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Featured Article

Evaluation of vSIM for Nursing™: A Trial of Innovation

Cynthia L. Foronda, PhD, RN, CNE, ANEF^{a,*}, Sandra M. Swoboda, RN, MS, FCCM^b, Krysia Warren Hudson, DNP, RN, BC^c, Emily Jones, MA^d, Nancy Sullivan, DNP, RN^e, Jessica Ockimey^f, Pamela R. Jeffries, PhD, RN, FAAN, ANEF^g

^aAssistant Professor of Nursing, Department of Acute and Chronic Care, Johns Hopkins University, School of Nursing, Baltimore, MD 21205, USA

^bSenior Research Program Coordinator/Simulation Educator, Johns Hopkins University, Schools of Medicine and Nursing, Baltimore, MD 21287, USA

^cInstructor, Department of Acute and Chronic Care, Johns Hopkins University, School of Nursing, Baltimore, MD 21205, USA

^dEmerging Technologies Manager, Johns Hopkins University, School of Nursing, Baltimore, MD 21205, USA

^eClinical Simulation Director, Department of Acute and Chronic Care, Johns Hopkins University, School of Nursing, Baltimore, MD 21205, USA

^fSimulation Specialist, Johns Hopkins University, School of Nursing, Baltimore, MD 21205, USA

^gDean and Professor of Nursing, George Washington University School of Nursing, Washington, DC, 20036, USA

KEYWORDS

virtual simulation;
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Abstract

Background: Virtual simulation is an emerging technology that has been suggested as an effective pedagogical approach to teaching various skills in nursing education. The purpose of this study was to report students' experience with vSim for Nursing™.

Method: This study used a descriptive, mixed-methods design with 54 accelerated Bachelor of Science in Nursing students. Students performed in scenarios with a patient who had pneumonia and developed anaphylaxis and a patient who developed cardiac arrest requiring defibrillation. Students were surveyed regarding their satisfaction with the experience.

Results: Most students reported that the product was easy to use (20% strongly agree, 78% agree). Nearly, all students recommended the virtual simulation for future use (98%). Several students indicated frustration with real-time features such as handwashing and the inability to multitask.

Conclusions: Most students suggested that the virtual simulation was a positive experience. However, this innovative pedagogy warrants more stringent investigation.

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* Corresponding author: cforond1@jhu.edu (C. L. Foronda).

Background

The National League for Nursing Research Priorities in Nursing Education call for the identification and evaluation of the effectiveness of emerging technologies in the teaching

Key Points

- vSim for Nursing™ employs a web-based platform to simulate nursing scenarios whereby students have the opportunity to interact with patients and receive direct feedback on their performance.
- Nearly all students (98%) recommended the virtual simulation for future use.
- Virtual simulation has a wide range of applications and warrants further exploration.

of nursing decision-making skills (NLN, 2012). Virtual simulation is an emerging technology that has been suggested to be effective in teaching various skills in nursing education (Caylor, Aebersold, Lapham, & Carlson, 2015; Foronda, Budhathoki, & Salani, 2014a; Foronda, Gattamorta, Snowden, & Bauman, 2014b; McCallum, Ness, & Price, 2011). In the last decade, a variety of virtual simulation products have emerged, and it is predicted that the use of virtual simulation will expand (Foronda & Bauman, 2014). The purpose of this research brief

was to report students' experience with an interactive virtual simulation learning product called vSim for Nursing™.

Research in Virtual Simulation in Nursing

Searching the Cumulative Index to Nursing and Allied Health Literature database, using keywords of “virtual simulation” and “nursing” from 2010 to 2015, 15 research articles were generated. Of this body of literature, most studies (n = 11) were conducted with nursing students. Two studies evaluated faculty members' perceptions of virtual simulation as a feasible learning tool (Jenson & Forsyth, 2012; Vottero, 2014). Faculty members' perceptions were positive with the virtual reality simulations in teaching skills of IV insertion and medication withdrawal from an electronic medication dispensing system. Two studies examined use of virtual simulation with nurses (Hudson, Taylor, Kozachik, Shaefer, & Wilson, 2015; Kalisch, Aebersold, McLaughlin, Tschannen, & Lane, 2015). The remaining topics ranged from problem-based learning (McElhinney, 2011), teamwork (Caylor et al., 2015; Kalisch et al., 2015), psychiatric nursing (Kidd, Knisley, & Morgan, 2012); communication (Foronda et al., 2014b), decision-making (Hudson et al., 2015), problem-based learning (Hudson et al., 2015; McElhinney, 2011); patient management (Chia, 2013; Josephsen & Butt, 2014), disaster training (Farra, Miller, Timm, & Schafer, 2013; Farra, Smith, Gillespie, Nicely, Ulrich & Hodgson, 2015; Jose & Dufrene, 2014), psychomotor skills (Jenson & Forsyth,

