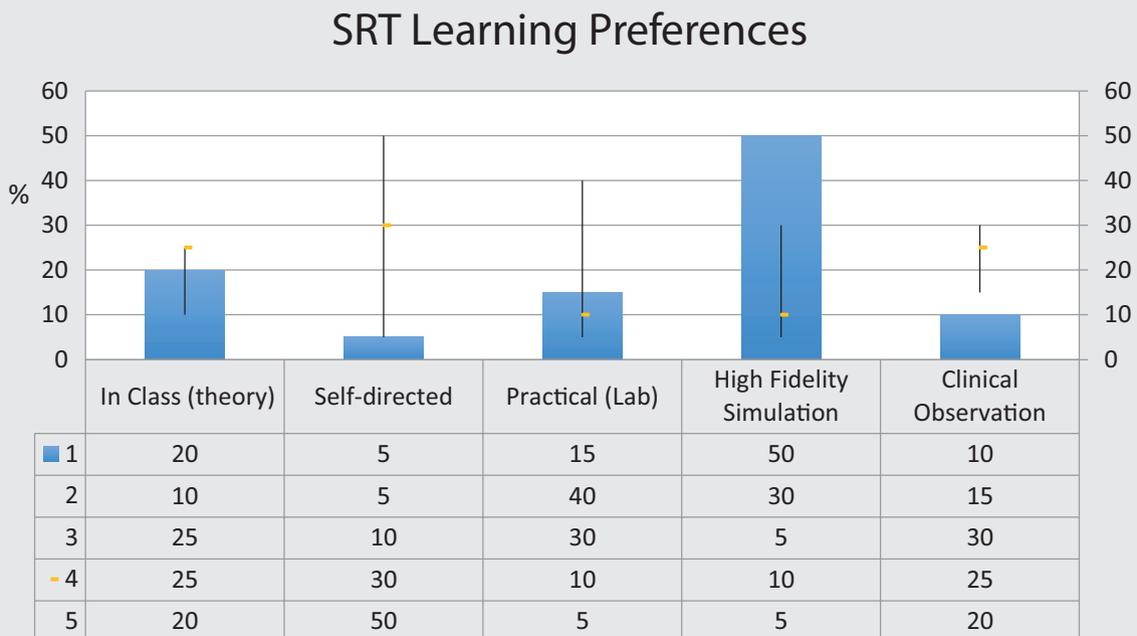
SRTs identified self-directed learning as their least preferred method. In this context, self-directed learning was defined as proactively initiating and enhancing self-identified areas of weakness and taking active steps to improve [9]. This distribution did not distinguish between informal and formal 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 leaning 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

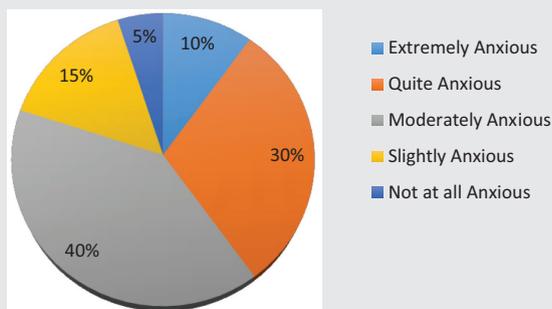
**FIGURE 1**  
Learning model preferences by surveyed SRT participants (1 = most preferred, 5 = least preferred).



“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.”

