Clinical Simulation in Nursing (2019) 33, 26-34

ELSEVIER

Clinical Simulation in Nursing

www.elsevier.com/locate/ecsn

Featured Article

Simulation Observers Learn the Same as Participants: The Evidence

Brandon Kyle Johnson, PhD, RN, CHSE*

Texas Tech University Health Sciences Center, School of Nursing, Lubbock, TX, USA

KEYWORDS
simulation;
observer role;
debriefing;
experiential learning;
observational learning;
knowledge;
DML

Abstract

Background: Confusion continues regarding the value of the observer in simulation and whether they engage in the active and experiential learning environment that underpins simulation. Despite studies demonstrating no differences in knowledge between the participant and observer, it is still unknown how observers learn in simulation and how they apply that learning to a contextually similar situation, a critical aspect of debriefing.

Method: An experimental, pretest-multiple posttest, repeated-measures study was used to describe the knowledge demonstration, knowledge retention, and knowledge application of participants and observers after a simulation and debriefing.

Results: There was no significant difference between participant and observer in any of the measures. There was significant knowledge gain regardless of role and significant knowledge decay in both groups four weeks later.

Conclusions: The observer appears to construct knowledge similarly to participants. Educators must consider the value of assigning learners to both participant and observer roles.

Cite this article:

Johnson, B. K. (2019, August). Simulation observers learn the same as participants: The evidence. *Clinical Simulation in Nursing, 33*(C), 26-34. https://doi.org/10.1016/j.ecns.2019.04.006.

Learners are often assigned to the roles of participant and observer in simulation (International Nursing Association for Clinical Simulation and Learning [INACSL] Standards Committee, 2016). This assumes that when good pedagogical practices are used, students in both roles can be considered actively engaged in the experience. A learner in the participant role makes decisions and provides patient care during the scenario. Meanwhile, a learner in the observer role watches the scenario unfold, either in the simulation environment or from an audio-visual room, and does not directly care for the patient (O'Regan, Molloy, Watterson, & Nestel, 2016). This practice is common due to the continuing triple threat in nursing education: lack of clinical sites, lack of faculty, and increasing student enrollment (American Association of Colleges of Nursing [AACN], 2018; National Council of State Boards of Nursing [NCSBN], 2016; National League for Nursing [NLN], 2017).

Funding: This work was supported by the American Association of Colleges of Nursing Jonas Nurse Leader Scholars Program/Jonas Center and the National League for Nursing Mary Anne Rizzolo Doctoral Research Award.

* Corresponding author: kyle.johnson@ttuhsc.edu (B. K. Johnson).

1876-1399/$ - see front matter
https://doi.org/10.1016/j.ecns.2019.04.006

In addition, availability of faculty, simulation center financial constraints, and the convenience of keeping students in predetermined clinical groups also lead to the practice of assigning students into participant and observer roles (Bong et al., 2017). In fact, the NCSBN National Simulation Study reported that learners spend a majority of time in simulation as an observer (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). However, simulation is intended to simulate real nursing practice, and issues with transition from student to practicing nurse continue to be prominent concerns for the discipline (Regan et al., 2017; Spector et al., 2015). Yet, faculty realize that having multiple learners assigned as variants of the nurse (primary, secondary, charge, etc.) just to ensure everyone is a participant does not prepare students for the realities of nursing practice.

Therefore, confusion about the value of the observer role in simulation persists, and there is a lack of discipline-specific research exploring whether observer experiences provide the active and experiential learning environment that underpins simulation (Johnson, 2018). This experimental, pretest-multiple posttest, repeated-measures study describes the knowledge demonstration, knowledge retention, and knowledge application of participants and observers after a simulation.

Key Points

- There was no significant difference in knowledge demonstrated, retained, or applied between students in participant and observer roles in simulation.
- When students are in the observer role during simulation, learning mirrors the gains and decays in knowledge of those in the participant role.
- Simulations that are constructed according to the INACSL Standards of Best Practice: Simulation[SM] provide significant learning experiences and increases in knowledge regardless of student role.

Background

Recent nursing literature demonstrates no differences in cognitive knowledge outcomes between participants and observers in different simulation environments (Rode, Callihan, & Barnes, 2016; Scherer, Foltz-Ramos, Fabry, & Chao, 2016; Thidemann & Soderhamn, 2013). These studies included debriefing, the most significant component of simulation where learner gaps are bridged (Adamson & Rodgers, 2016; Shinnick, Woo, Horwich & Steadman, 2011) and where the transformation of experience into meaningful learning occurs (Dreifuerst, 2009).

However, no empirical research describes how prelicensure nursing students in observer roles learn directly from simulation scenarios. Rather, studies most commonly evaluate observer outcomes after the debriefing or only examine task training (Domuracki, Wong, Olivieri, & Grierson, 2015; Welsher et al., 2018) exposing a lack of understanding of learning through observation, which is an emerging form of theoretically supported brain-based learning (Johnson, 2018). In addition, no studies demonstrate that observers apply their learning to a contextually similar situation like participants do, yet this is a critical aspect of simulation with debriefing (INACSL Standards Committee, 2016).

