RESPIRATORY THERAPY STUDENT ANXIETY IN SIMULATION-BASED LEARNING

BY

MEGHNA PATEL

MHS, Washburn University, 2019

A PROJECT

SUBMITTED TO THE DEPARTMENT OF ALLIED HEALTH
OF WASHBURN UNIVERSITY IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF HEALTH SCIENCE

Committee Chairperson

Department Member

Committee Member

WASHBURN UNIVERSITY OF TOPEKA

DECEMBER 2019
RESPIRATORY THERAPY STUDENT ANXIETY IN SIMULATION-BASED LEARNING

A Project

Presented for the Master of Health Science Degree

Washburn University

Meghna Patel

December 2019
Abstract

Simulation-based learning offers hands-on experience to facilitate the application of theory to practice before students report to clinical. Simulation also allows faculty to reinforce course objectives and assess student learning. Despite the numerous benefits, the literature shows that the technology, method, and environment of simulation could cause student anxiety. High levels of anxiety associated with learning can have a negative effect on student achievement. This action research project assessed the level of anxiety experienced by a population of first and second-year community college respiratory therapy students in relation to simulation-based learning. Participants experienced moderately high levels of anxiety in many simulation components. Being observed or assessed by instructors and making mistakes caused the highest level of anxiety. Recommendations to reduce anxiety are identified, which may lead to enhanced learning in simulation-based learning.
# Table of Contents

INTRODUCTION........................................................................................................... 1

LITERATURE REVIEW.................................................................................................. 3

  Benefits of Simulation-Based Learning................................................................. 4
  Student Anxiety..................................................................................................... 6
  Techniques to Moderate Anxiety......................................................................... 8

METHODS..................................................................................................................... 9

RESULTS...................................................................................................................... 11

  Demographic Characteristics of Participants...................................................... 11
  Student Reports of Anxiety.................................................................................... 12
  Open-Ended Questions......................................................................................... 13

DISCUSSION................................................................................................................. 15

  Being Observed and Evaluated by Instructors...................................................... 16
  Possibility of Making a Mistake........................................................................... 17
  Debriefing.............................................................................................................. 18
  Student Suggestions and Comments.................................................................... 20

CONCLUSION............................................................................................................... 20

REFERENCES............................................................................................................. 22

FIGURES....................................................................................................................... 26

  Level of Agreement in Anxiety Related to Simulation-Based Learning............. 26

TABLES......................................................................................................................... 27

  Demographic Characteristics of Survey Participants......................................... 27
  Degree of Anxiety in Simulation-Based Learning in Rank Order....................... 28
APPENDICES

Appendix A
Appendix B
Appendix C
Respiratory Therapy Student Anxiety in Simulation-Based Learning

Simulation-based learning is one type of learning modality that can help develop professional competencies. Gaba (2004) defines simulation as “a technique, not a technology, to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner” (p. i2). This teaching approach has been widely used in healthcare education and training over numerous years (Alhaykan, 2015), and has become a common approach to teaching a range of clinical skills within respiratory therapy educational programs.

In the early 1960s, cardiopulmonary resuscitation programs incorporated the use of Resusci-Anne mannequins to provide simulated, hands-on training to revive someone whose heart had stopped beating. Since then, nursing programs, anesthesiology, and respiratory care programs, as well as other medical professions, have found value in using simulation to teach patient care without risking human lives (Hanlon, 2014). In the mid-1990s, the Laerdal company developed the SimMan, a more advanced high-fidelity simulator (Rozansky, 2012). The term simulation is not only applied to high fidelity mannequins, but it may also be applied to a wide range of simulated experiences, including role-playing, standardized patients or actors, and low-fidelity mannequins (Cato, 2013). A typical simulation experience consists of pre-brief, preparation, scenario, and debriefing sections to replicate real-world clinical situations (Yockey, 2015). In this research report, a discussion of simulation and simulation-based learning is focused on low to high fidelity mannequins that produce physiological responses similar to humans.

Today, technology has brought these inanimate human replicas or simulators to life so that they may be used as an innovative teaching technique. Simulators enrich the educational
experience and help to create a strong clinical foundation for many students in health professions programs (Cato, 2013). Various health professions programs and academic institutions have implemented simulation as a substitute for a portion of clinical training hours that were traditionally accomplished through actual clinical placement (Middleton, 2017). Through interactive learning, simulations fill the gaps between theory and clinical practice (Yockey, 2015). Simulation-based learning also allows faculty to reinforce course objectives and assess student learning.

The advanced technology used in respiratory therapy and the often critical nature of this type of medical care make simulation-based learning a good fit for respiratory therapy programs and for use to advance the skills of current respiratory therapy professionals. This method of instruction is advantageous because it allows students to practice critical thinking, clinical decision making, and psychomotor skills in a safe environment without potential risk to a live patient (Cato, 2013). Respiratory therapy programs commonly employ a variety of hands-on experiences in the simulation lab to facilitate the application of theory to practice before students report to clinical education. Further, the American Association for Respiratory Care (AARC) recognizes the vital role simulation-based learning can play in orienting newly hired respiratory therapists to a practice setting, but also in preparing respiratory therapy students for future clinical practice (Rozansky, 2012).

