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Enhancing Learning and Self-Efficacy with Virtual Simulation

Lawone J. Lane
Gardner-Webb University, llane4@gardner-webb.edu

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Lawone J. Lane

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Submitted by:	Approved by:
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Lawone J. Lane, MSN, RN, CNE	Dr. Ashley Isaac-Dockery, DNP, ANP-BC
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Date	Date

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To the college community where this project was conducted for allowing me access to the students and facilities.

To the students who volunteered to participate in the project.

To my family, particularly to my husband, Danny, my son, Michael, my daughter, Claire, and my mother, Marilyn Knight for their support, patience, and love during my educational journey.

Enhancing Learning and Self-Efficacy with Virtual Simulation

Abstract

Background

Evidence is lacking for support in the use of virtual simulation as a viable alternative for experiential learning and enhancing satisfaction, self-efficacy, and learning.

Problem

Virtual simulation activities can provide opportunities for nursing students outside of clinical sites. In prelicensure nursing education, how does the development of a virtual simulation compare to traditional nursing education and does virtual simulation enhance student satisfaction, self-efficacy, and learning?

Approach

A non-experimental descriptive design was used to examine attitudes of prelicensure nursing students related to perceived satisfaction, self-efficacy, and learning following a virtual simulation in place of a clinical site experience.

Outcomes

Nursing students indicated a moderately high perception of self-efficacy and a high degree of satisfaction with learning using a virtual simulation activity. Self-confidence with learning was slightly above average.

Conclusions

Outcomes support virtual simulation as a desirable option for learning and contributes to nursing knowledge regarding use of alternative methods to enhance satisfaction and self-confidence in learning.

Key Terms

Self-Efficacy

Personal Satisfaction

Virtual Simulation

Pre-licensure Nursing

Clinical Reasoning

Enhancing Learning and Self-Efficacy with Virtual Simulation

Names and Credentials: Lawone J. Lane, MSN, RN, CNE; Dr. Isaac-Dockery, DNP, ANP-BC, MSN, RN

Author's Affiliations: DNP Candidate (Mrs. Lane), Hunt School of Nursing, Gardner-Webb University, Boiling Springs, NC; Faculty Chair (Dr. Isaac-Dockery), Hunt School of Nursing, Gardner-Webb, Boiling Springs, NC

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Access of clinical practice sites can be limited or prohibited due to safety concerns for students, faculty, clients, pandemics and/or natural disasters. Virtual simulation educational experiences allow nursing students to develop knowledge and skills to perform and participate as highly skilled nurses regardless of access to clinical practice sites. Virtual simulation can be substituted as a replacement clinical activity. Additionally, virtual simulation is utilized to enhance satisfaction, self-confidence, and learning in prelicensure nursing students when there is an inability to access clinical practice sites.

Background

COVID –19 disrupted the flow of nursing education for the year 2020 – 2021. This profoundly impacted completion of courses and clinical components for nursing students. Most tertiary educational systems have contingency plans for anticipated absences; however, most do not have a repository of remote learning experiences mirroring experiential learning obtained in a lab or clinical practice environment. Virtual simulation is touted as a viable alternative strategy for experiential learning allowing students to practice and make decisions in a safe and controlled environment while enhancing proficiency in skills and learning. Self-efficacy is increased because the student can witness consequences of their actions and determine a better course of action, thus improving critical thinking ability.[1] The literature regarding the use of virtual simulation as an alternative educational modality has been shown to positively affect outcomes in nursing education. Outcomes described in various studies state virtual simulation is cost-effective,[2,3] reproducible,[4] can be done remotely,[5] and has high learner

satisfaction.[6,7] In addition, virtual simulation enhances nursing skill development and knowledge,[8,9,10,3,11,12,13] increases confidence and self-efficacy, [14,4,13] and improves clinical reasoning ability.[15,16,17,4,18,19] Virtual Simulation is an experiential and active learning process providing consistency with instruction, when used, and can be practiced in a safe environment.[20] This type of learning allows students exposure to situations they may experience in the clinical practice environment.[21]

Problem

Undergraduate nursing students need experiential learning activities to engage in strategies for clinical reasoning to meet program objectives and outcomes. The ability to complete courses, regardless of where learning takes place is vital. By increasing the use of virtual simulation activities available for remote learning, schools of nursing can provide opportunities to meet learning objectives, improve knowledge, allow students to practice skills in a safe learning environment, and enhance satisfaction and self-confidence with learning.[19] Schools of nursing are being increasingly challenged to develop strategies to replicate actual clinical experiences for students because of the high demand for actual clinical space in institutions which are overwhelmed with students. Simulation can standardize clinical experiences for the learner and assist with the development of clinical reasoning skills similar to those in traditional clinical experiences.[22] In prelicensure nursing education, how does the development of a virtual simulation compare to traditional nursing education and does virtual simulation enhance student satisfaction, self-efficacy, and learning?