Dreifuerst (2009) noted that assimilation is a defining attribute of debriefing and that ‘‘assimilation and accommodation are the ultimate goals in a practice profession and the essence of reflection’’ (p. 111). Assimilation and accommodation are components of judgment, reasoning, and metacognitive thinking, the distinguishing factors of the expert nurse (Benner, Stannard, & Hooper, 1996; Dreifuerst, 2009). In debriefing, when learners are asked to recall critical decision points to reflect-in-action, the goal is to help them assimilate knowledge around a situation and others like it. When learners are guided to reflect-on-action and consider what they might do differently next time, they learn to accommodate their knowledge to correctly fit a different clinical context (Dreifuerst, 2009; Kolb, 2015; Schön, 1983). Finally, when learners are asked to test their knowledge in a new clinical situation that is similar on the surface, but different in deep structure (Forneris & Fey, 2016), they are guided to reflect-beyond-action resulting in application involving both assimilation and accommodation while reframing knowledge to the new context (Dreifuerst, 2009; Johnson, 2018; Kolb, 2015; Schön, 1983).

Debriefing for Meaningful Learning© (DML) is a theoretically-derived and evidence-based method designed to teach reflective practice and foster assimilation, accommodation, and anticipation (Dreifuerst, 2012). The concept of the reflective practitioner was first advanced by Schön (1983) describing how clinicians reflect-in-action and reflect-on-action, and also by Dreifuerst (2009) as they reflect-beyond-action. In DML, the final stage includes explicit reflection-beyond-action (Dreifuerst, 2009, 2012) where learners are deliberately guided through a parallel case to learn to anticipate and apply knowledge to clinical contexts that are similar, but different from the one in the simulation.

Theoretical Framework

Assimilation and accommodation are two constructivist knowledge outcomes of Experiential Learning Theory (ELT; Kolb, 2015), the most well-supported theory that underpins simulation (Decker & Dreifuerst, 2012; Dreifuerst, 2009; Jeffries, Rodgers, & Adamson, 2016). However, Social

Learning Theory (SLT; Bandura, 1971), a theory supporting vicarious or observational learning, has been used minimally in simulation research (Rode et al., 2016). Furthermore, there is scant literature describing how SLT is part of ELT (Hoover & Giambatista, 2009) leading to concerns that learners as observers may not experience all constructs of ELT (Bong et al., 2017). There is also a lack of discipline-specific research exploring how observer experiences are underpinned by constructivist and experiential learning models (Johnson, 2018). A new framework, Observational Experiential Learning, was developed and tested during this study based on the concept of vicarious experiential learning as it incorporates elements of SLT and ELT through vicarious learning (Hoover & Giambatista, 2009) reported in the study by Johnson (2018). SLT includes the constructs of attention, motivation, knowledge retention, and motor reproduction (Bandura, 1971). ELT was expanded by including how concepts from SLT inform each of the ELT major constructs: the concrete experience, reflective observation, abstract conceptualization, and active experimentation ((Johnson, 2018). Vicarious experiential learning is an educational methodology that ''exists when a personally responsible participant(s) cognitively, emotionally, and behaviorally processes knowledge, skills, and/or attitudes through processes of observation in a learning situation characterized by a high level of active involvement despite absence of direct, personalized consequences'' (Hoover & Giambatista, 2009, p. 36).

Methods

This study investigated the relationship between prelicensure nursing students' roles in simulation and cognitive knowledge demonstration, retention, and application (assimilation and accommodation) of the care for patients with two different kinds of respiratory distress. The aims were to understand how knowledge is constructed throughout simulation and debriefing and how that knowledge is retained and applied when learners are in participant and observer roles. This study addressed two specific research questions: 1) Is there a difference in knowledge demonstrated and retained by nursing students in participant versus observer roles after a simulation about the care of a patient with opioid-induced respiratory depression at baseline, before and after debriefing with DML, and four weeks later? 2) Is there a difference in knowledge demonstrated and retained by nursing students in participant versus observer roles when applied to a parallel case about a patient with a different kind of respiratory distress after DML and 4 weeks later?

Sample

A convenience sample of prelicensure, baccalaureate nursing students in their first semester of their senior year from two sites at a southwestern U.S. multicampus university were invited to participate. Students were enrolled in both theory and clinical courses designed to integrate complex and crisis care into simulation. A priori, the desired sample size was determined using G Power Analysis 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). The alpha was set at $p = .05$, and the beta was set at a power of 80%. Therefore, 114 participants were necessary for a medium effect size of 0.50. Following IRB approval, 119 students agreed to participate with 76 at the first campus and 43 at the second. Homogeneity of variance of the pretest scores was established ($p > .05$) (Tabachnick & Fidell, 2013); therefore, the data from both sites could be combined into one sample resulting in n = 59 students in the participant role and n = 60 students in the observer role.