Despite the numerous benefits claimed in the literature, the technology, methods, and environment of simulation-based learning can cause anxiety among students (Cato, 2013). High levels of anxiety experienced in association with learning can have a negative effect on student achievement, perhaps causing students to miss an opportunity to learn valuable aspects of respiratory care. Purfeerst (2011) showed that students who suffer from severe anxiety might
experience impaired academic performance, low grades, and in some cases, high dropout rates. Although optimal levels of anxiety for learning are unknown (Nielsen & Harder, 2013), the literature suggests various strategies to moderate student anxiety experienced during simulation-based learning (Cato, 2013; Hutchinson & Janiszewski, 2013; Nielsen & Harder, 2013).

The use of simulation in respiratory therapy education has expanded in recent years. Simulation-based learning supports essential clinical learning, but some RT students experience high levels of anxiety during simulation scenarios. The purpose of this action research project is to assess the level of anxiety experienced by a purposively selected population of first and second-year community college respiratory therapy students in relation to simulation-based learning. The findings will provide data about whether this student population experiences anxiety during simulation-based learning experiences. This information can be used to determine if there is a need to identify strategies to moderate student anxiety associated with simulation-based learning in this context. Using evidence-based solutions to reduce student anxiety may help to establish a positive simulation-learning environment for students where support and encouragement are provided while students develop competency before performing skills in the clinical education setting with actual patients.

**Literature Review**

In this section, three areas of literature are discussed: benefits of simulation, student anxiety concerning simulation-based learning, and the techniques which help to moderate anxiety. Literature regarding RT student anxiety during simulation is scant. As a result, a literature review of nursing and other health care professions was utilized in this study. The search keywords used to gather studies for the analysis included the following: simulation, simulation-based learning, student anxiety during simulation, nursing student, respiratory
therapy, clinical simulation, and anxiety. These search terms were utilized together to find articles in different databases such as Science Direct, MEDLINE, Google Scholar, Nursing and Allied Health Literature, ATLAS, and PubMed.

**Benefits of Simulation-Based Learning**

By definition, simulation-based learning “integrates cognitive, technical, and behavioral skills into an environment where learners believe the setting is real, act as they would responding in the field, and feel safe to make mistakes to learn from there” (American Academy of Pediatrics, 2019, para. 1). Simulation has a broad range of educational uses and is utilized by many groups of health professionals as well as by programs preparing future health care professionals. An Association of American Medical Colleges survey showed various health professionals participate in simulation programs and the primary use of simulation is for education. Aside from medical school students, nurses are the health care profession that uses simulation the most, followed by respiratory therapy (Rozansky, 2012). Simulation-based training assists physicians and other clinicians to practice procedural skills without practicing on patients in the clinical arena. Simulation allows healthcare professionals to, maintain skills, master new techniques, communicate effectively within the team, and review performance (Rozansky, 2012). Importantly, these simulation-based experiences are viewed as a practice where it is acceptable to make mistakes in a consequence-free environment (Rozansky, 2012).

Simulation is an invaluable tool for the respiratory therapist. It helps students to bridge the gap between the classroom and actual patient care through practice opportunities and debriefing (Gore & Thompson, 2016). Simulation can also be used to enhance interprofessional competencies and interprofessional teamwork and communication (Middleton, 2017). In general, simulation consists of a student or group of students providing care for a simulated patient while
being observed by faculty and peers and then provided feedback to promote learning. Gore and Thompson (2016) define debriefing as “the practice to teach the learners the process of what, why, and how” (p. 2). This practice is a special form of feedback designed to either examine proficiency of technical skills or engage learners in reflecting on decision making and affective or emotional aspects of the experience (Burns, 2015). Debriefing allows the learner to connect information obtained in the classroom to the experiential learning of simulation (Gore & Thompson, 2016).

The literature shows that simulation can advance procedural skills of respiratory therapy students and professionals without any risk to an actual patient. For example, simulated practice allows RT students or RT professionals to practice the insertion of a chest tube in a simulated ICU patient who is at high risk of developing the need for an urgent chest tube (Middleton 2017). Further, simulation can aid the RT student or professional in correcting deficiencies in performing procedures such as endotracheal intubation and arterial sticks for blood gases (Rozansky 2012). West and Parchoma (2017) assert that incorporating clinical simulation-based education in respiratory therapy facilitates engagement in the same critical thinking and clinical decision-making skills required in actual clinical practice, ensuring learners are fully prepared to begin practice in real settings safely.

The AARC recommends the use of simulation training for continuing education to increase competence for current practitioners. Rozansky (2012) asserts that simulation is essential to the future of educating students, both didactically and clinically. To meet the regulatory requirements for licensure and subsequent entry to practice for the profession of respiratory therapy, the graduate must perform continuous self-evaluations and demonstrate critical thinking problem-solving, and decision-making skills along with other competencies
As the fidelity or realism of the simulation experience increases, students will have more opportunities for problem-solving situations similar to those that may occur in actual clinical practice (Yockey, 2015).

