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Effects of Nursing Students' Roles in Simulation-Based Education on Satisfaction, Self-Confidence, Self-Efficacy, and Knowledge Acquisition: A Quasi-Experimental Study

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ABSTRACT

The increasing number of learners, combined with the time- and resource-intensive nature of simulation-based learning (SBL), may limit opportunities for active participation. Most existing SBL research has focused on comparing active participants with observers. However, few studies have examined the impact of the ecological organisation of simulation training sessions, including active participants and observers (AP-O) formats versus observer-only formats, on learning outcomes in emergency simulation training. This quasi-experimental study aimed to evaluate the effects of AP-O versus observers-only roles on nursing students' satisfaction, self-confidence, self-efficacy, and knowledge acquisition during an emergency SBL training session. A total of 69 undergraduate nursing students were randomly assigned to either the AP-O group or observers. All participants completed three emergency simulation scenarios using standardised patients. Data were collected using a multiple-choice questionnaire and three validated scales. Both groups showed significant improvements in knowledge scores after each simulation scenario ($p < 0.001$). However, no statistically significant differences were found between the AP-O and observer groups in terms of learning satisfaction, self-efficacy, self-confidence, or knowledge acquisition ($p > 0.05$). These findings suggest that SBL is effective in enhancing students' learning outcomes and knowledge transfer, regardless of their simulation role.

Keywords: *Simulation-based learning, Nursing students, Active participant, Observer, Learning outcomes*

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INTRODUCTION

Simulation-based learning (SBL) has gained ground in healthcare education, offering a safe environment for nursing learners to bridge the theory-practice gap and learn from their mistakes without risking patient safety (1,2). While SBL enhances knowledge, critical thinking, and clinical performance (3), it faces logistical challenges such as large student cohorts and limited resources, which often limit active student participation (4). As a result, learners are frequently assigned to either an active participant (AP) or an observer role (5, 6). During the simulation scenario, students in the AP role engage in real-time decision-making and direct interaction with the simulation environment, while observers watch the scenario in real time without direct involvement. Observational learning, or vicarious learning, is the acquisition of knowledge, skills, strategies, or behaviours through observing others (7). Moreover, it has been widely demonstrated among educators and researchers that SBL has principally grounded in experiential learning theory. However, the framework of observational learning, particularly Bandura's social learning theory, remains underutilised by educators and researchers in simulation (8,9).

Evidence suggests that the learner's role in SBL may have a differential impact on simulation design and levels of learning (10) and learning outcomes (4,11), such as self-confidence, self-efficacy, and knowledge acquisition. Self-confidence, defined as the learners' trust in their abilities (12), is a critical clinical competence for nursing students, impacting assertiveness, communication, and teamwork (13). Exploring this outcome is essential in pre-licensing nursing education (12) because a lack of self-confidence can hinder the achievement of student learning outcomes. However, sufficient self-confidence can optimise the nursing learning experience (14). Self-efficacy refers to a person's belief in their ability to organise and execute the actions required to produce desired results in a specific situation (12). According to Bandura's social cognitive theory, self-efficacy is increased by verbal reinforcement, effective performance, observational experiences, and emotional states (15,16). Furthermore, students' self-efficacy affects their ability to transfer skills to real clinical situations (17).

There are inconsistent data about observers' knowledge acquisition, making it difficult to determine the relative effectiveness of AP versus observer roles in simulation training (10). Furthermore, few studies have examined the effectiveness of students' learning outcomes when assigned to a combination of both roles (AP-O), which reflects more ecological SBL training organisation, versus observer role only during a simulation training session, particularly in emergency simulation training (5,18). Therefore, further research is still needed to explore the learning outcomes of students according to their roles during SBL sessions. The aim of this study is to assess the effects of AP-O versus observer-only roles on satisfaction, self-confidence, self-efficacy and knowledge acquisition among undergraduate nursing students during emergency simulation training. Guided by the National League for Nursing (NLN) Jeffries's simulation theory (18), Bandura's social learning theory (7), and Kirkpatrick's four-level evaluation model (19), this study focused on the first two levels of Kirkpatrick's model: reactions and learning. We hypothesised that the AP-O group would achieve better learning outcomes than the observer-only group.

METHODS

Study Design

The study adopted a quasi-experimental, two-group, pretest-posttest design.