Interventions and Instruments

The study intervention used a simulation with a female patient experiencing opioid-induced respiratory depression requiring antidote therapy followed by DML debriefing. All simulations were facilitated by the investigator and used a high-fidelity manikin. This simulation represents the concrete experience (CE) according to ELT (Kolb, 2015). Despite belief that experiential learning must be direct rather than observed, ELT never explicitly states that a CE must be a hands-on experience (Hoover & Giambatista, 2009). Furthermore, experiential learning is defined as the transformation of a grasped experience (Kolb, 2015); therefore, the simulation scenario provided an opportunity for participants and observers to grasp, or take in, a new experience (Johnson, 2018).

The parallel case presented during reflection-beyond-action in DML (Dreifuerst, 2012) involved a similar, yet different contextual case of respiratory distress with a young male who was recently stung by a bee and began to experience respiratory distress leading to anaphylaxis requiring antidote therapy. Reflection-beyond-action (Dreifuerst, 2015) is designed to facilitate assimilation and accommodation. It represents active experimentation (AE) to all learners according to ELT. AE assists in the refinement of accommodated knowledge and provides the transformation of the previously grasped simulation experience (Johnson, 2018; Kolb, 2015). While Kolb (2015) defines AE as a time for hands-on manipulation of an experience, Forneris and Fey (2016) suggested that the debriefing, where learners are presented with an alternative situation that is similar on the surface with differences in deep structure, operationalizes AE. In this study, all learners were guided through the same alternative case.

Two knowledge instruments developed by the investigator and piloted multiple times before use in this study tested the research questions (Johnson, 2018). The CE instrument (CE Pretest, CE Posttest 1, CE Posttest 2, and CE Posttest 3) contained a brief description of the simulation (opioid-induced respiratory distress) scenario followed by 10 NCLEX-RN like items that examined various Bloom's taxonomy domains of knowledge and NCLEX-RN Integrated Processes. The AE instrument (AE Posttest 1 and AE Posttest 2) contained the same 10 questions and answer choices; however, this version was preceded by the parallel case (anaphylaxis), which had been presented in the DML reflection-beyond-action phase of debriefing. The AE instrument was developed to operationalize assimilation and accommodation and test how knowledge is applied to a similar, yet different contextual case to determine whether the participants could recognize when similar and different nursing actions were required. On the AE instrument, because of similarities and differences in how knowledge is applied to the new situation, five of the questions facilitated assimilation where the correct choice was the same as the correct choice on the CE instrument and five of the questions facilitated accommodation where the correct choice was different than the correct choice on the CE instrument. Each question was scored with 10 points for a correct answer. Therefore, the instruments had a minimum score of 0 and maximum score of 100.

Both instruments were examined for content validity, item difficulty, and item discrimination and evaluated according to item analysis criteria outlined by Haladyna and Rodriguez (2013). In addition, to examine criterion-related validity, measures for instructional sensitivity including the pre-post discrimination index and individual gain index were collected during pilot analyses and during the final study (Haladyna & Rodriguez, 2013; Waltz, Strickland, & Lenz, 2017). Internal consistency of the CE and AE instruments was low (<0.50) throughout the pilot testing, despite elimination of poorly discriminating items and thorough investigation of validity; however, low internal consistency scores are anticipated on short, multidimensional assessments (Haladyna, 2016). While both instruments examined respiratory distress, they assessed multiple dimensions of knowledge and all five components of the nursing process. Therefore, test-retest reliability indicated that the instruments were moderately stable over time (Johnson, 2018).

Procedure

One week before the simulation, all students received preparatory assignments that included the objectives of the scenario. Students were randomly assigned to small groups no larger than six students, as this is a common practice in simulation. When they arrived, each student learner completed the CE pretest and was randomly assigned to their role of a participant (nurse 1, nurse 2, charge nurse) or observer. Students in the participant role delivered patient care during the simulation, while students in the observer role observed from an audio-visual room on a flat screen television. The INACSL Standards of Best Practice: Simulation^{SM} (INACSL Standards Committee, 2016) do not provide any guidelines for what an observer should or should not be doing in simulation. Therefore, no worksheets, activities, or additional responsibilities were required for observers. Observers sat in front of the screen and could take notes if they desired. The scenario lasted approximately 10 to 15 minutes. When the simulation was over, participants joined the observers and completed CE Posttest 1 before debriefing. The investigator, trained in the DML method by the developer, facilitated all debriefing sessions over 45 to 60 minutes. After DML debriefing, all students completed CE Posttest 2 and AE Posttest 1. Four weeks later, they completed the CE Posttest 3 and AE Posttest 2 (Figure 1).