Approach

Using a non-experimental descriptive design, a virtual simulation experience was developed using the NLN Jeffries Simulation theory for 60 baccalaureate nursing students. The premise of the theory posits simulation can standardize clinical experiences and develop clinical reasoning skills comparable to those in traditional clinical experiences.[22] Consideration for the expanded use of simulation include the potentiality of applying active learning strategies structured for self-directed learning allowing participants to reflect and critically think. [22]

In place of a clinical day at a facility, a group of 8-10 students (a clinical group) completed the virtual simulation. This occurred over a period of 7 weeks with a new clinical group each week. This alleviated crowding in the clinical facility. Students were required to prepare for the virtual simulation using textbooks, journal articles, and audiovisual materials in their online learning management system which included information on interprofessional collaboration, medication information for the virtual patient, and the patient's electronic medical record. Using a free online virtual simulation regarding interprofessional collaboration and a patient with an orthopedic medical-surgical problem, students individually and remotely completed the virtual simulation. Students received a performance score and if the student desired, they were able to repeat the simulation multiple times to their satisfaction to improve scores, although not required. A virtual debrief by clinical faculty followed simulation on the day of completion. The virtual simulation and debrief was completed remotely by all 60 students. Students were then requested to voluntarily complete a questionnaire [23] and survey [24] anonymously, assessing perceived satisfaction, self-confidence, and learning using virtual simulation. The Nation League for Nursing Student Satisfaction and Self-

Confidence in Learning questionnaire [23] and General Self-Efficacy Scale (GSE)[24] were used post-simulation to assess perceived satisfaction, self-efficacy, and learning with a virtual simulation experience.

Outcomes

All students completed the required virtual simulation (n=60). Eleven students (18%) completed the General Self-Efficacy Scale (GSE). The GSE is a 10-item survey where responses were made on a 4-point Likert scale ranging from "not at all true" to "exactly true" measuring the construct of perceived self-efficacy. Reliability for the GSE has been demonstrated with Cronbach's alpha that ranges from 0.76-0.90 with the majority in the high 0.80s. Schwarzer and Jerusalem report the construct of perceived self-efficacy reflects an optimistic self-belief one can perform novel or difficult tasks, or cope with adversity and facilitates persistence in the presence of difficulty and recovery from setbacks.[25] The authors further state that the construct is related to subsequent behavior and is therefore relevant for clinical practice and behavior change.[25] Students responded with a range of 27-35 points. The minimum score one can receive is 10, with a maximum score of 40 points on the GSE scale. The student response mean score (34.2) indicates a moderately high perception of self-efficacy in this group. Further indicating students have a general sense of perceived self-efficacy which is predictive of coping with daily hassles and adaptation after experiencing stressful life events [25]

Eight students (13%) completed the NLN Student Satisfaction and Self-Confidence in Learning questionnaire. The questionnaire consisted of 13-item question, designed to measure student satisfaction with the simulation activity and self-confidence in learning using a 5-point scale (1-5) from "strongly disagree' to "strongly agree".

Reliability has been tested using Cronbach's alpha and satisfaction is 0.94 and self-confidence is 0.87. [23] The questionnaire assesses the attitudes towards instruction and self-confidence in learning in a simulation.[26] The questionnaire contained subscales: one containing five items measuring satisfaction with teaching strategies, learning materials, facilitation, motivation, and suitability of simulation.[27] The second subscale consisted of eight items measuring self-confidence in content proficiency, necessity, skills acquisition, availability of resources, and ability to get assistance in solving clinical issues in simulation.[27] Sixty-three percent of students scored greater than the mean of 11.6 indicating a moderately high level of satisfaction with simulation. Scoring on the second subscale, measuring self-confidence in learning, revealed most students felt self-confident in what they had learned during the virtual simulation. Overall, the NLN Student Satisfaction and Self-Confidence in Learning questionnaire, with a possible range of 13-52 (mean 32.5), showed student response average score of 33.6 (response range 15-39) indicating students were satisfied with the simulation and were self-confident in their learning.