Participants

A total of 69 second-year undergraduate emergency nursing students participated in this study. All had previously completed a 50-hour theoretical module on emergency care, and all participants were first-time users of SBL. Allocation to the AP-O role was carried out before each scenario by drawing lots from the class list. The remaining students were automatically assigned to the observer-only group. Across the three simulation scenarios, students from both groups participated in the same pre-briefing and debriefing sessions. A priori power analysis was conducted to estimate the required sample size for detecting a statistically significant difference between the two groups (n = 28 and n = 41). Using G*Power 3.1 software, a two-tailed independent samples t-test was selected with an alpha level (α) of 0.05 and a desired power (1 – β) of 0.80. Assuming a medium effect size (Cohen's d = 0.3), the required total sample size was calculated to be approximately 64 participants. The final sample of 69 students (AP-O group: n = 28; observer-only group: n = 41). The detailed role assignment procedure is described in the procedure section. Figure 1 illustrates the flowchart of group allocation, simulation scenarios, and measurement points.

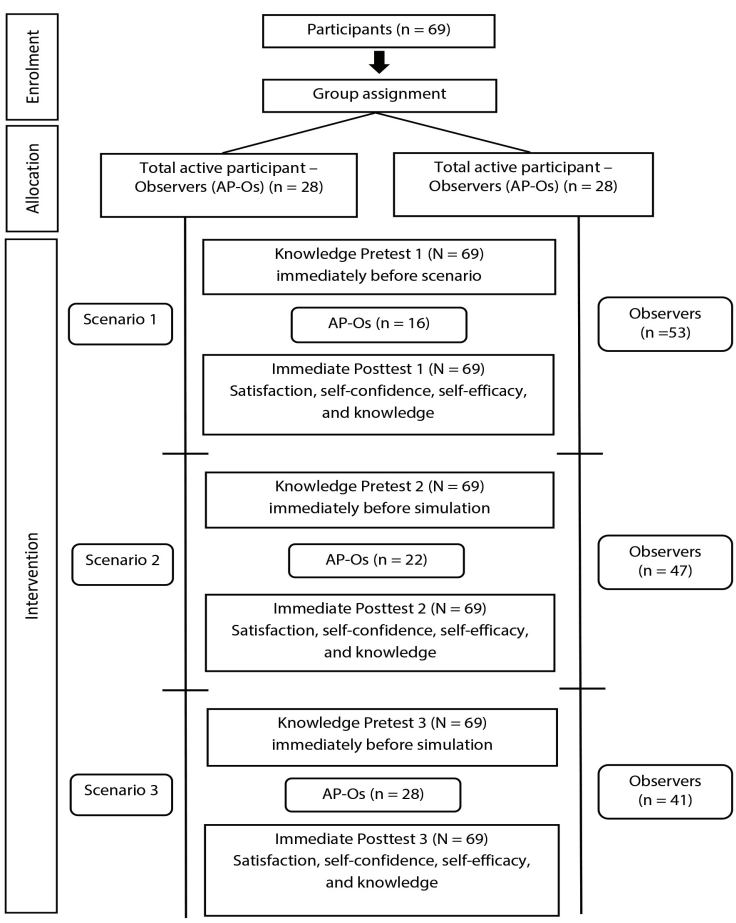


Figure 1: Flowchart of group allocation, simulation scenarios, and measurement points.

Study Setting and Duration

This study was conducted at the Higher Institute of Nursing Professions and Health Techniques in Agadir, Morocco, between 1 February and 31 July 2024.

Data Collection

Data were collected using four tools: (a) a sociodemographic questionnaire (gender, age, prior experience in SBL); (b) the French version of the Satisfaction and Self-Confidence in Learning (SSCL) scale (20); (c) the French version of the General Self-Efficacy (GSE) scale (21); and (d) an author-developed multiple-choice questionnaire to assess theoretical knowledge in emergency nursing.

The French version of the SSCL scale was used to assess satisfaction (Kirkpatrick Level 1) and self-confidence in learning (Kirkpatrick Level 2). It consists of 13 items, with five items assessing satisfaction and eight items assessing self-confidence in learning. Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A total of 25 points can be obtained for satisfaction and 40 points for self-confidence. Higher scores indicate greater satisfaction and self-confidence in learning.

The self-efficacy outcome (Kirkpatrick Level 2) was measured using the validated French version of the GSE scale. The scale comprises 10 items rated on a 4-point Likert scale from 1 (not at all true) to 4 (exactly true). Total scores range from 10 to 40, with scores ≥ 30 indicating high perceived self-efficacy.