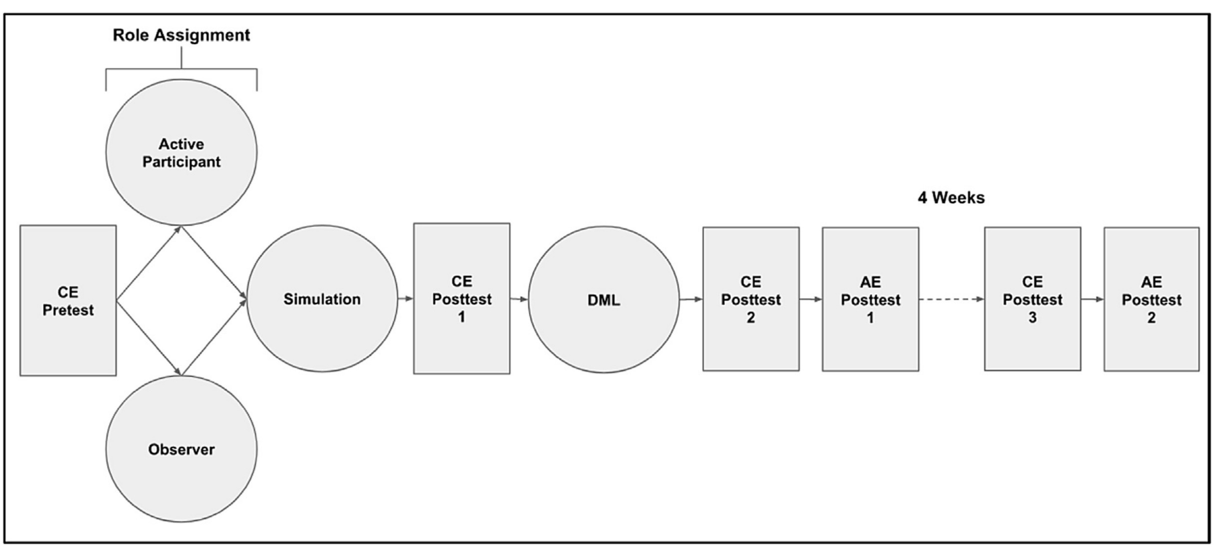

Figure 1 Study procedure. *Note.* CE = concrete experience; AE = active experimentation; DML = Debriefing for Meaningful Learning©.

Table Descriptive Statistics for Knowledge Instruments

Element	Participant ($N = 59$)	Observer ($N = 60$)	Total ($N = 119$)
CE Pretest			
M (SD)	65.9 (*12.5*)	63.7 (*14.1*)	64.8 (*13.3*)
Minimum	40	30	30
Maximum	90	90	90
CE Posttest 1			
M (SD)	74.4 (*11.8*)	75.7 (*13.7*)	75 (*12.7*)
Minimum	40	40	40
Maximum	100	100	100
CE Posttest 2			
M (SD)	86.1 (*10.7*)	85.3 (*13.3*)	85.7 (*12*)
Minimum	50	50	50
Maximum	100	100	100
CE Posttest 3			
M (SD)	73.1 (*12.4*)	71.3 (*13.9*)	72.2 (*13.2*)
Minimum	40	30	30
Maximum	100	100	100
AE Posttest 1			
M (SD)	86.1 (*12*)	87.7 (*10.9*)	86.9 (*11.5*)
Minimum	60	60	60
Maximum	100	100	100
AE Posttest 2			
M (SD)	70.3 (*13.9*)	72.5 (*16.8*)	71.4 (*15.4*)
Minimum	20	40	20
Maximum	100	100	100

Note. CE = concrete experience; AE = active experimentation.

Results

Descriptive and inferential statistics were calculated using SPSS version 24 (IBM Corp, Released 2016). All 119 students who were invited completed the study resulting in a sample that was largely female (84%; n = 100), was Caucasian (69%; n = 82), had no prior degree (86.6%; n = 103), and averaged 22 years old. Table provides descriptive statistics for each administration of the CE instrument and AE instrument.

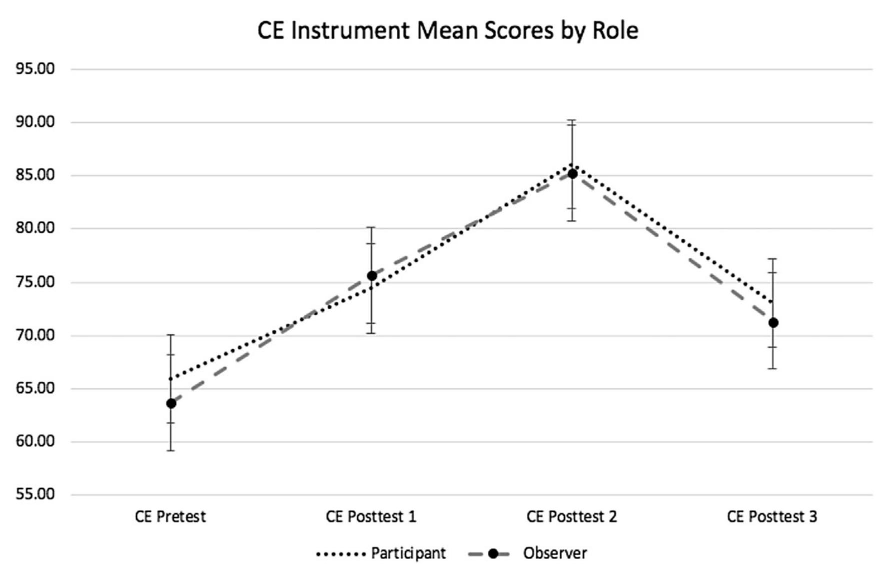

Figure 2 CE instrument mean score differences by role. *Note*. CE = concrete experience.

