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Overcoming Challenges in Evaluating Active versus Observer Roles in Simulation-Based Education

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Different student roles are frequently used in simulation-based education. A participant in the active role such as the primary nurse makes decisions and is involved in total patient care in the scenario. Alternatively, a participant in the passive role such as the observer, is frequently watching the simulation unfold without direct involvement in the decision-making. In the National Simulation Study, authors noted that students spend a large amount of time in the passive observation role (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014).

Current research and practice within the nursing discipline has equated having students observe nursing practice with constructivist and experiential learning—the guiding frameworks that underpin simulation-based education (Jeffries, Rogers, & Adamson, 2016). However, there has been no research in nursing education to explore if these experiences for learners in observational roles do in fact support constructivist and experiential learning models. These theories include concepts of assimilation, accommodation, and active experimentation which would require two experiences, similar in nature, to allow for these to be evaluated (Kolb, 2015; Piaget & Cook, 1952). Therefore, the purpose of this pilot study was to establish that two simulation-based experiences, involving a clinical situation with respiratory distress, were contextually equivalent scenarios.

Research in nursing education is beginning to demonstrate that learning outcomes are not significantly different based on the student role in simulations (Fluharty et al., 2012; Kaplan et al., 2012; Livsey & Lavender-Stott, 2015; Rode et al., 2016; Scherer et al., 2016; Smith et al., 2013; Thidemann & Soderhamn, 2013; Zulkosky et al., 2016). However, only three studies examine more than one simulation (Livsey & Lavender-Stott, 2015; Rode et al., 2016; Scherer et al., 2016). Additionally, a significant amount of the existing studies failed to report psychometric analyses of knowledge assessments and/or behavioral instruments raising questions to stated outcomes (Kaplan et al., 2012; Smith et al., 2013; Thidemann & Soderhamn, 2013.) As nursing education simulation programs seek to increase simulation-based experiences, research is needed to demonstrate if one simulation-based experience is enough, despite role, for learners to assimilate and accommodate in subsequent scenarios. Assimilation and accommodation are suggested as the “ultimate goal in a practice profession and the essence of reflection” in simulation-based education (Dreifuerst, 2009, p. 111).

This study took place at a large multi-campus university baccalaureate prelicensure nursing program in the Southwest and involved 78 students and 10 faculty across two campuses. Data collection for the two simulations included four pre/post-tests that were designed to measure knowledge related to respiratory distress. Efforts to establish equivalency included constructing each exam with a similar number of questions assessing equal numbers of knowledge domains and NCLEX-RN competencies in alignment with the 2016 NCLEX-RN Test Plan. Content validity was established with an expert NCLEX-RN item writer. Item analyses were conducted to assess difficulty, discrimination, and instructional sensitivity (Haladyna, 2016; Waltz, Strickland, & Lenz, 2017) as well as internal consistency using the Küder-Richardson Formula 20. Additionally, data collection included a list of action-items that was developed to assess if each simulation required similar actions to address respiratory distress. Content validity was established with course faculty and a PhD prepared nurse with expertise in nursing education research. Interrater reliability was conducted through viewing recorded simulations.

Preliminary findings from this study include that psychometric testing of multiple-choice knowledge assessments can assist nursing education researchers not only in demonstrating the validity and reliability of measurements, but also in understanding how sensitive the simulation scenario and debriefing are to the content of the assessment. Although critiqued as a passive form of knowledge, multiple-choice tests are feasible to implement in simulation-based education (O'Donnel et al., 2014). Low validity and reliability scores were apparent; however, through the examination of additional discriminants including the Pre-Post Discrimination Index, the Individual Gain Index, and the Net Gain Index (Waltz, Strickland, & Lenz, 2017), the simulation markedly improved performance on individual questions indicating the sensitivity of the simulation.

The list of action items demonstrated moderate internal consistency using Cronbach's alpha (Simulation 1= .692, Simulation 2=.795); however, faculty that participated and viewed recorded simulations reported issues in the facilitation of simulation-based education across instructors and campuses that confounded the ability to state that two simulation experiences were equivalent. This finding supports that multi-site/multi-campus programs of simulation need to be strongly based on the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards of Best Practice: Simulation (2016). Otherwise, it is highly likely that simulation-based experiences are different from facilitator-to-facilitator and campus-to-campus.