Three multiple-choice questionnaires were developed by the authors to assess theoretical knowledge or cognitive performance in nursing emergency care (Kirkpatrick Level 2). Each questionnaire's items were explicitly aligned with the learning objectives of its corresponding simulation scenario. They included 15 items: 10 directly related to the scenario (scored 0–10; a score ≥ 5 was considered a passing score) and 5 unrelated distractor items, included to prevent participants from identifying the scenario topic beforehand and excluded from the analysis. The questionnaires were written by the authors and validated by two nursing faculty members with expertise in emergency care and simulation-based education.

Procedure

A total of three different simulation scenarios were conducted over three consecutive days, each involving a case with increasing learning objectives. The first scenario addressed an adult with severe asthma, the second focused on the management of post-surgical hemorrhagic stroke, and the third simulated an in-hospital adult cardiac arrest. These scenarios were designed around the same theme of emergency care management. The progressive variation of clinical situations aimed to facilitate the mobilisation of knowledge and skills discussed during the debriefing of the previous scenario and to promote their transfer to subsequent sessions, particularly regarding the application of the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) bundle and crisis resource management competencies. Each scenario lasted 50 minutes, comprising 10 minutes for pre-briefing, 10 minutes for the simulated situation, and 30 minutes for debriefing. The scenarios were validated and facilitated by three nurse anaesthetist educators trained in healthcare simulation. Three Standardised Patients (SPs) were trained in advance to portray patient roles. These SPs were blinded to the study participants' identities and the study outcomes. The SP modality was

selected because it effectively enhances physical assessment skills, diagnostic reasoning, clinical judgment, self-efficacy, and promotes patient-centred care (22–24). Physiological parameters were controlled and displayed using the free Vital Sign Simulator application.

The allocation of roles was systematically organised before each of the three simulation scenarios. The AP-O role referred to students who acted once as active participants and observed during the remaining scenarios, while the observer-only group included students who exclusively observed without direct participation. Across all scenarios, both the allocation principle and the simulation conditions were identical: within each subgroup, a predetermined number of students was randomly assigned to the AP-O role, while the remaining participants automatically served as observers. In the first scenario, participants were divided into four subgroups: four students assigned to the AP-O role, yielding a total of 16 AP-O, and the remaining 53 students were observers. In the second scenario, two subgroups were formed among the observers, and three students per subgroup were assigned to the AP-O role, adding six new AP-Os. Considering students who had already acted as AP-O in Scenario 1, the analysed sample for scenario 2 comprised 22 AP-O and 47 observers. In the third scenario, two new subgroups were created. Three students per subgroup were assigned to the AP-O role, yielding six additional AP-Os. By the end of the third scenario, corresponding to the achievement of the simulation training, the cumulative distribution comprised 28 AP-O and 41 observers.

No specific briefing or observation tool was provided to guide observers during the sessions. According to Kirkpatrick's evaluation model, the learning outcomes targeted in this study were classified as reactions (Kirkpatrick Level 1) and learning (Kirkpatrick Level 2). The progressive use of varied clinical situations reinforced participants' ability to transfer knowledge and behaviour across scenarios, thereby supporting the application of these competencies in increasingly complex emergency contexts.

Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Continuous variables were presented as means with standard deviations (M(SD)) or as medians with interquartile ranges (IQR), as appropriate. Categorical variables were summarised using frequencies and percentages. After checking normality assumptions using the Shapiro-Wilk test, an independent t-test was used to compare the mean scores of the two groups (AP-O vs Observer) for satisfaction, self-efficacy, self-confidence, and knowledge acquisition. In addition, a paired t-test was used to compare the mean knowledge scores before and after each simulation scenario. A significance level of $p < 0.05$ was used.

RESULTS

Participants' Characteristics

A total of 69 second-year undergraduate nursing students participated and completed all the phases of the study experiment. The AP-O group included 23 females (33%) and five males (7%), while the observer group included 22 females (32%) and 19 males (27%), with a

statistically significant difference ($p = 0.015$). Participants' ages ranged from 19 to 20 years, with a median age of 20 years (IQR: 19–20). No significant difference in age was found between the two groups ($p = 0.40$). Notably, none of the participants had prior experience with SBL before this study.