Conclusions

Utilizing virtual simulation as a viable teaching modality is shown to be beneficial to learners in several ways: knowledge, skill performance, satisfaction, critical thinking, and self-efficacy. Jeffries reported knowledge derived from simulation is retained by the learner longer than knowledge from traditional lecture. [28] Repetition and ability to accomplish learning in a safe setting for the learner allows development of psychomotor skills. These skills can be practiced for improved skill acquisition. Furthermore, students are typically satisfied with simulation as a learning modality and the literature shows

satisfied learners who acquire new skills can directly transfer those skills to the clinical area which enhances self-confidence and facilitates better judgement. The National Council of State Boards of Nursing notes there are many advantages of simulation over actual clinical experience because simulation: reduces training variability and increases standardization; can be customized for individual learning; is truly student-centered experiential learning instead of passive learning; allows for independent critical-thinking, decision-making and delegation; offers opportunities to practice rare and critical events; can be designed and manipulated; can be reproduced; occurs on schedule; offers opportunities to make and learn from mistakes; and is safe and respectful for patients.[29]

The outcome of this project showed prelicensure students generally have a high degree of perceived self-efficacy. Students perceived a high degree of satisfaction with the virtual simulation experience. In addition, student's self-confidence in learning was slightly above average. Based on survey responses, virtual simulation is a viable alternative activity that can be utilized or substituted to enhance learning in prelicensure students and provides an experiential learning activity increasing learning and self-efficacy. Additionally, simulation can be added to the repository of sustainable learning experiences allowing progression and completion of nursing courses in a timely manner; especially when there are absences or complexities in procuring clinical space for nursing students. The outcomes of this project support virtual simulation as a desirable and viable option to traditional experiential learning and contributes to nursing knowledge regarding development and evaluation of alternative teaching methods to enhance satisfaction and self-confidence in learning in prelicensure nursing students.

References

1. Bastable SB. *Nurse as Educator: Principles of Teaching and Learning for Nursing Practice*. 5th ed. Jones & Bartlett Learning 2019.

2. Cook DA, Hatala R, Brydges R, et al. Technology-enhanced simulation for health professional's education: A systematic review and meta-analysis. *JAMA. 2011;* 306(9): 978-988. doi:10.1001/jama.2011.1234

3. Guise V, Chambers M, Valimaki M. What can virtual patient simulation offer mental health education? *J of Psychiatr Ment Health Nurs.* 2012; 19(5): 410-418. doi.org/10.1111/j.1365-2850.2011.01797.x

4. Mabry J, Lee E, Roberts T, et al. Virtual simulation to increase self-efficacy through deliberate practice. *Nurse Educ*. 2019; 45(4): 202-205. doi: 10.1097/NNE.0000000000000758

5. Smith PC, Hamilton BK. The effects of virtual reality simulation as a teaching strategy for skills preparation in nursing students. *Clin Simul Nurs.* 2015; 11(1): 52-58. doi-org.10.1016/j.ecns.2014.10.001

6. Foronda C, Hudson KW, Budhathoki C. Use of virtual simulation to impact nursing students' cognitive and affective knowledge of evidence-based practice. *Worldviews Evid Based Nurs*. 2017; 14(2): 168-170. doi.10.1111/wvn.12207

7. Leighton K. Development of the clinical learning environment comparison survey. *Clin Simul Nurs*. 2015; 11(1): 44-51. doi.org.10.1016/j.ecns.2014.11.002

8. Borg Sapiano R, Sammut R, Trapani J. The effectiveness of virtual simulation in improving knowledge and performance during patient deterioration: A pre and post design. *Nurse Educ Today*. 2017; 62: 128-133. doi-org.10.1016/j.nedt.2017.12.025

9. Cant RP, Cooper SJ. The value of simulation-based learning in pre-licensure nurse education: A state-of-the-art review and meta-analysis. *Nurse Educ in Pract*. 2017; 27: 45-62. doi-org.10.1016/j.nepr.2017.08.012

10. Foronda C, Godsall L, Trybulski J. Virtual clinical simulation: The State of the science. *Clin Simul Nurs.* 2013;9(8): 279-286. doi.org/10.1016/j.ecns.2012.05.005

