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# Development and validation of simulation teaching strategies in an integrated nursing practicum

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ABSTRACT

*Background:* Simulation is an effective teaching method for nursing education.
*Aim:* This study evaluated the effects of simulation teaching strategies applied to an integrated nursing practicum based on the Jeffries Simulation framework on the critical thinking disposition, general self-efficacy, and learning motivation of senior nursing students.
*Methods:* Using a prospective, one-group, pre- and post-test design, 69 Korean students from one university participated in a 30-h simulation-based practicum consisting of three sections: prerequisite learning, scenario implementation, and debriefing.
*Findings:* Students showed significant improvements over time in critical thinking disposition ($p < 0.001$), general self-efficacy ($p = 0.001$), and learning motivation ($p < 0.001$).
*Discussion:* These findings suggest that a simulation-based practicum based on the Jeffries Simulation framework would be an effective learning method to facilitate critical thinking disposition, improve general self-efficacy, and enhance learning motivation.
*Conclusion:* Simulation teaching strategies might be used in clinical education to increase students' competencies. In addition, Jeffries Simulation Framework would be useful one to develop simulations and evaluate outcomes for simulation practicum.


## 1. Introduction

As patient litigation and safety concerns increase, nursing students have often been limited in integrated opportunities for clinical performance in the hospitals (Nevin, Neill, & Mulkerrins, 2014). As a result, nursing students sometimes achieve the educational objectives for nursing practica insufficiently even though clinical preparation is a key component in nursing curricula (Levett-Jones & Bourgeois, 2011; Shin, Ma, Park, Ji, & Kim, 2015). Further, these may lead to decreased clinical competencies in new nurses and nursing graduates struggle with performing clinical skills proficiently due to a lack of exposure and practice in their undergraduate nursing studies (Missen, McKenna, Beauchamp, & Larkins, 2016; Walker, Earl, Costa, & Cuddihy, 2013). Therefore, more effective educational strategies for clinical practica in the undergraduate programme are needed to overcome these limitations and to improve nursing students' clinical competencies, especially for senior students who are expected to engage in the nursing role immediately following graduation.

Simulation is an effective teaching strategy for clinical education and is becoming increasingly prevalent in healthcare education, including in the nursing discipline (Frost & Reid-Searl, 2015; Kelly & Jeffries, 2012; Kelly, 2010; Shin et al., 2015). Simulations are defined as activities that mimic the reality of clinical environments and are designed to demonstrate procedures, decision making, and critical thinking through techniques such as role-playing and the use of devices like mannequins (Jeffries, 2005). Simulation as an active and participatory learning experience has entered a new phase with the availability of high technology (Kelly, 2010). Of the various tools for simulations, the high fidelity human-patient simulator is described as an efficient tool for experiential learning because it is capable of simulating multiple physiological functions and creating realistic scenarios for students' experiential learning.

Simulation teaching strategies may have many benefits on the learning outcomes of a nursing practicum. First, simulation is a relatively efficient and safe teaching method without fear of causing harm to actual patients (Jeffries, 2005). Second, during a simulation scenario practicum, students are exposed to realistic and interactive clinical settings and try to integrate their knowledge and

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practice as active learners to solve problems. Lastly, students are encouraged to reflect on their actions and to verbalize the consequences of their actions or inactions during the debriefing period, which is a reflective period following the enactment of a simulation scenario (Dufrene & Young, 2013; Reed, 2012). Therefore, through the experience of simulation with real-life scenarios, students can practice skills, receive feedback from facilitators and other students, and learn from patient responses and outcomes in a safe environment. These learning activities can help the students develop the various competencies required in real practice settings, such as confidence, critical thinking, decision making, and psychomotor skills (Moule, 2011). Thus, the importance of simulation strategies in education for nursing practice will continue to increase.

As the importance of simulation increases, many studies have verified the effects of simulation teaching strategies (Brady, Bogossian, & Gibbons, 2015; Cardoza & Hood, 2012; Lewis, Strachan, & Smith, 2012; Roh & Lim, 2014; Shin & Kim, 2014; Shin et al., 2015). Several models or theories have been used in previous simulation studies, including the Experiential Learning Theory (Kolb, 1984), Novice to Expert Model (Benner, 1982), Clinical Judgment Model (Tanner, 2006), Interactive Model of Clinical Judgment (Lasater, 2007), and The Nursing Education Simulation Framework (Jeffries, 2005). Of these, the Nursing Education Simulation Framework (i.e. Jeffries Simulation Framework) is suggested as one of the most useful frameworks to develop simulations and evaluate outcomes (Groom, Henderson, & Sittner, 2014).