Effect of the assigned role on participants' satisfaction, self-confidence and self-efficacy during nursing SBL

As shown in Table 1, the study results demonstrate consistently high levels of satisfaction and self-efficacy, as well as moderate levels of self-confidence, among both AP-O and observer-only groups across the three simulation scenarios. In the AP-O group, satisfaction scores ranged from 23.32 (4.02) to 23.64 (1.95), self-confidence scores from 28.41 (4.07) to 32.73 (4.36), and self-efficacy scores from 29.54 (4.30) to 32.02 (4.53). In the observer-only group, satisfaction scores ranged from 21.10 (4.63) to 22.41 (4.07), self-confidence scores from 30.93 (4.83) to 34.25 (4.09), and self-efficacy scores from 30.36 (4.47) to 32.54 (4.50). No statistically significant differences were observed between roles across the three scenarios. For satisfaction, the *p*-values were 0.19, 0.71, and 0.24; for self-confidence, 0.24, 0.19, and 0.11; and for self-efficacy, 0.64, 0.86, and 0.69, respectively.

Table 1: Effect of the students' role on satisfaction, self-confidence and self-efficacy during the three simulation scenarios

Variable	Simulation scenarios	AP-O n, M(SD)	Observer only n, M(SD)	*p**
Satisfaction	1	16, 23.39(1.73)	53, 22.41(4.07)	0.19
	2	22, 23.32(4.02)	47, 21.85(4.63)	0.71
	3	28, 23.64(1.95)	41, 22.10(4.63)	0.24
Self-confidence	1	16, 28.41(4.07)	53, 30.93(4.83)	0.19
	2	22, 32.13(4.63)	47, 33.18(5.85)	0.11
	3	28, 32.73(4.36)	41, 34.25(4.09)	0.19
Self-efficacy	1	16, 30.36(4.47)	53, 29.54(4.30)	0.64
	2	22, 32.14(4.90)	47, 30.90(5.01)	0.86
	3	28, 32.54(4.50)	41, 32.02(4.53)	0.69

Notes: AP-O = Active participant-observer; M(SD) = Mean (standard deviation); *Significant at < 0.05

Effect of the participants' role on knowledge acquisition during nursing SBL session

The comparison of knowledge acquisition scores before and after each simulation scenario revealed a statistically significant improvement within both groups ($p < 0.001$). However, no significant differences were found between the groups when comparing pre-test or post-test scores across the three scenarios ($p > 0.05$). The detailed results are presented in Table 2.

Table 2: Comparison of the knowledge acquisition scores between AP-O and observer groups during the three simulation scenarios

Assessment time point	Scenarios	AP-O *n*, M(SD)	Observer only *n*, M(SD)	Between-group comparison, *p**
Pre-test	1	16, 4.15(1.22)	53, 4.0(1.33)	0.68
	2	22, 4.15(1.22)	47, 4.0(1.33)	0.68
	3	28, 5.25(1.22)	41, 4.82(1.26)	0.10
Post-test	1	16, 5.62(1.08)	53, 6.12(1.27)	0.80
	2	22, 5.62(1.08)	47, 6.12(1.27)	0.80
	3	28, 6.82(1.05)	41, 6.40(1.09)	0.85
Within group comparison, *p**	1	< 0.001	< 0.001	–
	2	< 0.001	< 0.001	–
	3	< 0.001	< 0.001	–

Notes: AP-O = Active participant-observer; M(SD) = Mean (standard deviation), N = 69; *Significant at $p < 0.05$

DISCUSSION

This study aimed to evaluate the effects of students' simulation roles (AP-O vs observer-only) on satisfaction, self-efficacy, self-confidence, and knowledge acquisition during emergency simulation training experiences. Referring to Kirkpatrick's four-level evaluation model widely used in healthcare education programes (25), the discussion of the effect of learners' roles on learning outcomes during SBL is organised as follows: first, satisfaction and self-confidence; second, self-efficacy; and third, knowledge acquisition across the three simulation scenarios. The study found no significant differences between the AP-O role and observers in satisfaction, self-efficacy, self-confidence, and theoretical knowledge acquisition. However, theoretical knowledge significantly improved after each simulated scenario in both groups, demonstrating an immediate enhancement in learners' knowledge acquisition.

Effects of Simulation Learners' Role on Satisfaction and Self-Confidence in Learning

In this study, both AP-O and observer-only groups reported high levels of satisfaction (mean ≥ 21/25) and moderate levels of self-confidence (mean ≥ 28/40) across the three simulation scenarios. These findings indicate that simulation effectively promotes positive student satisfaction and self-confidence in learning, regardless of assigned role.

