Feasibility and Learning Outcomes Associated with Preparing Nursing Students for Simulation using Virtual Simulation Games

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BACKGROUND

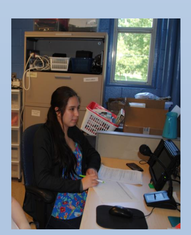
- Pre-simulation preparation is a critical aspect of simulation education that has not been well-studied, and there is a need for innovative approaches to optimize learning during the simulation
- Traditional pre-simulation preparation activities include readings, lectures, and quizzes
- As part of a multi-site study we have developed a serious virtual simulation game to enhance pre-simulation preparation for a respiratory distress simulation scenario for undergraduate nursing students

OBJECTIVES

To describe development and implementation of an innovative serious virtual simulation game to prepare nursing students to participate in a live simulation scenario focused on managing respiratory distress

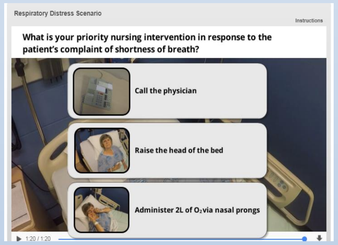
DESCRIPTION OF THE INNOVATION

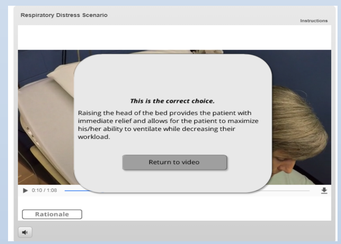
- A validated deteriorating patient simulation scenario focused on respiratory distress was previously implemented in a 4th year critical care nursing course, with self-regulated pre-simulation preparation guided by a scenario-specific learning outcomes assessment rubric
- An innovative serious virtual game simulation was developed based on the respiratory distress scenario and incorporated five decision points designed to promote critical thinking
- The virtual game consists of video clips filmed from the perspective of a nurse interacting with a patient using a Go-Pro camera
- At regular intervals, learners must select the best of three or four potential nursing actions in response to the situation
- Learners are provided with immediate feedback following selection of an incorrect response, and have the option to click on a rationale button following the selection of a correct response

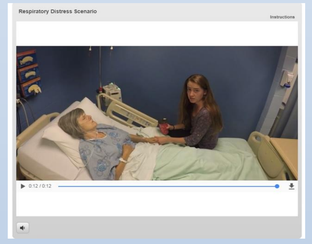




TIMELINE OF GAME DEVELOPMENT

- **April 2017, Workshop at Trent University:** selecting decision points from a validated scenario, developing a map of the decision points, and tips on writing the filming script
- **June, Script writing at Queen's University**: 3 faculty members and 1 graduate student
- **July, Game filming at Queen's University:** filmed over 1 day in the simulation lab, using a Go-Pro worn by the nurse in the scenario
- **Equipment required:** Go-Pro, head strap, 2 i-phones, movie clapboard, chalk
- **Filming personnel:** 2 faculty members, 1 drama student, 1 IT student, 1 standardized patient , 1 grad student (nurse role), 1 undergraduate student (family member) at Queen's
- Game was later filmed in French at University of Ottawa
- **August to September, Game assembly:** game assembled using Articulate software
- **October, Researcher testing**: feedback provided to developer







Respiratory Distress Virtual Simulation Game Decision Point Map

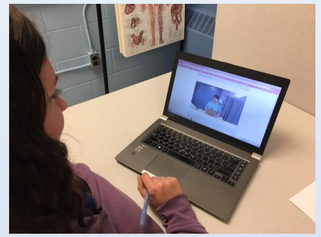
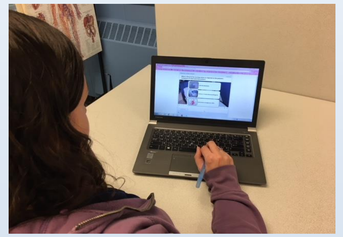
Assessment Findings	Decision Point Questions	Response A	Response B	Response C
Patient reports shortness of breath	What is the priority nursing intervention?	Raise head of the bed	Call MD	Administer 02 2L by NP
Patient reports chest pain	What is the priority nursing action?	12 Lead ECG	Administer nitro prn	Call MD
IV heparin infusion is turned off	What is your first intervention?	Call MD and ask to redraw PTT	Restart heparin drip at previous rate	Complete an incident report
Patient has decreased level of consciousness and decreased 02 sat	How will you communicate to the MD to indicate the urgency of the situation?	Report concern that patient's condition is worsening	Report patient is stable but family insisted you call	Request MD assess the patient
	What are you anticipating is the root cause of the patient's distress	Pulmonary embolus	Myocardial infarction	Pneumonia

EVALUATION

Formal Usability Testing: 3 instructors and 3 students provided additional feedback to game developer

Learning Outcomes:

- 123 nursing students in a critical care course were randomized to traditional pre-sim prep (paper case study) or virtual simulation game pre-sim prep;
- 97 nursing students (78.8%) provided pre and post data (knowledge test, anxiety and confidence scale, self-assessment rubric) and completed a modified CRiSP survey which evaluated their perceptions of the usability, engagement and learning associated with each pre-sim prep type

PRELIMINARY FEEDBACK

- Usability, engagement & learning rated highly by faculty and students
- *I'm a visual learner and it really helped me focus and learn*
- *The rational for each decision was a helpful aspect of the presimulation preparation virtual game*
- *The video game was a novel way to present the information, provided an aspect of learning that reading textbooks does not*
- *VSG facilitated engaging prep, often readings are long and lack engagement, decreasing likelihood of thorough engagement*
- *It was interactive, relevant and engaging, I learn better when I am actively doing something so this was helpful*
- *I felt more prepared and less anxious*

IMPACT

- We anticipate the serious virtual simulation game will be an engaging pre-simulation preparation activity
- The advantages to using virtual games for pre-simulation preparation could include the promotion of self-regulated learning, enhanced knowledge, decreased anxiety, and enhanced preparation and performance during a live simulation scenario
- Additionally, we anticipate that standardized pre-simulation preparation will reduce faculty preparation time and student assessment time, and may decrease instructional time in the simulation laboratory

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