The quality of clinical education experiences is impacted by many factors, such as a lack of available clinical sites, limited patient exposure, and an inadequate number of supervising clinical faculty (Rozansky, 2012). Despite the numerous benefits of clinical education, simulation has provided an alternative to clinical experience. Simulation-based learning can provide clinical experiences reflective of actual clinical environment rotations (Rozansky, 2012). Research has shown that when students, who participated in quality simulation-based learning, are in the real clinical setting, their skill level increased compared to students whose training did not include simulation (Rozansky, 2012). Further, simulation has been demonstrated to improve patient safety. As Gaba (2014) explains, “Simulation can be a bottom-up tool for changing the culture of health care to be more safety-oriented, by training clinicians in practices that enact the desired culture of safety” (p. 2). Another benefit of simulation is that all students can be exposed to the same clinical event and have the opportunity to apply what they have learned into practice (Cato, 2014). This ability to ensure access to all students is critical for programs needing to demonstrate efforts to provide equitable learning experiences.

**Student Anxiety**

Yockey (2015) describes stress as a normal part of daily thoughts and situations that produce a sensation of frustration, which can motivate a person to take action. Whereas anxiety is a psychophysiological response to excessive stress that produces feelings of fear. By definition, anxiety is “an emotion characterized by a feeling of tension, worry and physical changes like increased blood pressure” (American Psychological Association, 2019, para. 1).
Anxiety is a subjective feeling of uneasiness or fear regarding an undefined future threat and occurs from cognitive pressure (Yockey & Henry, 2019). Students may have adequate ability but poor performance due to anxiety (Yockey & Henry, 2019).

The literature reports that students experience anxiety related to the use of simulation (Beischel, 2013; Cato 2013). While simulation has been demonstrated as a beneficial means of promoting learning in health care professions, it has also been identified as anxiety-producing (Cato 2013). Students experience anxiety during simulation when being critiqued or when they perceive they are being critiqued. Anxiety may also develop during debriefing sessions while performing in front of faculty and peers, and as a result of being recorded. Beischel (2013) points out that simulation is like testing in that during the simulation the student’s performance is inevitably critiqued and evaluated. Performing in front of faculty and peers is found to produce anxiety, regardless of whether it is used for formative or summative assessment (Beischel, 2013).

The video recording of simulation experiences is a valuable piece of today’s simulation. The video recording feature allows students to review their performance and identify areas of needed improvement. However, in a review of literature Nielsen and Harder (2013) found three patterns of anxiety related to simulation-based learning with the most prevalent themes related to being observed, video recorded, and graded by instructors during a simulation (Nielsen & Harder, 2013). Cato (2013) recommended allowing a private review of simulation video for personal reflection and to remediate in private to lessen simulation anxiety.

Students also have reported anxiety associated with a lack of experience in simulation, a lack of preparation for the simulation, and minimal orientation to the simulation setting (Beischel, 2013; Cato, 2013). Similarly, Yockey and Henry’s (2019) study showed that poor performance in the simulation is caused by inadequate knowledge, poor preparation, or
performance impacted by anxiety. The opportunity to practice individual skills before simulation and to receive an introduction to the scenario beforehand are recommended practices to lessen anxiety (Cato, 2013). Beischel (2013) found preparation for the simulation experience increased anxiety if student preparation time exceeded one hour. In this study, 62% of students self-reported preparation times greater than one hour, yet students still reported feeling ill-prepared for the simulation experience (Beischel, 2013).

Furthermore, the experience of making mistakes has the potential to be a positive or negative aspect of simulation. Simulation is a valuable learning method that often involves students making errors in front of others. Many view errors in simulation as learning opportunities; however, the fear of making mistakes can lead to increased student anxiety (Beischel, 2013; Cato, 2013). In particular, Beischel (2013) found that fear of failure in the simulation was associated with increased anxiety. Yockey (2015) reports that the debrief experience and video evidence associated with simulation errors, often discussed in group settings, is what triggers anxiety for students.

**Techniques to Moderate Anxiety**

It is necessary to reduce student anxiety during simulation to ensure a more positive learning environment, increase learning, and facilitate a more natural transition to clinical practice (Avery & Overton 2019). Avery and Overton (2019) pointed out several methods of creating a less threatening simulation learning environment. These modulating efforts included providing an orientation to the simulation settings, including manikin and equipment orientation as well as ensuring that faculty and students are well prepared. Using simulation frequently can also help to minimize the threat of failure experienced by many students.
Beischel (2013) found that among the variables studied, students who showed readiness to learn, which included sleeping, eating, and anticipating in the course before simulation experienced less anxiety. Although Beischel’s (2013) study indicated that participants who showed readiness to learn experienced less anxiety, readiness did not correlate with improved cognitive learning outcomes. Avery and Overton (2019) suggested utilizing an innovative learning strategy, for example, an educational gaming strategy in which students select the advanced skill to be demonstrated in the simulation. This approach served to engage and empower students actively. Innovative learning strategies can reduce performance anxiety and enhance learning (Avery & Overton, 2019).

Simulation-based learning can be beneficial and help to lessen anxiety during the transition to clinical settings. Alhaykan (2015) conducted a survey in which he found students had a positive perception of the simulation. According to the study, students agreed that the simulation was a valuable learning experience, which increased their critical thinking skills. Students also agreed that the knowledge gained from the simulation session transferred to the clinical setting and most students agreed that because of simulation, they were less anxious in clinical settings. Regardless of the many benefits and possible challenges of simulation-based learning, a discussion about simulation-based learning cannot conclude without mentioning that simulation is a resource-intensive learning modality that requires significant faculty time, space, and equipment (Yockey & Henry, 2019).

