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High-fidelity simulation among bachelor students in simulation groups and use of different roles

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SUMMARY

Cost limitations might challenge the use of high-fidelity simulation as a teaching–learning method. This article presents the results of a Norwegian project including two simulation studies in which simulation teaching and learning were studied among students in the second year of a three-year bachelor nursing programme. The students were organised into small simulation groups with different roles; nurse, physician, family member and observer. Based on experiences in different roles, the students evaluated the simulation design characteristics and educational practices used in the simulation. In addition, three simulation outcomes were measured; knowledge (learning), Student Satisfaction and Self-confidence in Learning. The simulation was evaluated to be a valuable teaching–learning method to develop professional understanding and insight independent of roles. Overall, the students rated the Student Satisfaction and Self-confidence in Learning as high. Knowledge about the specific patient focus increased after the simulation activity. Students can develop practical, communication and collaboration skills, through experiencing the nurse's role. Assuming the observer role, students have the potential for vicarious learning, which could increase the learning value. Both methods of learning (practical experience or vicarious learning) may bridge the gap between theory and practice and contribute to the development of skills in reflective and critical thinking.

Introduction

Human patient simulators (HPSs) have the ability to mimic realism and real-life situations due to their advanced technology. The simulators have increased in popularity during recent years and have become a popular tool in nursing education (Sullivan-Mann et al., 2009; Jeffries, 2009; Nehring and Lashley, 2009; Sanford, 2010). The use of high-fidelity simulation (HFS) can prepare nursing students with limited clinical experience for clinical practice using the knowledge and skills gained through designed scenarios (Rauen, 2001; Nehring et al., 2002; Jeffries, 2007).

Cost limitations might challenge the use of HFS as a teaching–learning method. Additionally, questions may arise concerning the learning value and outcome achieved within smaller simulation groups that include both active student roles in the simulated scenario and observation roles. Leigh (2008) stated that observing other students performing in a simulation exercise maximises the effect of the simulation. With references to Hoffmann et al. (2007) and Maibach and Schieber (1996), she stated that the ability to learn from their peers affected both participants and observer self-efficacy.

This article presents the results of a Norwegian project including two simulation studies (2009 and 2010), in which simulation teaching and learning were studied among students in the second year of a three-year bachelor nursing programme. The students were organised into small simulation groups with different roles (nurse, physician, family member and observer). The students who played the nurse role were highly focused and had the opportunity to demonstrate their knowledge and newly learned skills by participating in the designed HFS scenario. The observers were required to watch the simulated scenario and consider what they observed using their knowledge, newly learned skills and imagination. After the simulation, some observers commented that they felt as if they were "sucked into" or "dragged into" the scenario and felt that they became a part of it. In their thoughts, they "acted" as if they were in the nurse role and discussed the procedure with themselves during the on-going scenario.

Lave and Wenger (1991) previously focused on "the power of context". As members of small simulation groups, the observers were part of the learning community as legitimate peripheral members, but they were not participators in the simulation scenario. They had to learn by observing the experiences of their peers playing the nurse role.

The theoretical framework for the research reported from these two studies is the Nursing Education Simulation Framework, which was developed to design, implement and evaluate simulations used in nursing education (Jeffries, 2005, 2007). The framework consists of five major components: teacher factors, student factors, educational practices, simulation design characteristics and outcomes. These components are operationalized through a number of variables.

The aim was to evaluate the HFS scenario experiences among nursing students organised into small simulation groups with different roles. The

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students evaluated the simulation design characteristics and the educational practices. In addition, three simulation outcomes were measured; knowledge (learning), satisfaction and self-confidence in learning.

Inspired by Dobbs et al. (2006) and Smith and Roehrs (2009), five research questions were asked:

1. What is the learning outcome of knowledge when incorporating an HFS experience in the teaching–learning process?

Depending on the different roles in the simulation group (nurse, physician, family member or observer):

2. How satisfied are the nursing students with the HFS scenario experience?
3. What is the self-reported effect on self-confidence with the HFS scenario experience?
4. How do the bachelor nursing students evaluate the HFS scenario experience regarding how well the five simulation design characteristics were presented in the experience?
5. How do the bachelor nursing students evaluate the HFS scenario experience regarding how well the four educational practices were presented in the experience?

The results will add to the body of nursing knowledge on the use of HFS experiences among bachelor nursing students with little clinical experience who participate in different roles as members of simulation groups.

Background Literature

Simulation technology with HPS has been described and documented in the literature over many years (Issenberg et al., 1999; Feingold et al., 2004; Hyland and Hawkins, 2009).