High satisfaction levels were observed in both groups, with no significant differences between AP-O and observer roles. Similar findings were reported in previous studies (26–29). In contrast, some evidence suggests that observers may be less satisfied than active participants (30). Moreover, Blanié et al. (31), who compared AP-O and observer-only roles reported positive satisfaction outcomes in both groups, with significantly higher scores in the AP-O group. Nevertheless, studies have shown that observers can achieve outcomes

comparable to those of active participants when provided with structured support, such as targeted pre-briefings or observation guides. O'Regan et al.'s (10) systematic review confirmed that guided observation enhances satisfaction and other learning outcomes. The importance of students' satisfaction as an outcome has been widely demonstrated in the literature. It was closely associated with the improvement of students' learning outcomes. These positive results among observers in our study highlight an opportunity for educators to deliberately integrate and optimise the observer role while maintaining learner engagement and achieving outcomes.

Self-confidence scores remained consistently above 28/40 in both groups, indicating moderate levels of confidence that support SBL's effectiveness in enhancing learners' confidence. This finding aligns with evidence from a systematic review that demonstrated the positive impact of SBL on nursing students' self-confidence (32). Similar results have been reported in studies showing comparable improvements in both AP-O and observer-only groups (27). However, Moraes et al. (33) reported higher self-confidence among active participants than among observers, suggesting that role allocation may influence this outcome under certain conditions. Moreover, perceived confidence represents a critical skill in providing safe and effective nursing care, as it enables practitioners to manage complex clinical challenges while ensuring accurate and appropriate interventions (34). Therefore, it is important to examine whether the self-confidence outcomes observed in this study are transferable to real clinical settings. Nevertheless, the absence of medium- or long-term follow-up in this study limits the evaluation of sustained changes in self-confidence. Consequently, future research should adopt longitudinal pre–post designs to investigate how self-confidence outcomes are transferred to clinical decision-making in real-world practice settings, across active roles and observers.

Effect of Student's Role During SBL on Self-Efficacy

In this study, self-efficacy scores consistently exceeded 29.54/40 across scenarios, indicating a generally high level of perceived self-efficacy among participants. The comparison between AP-O and observer-only roles revealed no statistically significant differences across the three simulation scenarios ($p > 0.05$). The increased level of self-efficacy among nursing students was previously demonstrated (35). Furthermore, evidence has demonstrated that clinical training and simulation are effective in enhancing nursing students' self-efficacy (15). In addition, simulation training using SP allows novice nursing students to immerse themselves in realistic patient scenarios, thereby improving their self-efficacy (32). However, the non-significant difference in self-efficacy between the two groups aligns with the findings reported by Jiang et al. (26). In contrast, the study by Moraes et al. (33) reported higher self-efficacy scores among active participants compared to observers, suggesting a potential advantage of direct engagement and sense of presence in simulation. Our findings may be explained by the SBL modality used, specifically the use of SP, which has been shown to effectively enhance learners' self-efficacy (22,23). This is particularly relevant, as self-efficacy is widely recognised as an important outcome of simulation-based education (36). In addition, the debriefing phase, as the cornerstone of SBL, facilitates the process of critical reflection, allowing learners to analyse their actions and decisions during the simulation. Furthermore, constructive feedback from instructors promotes self-correction and allows students to adjust their learning strategies as needed (37).

Effect of Simulation Student Role on Knowledge Acquisition

The study results demonstrated a significant improvement in participants' knowledge acquisition ($p < 0.001$), with no significant difference observed between learners' roles during the simulation scenarios ($p > 0.05$). This finding is supported by previous literature (6,26,28,38–40). The facilitated reflective practice (constructive feedback and group discussion between students and trainers) during debriefing sessions enabled students to validate their knowledge and address their knowledge gaps (41). This result suggests that all students learn whether they are active or observers during SBL. That is why it is important for educators to consider implementing simulation training despite the large cohort of nursing students.