Method

This study was performed using the principles of action research, which is a method used most particularly for improving practice. The method of data collection included a participant survey. A review of recent literature guided the formation of the survey questions. The survey
questions were reviewed by the project faculty advisor, who provided feedback on the questions and ways to ease the administration of the survey. The survey questions were edited and modified according to the advisor’s feedback and input into Microsoft Forms. The survey was designed to ask participants to rate the degree of anxiety related to specific aspects of simulation-based learning on a 5-point Likert-type scale. The survey also contained open-ended questions about additional sources of anxiety and suggested ways instructors could reduce student anxiety associated with simulation-based learning (see Appendix C for Survey Questions).

Approval from the Washburn University Institutional Review Board (IRB) was obtained before conducting the study. In addition to the standard application, the IRB also reviewed supporting documents that demonstrated that participants would be informed about various details of the research project. For example, prospective participants were informed that their participation was completely voluntary. A draft of the email invitation that described the important components of the action research project was also provided to the IRB. In the invitation, prospective student participants were assured that every effort would be made to ensure the anonymity of their responses and participation and that there were no foreseeable risks involved in participation. The invitation also stated that the collected data would be stored in a password protected electronic format, and only researchers on this project would have access to the data. The URL to the survey was included in the email invitation allowing interested students to connect to the survey and consent easily. The IRB approved consent form was presented as the first question of the survey. The consent form included the researcher’s name, the purpose of the study, foreseeable risks, safeguards, the reassurance of the voluntariness of participation, and a statement that participants could exit the survey any time. Participants were encouraged to print a copy of the consent form for their records.
Additionally, approval was granted by the IRB of the community college where student participants were enrolled. The survey was administered electronically using Microsoft Forms. The information technology (IT) department of community college sent the email invitation to the participant pool to ensure anonymity and validity of a study. The survey was administered from October 18 to October 31, 2019. Completed surveys were identified by responses only, with no name or student identification required on the survey form. The IT department at the community college collected the data and after the closing date of the survey, exported the raw data and shared it with the researcher for analysis. The researcher saved the exported data on a password-protected device. The collected data were analyzed using descriptive statistics.

**Results**

The purpose of this study was to assess the level of anxiety experienced by a population of first and second-year community college respiratory therapy students concerning simulation-based learning. The following section outlines the results of the survey using descriptive statistics.

**Demographic Characteristics of Participants**

The invitation to participate in the survey was emailed to 49 first and second-year community college respiratory therapy (RT) students. Twenty-seven students (55%) accessed the survey. Three participants declined to consent, which terminated the survey. Participant demographic information was collected to describe the population (see Table 1). Twenty-four students answered affirmatively to the consent and completed the survey (n=24), yielding a response rate of 49%. Sixty-three percent of the participants were first-year RT students (n= 15), and 38% of participants were second-year RT students (n=9). Overall, the majority of participants were females (88%), while males accounted for 13% of participants. There were
four age groups represented by the survey completers as shown in Table 1. The highest percentage of participants were in the 33-40 age group. Twenty-seven percent of participants were in the age group of 18-25 years, while the groups of 26-32 years and 41 and over each represented 17% of participants. In the survey, participants were asked about their ethnicity/race. The majority of the respondents selected White/Caucasian as their ethnicity. Twenty-five percent of respondents indicated an ethnicity of Black/African American. The less common ethnicities represented by participants were Hispanic/Latino (17%) and Asian/Pacific Islander (8%). The average time spent completing the survey was 6 minutes and 24 seconds.

**Student Reports of Anxiety**

The survey included fifteen items asking participants to rate the degree of anxiety on a 5-point Likert-type scale (see Appendix C for Survey Questions). In the survey, these 15 items were organized by letter rather than by number (A-0). The five possible responses were: extremely anxious (5), highly anxious (4), moderately anxious (3), slightly anxious (2), and not at all anxious (1). Data were tabulated using Microsoft Excel. Table 2 shows the fifteen survey items and the median scores of the respiratory therapy students’ degree of anxiety related to simulation-based learning.

Survey responses showed that the most anxiety-inducing elements of simulation-based learning relate to the student’s “performance being assessed/evaluated by the instructor(s),” “being observed by instructors during a simulation scenario,” and “the possibility of making a mistake.” These elements received the highest score in terms of causing anxiety for students, with a median score of 4. The next aspect of simulation prompting anxiety dealt with “the presence of cameras or being recorded during simulation” (Mdn = 3.5). Observing other
students during a simulation scenario (Mdn = 1.0) and interacting with mannequins (Mdn = 1.0) received the lowest scores in terms of causing anxiety for students.

Furthermore, six survey items asked student participants to rate their level of agreement on a 5-point Likert-type scale with specific aspects of simulation-based learning. The possible responses were: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). Data were tabulated in Microsoft Excel. Figure 1 shows the six survey items and the corresponding level of agreement as percentages. Student participants indicated the highest agreement (54.2%) with the statement about “debriefing sessions enhance learning.” Students also reported agreement with “instructions provided by the instructors were easy to understand” (58.3%), “allotted time at station is sufficient” (52.2%), and “simulation scenarios help prepare me for clinical” (50%). The item generating a high rate of disagreement related to having “enough time at the stations” (8.7%).