**FIGURE 2**  
**Distribution of student respiratory therapists’ (SRTs) perceived anxiety transitioning into a clinical learning model.**

SRTs Anxiety Transitioning into a Clinical Learning Model



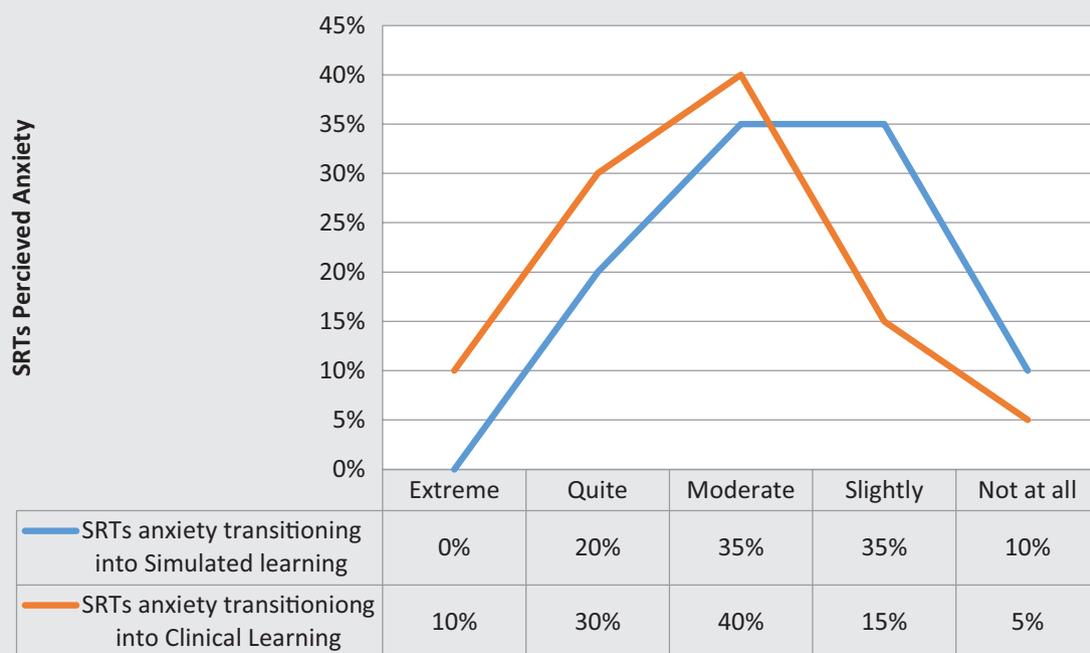
Another SRT commented “Anxiety affects my learning to a point of being scared of messing up.”

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

**FIGURE 3**  
**Comparison of student respiratory therapists’ (SRTs) perception of transitioning into a clinical learning model and into a simulated learning model in terms of anxiety.**



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 experiential 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 practicum.

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

**TABLE 2**  
**Focus group comments on anxiety and confidence**

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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.”

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*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.

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### REFERENCES

1. Lisko SA, O'Dell V. Integration of theory and practice: Experiential learning theory and nursing education. *Nurs Educ Pers* 2010;31(2):106-8.
  2. Kolb DA. *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice-Hall; 1984.
  3. Breunig M. Turning experiential education and critical pedagogy theory into praxis. *J Exp Educ* 2005;28(2):106-22. doi: 10.1177/105382590502800205.
  4. Freire, P., & Ramos, M. B. (1970). *Pedagogy of the oppressed*. New York: Continuum.
  5. Kemmis, McTaggart, Retallic. Four moments of action research. Available at: <http://individual.utoronto.ca/sadaf/resources/parhandout2.pdf> (Accessed 2 April 2014)
  6. Mezirow J. Transformative learning: Theory to practice. *New Dir Adult Cont Educ* 1997;74:5-12. doi: 10.1002/ace.7401.
  7. Jensen E. *Completing the puzzle: The brain compatible approach to learning*. Del Mar, CA: The Brain Store; 1997.
  8. Knowles M. *The modern practice of adult education: From pedagogy to andragogy*. Wilton, CT: Association Press; 1980.
  9. Shokar G, Shokar NK, Romero CM, Bulik RJ. Self-directed learning: Looking at outcomes with medical students. *Fam Med* 2002;34(3):197-200.
  10. Sportsman S, Schumacker RE, Hamilton P. Evaluating the impact of scenario-based high fidelity patient simulation on academic metrics of student success. *Teach Technol* 2011;32(4):259-65.
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