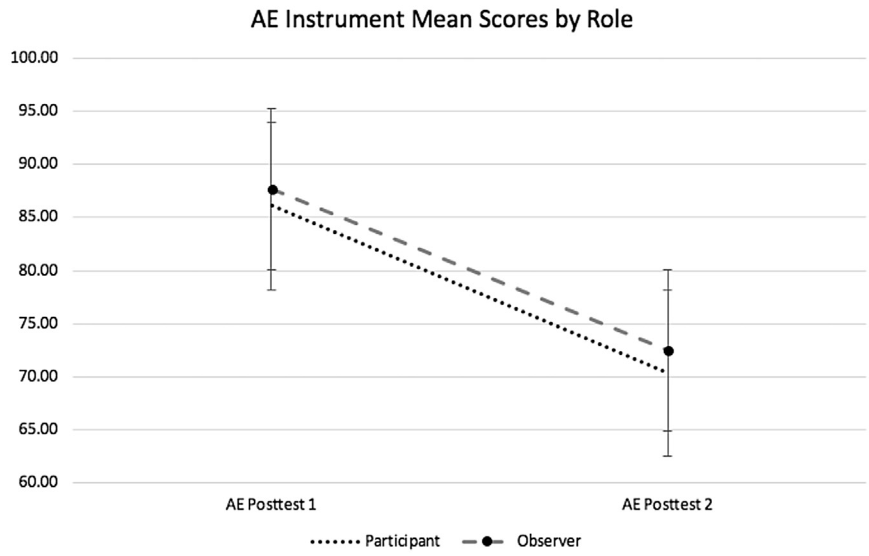

Figure 3 AE instrument mean score differences by role. *Note.* AE = active experimentation.

The first research question was tested using a mixed repeated-measures analysis of variance by site and role using mean scores from the four administrations of the CE instrument. Mauchly's test of sphericity revealed a violation for time ($\chi^2(5) = 0.906$, $p = .048$) for the assumption of sphericity; therefore, the degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = 0.993$).

To answer the first research question, time was the within-subjects factor as the CE instrument was administered four times in this study. Figure 2 demonstrates the changes over time for the CE instrument. Across the four time points, an overall "CE Knowledge" score was aggregated. For the within-subjects effects, the two-way interaction effect between time and role was not statistically significant, $F(2.978, 342.524) = 1.089$, $p = .354$, partial $\eta^2 = 0.009$, $\varepsilon = 0.993$. Furthermore, when examining role in simulation, the between-subjects factor, there was not a statistically significant difference in CE Knowledge scores over time $F(1, 115) = 0.083$, $p = .773$, partial $\eta^2 = 0.001$.

A student's score in the participant role ($M = 75.141$, $SE = 1.29$) was associated with a CE Knowledge score of 0.524, 95% CI [−3.067, 4.115] points higher than a student's score in the observer role ($M = 74.617$, $SE = 1.27$), which was not statistically significant ($p = .773$). Therefore, there was no statistically significant difference in knowledge gained or retained between students in participant and observer roles after a simulation about the care of a patient with respiratory distress (opioid-induced respiratory distress) at baseline, before DML, after DML, and after four weeks of time (see Figure 2).

Although the interventions between each time point were not the variables of interest, there was a statistically significant difference in the mean CE instrument scores at the different time points $F(2.978, 342.524) = 78.704$, $p < .0005$, partial $\eta^2 = 0.406$, $\varepsilon = 0.993$. Between each time point, a variable in the study was performed, including the simulation participation or observation, debriefing with DML, or four weeks of time. Therefore, all pairwise comparisons were run for each simple main effect with reported 95% confidence intervals and p-values Bonferroni-adjusted within each simple main effect. The marginal means for the CE Pretest, CE Posttest 1, CE Posttest 2, and CE Posttest 3 scores were 65.49 ($SE = 1.26$), 75.59 ($SE = 1.21$), 85.72 ($SE = 1.16$), and 72.72 ($SE = 1.25$), respectively.

A CE Posttest 1 score was associated with a mean CE Knowledge score 10.095, 95% CI [6.77, 13.43] points higher than a CE Pretest score, a statistically significant difference, $p < .0005$. A CE Posttest 2 score was associated with a mean CE Knowledge score 10.138, 95% CI [7.1, 13.18] points higher than a CE Posttest 1 score, a statistically significant difference, $p < .0005$. Finally, the CE Posttest 3 score was associated with a mean CE Knowledge score that was −13.01, 95% CI [−16.81, −9.21] points lower than the CE Posttest 2 score, a statistically significant difference, $p < .0005$. These findings indicated that the simulation and debriefing positively and significantly impacted the student scores, despite role; however, the four-week time period resulted in a significant decay in knowledge for students in both roles (see Figure 2).

