

Title:

Hands Off: Student Experiences in Objective Data Collection in Virtual Clinical Simulation

A. J. Kleinheksel, PhD

Francisco Jimenez, PhD

Aaron Kotranza, PhD

Shadow Health, Inc, Gainesville, FL, USA

Session Title:

Using Simulation in Nursing Education

Slot:

R 08: Monday, 31 July 2017: 10:15 AM-11:30 AM

Scheduled Time:

10:15 AM

Keywords:

physical assessment, undergraduate nursing and virtual patient simulation

References:

1. Hayden, J.K., Smiley, R.A., Alexander, M., Kardong-Edgren, S., Jeffries, P.R. (2014). The NCSBN National Simulation Study: A longitudinal, randomized controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, 5, S1–S64.
2. Duff, E., Miller, L., & Bruce, J. (2016, September). Online virtual simulation and diagnostic reasoning: A scoping review. *Clinical Simulation in Nursing*, 12(9), 377-384. <http://dx.doi.org/10.1016/j.ecns.2016.04.001>.
3. Cendan, J., & Lok, B. (2012). The use of virtual patients in medical school curricula. *Advances in Physiology Education*, 36(1), 48–53. <http://doi.org/10.1152/advan.00054.2011>
4. Johnson, R. B., & Onwuegbuzie, A. J., (2004, October). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33, 14-26. doi:10.3102/0013189X033007014

Abstract Summary:

Virtual patient simulation is a valuable tool for clinical curricula, but the inability to engage in physical contact may limit its application. This session will describe a novel virtual patient simulation for evaluating physical assessment and present the results of a mixed-methods study of pre- and postlicensure baccalaureate student experiences.

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE
The learner will be able to identify the differentiating characteristics of pre-licensure and post-licensure BSN students' attitudes towards virtual clinical simulation.	Learners will be presented with qualitative and quantitative research describing the differences between pre- and post-licensure BSN students' perceptions of virtual patient fidelity and educational efficacy.

The learner will be able to describe the value of virtual simulation experiences to students with varying levels of professional nursing experience.	Learners will engage in discussion of the benefits and challenges of implementing virtual patient simulations with two significantly different student populations.
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Abstract Text:

Purpose:

The purpose of this study was to investigate the impact of professional nursing experience on student satisfaction and perceived efficacy of virtual patient simulation in baccalaureate nursing curricula.

The increasing adoption of simulation in undergraduate nursing curriculum is motivated by the National Council of State Boards of Nursing simulation study (Hayden, et. al 2014) which supports replacing up to 50% of clinical hours with simulation. While the NCBSN study was limited in scope to physical and high-fidelity computer-assisted simulation (e.g human patient simulators) and pre-licensure undergraduate nursing programs, virtual simulation, including virtual patient simulation, is an additional tool for educators augmenting or replacing clinical placements with simulation. Virtual simulation can be as or more effective than physical simulation for teaching diagnostic reasoning to pre-licensure nursing students (Duff, Miller, and Bruce, 2016). Virtual patient simulation has been adopted to teach medical students communication and diagnostic skills (Cendan and Lok, 2012). However, the adoption of virtual simulation for “hands on” curricular components such as physical assessment may be limited by the lack of physical contact with the simulated patient. Particularly for post-licensure students, who typically have practical nursing experience, the lack of physical interaction may limit student satisfaction and the perceived efficacy of the simulation, presenting a barrier to curriculum integration.

To illuminate the potential for implementation of virtual patient simulations in physical assessment curricula, the researchers evaluated pre- and post-licensure baccalaureate nursing students’ attitudes towards curriculum-integrated virtual patient simulations that teach and evaluate physical assessment.

Methods:

Participants: The participants in this study were BSN and RN-BSN students at 20 nursing schools across the United States. A total of 5,774 students were enrolled in courses during the spring 2016 semester. Sample exclusion criteria was identified based on the specific assignment and courses configurations that would most likely result in unreliable student data: students enrolled in courses in which instructors allowed multiple attempts or reopening of the assignments and assignment attempts in which students spent less than 10 minutes with the virtual patient. The assignments sampled for this study were Digital Clinical Experience (DCE) Focused Exams (FE) that included a newly released objective data collection feature. A final sample of 1,028 student attempts for the FE assignments of the DCE were selected for the study: 480 for the Respiratory FE (46.7%), 323 for the Cardiovascular FE (31.4%), and 225 for the Abdominal FE (21.9%).

Materials: Three assignments of DCE Undergraduate Health Assessment simulation product were selected for the study: the Respiratory FE, the Cardiovascular FE, and the Abdominal FE. In the Respiratory FE, students perform a focused examination of a 8-year-old male pediatric patient who is having a persistent cough. In the Cardiovascular FE, students perform a focused examination of a 58-year-old postoperative male patient who is presenting with chest discomfort. In the Abdominal FE, students perform a focused examination on a 68-year-old female patient who comes to the ER with abdominal pain. Each virtual patient case and associated performance assessment instruments were previously validated for nursing accuracy and learning value by several subject-matter experts.