Open-Ended Questions

The survey also included two open-ended questions. The first question asked student participants to list any other sources of anxiety experienced during simulation scenarios. The second open-ended question asked participants to describe in their own words, what an instructor could do to reduce student anxiety related to simulation-based learning. Of the 24 completed surveys, ten students included written responses regarding other sources of anxiety during simulation scenarios (42%), and 13 students included written responses regarding what instructors can do to help to reduce student anxiety (54%).

Some responses to the first open-ended question concerning other sources of anxiety related to simulation-based learning include:
• "I don't like to be put on the spot in front of my peers, and I perform poorly when a group is watching me."

• "Not feeling smart enough or well enough prepared to do tasks on a real patient."

• “Sometimes the simulations aren't as put together as could be. In some cases, it makes you anxious about the unknown, whether to talk through your skill or perform it ... we just run through the steps, and each instructor has different expectations and ways of teaching...better clarification with hints.”

• “Just knowing of taking a test or being watched makes anxious.”

• “Cameras and other students.”

Thirteen responses were collected from the second open-ended question inquiring about what an instructor could do to reduce student anxiety related to simulation-based learning. Some of the comments offered specific actions for instructors to take during simulation experiences such as:

• "Make sure that they evaluate us each time we do this. Make sure that we understand the risk of it doing it wrong. Maybe not putting so much pressure on us when we are doing simulations. Making sure that we can ask questions during simulations when we are unsure."

• "When practicing hands-on be more critical of skills while practicing that way, you feel more confident in skills prior to SIM or real situation since these skills are vital to patient safety and life."

• "To pair us up rather than being in big groups."

Student comments also related to the amount of time allocated to simulation labs. For example, one student stated, "A professor could help with anxiety with a patient by guiding the
student through the procedure, less clinical days and more hands-on lab days." Another student shared, "More hands-on or more lab time would help me a lot." Additionally, respondents mentioned more one-on-one time with the instructor, and how being positive and encouraging would help reduce anxiety experienced during simulation-based learning. Several comments addressed the need for feedback such as, "Allow time to practice and give feedback and have tutors available to critique in a non-confrontational way." One respondent commented regarding the teaching style of professors saying, "Professors should pay particular attention to teaching styles by students test scores to determine the effectiveness of teaching. There are TOO many students, whom will quit school due to not understanding or professors not taking time to explain material for ALL students benefit." Lastly, one student revealed that the pass/fail situation makes it more anxious during simulation-based learning.

Discussion

Simulation is a standard learning modality implemented in RT education programs and it holds the potential to promote deep learning. However, it has also been associated with creating anxiety among students. This anxiety can lead to cognitive interference that can inhibit learning. The result of this study reveals that first and second-year respiratory therapy students at a Midwest community college experience moderately high levels of anxiety in many elements of simulation-based learning. The following discussion addresses the highest sources of anxiety identified in this study (being observed, being evaluated, and making mistakes) and the important finding that debriefing sessions enhance learning. Additionally, recommendations to reduce simulation anxiety are shared.
Being Observed and Evaluated by Instructors

The study findings showed that being observed and assessed or evaluated by the instructors during a simulation ranked highest in terms of provoking anxiety. The median rating for observation and evaluation were 4.0, which indicates agreement that students experience anxiety related to these two components of simulation. These findings of anxiety are understandable given the nature of classroom observation and assessment. An example of a respondent comment reflective of increased anxiety follows: “Just knowing of taking a test or being watched makes [me] anxious.” Another student commented that being on camera makes the student anxious.

These findings are consistent with Beischel (2013), who found simulation reflects general testing qualities in that during the simulation, the student’s performance is inevitably critiqued and evaluated. Performing in front of faculty and peers is found to produce anxiety, regardless of the learning activities being a summative or formative assessment. Therefore, it is important for instructors to understand that simulation is not an anxiety-free instructional technique. Fortunately, the literature suggests that simulation-related anxiety can be moderated by providing students with multiple opportunities to practice individual skills before summative assessment (Cato 2013). Providing remediation in private and ensuring a private review of simulation video aimed at promoting personal reflection are recommended strategies for lessening simulation anxiety (Cato 2013). Horsley (2012) supports the idea of faculty observing students during summative assessment from a remote viewing location or a control room if it is available. Further, a survey respondent suggested faculty may need to be more positive and encouraging during the simulation learning experience.
Possibility of Making a Mistake

The possibility of making a mistake in the simulation also ranked highest in provoking anxiety (Mdn = 4). The experience of making mistakes has the potential to be a positive or negative aspect of simulation. While simulation-based learning is a valuable teaching technique that provides students with opportunities to learn how to recognize and manage mistakes in a safe learning environment, the fear of making mistakes can lead to increased student anxiety. If students experience anxiety concerning mistakes, students may miss the learning potential of each mistake. One of the recommendations made by Cato (2013) to reduce the fear of making mistakes is to allow students to practice expected skills, including a practice simulation. Importantly, instructors should remind students of the practice activities and let students know that it is acceptable to make mistakes in the risk-free simulated environment. Instructors should make appropriate prompts to help students when they seem to be moving toward making mistakes. Instructors can also emphasize this point by carefully debriefing immediately after the scenarios when a mistake is identified, and the learner can translate the debrief information into lessons.