The second research question was tested with mean scores from the two administrations of the AE instrument using independent-samples t-tests. Figure 3 demonstrates the differences over time for the AE instrument. For AE Posttest 1, there were no statistically significant differences in knowledge scores when comparing students in the observer role ($M = 87.67$, $SD = 10.95$) to those in the participant role ($M = 86.1$, $SD = 12$). This difference, 1.56, 95% CI [−2.61, 5.74,], was not statistically significant, $t(117) = 0.742$, $p = .459$, with a small-sized effect, $d = .14$.

For AE Posttest 2 administered four weeks later again, there were no statistically significant differences in knowledge scores when comparing participants in the observer role ($M = 72.5$, $SD = 16.84$) to those in the participant role ($M = 70.34$, $SD = 13.89$). This difference, 2.16, 95% CI [−3.44, 7.76], was not statistically significant, $t(113.59) = 0.764$, $p = .446$, with a small-sized effect, $d = .14$. Therefore, there was no significant difference in knowledge demonstrated and retained between student roles after debriefing and four weeks later when applied to the care of the patient experiencing anaphylaxis, a parallel case of respiratory distress (see Figure 3).

Discussion

This research demonstrates that for students in the observer role during simulation, learning mirrored the gains and decays in knowledge of those in the participant role. The implications of this finding are far-reaching for nursing education and for State Boards of Nursing as they consider regulation for the use of simulation (Bradley et al., in press). This study establishes that significant learning occurs in the simulation regardless of role and learners in the observer role grasped the learning from the simulation. These findings support simulations that are constructed according to the INACSL Standards of Best Practice: Simulation[SM] (INACSL Standards Committee, 2016) provide significant learning experiences and increases in knowledge despite student role. This is important because education for health care students using simulation is resource intense, posing challenges for programs that desire to efficiently and adequately prepare health care professionals (Maloney & Haines, 2016). Through the use of technology, observation can occur across simulation sites, campuses, and cities where learners grasp clinical care through a rich observation experience followed by theoretically derived and evidence-based debriefing. Moreover, this study extends the literature stating that debriefing is where the most significant learning occurs (Shinnick, Woo, Horwich, & Steadman, 2011). Although knowledge scores were not significantly different between students in participant and observer roles following simulation, the knowledge was similarly assimilated and accommodated according to the theoretical concepts and role had no significant impact on the scores when everyone actively participated in the debriefing. This also adds theoretical and empirical support for DML debriefing that this structured, iterative method facilitates knowledge assimilation, a defining attribute of debriefing (Dreifuerst, 2009, 2012). Further, this study extends the findings of recent research exploring roles in simulation (Rode et al., 2016; Scherer et al., 2016; Thidemann & Soderhamn, 2013) with an experimental study that isolates the learning from both the simulation and debriefing for clarity in how knowledge is constructed between participant and observer.

Although knowledge significantly increased despite role throughout the simulation and debriefing, knowledge was tested four weeks later and demonstrated significant decay below previous posttest scores for both participants and observers. It is well documented that knowledge associated with basic cardiopulmonary resuscitation training decays as quickly as three months (Oermann et al., 2011) indicating the need for another dose and increased frequency (American Heart Association [AHA], 2018). In addition, pilots must receive repetitive training and deliberate practice using simulation for infrequent experiences that they do not encounter often, to address potential skill and response delay from a lack of exposure (U.S. Department of Transportation Federal Aviation Administration, 2015).

The significant knowledge decay that occurred indicates that educators using simulation must be aware of the curriculum sequencing rather than focusing solely on one simulation experience in isolation. Rather than moving from one simulation experience to the next with minimal consideration for previous and future simulations, this study provided support that simulations should build on similar, yet different contextual presentations of concepts (Johnson, 2018). Simulation educators must be aware of how the results from this study contrast the assumptions in conventional pedagogy that once the content is covered, the thinking about the content follows; rather, the focus should be on how content is taught and revisited throughout the curriculum (Ironside, 2004). With the rapid knowledge decay, sequencing simulations carefully throughout the curriculum should be considered and further tested to explore the long-term effects of simulation in relation to knowledge retention. Simulation educators can accomplish this by facilitating slightly similar and different situations in the simulation or debriefing in juxtaposition to current, previous, and future concepts (Herrington & Schneidereith, 2017; Woda, Hansen, Paquette, & Topp, 2017) or even with direct patient care clinical experiences (Hansen & Bratt, 2017; Schlairet & Fenster, 2012). In this process, learners in both roles would experience deliberate thinking practice where they are repeatedly exposed to similar, yet different situations, building toward mastery learning (Gonzalez & Kardong-Edgren, 2017; Oermann et al., 2011).

Limitations

Although the experimental design controlled the major threats to internal validity, there were limitations that threaten the external validity of this study. The most notable limitation was the group size and facilitation in the simulation. Simulation most commonly occurs in small groups. This study used random assignment of five to six learners in small groups followed by random assignment to the role of participant and observer and would need further testing for larger groups with unequal numbers of learners. Furthermore, for optimal control, the facilitator of the simulation and debriefing was the same at both sites and in all groups to eliminate the confounding variable of different simulation facilitation or debriefing style.