2012; Vottero, 2014), nutritional assessment (Sweigart, Hodson-Carlton, Campbell, & Lutz, 2010) and attitudes toward the poor (Menzel, Willson, & Doolen, 2014). All studies described virtual simulation to be an effective pedagogy; however, several studies indicated that the technology itself could be problematic for the user because of the inability to manipulate the avatars and communicate in a virtual simulation environment (Caylor et al., 2015; Hudson et al., 2015; Kidd et al., 2012; Menzel et al., 2014; Sweigart et al., 2010; Vottero, 2014).

vSim for Nursing™

vSim for Nursing was developed through a collaboration between Wolters Kluwer Health (Lippincott), Laerdal Medical, and the National League for Nursing. Peer-reviewed, manikin-based simulations were adapted for use in a virtual environment. vSim for Nursing employs a Web-based platform to simulate nursing scenarios whereby students have the opportunity to interact with patients and receive direct feedback on their performance. Scenarios allow students to apply knowledge, make decisions, perform interventions, receive feedback on actions, and repeat the experience as desired. The National League for Nursing conducted a pilot project with selected nursing programs in the 2014 spring semester to evaluate clinical faculty utilization and satisfaction (Forneris & Scroggs, 2014). Faculty perceptions of vSim were positive, and they indicated that vSim offered “more value and utility than other teaching methods” (p. 348). No literature was identified that described students' perceptions of using vSim for Nursing.

Sample

One-hundred twenty accelerated Bachelor of Science in Nursing (BSN) students participated in the simulations. Fifty-four students completed the voluntary evaluations yielding a response rate of 45%. As the evaluation was part of standard educational practice, demographic data were not collected.

Methods

This study used a descriptive, mixed-methods approach. Institutional review board approval was obtained. vSim for Nursing was released in the spring of 2014 for pilot testing to the study site free of charge. Although the single-user product was designed to be flexible enough to be completed at home, the vSim experience was performed in the computer laboratory at the school of nursing. As this was the students' first exposure to vSim for Nursing, students were arranged in pairs on one computer to allow for discussion and interactive learning. Students spent approximately 10 minutes completing a tutorial. Faculty members

chose two scenarios for the students to complete during the 2-hour, medical–surgical simulation time frame. The first simulation scenario was a patient with pneumonia who went into anaphylaxis. The second scenario was a patient who went into cardiac arrest and required defibrillation. Each simulation lasted approximately 45 minutes.

During the simulation exercise, students were instructed to follow the vSim format starting with completing a prequiz assessing baseline knowledge of pharmacology, pathophysiology, and nursing interventions. Then, students performed the simulation, reviewing real-time feedback on their performance and repeated each simulation. Students were not graded on their simulation performance; rather, it was an exercise incorporated into the normally scheduled simulation day. After performing the two virtual simulations, students participated in a facilitator-led, 20-minute debriefing following Dreifuerst's (2012) Debriefing for Meaningful Learning process.

After debriefing, students were asked to evaluate the experience using an anonymous electronic survey format powered by Qualtrics (Provo, Utah). Students were given a paper with a quick response code to scan from their smartphones that linked to an electronic survey. The four-item survey consisted of two Likert-type questions (1—strongly agree, 4—strongly disagree), one (yes/no) question, and an open-ended question. The survey items were (a) the virtual simulation was easy to navigate, (b) the content of this virtual simulation was directly relevant to my role as a nurse, (c) I would recommend this virtual simulation for future use, and (d) please share any additional comments about this virtual simulation. Data were aggregated and analyzed. Descriptive statistics were calculated, and a qualitative content analysis was performed independently by two researchers on the open-ended question. Themes were derived independently and discussed until consensus was achieved.