Further, instructors can focus on providing feedback to help students prevent future errors (Yockey & Henry, 2018). Yockey & Henry (2018) also recommended linking simulation objectives to theoretical concepts and real-world clinical activities. The results from this action research project show that first and second-year RT students experience anxiety related to the possibility of making a mistake. This finding needs to be shared with simulation instructors so efforts can be made to shift student perspectives about mistakes so they can benefit from the lessons that emerge from mistakes. Instructors also should strongly consider the importance of conducting effective debriefing sessions after each scenario to extract lessons learned.
Debriefing

Debriefing is one of the essential features of simulation-based learning. Debriefing refers to a special type of discussion that uses guided reflection. The practice of debriefing is a form of feedback designed to examine the proficiency of technical skills and engage learners in reflecting on the decision-making aspects of simulated experiences (Burns, 2015). The use of debriefing allows the learner to connect information obtained in the classroom to the experiential learning of simulation (Gore & Thompson 2016), which promotes deep rather than superficial learning. Beischel (2013) found students readily agreed that the debriefing period provided space to discuss strengths and weaknesses and to ask questions. Effective debriefing sessions provide adequate opportunity to address students’ feelings after the simulation session as well as discuss and evaluate non-technical skills, such as communication, clinical reasoning, leadership, and teamwork (Alhaykan, 2015).

The data from this action research project revealed that debriefing sessions are important to first and second-year community college RT students. Fifty-four percent of the student respondents positively agreed that debriefing sessions enhanced their learning, suggesting that simulation scenarios followed by debriefing help students transfer knowledge and skills for use in clinical practice. The reports by student respondents that debriefing is a valuable practice needs to be shared with simulation instructors so they may consider how to integrate the practice of debriefing into each scenario.

Instructors seeking to improve facilitation of debriefing sessions may turn toward established frameworks available in the simulation literature. These frameworks or structures are designed to guide effective debriefing practice. For example, Sawyer et al. (2016) describe 3-phase and multi-phase conversational structures:
In the 3-phase conversational structure, the first phase (reaction) starts with the opening question, “How did that feel?” During the second phase (analysis), the focus is on what happened during the simulation and why participants performed the way they did. The third phase (summary) is focused on what lessons were learned and insights gained during the analysis phase.

In the multi-phase approach to debriefing called “PEARLS” (Promoting Excellence and Reflective Learning in Simulation) a 4 phase debriefing framework is used. The four phases are reaction, description, analysis, and summary. This approach is designed to ensure that facilitators and participants have a shared mental model of what happened during the simulation.

Instructors can also improve the facilitation of debriefing sessions by implementing standards available in the simulation literature. For example, the International Nursing Association for Clinical Simulation and Learning (INACL) designed standards for best practices in simulation debriefing. The standards include:

- The debrief is facilitated by a person(s) competent in the process of debriefing.
- The debrief is conducted in an environment that is conducive to learning and supports confidentiality, trust, open communication, self-analysis, feedback, and reflection.
- The debrief is facilitated by a person(s) who can devote enough concentrated attention during the simulation to effectively debrief the simulation-based experience.
- The debrief is based on a theoretical framework for debriefing that is structured in a purposeful way.
- The debrief is congruent with the objectives and outcomes of the simulation-based experience (INACSL Standards Committee, 2016).
Students Suggestions and Comments

The comments and suggestions made by students in the open-ended questions section of the survey are valuable and need to be taken seriously by clinical and simulation instructors. Suggestions extending from the survey include the following: “More hands-on,” was a statement provided by one student, suggesting that a professor could help by guiding the student through the procedure and providing more hands-on lab days in comparison to the number of clinical days. Another student also stated that more lab days would help to reduce anxiety experienced during simulation by stating, “More hands-on or more lab time would help me a lot.” Another student suggested, “One on one [time] with the instructor,” as a strategy instructors could use to minimize student anxiety. Approaches for providing more lab time and one-on-one instruction, as recommended by student respondents, may be to increase the number of open lab hours and improve instructor availability. Student respondents also shared comments about desiring clear instructions that support the successful completion of the simulated learning experience.

Conclusion

The use of simulation-based instruction in respiratory therapy education has numerous benefits as claimed in the literature. This action research project provided insight into understanding the level of anxiety first and second-year RT students at a community college experienced during simulation-based instruction and encourages instructors to utilize additional techniques to reduce student anxiety.

Concerning the enhancement of the simulation skills of instructors, it is important to point out that simulation-based learning is an instructional technique. As with all instructional efforts, structure, process, and outcomes must be purposely planned, and reflection should be used to identify the strengths and weaknesses of the activity once instruction has been delivered.
A useful resource for instructors is the criteria for developing effective simulated learning experiences established by the International Nursing Association for Clinical Simulation and Learning (INACSL). These recommendations may be useful to RT instructors who develop and facilitate simulation-based learning experiences. The criteria include:

- Perform a needs assessment;
- Construct measurable objectives;
- Structure the format of the simulation based on the purpose, theory, and modality;
- Design a scenario or case to provide context;
- Use various types of fidelity to create the required perception of realism;
- Maintain a facilitative approach that is participant-centered and driven by objectives, participant’s knowledge and experience, and expected outcomes;
- Begin simulation-based experiences with prebriefing;
- Follow simulation-based experiences with a debriefing and/or feedback session;
- Include an evaluation of the participant(s), facilitator(s), the simulation-based experience, the facility, and the support team;
- Provide preparation materials and resources to promote participants’ ability to meet identified objectives and achieve expected outcomes of the simulation-based experience;
- Pilot test simulation-based experiences before full implementation (INACSL Standards Committee, 2016).
References

Alhaykan, A. Students’ Perceptions of Using Simulation in Respiratory Therapy Program
[Respiratory Therapy Thesis]. Georgia State University. Atlanta, GA. Retrieved from
http://scholarworks.gsu.edu/cgi/viewcontent.cgi?article=1024&context=rt_theses

https://www.aap.org/en-us/continuing-medical-education/life-support/Pediatric-
Education-for-Prehospital-Professionals/Pages/Simulation-Based-Learning.aspx

https://www.apa.org/topics/anxiety/

https://doi.org/10.1016/j.ecns.2019.05.007

study. Western Journal of Nursing Research, 35(2), 226-247.
https://doi.org/10.1177/0193945911408444

performance: An educator’s perspective. International Journal of Medical Education, 6,
118-120. https://doi.org/10.5116ijme.55fb.3d3a

[doctoral dissertations]. Portland State University. Portland, OR.
https://doi.org/10.1177/0898010112462067


Figure 1. Level of Agreement in Anxiety Related to Simulation-Based Learning (n=24).
Table 1

*Demographic Characteristics of Survey Participants*

<table>
<thead>
<tr>
<th>Demographic Category</th>
<th>Subcategories</th>
<th>Number of Participants</th>
<th>Percentage of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status in Program</td>
<td>1st year RT students</td>
<td>15</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>2nd year RT students</td>
<td>9</td>
<td>38%</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>21</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3</td>
<td>13%</td>
</tr>
<tr>
<td>Age group</td>
<td>18-25</td>
<td>7</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>26-32</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>33-40</td>
<td>9</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>41 and older</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td>Ethnicity/Race</td>
<td>White or Caucasian</td>
<td>12</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Hispanic or Latino</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Black or African American</td>
<td>6</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Asian or Pacific Islander</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Note.* Twenty-four respondents consented and completed the survey (n=24).
Table 2

*Degree of Anxiety in Simulation-Based Learning in Rank Order*

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Statement</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Being observed by instructor(s) during a simulation scenario</td>
<td>4.0</td>
</tr>
<tr>
<td>K</td>
<td>The possibility of making a mistake</td>
<td>4.0</td>
</tr>
<tr>
<td>L</td>
<td>My performance being assessed/evaluated by the instructor(s)</td>
<td>4.0</td>
</tr>
<tr>
<td>O</td>
<td>The presences of cameras or being recorded during a simulation</td>
<td>3.5</td>
</tr>
<tr>
<td>A</td>
<td>Performing required tasks during a simulation scenario</td>
<td>3.0</td>
</tr>
<tr>
<td>H</td>
<td>Being singled out, called on, or asked to provide a response</td>
<td>3.0</td>
</tr>
<tr>
<td>J</td>
<td>Making decisions about patient care during a simulation scenario</td>
<td>3.0</td>
</tr>
<tr>
<td>G</td>
<td>Finding supplies for a simulation scenario</td>
<td>2.5</td>
</tr>
<tr>
<td>I</td>
<td>Distinguishing between what is real and what is simulated</td>
<td>2.5</td>
</tr>
<tr>
<td>D</td>
<td>Being observed by my peers during a simulation scenario</td>
<td>2.0</td>
</tr>
<tr>
<td>F</td>
<td>Working in large groups during a simulation scenario</td>
<td>2.0</td>
</tr>
<tr>
<td>M</td>
<td>Receiving feedback from the instructor(s) during debriefing sessions</td>
<td>2.0</td>
</tr>
<tr>
<td>N</td>
<td>Receiving feedback from my peers during debriefing sessions</td>
<td>2.0</td>
</tr>
<tr>
<td>B</td>
<td>Interacting with mannequins</td>
<td>1.0</td>
</tr>
<tr>
<td>E</td>
<td>Observing other students during a simulation scenario</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Note.* Twenty-four respondents consented and completed the survey (n=24). A higher median score reflects a higher level of anxiety. The median score corresponds to the following responses: Extremely anxious (5), Highly anxious (4), Moderately anxious (3), Slightly anxious (2), and Not at all anxious (1).
Appendix A
IRB Approval Email

From: irb <irb@washburn.edu>
Sent: Tuesday, October 1, 2019 2:11:14 PM
To: Meghna Patel <meghna.patel@washburn.edu>; Becky Dodge <becky.dodge@washburn.edu>
Subject: IRB application #19-54

Good afternoon,

I received the review of your edited IRB application entitled, “Respiratory Therapy (RT) Student Anxiety in Simulation-based Learning” (#19-54). Your proposed project has been approved. You are welcome to begin collecting data as soon as you see fit. Good luck with your project!

Dr. Mike Russell
IRB Chair
Hello Respiratory Therapy Student,

I am conducting action research for my Master’s in Health Science final project at Washburn University. Your participation in this research project will be greatly appreciated and will help me in my efforts to complete my MHS final project. By completing the survey, you will assist me to learn more about anxiety students may experience during simulation based instruction.