Lastly, when evaluating action items, preliminary findings support research regarding formative and summative testing that while "all faculty are content experts, not all are expert evaluators" (Kardong-Edgren, et al., 2017). Interrater reliability was not established during this pilot study. Traditional simulation design with more students observing than participating presents challenges to conducting research regarding student role due to a clustered simulation design that is present. While the action items were present in each simulation as demonstrated by the moderate Cronbach's alpha, evaluation would need to be individualized which provides challenges with time, resources, and feasibility to occur as part of a clinical course.

Findings from this pilot study revealed numerous challenges in conducting research regarding role in simulation, multiple simulations, inter-rater reliability, validity and reliability in educational research, and multi-site/multi-campus research. These findings, although inconclusive, contribute to ongoing discussions in nursing education that will assist researchers and educators when using simulation as an educational intervention. Additional item analyses can provide educators and researchers with information regarding instructional versus content sensitivity. For novice researchers and educators, these additional discriminants can inform how effective classroom, clinical, or simulation-based instruction is in comparison to content examined. Further, a discussion regarding integration of INACSL Standards of Best Practice for Simulation will further contribute to advancing simulation-based experiences in individual schools, multi-campus schools, and multi-site research. Finally, while pilot studies in research and doctoral programs may result in inconclusive data, the learning experience is crucial to developing an understanding of research processes, challenges, and limitations in nursing education research.

Title:
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Keywords:
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References:
Dreifuerst, K. T. (2009). The essentials of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives, 30*(2), 109-114.

Fluharty, L., Hayes, A. S., Milgrom, L., Malarney, K., Smith, D., Reklau, M. A., . . . McNelis, A. M. (2012). A multisite, multi–academic track evaluation of end-of-life simulation for nursing education. *Clinical Simulation in Nursing, 8*(4), e135-e143. doi:http://dx.doi.org/10.1016/j.ecns.2010.08.003

Haladyna, T. M. (2016). Item analysis for selected response test items. In S. Lane, M. R. Raymond, & T. M. Haladyna (Eds.), *Handbook of Test Development*. New York: Routledge Taylor & Francis Group.

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*(2), S1-41.

INACSL Standards Committee. (2016a). INACSL Standards of Best Practice: Simulation Debriefing. *Clinical Simulation in Nursing, 12*, S21-S25. doi:10.1016/j.ecns.2016.09.008

INACSL Standards Committee. (2016b). INACSL Standards of Best Practice: Simulation Facilitation. *Clinical Simulation in Nursing, 12*, S16-S20. doi:10.1016/j.ecns.2016.09.007

INACSL Standards Committee. (2016c). INACSL Standards of Best Practice: Simulation Outcomes and Objectives. *Clinical Simulation in Nursing, 12*, S13-S15. doi:10.1016/j.ecns.2016.09.006

INACSL Standards Committee. (2016d). INACSL Standards of Best Practice: Simulation Participant Evaluation. *Clinical Simulation in Nursing, 12*, S26-S29. doi:10.1016/j.ecns.2016.09.009

INACSL Standards Committee. (2016e). INACSL Standards of Best Practice: Simulation Simulation Design. *Clinical Simulation in Nursing, 12*, S5-S12. doi:10.1016/j.ecns.2016.09.005

Jeffries, P. R., Rodgers, B., & Adamson, K. (2016). NLN Jeffries simulation theory: Brief narrative description. *Nursing Education Perspectives, 36*(5), 292-293. doi:10.5480/1536-5026-36.5.292

Kaplan, B. G., Abraham, C., & Gary, R. (2012). Effects of participation vs. observation of a simulation experience on testing outcomes: Implications for logistical planning for a school of nursing. *International Journal of Nursing Education Scholarship, 9*(1), 1-15.

Kardong-Edgren, S., Oermann, M.H., Rizzolo, M.A., & Odom-Maryon, T. (2017). Establishing inter- and intrarater reliability for high-stakes testing using simulation. *Nursing Education Perspectives 38*(2), 63-68. doi: 10.1097/01.NEP.0000000000000114

Kolb, D. A. (2015). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Upper Saddle River: Pearson Education, Inc.

Livsey, K., & Lavender-Stott, E. (2015). Impact of vicarious learning through peer observation during simulation on student behavioural measures. *Focus on Health Professional Education, 16*(4), 64-73.

