How to Use Simulation as a Learning Method in Bachelor and Postgraduate/ Master Education of Nurses and Teachers in Healthcare

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1 Introduction

The World Health Organization has stated that health education institutions should use simulation in the education of health professionals [1]. The 2018 report *Simulation in Nursing and Midwifery Education* emphasizes that "evidence from multiple studies shows that simulation is a highly valuable strategy for training nurses and midwives" [2]. Simulation has been utilized increasingly often as a teaching strategy in nursing education programmes. Pamela Jeffries defined simulation as "activities that mimic the reality of a clinical environment and are designed to demonstrate procedures, decision making, and critical thinking through techniques such as role-playing and the use of devices such as interactive videos or mannequins" [3].

Randomized controlled studies have been conducted to measure the learning effect of simulation as a didactic method [4, 5], and these studies support the use of simulation in the preparation of graduate nursing students. It has been shown that simulation, used as a pedagogical tool, prepares students for realistic situations [6–8]. Research also indicates that some parts of practical learning sessions can be replaced with simulation while achieving the same learning outcomes in relation to skills and knowledge [9]. Students are exposed to difficult situations during a simulation, which they may not have encountered in the clinical arena [10]. Reduced numbers of placements, and inconsistency in the quality and availability of learning

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I. Akselbo, I. Aune (eds.), *How Can we Use Simulation to Improve Competencies in Nursing?*, https://doi.org/10.1007/978-3-031-10399-5_2

experiences, have made learning in clinical studies more challenging [11]. When emergencies occur in the clinic, students are often not first in line to respond and thus do not gain sufficient experience in learning how to deal with these situations [6]. Simulation has the potential to complement learning in clinical and classroom settings and may therefore help students develop the required skills [10, 12–14]. Students should not enter real-life situations that they are not qualified to handle [15]. Simulation is considered a safe method of instruction for students learning to cope with unforeseen situations in relation to technical and non-technical skills and, thereby, improve management abilities [16].

There is a growing body of literature concerning the subject of simulation in nursing education, and several learning theories have been developed to determine if the use of simulation in nursing education results in successful action competence. Studies have utilized different theoretical frames of reference in this context, such as Kolb's experiential learning theory [17], Schön's reflection theory [18], Benner's theory of clinical imagination and relevance evaluation [19], and Bandura's social cognitive theory [20]. The selection of learning activities and didactic methods should be related to the learning outcomes that are the foundation of nursing education. Theories about reflection and experience can help describe how students accomplish learning when participating in situations that are imitations of clinical situations; in other words, simulations in which they will make decisions and exercise critical thinking [21].

When choosing learning methods in academia, one must plan activities that relate to the learning objectives. The bachelor of nursing program focuses on both theory and practice. One method that can be used to combine these two areas of learning is healthcare simulation; however, it is expensive and time-consuming [22, 23]. This dilemma necessitates justification for simulation as a learning method, as well as proof that simulation provides students with a more realistic approach in solving practical challenges than traditional teaching.

Careful preparation to facilitate psychosocial learning environments is a basic condition for a successful simulation. According to the International Nursing Association for Clinical Simulation and Learning [24], all simulation-based experiences begin with the development of measurable objectives designed to achieve expected outcomes. The description of learning outcomes in the program is often highly abstract and, thus, difficult to evaluate concretely. Therefore, objectives must be operationalized to give the simulation clear and measurable expectations [25]. These objectives are presented to the students before the simulation, along with the scenarios and schedule for implementation of the simulation training.

Certain prerequisites for simulations must be fulfilled for them to be perceived as good learning tools: professional and pedagogically skilled supervisors, students who are well prepared and motivated, suitable facilities with adapted equipment, and sufficient time [6]. Simulated practice of nursing assessment and patient management prior to a student's clinical nursing practicum is known to be a strong educational method when used in conjunction with other methods of teaching [26].