The following are a few important components of the action research project.

• The survey will take about ten minutes or less to complete.
• The survey will collect quantitative data of basic demographic information as well as information about learning in simulation, particularly student perspectives related to anxiety.
• You will receive no direct benefits from participation in this research study. However, your responses may help increase knowledge about simulation associated anxiety, which may help others in the future.
• There are no foreseeable risks involved in participating in this research project.
• The information obtained through the survey will be anonymous. Individual names or personally identifying information will not be associated with the data collected. No one will be able to identify you or your answers and no one will know whether or not you participated in the study.
• Data will be stored in a password protected electronic format, only researchers on this project will have access to the data.
• Your participation is voluntary. You may refuse to take part in the survey or exit the survey at any time without penalty. You are free to decline to answer any question you do not wish to answer for any reason.
• Note that the electronic consent is built into the survey (the first question).

This study has been approved by the Washburn University Institutional Review Board, IRB # 19-64.

Questions about the survey and the research can be directed to the researcher Meghna Patel at Meghna.patel@washburn.edu.

Please visit this URL to begin the survey: “URL”

Best Regards,

Meghna Patel
Washburn University Graduate Student
### Survey of Respiratory Student Anxiety Related to Simulation-Based Learning

This short survey is part of an action research project for the Master of Health Science degree at Washburn University. Your participation will be helpful in learning more about student anxiety related to simulation-based learning. Participation is anonymous. Your responses cannot be tied to your identity. No one will know if you answered questions in the survey or how you answered questions in the survey. Please respond as accurately as possible.

Note that the first question of the survey serves as the electronic consent.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Respiratory Therapy (RT) Student,

I am conducting action research for my Master’s in Health Science final project at Washburn University. Your participation in this research project will be greatly appreciated and will help me in my efforts to complete my MHS final project. By completing the survey, you will assist me in learning more about anxiety students may experience during simulation-based learning.

If you decide to participate, you will be asked to take a survey that will be administered online. You will be asked to respond to basic demographic questions, rate the level of anxiety you feel during the simulation-based learning, rate your level of agreement with specific aspects of simulation-based learning. You will not be asked to provide your name or any other personal information. There are no other risks to your participation in the survey, which should take less than 10 minutes to complete. You may not receive any direct benefit from taking part in this study. However, your responses may help increase knowledge and implement strategies to reduce the anxiety RT students may experience during simulation-based learning.

The information obtained through the survey will be anonymous. Individual names or personal identifying information will not be associated with the data collected. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Data will be stored in a password protected electronic format; only researchers on this project will have access to the data.

Your participation is voluntary. You may refuse to take part in the survey or exit the survey at any time without penalty. You are free to decline to answer any question you do not wish to answer for any reason.

Questions about the survey and the research can be directed to the researcher Meghna Patel at Meghna.patel@washburn.edu.

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that:

- You have read the above consent information.
- You voluntarily agree to participate.
- You are 18 years of age or older.

Clicking on the "Disagree" button will end the survey.

☐ Agree

☐ Disagree
2. Select your age group.
   - 18-25
   - 26-32
   - 33-40
   - 41 or older

3. How do you describe your gender?
   - Female
   - Male
   - Transgender
   - I do not identify as female, male, or transgender
   - I would prefer not to answer

4. Select the category that represents your ethnicity
   - White or Caucasian
   - Hispanic or Latino
   - Black or African American
   - Asian or Pacific Islander
   - Other
   - I would prefer not to answer

5. Select the student group that best describes you.
   - 1st year respiratory therapy student
   - 2nd year respiratory therapy student
6. Rate the degree of anxiety you feel in relation to each listed component of simulation based-learning.

<table>
<thead>
<tr>
<th>Component</th>
<th>Extremely Anxious</th>
<th>Highly Anxious</th>
<th>Moderately Anxious</th>
<th>Slightly Anxious</th>
<th>Not at All Anxious</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Performing required tasks during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Interacting with mannequins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Being observed by instructor(s) during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Being observed by my peers during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Observing other students during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Working in large groups during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Finding supplies for a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. Being singled out, called on, or asked to provide a response during a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. Distinguishing between what is real and what is simulated (i.e. patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operation of equipment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question 6 Continued...

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Making decisions about patient care during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K. The possibility of making a mistake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L. My performance being assessed/evaluated by the instructor(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M. Receiving feedback from the instructor(s) during debriefing sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N. Receiving feedback from my peers during debriefing sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O. The presence of cameras or being recorded during a simulation scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. Rate your level of agreement with the following questions concerning simulation-based learning.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. The materials provided by the instructor(s), prior to simulations, prepare me to participate in simulation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>B. Instructions provided by the instructor(s), prior to simulations, are easy to understand</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>C. Instructions provided by the instructor(s), prior to simulations, are adequate (i.e. provided enough information)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>D. The allotted time for simulation is adequate</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>E. Simulation prepares me to perform in the clinical setting</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>F. Debriefing sessions enhance my learning</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
8. List any other sources of anxiety you experience during simulation scenarios.

Enter your answer

9. Describe in your own words, what an instructor could do to reduce student anxiety related to simulation-based learning.

Enter your answer