The National League for Nursing Group originally developed a consistent and empirically supported simulation model to guide the design and implementation of simulations and evaluate outcomes (Jeffries, 2005); future work reported better understanding of the simulation framework from conceptualization to evaluation of the simulation (Jeffries, 2007, 2012). This model consists of five components, including educational practice factors, student factors, teacher factors, simulation design characteristics, and outcomes (i.e. knowledge, skill performance, learner satisfaction, critical thinking, and self-confidence; Jeffries, 2005). All components are important to maximize the educational effects of simulations and thus are fully considered at each step in the design, implementation, and outcome evaluation of simulation practicum (Jeffries, 2005, 2007, 2012).

Although many studies have been conducted to evaluate the effectiveness of simulation-based learning, most studies have measured partial outcomes of Jeffries Simulation Framework; for example, critical thinking disposition (Kim et al., 2012; Shin & Kim, 2014; Shin et al., 2015; Wood & Toronto, 2012), self-efficacy (Cardoza & Hood, 2012; Lewis et al., 2012; Roh & Lim, 2014; Roh, 2014; Sinclair & Ferguson, 2009), clinical skills/skill performance (Brady et al., 2013; Brady et al., 2015), learning motivation (Kuznar, 2009; Roh & Kim, 2015; You & Chae, 2011; Yoo, Yoo, & Lee, 2010), and satisfaction (Liaw, Palham, Chan, Wong, & Lim, 2015; Roh & Lim, 2014). However, the original developer (Jeffries, 2005, 2007, 2012) recommended that major components in the simulation model should be considered, especially in the courses' or scenarios' design, implementation, and measurement.

In addition, according to a recent systematic review about simulation studies, Groom et al. (2014) noted that there was a general lack of an identified theoretical framework underpinning the majority of the empirical simulation literature and variance in construct and sub-construct terms. To improve the research quality, standardization of terms and better description of constructs and methodologies are required. For that, the project team suggested that utilizing and referencing the National League for Nursing/Jeffries Simulation Framework in the design, implementation, and reporting of simulation instruction and research should bring better standardization and reproducibility to the process (Groom et al., 2014). Therefore, Jeffries Simulation Framework should be adopted and applied in subject development and evaluation.

Thus, the current study developed an integrated nursing practicum for Korean senior nursing students based on the key components of Jeffries Simulation Framework (i.e. educational practice factors, student factors, teacher factors, and simulation design characteristics); it explored the effect of the developed simulation teaching strategies on the major outcome variables suggested by Jeffries Simulation Framework (2005). In addition, this study analysed the participants' evaluation feedback. It would improve in-depth understanding and applicability of Jeffries Simulation Framework and encourage *trans*-cultural strategies for future international research.

### 1.1. Purpose of the study

The primary purpose of this study was to develop a 30-h integrated nursing practicum for senior nursing students based on the key components of Jeffries Simulation Framework (2005) and to examine the effects of simulation teaching strategies on the major outcomes; that is, critical thinking disposition, general self-efficacy, learning motivation, and skill performance. Additionally, course evaluation feedback from the perspective of students who participated in the simulation practicum was reported to further develop the integrated nursing practicum course.

## 2. Methods

### 2.1. Design and sample

A one-group, pre- and post-test, intervention design was used for this study. A convenience sample of 72 senior (fourth undergraduate year) nursing students participating in an integrated nursing practicum, during the fall semester in 2012 at a university in Suwon, South Korea was obtained. A total of 69 students completed the pre- and post-test questionnaires; responses from three students were not used in the analysis because their post-test questionnaires were incomplete. Using the G-Power 3.1.2 software programme (Faul, Erdfelder, Lang, & Buchner, 2007) for a post-hoc power analysis of paired *t*-tests, the sample size reached a power $(1 - \beta)$ of 98.3% with an effect size of 0.50 and an alpha value of 0.05.

### 2.2. Measurements

#### 2.2.1. Critical thinking disposition

Critical thinking disposition was measured using the Critical Thinking Disposition Scale developed by Yoon (2004). Regarding the concept of critical thinking, there are two dimensions: critical thinking skills and critical thinking disposition (Facione, 1990; Mahbobi, Jafarian, & Khorasani, 2013). While the first dimension emphasizes cognitive skills and strategies, the second dimension focuses on the attitudinal elements and internal motives for problem-solving (Facione & Facione, 1992; Mahbobi et al., 2013). In detail, critical thinking disposition represents inner motivation or personality attributes in problem-solving and decision making by thinking, which leads individuals to use and achieve critical thinking skills (Facione, Facione, & Sanchez, 1994). There is a highly significant correlation ($r = 0.66$) between critical thinking disposition and critical thinking skills (Facione & Facione, 1992). Although it is important to measure two dimensions simultaneously in the current study, there is no available Korean version of a scale to measure critical thinking skills. Therefore, in this study, only critical thinking disposition was measured using the Critical Thinking Disposition Scale developed by Yoon (2004). This scale is similar to

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