There are increasing demands and expectations that healthcare professionals provide safe and secure services. The campaign "In Safe Hands" aimed to reduce

unnecessary patient injuries in health services, contribute to the construction of long-term systems and infrastructure for patient safety, and improve patient safety culture in health services [27]. In the national education plan for bachelor of nursing programs in Norway, programs are required to include clinical practice [28]. Emergency preparedness involves competent health professionals, updated instructions, and procedures to be followed in serious situations. Students can acquire this experience via simulation in curricula-based theoretical sequences wherein the aim is to ensure patient safety and fulfil the requirements of professional healthcare services [29].

In this chapter, results from three different studies in Norway [6, 30, 31] about simulation as a learning method are presented and discussed alongside relevant pedagogical theory and other research.

2 Students' Experiences Related to the Use of Simulation

2.1 Simulation as an Educational Method

Students emphasize that simulation provides a higher degree of realism and seriousness than skills training. The simulations more accurately portray the severity of a situation and thus capture the students' full and immediate attention. Students state that they learn more from a simulation followed by debriefing than they do from an entire day of lectures [30, 31]. Students remember better and have better learning outcomes when they simulate what they are going to learn [32, 33].

> *I think it's easier when I can relate to a situation. Then I can think back to what happened, instead of just sitting and looking at a PowerPoint or in a book* [30].

The severity of a simulated scenario prompts the students to concentrate on the tasks at hand and inspires them to discuss their actions afterward. They express that the simulation gave them a better understanding of the physiological and communicative challenges in an emergency than either traditional lectures or training in large groups with fellow students [30]. This is in accordance with Akselbo et al. [6] and Cant and Cooper [26], who express that students feel more competent and able to cope with real-life emergencies following simulation. The students express that they learn something new about themselves in terms of how they behave and deal with situations (e.g., in relation to stress and communication). As a simulation takes place in a safe environment, making mistakes is not a matter of life or death. This sense of security gives the students the opportunity to practice and learn from their mistakes before applying their skills to real-life emergencies [30]. Therefore, students appreciate the opportunity to address an emergency in a controlled environment. The students' experience of stress should be a driver of learning, rather than an obstacle [34]. Theories of reflection, such as Schön's reflection theory, describe how students who participate in simulations of clinical situations can make decisions and exercise critical thinking [21]. Schön's theory may help explain precisely

what occurs during the debriefing and reflection processes. He introduced the concept of the reflective practitioner, which distinguishes between the reflection that happens during the act and the critical reflection that occurs after the act [35]. When the students are in an unfamiliar situation, such as a new simulated scenario, the actions appropriate to the scenario require knowledge that they have not yet. They are forced to rely on the competence and knowledge they possessed prior to the start of the simulation. This leads to what Schön terms "reflection-in-action." During the debriefing, in which the students reflect on the actions they took to solve the problem in the simulated scenario, further knowledge is developed. Schön terms this process "reflection-on-action" and claims that such reflection enables one to bridge the gap between theory and practice. The ability to reflect in action during simulation is a key factor in ensuring the best possible patient care in an emergency [35].

2.2 The Significance of the Briefing

Students point out that the information provided by their teachers prior to a simulation contributed to more knowledge and confidence in the simulation itself. The teachers' commitment and positivity were transmitted to the students [31]. The students report that they were worried before the simulation, but with information and time for questions, the worry was lessened. This was expressed as follows by a student:

> *We prepared for what the simulation was. The teacher made us reflect on the theme of the case. She worked to ensure that everyone understood what simulation was, and that different emotions could arise* [31].

Public health nursing students highlight that if simulation is to be perceived as a good learning tool, there are some prerequisites that must be fulfilled. For instance, instructors must be committed not only to facilitate a set of resources but also to create a complete environment for learning [6]. Gibson [36] introduced the concept of "affordance," which elaborates the relationship between the design of learning environments and how the design supports the learning experience.