Simulation is defined as "a teaching method that attempts to replicate some or nearly all of the essential aspects of a clinical situation so that the situation may be more readily understood and managed when it occurs for real in clinical practice" (Morton, 1996, p. 76). Fidelity refers to the extent whether the simulation scenario and the simulation surroundings are trustworthy and resemble a real-life situation (Maran and Glavin, 2003). The safe and risk-free simulation environment provides a unique modality to teach and train best practices and for evaluation and learning. The students can integrate theory and practice and develop skills in critical thinking through data analysis, decision making and problem solving without the fear of harming a patient, and they can develop communication and collaboration skills (Rauen, 2001; Jeffries, 2007). In a literature review, Rodgers (2007) stated that "learner feelings of self-confidence tend to be improved when the learning experience is simulation-based" (2007, p. 55).

The effectiveness of simulation as a tool for actively involving students in their learning progress towards programmatic goals has been demonstrated throughout the years (Nehring et al., 2002; Bremner et al., 2006; Jeffries, 2007). Bremner et al. (2006) presented several recommendations for best practices when using HPS, noted the importance of well-articulated learner outcomes for the HPS session, clear connection to course/clinical objectives and HPS session and debriefing session after each HPS experience.

Debriefing is a valuable tool when used with simulation (Rauen, 2001; Jeffries, 2005), and it immediately follows the simulation activity. The debriefing and reflective thinking are a "process in which people who have had an experience are led through a purposive discussion of that experience" (Lederman, 1992, p. 146). Through this process, the participants assess significant parts of the simulation and are encouraged to discover new understandings and add new knowledge to their practice (Lederman, 1992). With references to simulation literature published since 1999, Jeffries (2005) stated that the debriefing session allows the participants to link theory to practice and research, develop critical thinking, and discuss how to intervene professionally in simulated clinical situations. Doerr and Murray (2008) emphasised the importance of beginning the debriefing session with positive reinforcement and finding "something positive that each participant did very well" (Doerr and Murray, 2008, p. 783). Steinwachs (1992) described how to facilitate a debriefing through three phases: the description phase, analysis/analogy phase and application phase. In the description phase, the participants first have the chance to air their impressions and feelings from the simulated experience, before they describe what happened during the scenario. In the analysis/analogy phase, the participants systematically examine the scenario. It may be helpful to watch video recordings from different sequences of the simulation to identify and explore parallels with real-world situations. In the application phase, the participants consider relevant aspects and their understandings of the scenario and which courses of action they wish to include in their own future clinical practice, with focus on the best practice.

To increase attention to learning, HFS takes advantage of drama pedagogy and theatre science. Bolton (1984) stated that the interaction between thought, emotion and actions is fundamental for drama pedagogy, which is essential for human insight and development. Using theatre as an analogy for HFS, Roberts and Greene (2010) emphasised the importance of pedagogy rather than technology. Students, playing the nurse role in a simulated scenario, "must improvise and base their actions on prior learning and experience" (Roberts and Greene, 2010, p. 2) while acting out their role in front of an audience consisting of peers as observers. The observers are not regarded as passive recipients of the performance. By being fully engaged in the scenario through observations, they actively seek to understand and learn from the students playing the nurse role.

Roberts (2010) highlighted the emerging body of literature asserting that students are able to learn from each other's experiences. This learning is known as vicarious learning.

Fox (2003) describes vicarious learning as the use of human imagination, which allows one to learn through the experiences of another. The imagination can be activated if there are no opportunities for personal experience. Vicarious learning is characterised by active listening and reflective thinking (Nehls, 1995).

The simulation literature asserts that participation in HFS is a useful tool in nursing education to develop practical, communication and collaboration skills. As observers of HFS, the context has the potential to foster vicarious learning. Both methods of learning may bridge the gap between theory and practice and contribute to the development of skills in reflective and critical thinking.

Methods

Study Design

The studies had a quasi-experimental design, and learning and attitudes towards simulation were evaluated using HFS as an intervention. HFS was performed in the second year of a nursing programme at a university in the southern part of Norway.

Participants

The students performed their first eight-week period of clinical practice at a nursing home in the first year of the nursing programme. In the remaining four clinical periods during the second and third years of the study, the students followed a rotation plan with four major focuses: medical, surgical, psychiatry and community health services. The students were randomly divided into the clinical rotations by the study coordinator. Due to resource limitations in 2009, approximately half of the total number of nursing students ($n = 104$) in the second year of the study had the opportunity to perform the simulation. Students assigned to hospital-based medical and surgical clinical practice in their second period were asked to participate. A total of 57