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Training with Simulation in Nursing Care

This article explores whether simulation could be a valuable tool for addressing the shortage of nurses in the healthcare sector and how it can provide realistic and safe learning environments for nursing students and professionals to practice their skills, gain confidence, and receive feedback.

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key points

- Simulation-based learning is a pedagogical approach that allows students to practice work-related skills in a safe setting and to gain confidence in their performance.
- It involves careful planning, selection and design of realistic scenarios and feedback mechanisms.
- It is not a replacement for traditional instruction but a complementary tool that can enhance learning outcomes.
- Simulation-based learning does not primarily depend on the level of realism or fidelity of the simulation but on the alignment of the learning objectives and the simulation design.
- It also requires a shift from teacher-centred to learner-centred education, where the teacher acts as a facilitator rather than a transmitter of knowledge.
- Simulation-based learning is a relatively new field in nursing education, but it has great potential to improve the quality of nursing care and to motivate and accelerate the learning process of new staff.
- It can also empower patients and their relatives to cope better with their health conditions.

Is There a Way to Improve Nursing Outcomes and Reduce Nursing Staff Shortages?

Nursing in Germany and Europe faces major challenges. The demand for qualified nursing care is steadily increasing as the population ages, and more and more people suffer from chronic diseases. At the same time, the length of stay of patients in hospitals has decreased, which increases the demands on nursing care. Professional nursing care is becoming more complex and requires high professional competence and flexibility. In addition, the diversity of nursing staff in the healthcare system is increasing, which requires intercultural competence and communication.

The rapidly increasing shortage of nursing staff requires different approaches and concepts to reduce the current and future demand with quality assurance. The following three levers can be effective here:

- Recruiting suitable personnel
- Developing technological products to support and assist
- Improving the processes in the healthcare system

Therefore, this article will pursue the following questions: Could simulation be a valuable tool for addressing the shortage of nurses in the healthcare sector? How can simulation provide realistic and safe learning environments for nursing students and professionals where they can practice their skills, gain confidence, and receive feedback?

Definition and Types of Simulation

Simulation is a technique that uses realistic scenarios and equipment to mimic the real-world conditions and challenges people face. The kind of simulation or simulator depends on the previously defined goals

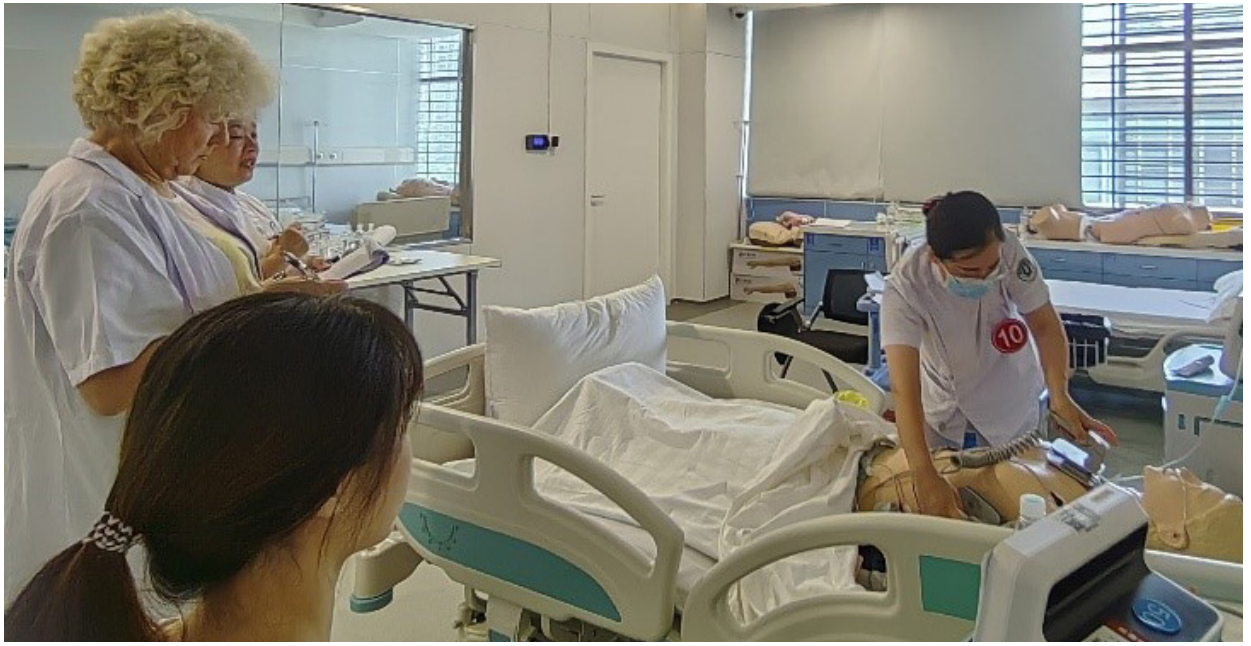

Figure 1: OSCE with manikin in a realistic patient environment and SP in the role of relative

and competencies the learners should achieve. According to Miller (Framework of Clinical Assessment), the learning pyramid is used for this purpose- the higher the desired level of competence, the more realistic it should be (Waxman 2010).