2.3 Communication and Actions During the Simulation

Communication and interaction are important factors in nursing practice [37]. International research on professional education shows that simulations have great potential for developing professional communication skills [38]. Students feel that simulation is an educational method in which they experience realistic feelings and stress in an acute situation. They recognize the importance of having a leader who communicates with all participants. Students highlight that good communication in an emergency is important to make the right decisions. They also state that poor communication makes the situation difficult to follow, leading them to become insecure and almost unable to act. Students have learned that the ability to communicate well is tested in critical situations because of the stress involved, and they have

learned how they respond to stress as an individual in a safe environment. After the simulation, they feel greater security, action competence, and coping ability for real-life situations:

> *We got to know this stress you can get in such situations and how hard it can be to keep your head cold, give clear messages, and have a clear leader* [6].

Effective communication and collaboration are essential components of nursing, and simulation can be a useful teaching strategy to improve these skills. The more often such simulations occur, the greater the progress is likely to be [37]. Students report that they become more aware of their own behavior when meeting other people. After the simulation, they reflect on their own communication skills, such as the use of pauses in a conversation, how to ask good questions, active listening, body language, non-verbal communication, empathy, and how to capture the patient's attention. Students make it clear that communication skills are crucial for doing a good job. To develop as a professional, it is important that students receive practice in communication [31]. Students learn that good communication is important in an emergency to make the right decisions [6]. The curriculum learning outcomes in nursing are largely related to communication and interaction. Effective communication and collaboration are essential components of nursing, and simulation can be a useful teaching strategy to improve these skills [37].

2.4 Preparedness for Later Practice

Aside from practice, students perceive simulation to be one of the most effective ways of preparing themselves for the nursing profession. Students acknowledge the usefulness of acting out an emergency, noting that it helps them feel like their body is equipped to cope with stress and that they know what to do [30].

> *You remember better, it is a bit limited what you remember from the curriculum books all the time. Especially a book that has a lot of text. So, it's kind of … such situations are remembered better later* [30].

Students emphasize that simulations prepare them to handle real emergencies. When emergencies occur in clinical practice, it is unlikely that students will be first in line to handle them. The debriefing is important for initiating discussion of serious situations that may be encountered and how to deal with them:

> *Simulation awakes more processes and thoughts in us and prepares us better than if we had read this in a book* [6].

2.5 Stress and Leadership

Students find the video recording of the simulated scenario uncomfortable but recognize the learning outcomes associated with it [30]. Students also identify challenges by having a group that observes the scenario [6]. At the same time, they learn

a lot from being part of the observing group themselves. Standing outside of such a situation creates positive learning outcomes regarding the observation of strengths and weaknesses in the actions taken. They discover the importance of cooperation in stressful situations to avoid misunderstandings that may lead to serious treatment failure [6]. In this way, the facilitator must be aware that students may feel stress and anxiety when performing in front of others, either in role play, during the conversation afterward, or via video clips [39]. Studies show that this becomes worse when more fellow students are involved [40].

In the simulated emergency, the student plays the role of the nurse and is therefore responsible for making the right decisions and acting reasonably. In this situation, students experience both physical and mental stress. They note that this experience allows them to understand how a real-life emergency would feel [30].

Prior to the simulation, students are uncertain and nervous. They note that they expend a lot of energy due to physical and mental stress. They comment that the simulation causes them to read more than usual and that afterwards, the simulation was not as scary as many had thought it would be. Some students indicate that the stress they feel during the simulation makes it difficult to manage the situation. A lack of knowledge of the situation and anxiety about managing other students sometimes keeps them from taking the lead [30].

> *It surprised me to watch the video and know how stressed you were in your head and then it didn't show. And you still manage to do all you need to do. One feels that one manages to perform even if one is stressed* [30].