11. Nicely S, Farra S. Fostering learning through interprofessional virtual reality simulation development. *Nurs Educ Perspect*. 2015; 36(5): 335-336. doi: 10.5480/13-1240

12. Rourke S. How does virtual reality simulation compare to simulated practice in the acquisition of clinical psychomotor skills for pre-registration student nurses? A systematic review. *Int J Nurs Stud.* 2020; 102: 103. doi-org.10.1016/j.ijnurstu.2019.103466

13. Sweigart L, Burden M, Carlton KH, et al. Virtual simulations across curriculum prepare nursing students for patient interviews. *Clin Simul Nurs.* 2014; 10(3): 139-145. doi-org.10.1016/j.ecns.2013.10.003

14. Forsberg E, Ziegert K, Hult H, et al. Assessing progression of clinical reasoning through virtual patients: An exploratory study. *Nurse Educ Pract*. 2016; 16(1): 97-103. doi-org.10.1016/j.nepr.2015.09.006

15. De Gagne JC, Oh J, Kang J, et al. Virtual worlds in nursing education: A synthesis of the literature. *J Nurs Educ*. 2013; 52(7): 1-11. doi:10.3928/01484834-20130610-03

16. Formeris SG, Schroggs NH. NLN scholars in residence conduct research on virtual simulation and the clinical faculty role. *Nurs Educ Perspect*. 2014; 35(5): 348-349.

17. Goncalves SA, Watson SM. Clinical conundrum? An innovative clinical makeup approach. *J Nurs Educ.* 2019; 58(11): 675. doi.org/10.3928/01484834-20191021-13

18. Padilha JM, Marchado PP, Ribeiro AL, et al. Clinical virtual simulation in nursing education. *Clinical Simulation in Learning*. 2018; 15: 13-18. doi: 10.2196/11529.

19. Padilha JM, Marchado PP, Ribeiro AL, et al. Clinical virtual simulation in nursing education. Randomized control trial. *J Med Internet Res.* 2019; 21(3): 1-9. doi.org/10.2196/11529

20. Harder N. Replace is not a four-letter word. *Clin Simul Nurs*. 2015; 11(10): 435-436. doi-org.10.1016/j.ecns.2015.07.001

21. Thomas CM, Barker N. Simulation elective: A novel approach to using simulation for learning. *Clinical Simulation in Learning*, 2018; 23: 21-29. doi-org.10.1016/j.ecns.2018.08.003

22. Jeffries PR, Rodgers B, Adamson KA. *The NLN Jeffries Simulation Theory*. National League for Nursing; 2016.

23. Student Satisfaction and Self-Confidence in Learning. NLN. http://www.nln.org/docs/default-source/default-document-library/instrument-2_satisfaction-and-self-confidence-in-learning.pdf?sfvrsn=0. Published 2021. Accessed July 1, 2021.

24. General Self Efficacy Scale. MIDSS. https://www.midss.org/content/general-self-efficacy-scale-gse. Published 2021. Accessed July 1, 2021.

25. Schwarzer R, Jerusalem M. *Generalized Self-Efficacy scale. Measures in Health Psychology: A user's portfolio. Causal and control beliefs*. 1995; 35-37: Windsor, UK: NFER-NELSON.

26. Jeffries PR, Rizzolo MA. "Designing and implementing models for the innovative use of using simulation to teach nursing care of ill adults and children: A national, multisite, multi-method study". *National League for Nursing and Laerdal Medical*. 2006; New York.

27. Franklin AE, Burns P, Lee CS. Psychometric testing on the NLN Student Satisfaction and Self-Confidence in Learning, Simulation and Design Scale, and Educational Practices Questionnaire using a sample of prelicensure novice nurses. *Nurse Educ Today*. 2014; 34: 1298-1304. doi.org/10.1016/j.nedt.2014.06.011

28. Jeffries PR. A framework for designing, implementing, and evaluating simulation. *Nurs Educ Perspect.* 2005; 26(2): 96-103. PMID: 15921126

29. Wolters Kluwer. "Nursing simulation scenarios: Preparing tomorrow's nurses, today". *Lippincott Nursing Education Blog.* http://nursingeducation.lww.com/blog.entry.html/2018/02/27/nursing_simulations-24Ly.html. Published 2018, Accessed February 27, 2021.