O'Donnell, J. M., Decker, S. I., Howard, V., Levett-Jones, T., & Miller, C. W. (2014). NLN/Jeffries Simulation Framework State of the Science Project: Simulation Learning Outcomes. *Clinical Simulation in Nursing, 10*(7), 373-382. doi:10.1016/j.ecns.2014.06.004

Piaget, J., & Cook, M. T. (1952). *The origins of intelligence in children*. New York, NY: International University Press.

Rode, J. L., Callihan, M. L., & Barnes, B. L. (2016). Assessing the value of large-group simulation in the classroom. *Clinical Simulation in Nursing, 12*(7), 251-259. doi:http://dx.doi.org/10.1016/j.ecns.2016.02.012

Scherer, Y. K., Foltz-Ramos, K., Fabry, D., & Chao, Y.-Y. (2016). Evaluating simulation methodologies to determine best strategies to maximize student learning. *Journal of Professional Nursing, 32*(5), 349-357. doi: http://dx.doi.org/10.1016/j.profnurs.2016.01.003

Smith, K. V., Klaassen, J., Zimmerman, C., & Cheng, A.-L. (2013). The evolution of a high–fidelity patient simulation learning experience to teach legal and ethical issues. *Journal of Professional Nursing, 29*(3), 168-173. doi:http://dx.doi.org/10.1016/j.profnurs.2012.04.020

Thidemann, I.-J., & Soderhamn, O. (2013). High-fidelity simulation among bachelor students in simulation groups and use of different roles. *Nurse Education Today, 33*(12), 1599-1604. doi:10.1016/j.nedt.2012.12.004

Waltz, C. F., Strickland, O. L., & Lenz, E. R. (2017). *Measurement in nursing and health research*. New York: Springer Publilshing Company.

Zulkosky, K. D., White, K. A., Price, A. L., & Pretz, J. E. (2016). Effect of simulation role on clinical decision-making accuracy. *Clinical Simulation in Nursing, 12*(3), 98-106. doi:10.1016/j.ecns.2016.01.007

Abstract Summary:
The purpose of this presentation is to identify the theoretical and methodological challenges for: 1) evaluating learners in observer versus active roles; and 2) implementing multi-site/multi-campus simulation-based experiences. Solutions will be proposed for these challenges.

Content Outline:
Introduction

1. Traditional Simulation Design: Majority of students spend time in observational roles in simulation-based education (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014)
2. Theoretical underpinning and limitations in testing observational learning
    1. Constructivism (Piaget & Cook, 1952)
    2. Experiential Learning (Kolb, 2015)

Body

1. Main Point #1: Instrumentation

1a) Supporting point #1: Content sensitivity vs. instructional sensitivity

i. Pre/Post Tests—issues with low validity/reliability measures and additional resources to for item analysis that indicate content sensitivity and instructional sensitivity (Haladyna, 2016)

2. Main Point #2: Evaluation of Simulations and Implementation Issues

2a) Supporting point #1: Issues with multi-campus schools and multi-site simulation-based research and INACSL Standards of Best Practice:Simulation (INACSL Standards Committee, 2016).

i. Debriefing (INACSL Standards Committee, 2016a)

ii. Facilitation (INACSL Standards Committee, 2016b)

iii. Objectives/Outcomes (INACSL Standards Committee, 2016c)

iv. Participant Evaluation (INACSL Standards Committee, 2016d)

v. Design (INACSL Standards Committee, 2016e)

2b) Supporting point #2: Issues with inter-rater reliability and faculty evaluators (Kardong-Edgren, Oermann, Rizzolo, & Odom-Maryon, 2017)

3. Main Point #3: Overcoming Challenges

3a) Supporting point #1: Continued psychometric testing of knowledge assessments

i. Setting standards and re-testing.

3b) Supporting point #2: Control in simulation-based education research and standardization across curriculum

i. Implementing INACSL Standards of Best Practice on multiple campuses

Conclusion

1. Evaluation of role in simulation presents challenges to current theoretical frameworks underpinning simulation.
2. Determining instructional sensitivity versus content sensitivity is a frequent issue faced by nursing education researchers and can be examined through additional item analyses.
3. Multi-campus programs and multi-site research should evaluate simulation facilitation and debriefing methods at all campuses using INACSL Standards of Best Practice.
4. Pilot studies and piloting simulation-based education experiences reveal underlying issues in simulation programs which will be necessary for control in simulation-based education research.

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