Conclusion

This study demonstrated that observers construct knowledge similarly to participants in simulation when all are actively engaged in the scenario and reflection-in-action, reflection-on-action, and reflection-beyond-action during debriefing. As nursing care becomes more complex requiring higher order thinking, simulation educators should consider how to sequence simulations throughout the curriculum to thread decision making and reasoning skills (Herrington & Schneidereith, 2017; Woda et al., 2017). Then, learners in both participant and observer roles would experience deliberate thinking practice with similar, yet different situations, building toward mastery (Gonzalez & Kardong-Edgren, 2017; Oermann et al., 2011). Deliberate thinking practice is the repeated practicing of the mental processes of assimilation, accommodation, and application, which are the goals of quality and safe nursing care (Dreifuerst, 2009). Because this study supports that assimilation and accommodation occurs in both roles, educators should continue to value placing learners in an observational role as it continues to have a strong theoretical and empirical foundation for its use in simulation.

Acknowledgments

The author gratefully acknowledges Drs Deanna L. Reising, Amy Hagedorn Wonder, Barbara Manz Friesth, Bobbi J Byrne, Kristina Thomas Dreifeurst, and Pamela M. Ironside for their support and expert guidance in this research study. The author also acknowledges Dr. Darrell Spurlock for his assistance in the statistical analysis.

References

Adamson, K., & Rodgers, B. (2016). Systematic review of the literature for the NLN Jeffries simulation framework: discussion, summary, and research findings. In Jeffries, P. R. (Ed.), *The NLN Jeffries Simulation Theory*. Philadelphia: Wolters Kluwer.

American Association of Colleges of Nursing. (2018). Nursing faculty shortage. Retrieved from http://www.aacnnursing.org/News-Information/Fact-Sheets/Nursing-Faculty-Shortage.

American Heart Association. (2018). Resuscitation quality improvement program. Retrieved from http://cpr.heart.org/AHAECC/CPRAndECC/Training/RQI/UCM_476470_RQI.jsp.

Bandura, A. (1971). *Social Learning Theory*. New York: General Learning Press.

Benner, P., Stannard, D., & Hooper, P. L. (1996). A 'thinking-in-action' approach to teaching clinical judgment: a classroom innovation for acute care advanced practice nurses. *Advanced Practice Nursing Quarterly*, *1*(4), 70-77.

Bong, C. L., Lee, S., Ng, A. S. B., Allen, J., Lim, E. H. L., & Vidyarthi, A. (2017). The effects of active (hot-seat) versus observer roles during simulation-based training on stress levels and non-technical performance: a randomized trial. *Advances in Simulation*, *2*(7), 1-13. https://doi.org/10.1186/s41077-017-0040-7.

Bradley, C. S., Johnson, B.K., Dreifuerst, K. T., White, P., Conde, S. K., Meakim, C. H., …, Childress, R. M. (in press). Regulation of simulation use in United States prelicensure nursing programs. Clinical Simulation in Nursing.

Decker, S. I., & Dreifuerst, K. T. (2012). Integrating guided reflection into simulated learning experiences. In Jeffries, P. R. (Ed.), *Simulation in nursing education: from conceptualization to evaluation* (2nd ed.). New York: National League for Nursing.

Domuracki, K., Wong, A., Olivieri, L., & Grierson, L. E. M. (2015). The impacts of observing flawed and flawless demonstrations on clinical skill learning. *Medical Education*, *49*(2), 186-192. https://doi.org/10.1111/medu.12631.

Dreifuerst, K. T. (2015). Getting started with debriefing for meaningful learning. *Clinical Simulation in Nursing*, *11*(5), 268-275. https://doi.org/10.1016/j.ecns.2015.01.005.

Dreifuerst, K. T. (2012). Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *Journal of Nursing Education*, *51*(6), 326-333. https://doi.org/10.3928/01484834-20120409-02.

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

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. (2009). Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149-1160. https://doi.org/10.3758/BRM.41.4.1149.

Forneris, S. G., & Fey, M. K. (2016). Critical conversations: the NLN guide for teaching thinking. *Nursing Education Perspectives*, *37*(5), 248-249. https://doi.org/10.1097/01.NEP.0000000000000069.

Gonzalez, L., & Kardong-Edgren, S. (2017). Deliberate practice for mastery learning in nursing. *Clinical Simulation in Nursing*, *13*(1), 10-14. https://doi.org/10.1016/j.ecns.2016.10.005.

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

Haladyna, T. M., & Rodriguez, M. C. (2013). *Developing and Validating Test Items*. New York: Routledge Taylor & Francis Group.

Hansen, J., & Bratt, M. (2017). Effect of sequence of simulated and clinical practicum learning experiences on clinical competency of nursing students. *Nurse Educator*, *42*(4), 231-235. https://doi.org/10.1097/NNE.0000000000000364.

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-S41.