The new objective data collection feature allows students to use the Exam Menu interface to perform physical assessments (e.g., inspection, percussion, and auscultation). As they perform each assessment, the Objective Data Collection tab automatically opens in the EHR allowing students to report on the respective assessment dimensions. For example, when students inspect the patient's abdomen to assess for abnormalities, the dimensions students can report on are symmetry (symmetric or asymmetric), contour (flat, rounded, protuberant, or hollowed), and appearance (e.g., rash, striae, distension, bruising, etc.). When students leave the virtual patient's room, the system alerts them to any assessments that they have not yet reported. When they submit their assignment to their instructor, students receive a score several aspects of their performance, including Objective Data Collection.

Measures: The researchers developed a survey containing eight Likert-type items and one open-ended question to measure students' attitudes towards the new objective data collection feature. The Likert-type items were "Overall, I feel that this assignment was a worthwhile learning experience", "I feel that the patient's body images and visuals allowed me to select the appropriate findings in the EHR", "I feel that the patient's body sounds allowed me to select the appropriate findings in the EHR", "I feel that the process of reporting objective findings improved my clinical reasoning skills", "I feel that the duration of this assignment was appropriate", "I feel that the score I received on objective data collection was a fair representation of my performance", "I feel that this assignment was too challenging for me to complete", and "I feel that this assignment helped me identify physical exam skills that need improvement". These items were evaluated on a scale of 1 to 5 where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The open-ended question was "How satisfied were you with the experience of selecting a physical exam from the menu, and then reporting the objective data in the EHR?".

Procedure: Each FE assignment had a post-exam activity that included a link to the survey instrument. In the survey instructions, students were told that their answers would be confidential and that participating or opting-out of the survey would not interfere with their patient exam assignment in any way. In order to ensure anonymity, identifying information, including demographics, were not collected in the survey.

Analysis: The data included in this study employed both quantitative and qualitative elements in a mixed-model design (Johnson & Onwuegbuzie, 2004). We conducted independent samples t-tests to compare RN-BSN and BSN student responses to the Likert-type items. Responses to the open-ended question were first coded for distinct concepts and themes in each student group separately. Then, responses were counted within each of the identified themes to obtain frequencies of occurrence.

Results:

Quantitative analysis: In the Respiratory FE assignment, compared to their BSN peers, RN-BSN students reported significantly higher levels of agreement to the items "Overall, I feel that this assignment was a worthwhile learning experience", $t(460) = 3.274$, $p < .05$, and "I feel that the duration of this assignment was appropriate", $t(449) = 4.123$, $p < .05$. In the Cardiovascular FE assignment, RN-BSN students reported significantly higher levels of agreement to the item "I feel that the duration of this assignment was appropriate" compared to their BSN peers, $t(319) = -3.095$, $p < .05$. Similar to Respiratory, in the Abdominal FE assignment, RN-BSN students reported significantly higher levels of agreement than their BSN peers to the items "Overall, I feel that this assignment was a worthwhile learning experience", $t(222) = 2.353$, $p < .05$, and "I feel that the duration of this assignment was appropriate", $t(223) = 3.095$, $p < .05$.

Qualitative analysis: Over 75% of the RN-BSN and 80% of the BSN students who responded to the open-ended question included in each FE reported that they were satisfied or very satisfied with the experience of selecting a physical exam from the menu, and then reporting the objective data in the EHR. The main themes emerging among responses from RN-BSN students were: 1) the need for better art and sound assets to identify abnormalities (e.g., it was difficult to distinguish if patient was flushed or not, or the quality of the auscultation sounds made it difficult to report the finding), 2) the expectation that the EHR would auto-populate with the correct dimensions selected without having to select them, and 3) using the open-text Nursing Progress Notes tab in the EHR to summarize objective findings implied additional work

and time. The main themes emerging among responses from BSN students were: 1) the activity was challenging or difficult to complete, 2) the workflow of the assessment was appropriate (i.e., having to perform the assessment and then record on the EHR, or EHR opening simultaneously with performing the assessment, or being able to report findings from various dimensions available), and 3) the idea that better instructions were required to complete the activity.

Conclusion:

Due to persistent shortages of clinical placements and faculty, nursing programs are in an increasing need of a variety of simulation modalities to achieve their learning objectives assessment outcomes. Virtual patient simulations presents a viable, flexible, and standardized option for faculty. This study found that students of both learning populations find value and realism in virtual patient physical assessments. This study also found that significantly more RN-BSN students found virtual physical assessments to be valuable and appropriate than their pre-licensure counterparts. This difference, which surprising at first glance may be explained by the high level of fidelity of the virtual environment, which experienced students recognize, and/or the complexity experience presented by the deep patient narrative, which is more realistic to a real person. The findings of this study can be used to add additional evidence to case for using virtual patients in nursing education, but more importantly, it can be used to help faculty better frame the design, use, and value of virtual patients for their different student populations.