Students feel that experiencing physical stress (e.g., a higher pulse and increased sweating) helps them better remember the skills learned in the simulation. They also feel that the situation is chaotic at times because everyone (or sometimes no one) takes the lead but that it is instructive to discuss management in the debriefing (e.g., what makes you a good leader and how to help each other succeed and communicate effectively). Although the video recording is stressful for some, others appreciate that the respondents are not sitting in the same room but rather following the simulation through streaming video. However, during the scenario, the students tend to forget about the video recording and concentrate on the tasks [30]. Taking leadership in emergencies requires the nurse to rapidly analyze a complex environment. The nurse must assess where and what sort of help is required and be able to communicate effectively to deliver that help [41]. Students express high levels of stress, both before and during the simulation, due to low self-confidence from lack of knowledge and experience with emergencies. They express a desire for a greater number of simulation opportunities throughout their education, as they feel this learning method will help ease their stress and produce positive learning outcomes [30]. Indeed, low self-confidence is associated with high levels of anxiety and delay in implementing expected actions, as well as increased errors [42]. The competence gained through simulation (e.g., knowing what is going to happen and how) helps raise student confidence and reduce stress levels [43]. Repeated simulation experiences increase students' self-confidence levels [42], and the more students work in situations requiring critical thinking, the greater their ability to refine and build on

their performance strategies [44]. Gaining emergency experience in a controlled environment is important for feeling autonomous and improving confidence [45–47].

Nursing students feel that simulation is an educational method where they get to experience the feelings of stress brought on by a realistic emergency. Simulations place students in new and unexpected situations. As with situations in clinical practice, it is necessary to be calm in the midst of action, which requires that the individual intuitively knows what to do (knowledge-in-action). Nursing students feel they must act without having complete control over the situation. Therefore, this is considered knowledge-in-action according to Schön [35].

2.6 The Significance of the Debriefing Process

Students believe that debriefing is effective for clarifying the whole course of events, since the situation during the simulation may be chaotic and difficult to follow. By reviewing the simulation, awareness of their actions increases and concerns topics such as what could be done differently, what was done well, communication, interaction, and priorities. Students experience learning by describing the course of the events themselves and obtaining feedback from other students to reveal the gaps in their knowledge [6].

> *We have made mistakes without hurting human beings, and we have reflected on both mistakes and strengths in our actions. This is the lesson we remember for a long time* [6].

Schön distinguishes between reflection-in-action and critical reflection after the action is performed. By reflecting on what solved the problem, new knowledge is developed (reflection-of-action). The reflection occurs in debriefing after the scenario. However, critical reflection occurs if the chosen solution is problematized, the action is explained, and there is an awareness of the motives behind the decisions. In an unexpected situation, one must make decisions based on new information and think quickly through several alternative actions to execute the most appropriate decision [35]. This is what happens in the debriefing phase, where nursing students are challenged to reflect on their actions and to provide professional clarification. If they are not content with their actions, they are encouraged to think about alternative solutions [6]. During the analysis phase of the debriefing stage, the facilitator can use his/her expertise to conceptualize the communication [48]. Debriefing, involving reflection and feedback from both the teacher and other students, is important for the students. Being able to discuss the simulation and highlight effective actions means that the students experience a broader and deeper understanding of the event. The students also recognize the gaps in their own knowledge and can discuss with their teacher how to obtain the knowledge they feel they are lacking [6, 30]. Students feel that the facilitator has a significant role in leading the conversation after the scenario. Students value that the facilitator is engaged, provides confidence, and asks clear questions and challenges reflection [31].

She asked many good questions that made me reflect on the different situations during the simulation, and we were forced to put it into words [31].

Students emphasize the usefulness of co-learning. They highlight the importance and value of dialogue and reflection in relation to one's own learning and development. It is emphasized that fellow students give good reflective feedback. Students learn from each other by putting into words what they would have done in the same situation [31]. According to Lave and Wenger [49], knowledge is rooted in specific situations, and learning takes place in a social community where individuals learn from each other.

3 Conclusion

Simulation provides a higher degree of realism and seriousness than skills training. It is an educational method providing a realistic scenario in which students experience feelings and stress similar to what they would experience in a real emergency. Simulation is perceived to be one of the most effective ways of preparing for the profession of nursing. During the debriefing process, students become aware of why they handled the situation the way they did, what could be done differently, and what was done well, in addition to learning communication, interaction, and priority management. Feedback from other students and the teacher helps reveal students' gaps in knowledge.

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