The absence of statistically significant differences between active and observer participants may be explained by the cognitive nature of learning and the effectiveness of vicarious learning strategies. According to cognitive learning theories, knowledge acquisition occurs through information processing, attention, and reflection, regardless of the learner's physical engagement in the task (42). This sense of presence may be strengthened by a standardised pre-briefing that focuses on suspension of disbelief and on improving students' intrinsic and extrinsic motivation. Furthermore, observational learning, as described by Bandura's Social Learning Theory, posits that individuals can acquire skills and behaviours by observing others, especially when the observation is structured and goal-directed (7). In the context of SBL, observers can achieve learning outcomes comparable to active participants when they are cognitively engaged through reflection during observation (39,43). Moreover, a personalised briefing session helps observers understand their responsibilities, thereby enhancing their involvement and attention during simulation scenarios (44). Although SBL demonstrated a positive effect on students' knowledge acquisition, regardless of their assigned role, reinforcing its effectiveness in training large cohorts, the transferability of this knowledge to clinical practice (Kirkpatrick Level 3) requires further exploration.

In summary, this study highlights that in resource-constrained nursing education, observational learning represents a valuable strategy for supporting SBL. It enables the training of large student cohorts while achieving learning outcomes comparable to those attained through active participation. Nevertheless, several limitations must be acknowledged when interpreting these findings. First, this was a single-centre study with a small sample size which may restrict the generalisability of our findings to broader populations. Furthermore, the post-intervention assessment of learners' long-term knowledge retention was not conducted. Further studies are required to assess the impact of learners' roles in simulation on knowledge retention, behavioural change (Kirkpatrick Level 3), and patient outcomes (Kirkpatrick Level 4) among nursing students.

CONCLUSION

In conclusion, this study demonstrated the positive effects of SBL on satisfaction, self-confidence, self-efficacy, and knowledge acquisition among nursing students, regardless of the assigned role (AP-O vs observer-only) during emergency simulation scenarios. These findings suggest that role assignments, particularly the observer role, can be strategically used by nursing educators to address SBL challenges in contexts with large student cohorts and limited simulation resources.

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ETHICAL APPROVAL

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Before conducting the research, we obtained institutional approval from the director of the nursing institute. Participation in the study was entirely voluntary. All participants were informed about the study objectives, and written informed consent was obtained prior to data collection. Participant confidentiality was strictly maintained, and all data were anonymised to ensure privacy. No personally identifiable information was collected or stored.

REFERENCES

1. Chiniara G, Cole G, Brisbin K, Huffman D, Cragg B, Lamacchia M, et al. Simulation in healthcare: a taxonomy and a conceptual framework for instructional design and media selection. Med Teach. 2013;35(8):e1380–95. https://doi.org/10.3109/014215 9X.2012.733451

2. Steadman RH, Huang YM. Simulation for quality assurance in training, credentialing and maintenance of certification. Best Pract Res Clin Anaesthesiol. 2012;26(1):3–15. https://doi.org/10.1016/j.bpa.2012.01.002

3. Gaba DM. The future vision of simulation in health care. Qual Saf Health Care. 2004;13(Suppl 1):i2–10. https://doi.org/10.1136/qhc.13.suppl_1.i2

4. Lai A, Haligua A, Bould MD, Everett T, Gale M, Pigford AA, et al. Learning crisis resource management: practicing versus an observational role in simulation training – a randomised controlled trial. Anaesth Crit Care Pain Med. 2016;35(4):275–81. https://doi.org/10.1016/j.accpm.2015.10.010

5. Bullard MJ, Weekes AJ, Cordle RJ, Fox SM, Wares CM, Heffner AC, et al. A mixed-methods comparison of participant and observer learner roles in simulation education. AEM Educ Train. 2018;3(1):20–32. https://doi.org/10.1002/aet2.10310

6. Johnson BK. Simulation observers learn the same as participants: the evidence. Clin Simul Nurs. 2019;33:26–34. https://doi.org/10.1016/j.ecns.2019.04.006

7. Bandura A. Social learning theory. Oxford, England: Prentice-Hall; 1977. p. 247.

8. Rudolph JW, Simon R, Raemer DB, Eppich WJ. Debriefing as formative assessment: closing performance gaps in medical education. Acad Emerg Med. 2008;15(11):1010–6. https://doi.org/10.1111/j.1553-2712.2008.00248.x

9. Stocker M, Burmester M, Allen M. Optimisation of simulated team training through the application of learning theories: a debate for a conceptual framework. BMC Med Educ. 2014;14(1):69. https://doi.org/10.1186/1472-6920-14-69

10. O'Regan S, Molloy E, Watterson L, Nestel D. Observer roles that optimise learning in healthcare simulation education: a systematic review. Adv Simul. 2016;1(1):4. https://doi.org/10.1186/s41077-015-0004-8