Results

Most students reported that the product was easy to use (20% strongly agree, 78% agree). All respondents reported that the content of the virtual simulation was directly relevant to their role as a nurse (61% strongly agree and 39% agree). Nearly, all students recommended the virtual simulation for future use (98%) with only one student negatively responding to future use.

Sixteen students responded with a mix of positive and negative feedback to the open-ended question on the survey. Positive comments included: “I really enjoyed it!” “I think it is really informative and very useful,” “It was more intuitive ... we could check orders ... organization was better ... layout was cleaner and more professional looking.”

Two students indicated they preferred manikin-based simulation over virtual simulation. “Walking through a scenario by actually doing the nursing actions in real life is

much more beneficial for me than trying to trouble shoot in the virtual simulation.” Four students expressed frustration that the real time features took too long. “Watching handwashing was not necessary.” Another student indicated, “Some of the actions were lengthy.” Two students noted that it was difficult to multitask in the virtual environment. These findings are reflective of the expressed frustrations in using avatars within the literature review (Caylor et al., 2015; Hudson et al., 2015; Kidd et al., 2012; Menzel et al., 2014; Sweigart et al., 2010; Vottero, 2014).

Nearly, all the nursing students who participated recommended vSim for future use suggesting that the virtual simulation experience was a positive one. These findings were similar to the findings of Foronda et al. (2016) who found nursing students described virtual simulation as “fun” and “better than reading.” The findings of this study supported findings from the literature review suggesting that students felt virtual simulation was an effective pedagogy.

Several findings of this study add to the body of knowledge regarding virtual simulation in the context of nursing education. Students mentioned that the handwashing feature was too slow. Students expressed the desire to multitask, yet they were hindered. These insights provoke deeper discussion about student expectations of working quickly and receiving immediate feedback. This raises the question if features such as handwashing should be performed in real time or if they should be accelerated in the virtual world. Correct and lengthy handwashing is a critical component of infection control. Yet, does the 20-second procedure require this delay when in the context of learning skills of prioritization in a virtual setting? Perhaps, order of execution is more important in the context of virtual learning. Future virtual simulation software designers may want to consider the ability for users to multitask. These statements warrant additional investigation. It is important to note that negative comments provide valuable information for improvement efforts including product upgrades.

This study had several limitations. This was a report of a single-center experience with a short, focused objective to engage accelerated BSN students in a virtual simulation experience as part of a longer interactive simulation day. Students worked together in pairs and not as individuals allowing for team troubleshooting and discussion in a computer laboratory. It is not known how students would have felt if they had to learn the technology independently in a remote setting. The evaluation survey was anonymous, and no demographic data were collected which limited generalizability. Students who did not bring a smartphone may not have been able to participate in the evaluation as readily. The vSim platform provided the potential for student assessment with quantitative performance measures; however, the experience was not counted as part of the students' grade. It is possible that if students were being formally evaluated, they might have had different perceptions about the virtual simulation experience.

Conclusion

Preliminary evidence with vSim for Nursing suggests that students were satisfied with learning this way. Virtual simulation has a wide range of applications and warrants further exploration. Virtual simulation could be used as innovative classroom pedagogy, content preparation for lecture, clinical make-up, independently, or as part of a simulation day to enhance or reinforce knowledge and learning. Research is warranted to evaluate the applications that are most effective—specifically, studies that compare student learning outcomes resulting from virtual simulation to manikin-based simulation. Further investigation is recommended to examine if virtual simulation may serve as an enhancement to or substitution for a portion of a clinical practicum, similar to the National Council of State Boards of Nursing study (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). It may be practical to use virtual simulation to serve as a way to make up missed clinical time.

Virtual products such as vSim for Nursing have been positively reviewed by nursing students and faculty members. The attributes of content, complexity, direct feedback, and ease of use are strengths of this product that should be further investigated for optimum use. Nurse educators and students may benefit from trialing this innovative pedagogy.

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