Herrington, A., & Schneidereith, T. A. (2017). Scaffolding and sequencing core concepts to develop a simulation-integrated nursing curriculum. *Nurse Educator*, *42*(4), 204-207. https://doi.org/10.1097/NNE.0000000000000358.

Hoover, J. D., & Giambatista, R. C. (2009). Why have we neglected vicarious experiential learning? *Developments in Business Simulation and Experiential Learning*, *36*, 33-37.

IBM Corp. (2016). *IBM SPSS Statistics for Windows, Version 24.0*. Armonk, NY: IBM Corp.

International Nursing Association for Clinical Simulation and Learning Standards Committee. (2016). INACSL standards of best practice:

Simulation[SM], debriefing. *Clinical Simulation in Nursing*, *12*(S), S21-S25. https://doi.org/10.1016/j.ecns.2016.09.008.
Ironside, P. M. (2004). "Covering content" and teaching thinking: deconstructing the additive curriculum. *Journal of Nursing Education*, *43*(1), 5-12.
Jeffries, P. R., Rodgers, B., & Adamson, K. (2016). NLN Jeffries simulation theory: brief narrative description. In Jeffries, P. R. (Ed.), *The NLN jeffries simulation theory*. Philadelphia, PA: Wolters-Kluwer.
Johnson, B. K. (2018). *Observational experiential learning facilitated by debriefing for meaningful learning: Exploring student roles in simulation (Order No. 10932561)*. Available from ProQuest Dissertations & Theses Global. (2128022193).
Kolb, D. A. (2015). *Experiential Learning: Experience as the Source of Learning and Development* (2nd ed.). Upper Saddle River: Pearson Education, Inc.
Maloney, S., & Haines, T. (2016). Issues of cost-benefit and cost-effectiveness for simulation in health professions education. *Advances in Simulation*, *1*(13), 1-6. https://doi.org/10.1186/s41077-016-0020-3.
National Council of State Boards of Nursing. (2016). A changing environment: 2016 NCSBN environmental scan. *Journal of Nursing Regulation*, *6*(4), 4-37. https://doi.org/10.1016/S2155-8256(16)31007-9.
National League for Nursing. (2017). NLN biennial survey of schools of nursing academic year 2015-2016: executive summary. *Nursing Education Perspectives*, *38*(4), 222.
O'Regan, S., Molloy, E., Watterson, L., & Nestel, D. (2016). Observer roles that optimise learning in healthcare simulation education: a systematic review. *Advances in Simulation*, *1*(4), 1-10.
Oermann, M. H., Kardong-Edgren, S., Odom-Maryon, T., Hallmark, B. F., Hurd, D., Rogers, N., …, & Smart, D. A. (2011). Deliberate practice of motor skills in nursing education: CPR as exemplar. *Nursing Education Perspectives*, *32*(5), 311-315.
Regan, S., Wong, C., Laschinger, H. K., Cummings, G., Leiter, M., Macphee, M., …, & Read, E. (2017). Starting out: qualitative perspectives of new graduate nurses and nurse leaders on transition to practice. *Journal of Nursing Management*, *25*, 246-255. https://doi.org/10.1111/jonm.12456.
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. https://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. https://doi.org/10.1016/j.profnurs.2016.01.003.
Schlairet, M. C., & Fenster, M. J. (2012). Dose and sequence of simulation and direct care experiences among beginning nursing students: a pilot study. *Journal of Nursing Education*, *51*(12), 668-675. https://doi.org/10.3928/01484834-20121005-03.
Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
Shinnick, M. A., Woo, M., Horwich, T. B., & Steadman, R. (2011). Debriefing: the most important component in simulation? *Clinical Simulation in Nursing*, *7*(3), e105-e111. https://doi.org/10.1016/j.ecns.2010.11.005.
Spector, N., Blegen, M. A., Silvestre, J., Barnsteiner, J., Lynn, M. R., Ulrich, B., …, & Alexander, M. (2015). Transition to practice study in hospital settings. *Journal of Nursing Regulation*, *5*(4), 24-38. https://doi.org/10.1016/S2155-8256(15)30031-4.
Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Upper Saddle River: Pearson.
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. https://doi.org/10.1016/j.nedt.2012.12.004.
U.S. Department of Transportation Federal Aviation Administration. (2015). *Logging Instrument Approach Procedures*. Washington, DC: InFO. Retrieved from: https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2015/InFO15012.pdf
Waltz, C. F., Strickland, O. L., & Lenz, E. R. (2017). *Measurement in Nursing and Health Research*. New York: Springer Publishing Company.
Welsher, A., Rojas, D., Khan, Z., VanderBeek, L., Kapralos, B., & Grierson, L. E. M. (2018). The application of observational practice and educational networks in simulation-based and distributed medical education contexts. *Simulation in Healthcare*, *13*(1), 3-10. https://doi.org/10.1097/SIH.0000000000000268.
Woda, A. A., Hansen, J., Paquette, M., & Topp, R. (2017). The impact of simulation sequencing on perceived clinical decision making. *Nurse Education in Practice*, *26*, 33-38. https://doi.org/10.1016/j.nepr.2017.06.008.