11. Fuglsang S, Bloch CW, Selberg H. Simulation training and professional self-confidence: a large-scale study of third-year nursing students. Nurs Educ Today. 2022;108:105175. https://doi.org/10.1016/j.nedt.2021.105175

12. Perry P. Concept analysis: confidence/self-confidence. Nurs Forum. 2011;46(4):218–30. https://doi.org/10.1111/j.1744-6198.2011.00230.x

13. Cowen KJ, Hubbard LJ, Hancock DC. Concerns of nursing students beginning clinical courses: a descriptive study. Nurse Educ Today. 2016;43:64–8. https://doi.org/10.1016/j.nedt.2016.05.001

14. Hope A, Garside J, Prescott S. Rethinking theory and practice: pre-registration student nurses experiences of simulation teaching and learning in the acquisition of clinical skills in preparation for practice. Nurse Educ Today. 2011;31(7):711–5. https://doi.org/10.1016/j.nedt.2010.12.011

15. Brennan BA. Psychometric evaluation of the clinical and simulation general self-efficacy scale. Nurs Educ Perspect. 2022;44(2):105–6. https://doi.org/10.1097/01.NEP.0000000000000979

16. Dunn KE, Osborne C, Link HJ. Research briefs high-fidelity simulation and nursing student self-efficacy: does training help the little engines know they can? Nurs Educ Perspect. 2014;35(6):403–4. https://doi.org/10.5480/12-1041.1

17. Van Horn E, Christman J. Assessment of nursing student confidence using the clinical skills self-efficacy scale. Nurs Educ Perspect. 2017;38(6):344–6. https://doi.org/10.1097/01.NEP.0000000000000169

18. Cowperthwait A. NLN/Jeffries simulation framework for simulated participant methodology. Clin Simul Nurs. 2020;42:12–21. https://doi.org/10.1016/j.ecns.2019.12.009

19. Kirkpatrick DL, Craig RL, Bittel LR. Evaluation of training. In: Craig RL, Bittel LR, editors. Evaluation of short-term training in rehabilitation. Washington (DC): U.S. Department of Health, Education, and Welfare; 1970. p. 41–54.

20. Simoneau IL, Van Gele P, Ledoux I, Lavoie S, Paquette C. Reliability of the French translation of instruments designed to assess the affective learning outcomes of human patient simulation in nursing education. Clin Simul Nurs. 2011;7(6):e263–4. https://doi.org/10.1016/j.ecns.2011.09.069

21. Saleh D, Romo L, Sweerts SJ. Validation of the general self-efficacy scale (GSE) in French university students. Eur Psychiatry. 2021;64(Suppl 1):S459. https://doi.org/10.1192/j.eurpsy.2021.1226

22. Sideras S, McKenzie G, Noone J, Markle D, Frazier M, Sullivan M. Making simulation come alive: standardised patients in undergraduate nursing education. Nurs Educ Perspect. 2013;34(6):421–5. https://doi.org/10.5480/1536-5026-34.6.421

23. Slater LZ, Bryant KD, Ng V. Nursing student perceptions of standardised patient use in health assessment. Clin Simul Nurs. 2016;12(9):368–76. https://doi.org/10.1016/j.ecns.2016.04.007

24. Dalwood N, Bowles KA, Williams C, Morgan P, Pritchard S, Blackstock F. Students as patients: a systematic review of peer simulation in health care professional education. Med Educ. 2020;54(5):387–99. https://doi.org/10.1111/medu.14058

25. Kirkpatrick DL. The four levels of evaluation. In: Brown SM, Seidner CJ, editors. Evaluating corporate training: models and issues. Dordrecht: Springer Netherlands; 1998. p. 95–112. https://doi.org/10.1007/978-94-011-4850-4_5

26. Jiang JL, Fu SY, Ma YC, Wang JH, Koo M. Comparative impact of active participation and observation in simulation-based emergency care education on knowledge, learning effectiveness, and satisfaction among undergraduate nursing students. Teach Learn Nurs. 2024;19(3):e566–73. https://doi.org/10.1016/j.teln.2024.04.003

27. Bates TA, Moore LC, Greene D, Cranford JS. Comparing outcomes of active student and observer roles in nursing simulation. Nurse Educ. 2019;44(4):216–21. https://doi.org/10.1097/NNE.0000000000000603

28. Zulkosky K, Minchhoff D, Dommel L, Price A, Handzlik BM. Effect of repeating simulation scenarios on student knowledge, performance, satisfaction and self-confidence. Clin Simul Nurs. 2021;55:27–36. https://doi.org/10.1016/j.ecns.2021.03.004

29. Teixeira A, Tavares JP, Cogo ALP. Satisfaction and self-confidence of nursing students as participants and observers in realistic simulations. Rev Gaúcha Enferm. 2022;43:e20210344. https://doi.org/10.1590/1983-1447.2022.20210344.en

30. Littlefield JH, Hahn HB, Meyer AS. Evaluation of a role-play learning exercise in an ambulatory clinic setting. Adv Health Sci Educ Theory Pract. 1999; 4(2): 167–73. https://doi.org/10.1023/a:1009789110719

31. Blanié A, Gorse S, Roulleau P, Figueiredo S, Benhamou D. Impact of learners' role (active participant-observer or observer only) on learning outcomes during high-fidelity simulation sessions in anaesthesia: a single center, prospective and randomised study. Anaesth Crit Care Pain Med. 2018;37(5):417–22. https://doi.org/10.1016/j.accpm.2017.11.016

32. Alrashidi N, An EP, Alrashedi MS, Alqarni AS, Gonzales F, Bassuni EM, et al. Effects of simulation in improving the self-confidence of student nurses in clinical practice: a systematic review. BMC Med Educ. 2023;23(1):815. https://doi.org/10.1186/s12909-023-04793-1

33. de Moraes EMB, Carvalho DRDS, Sandars J, Ozahata TM, Patel R, Cecilio-Fernandes D, et al. Unravelling the differences between observation and active participation in simulation-based education. Med Teach. 2025;47(6):991–6. https://doi.org/10.1080/0142159X.2024.2396381

34. Abdelkader AM, El-Aty NSA, Abdelrahman SM. The relationship between self-confidence in learning and clinical educators' characteristics by nursing students. IJONE. 2021;13(2):1–10. https://doi.org/10.37506/ijone.v13i2.14614

35. Karabacak U, Unver V, Ugur E, Kocatepe V, Ocaktan N, Ates E, et al. Examining the effect of simulation-based learning on self-efficacy and performance of first-year nursing students. Nurse Educ Pract. 2019;36:139–43. https://doi.org/10.1016/j.nepr.2019.03.012

36. Lavoie P, Michaud C, Bélisle M, Boyer L, Gosselin É, Grondin M, et al. Learning theories and tools for the assessment of core nursing competencies in simulation: a theoretical review. J Adv Nurs. 2018;74(2):239–50. https://doi.org/10.1111/jan.13416

37. Decker S, Fey M, Sideras S, Caballero S, Rockstraw L (Rocky), Boese T, et al. Standards of best practice: simulation standard VI: the debriefing process. Clin Sim Nurs. 2013;9(6, Supplement):S26–9. https://doi.org/10.1016/j.ecns.2013.04.008

38. Hooper BL, Carlson NG. Knowledge acquisition based on participant role assignment in a high-fidelity simulation. Nurse Educ. 2024;49(4):212–6. https://doi.org/10.1097/NNE.0000000000001592

39. Ham YS, Park YM, Roh YS. Comparison of learning outcomes between active participants and observer roles in simulation-based learning. Clin Sim Nurs. 2024;87:101497. https://doi.org/10.1016/j.ecns.2023.101497

40. Kirkpatrick AJ, Cantrell MA, Smeltzer SC. Palliative care knowledge and self-awareness in active and observing undergraduate nursing students after end-of-life simulation. Int J Palliat Nurs. 2020;26(3):133–42. https://doi/10.12968/ijpn.2020.26.3.133

41. Abelsson A, Bisholt B. Nurse students learning acute care by simulation – focus on observation and debriefing. Nurse Educ Pract. 2017;24:6–13. https://doi.org/10.1016/j.nepr.2017.03.001

42. Mayer, R. E. Cognitive theory and the design of multimedia instruction: an example of the two-way street between cognition and instruction. New Dir Teach Learn. 2002;89:55–71. https://doi.org/10.1002/tl.47

43. Rogers T, Andler C, O'Brien B, van Schaik S. Self-reported emotions in simulation-based learning: active participants vs. observers. Simul Healthc. 2019;14(3):140–5. https://doi.org/10.1097/SIH.0000000000000354

44. Johnson BK, Fey M. Setting observers up for success in simulation. Nurse Educ. 2023;48(6):321–5. https://doi.org/10.1097/NNE.0000000000001433