Low-Fidelity Simulation

Low-fidelity (Lo-Fi) simulation is used to build knowledge. The simulations in this category will feel the least real to the learner. These can include static models and two-dimensional displays. These can also be task trainers designed for specific tasks or procedures such as IV arms or cardiopulmonary resuscitation manikins.

What is the purpose of low fidelity?

Lo-Fi prototyping is a quick and easy way to translate high-level design concepts into tangible and testable artefacts. The first and most important role of lo-fi prototypes is to check and test functionality rather than the visual appearance of the product.

What are the disadvantages of LoFi?

The downsides of low-fidelity prototypes are that they have limited interactivity, lack realism, are hard to use for user feedback, are sometimes too basic to reflect the user experience of the finished product, and can oversimplify complex issues.

High-Fidelity Simulation

High-fidelity (Hi-Fi) simulation is a healthcare education methodology that involves the use of sophisticated life-like manikins in realistic patient environments (types of simulation). The top used scenarios in Hi-Fi simulations are:

- Hypo and hyperglycaemia
- Deteriorating patient
- Respiratory: distress, arrest, and pulmonary embolism
- End of Life: the dying patient
- Cardiovascular: myocardial infarction and cardiac arrest
- Sepsis and multiple organ dysfunction syndrome
- Fluid volume deficit: electrolyte imbalance of geriatric patients
- Congestive heart failure exacerbation
- Shock: anaphylactic, cardiogenic, neurogenic

Standardised Patients

Standardised patients (SPs) are used for exams like OSCE. They follow strict and uniform guidelines to ensure consistency for trainees. This includes opening statements, answers and emotions (ASPE 2018). For communication training, SPs are more flexible and interactive. They can use their own

Advantages of Virtual Reality	Disadvantages of Virtual Reality
Location: Not limited by geographic location **Time:** Allows for synchronous and asynchronous learning	**Possible cognitive overload** Depending on the conception/implementation of the learning unit, the impressions in VR can be overwhelming for participants
Accessibility: Users can practice in VR from anywhere	**Simulator Sickness** Some VR participants report nausea, dizziness and disorientation
Personnel: VR simulation is less human resource-intensive	
Assessment: Allows for a unique first-person perspective in assessments **Software:** VR software can be updated and changed easily	**No uniform standards** There are currently no uniform standards Once you've decided on one system, you can't easily switch to another
Diversity: VR allows for diversity in the simulated environment	**Confinedness of the glasses** Some participants stumble or fall because they are no longer aware of the reality around them or they are confused by the VR
Learning Environment: Environment, equipment and ergonomics can be customised	

Table 1: Pros and Cons of Virtual Reality

biography and improvise. They also give feedback to trainees after the training (Schlegel 2015).

AR/VR-Simulation

Augmented reality (AR) adds virtual content to the real world. Users see the virtual elements as part of the real space. AR can also use other senses besides vision. Virtual reality (VR) creates a simulated experience that can be similar or different from reality. VR helps users empathise with others and understand their conditions, such as Alzheimer's.

Gamified Simulation

A gamified simulation is a learning method that combines elements of games and simulations to increase the motivation, engagement and feedback of the learners. In nursing education, a gamified simulation can help improve the clinical skills, critical thinking and decision-making of the students. A gamified simulation in healthcare can take various forms, such as virtual patients, interactive scenarios or digital games. The key dimensions of educational games are explained in Table 2.

Advantages and Chances of Simulation

Simulation is a technique that mimics real-life scenarios using tools and technologies. It has many benefits and opportunities for nursing and patient education. For example:

- **Improved patient safety:** to reduce the risk of medical errors and improve patient outcomes.
- **Enhanced training:** provides healthcare professionals with a safe and controlled environment to practice their skills, gain experience, and improve their confidence and competence.
- **Cost-effective:** simulation can be a cost-effective way to train healthcare. professionals, as it eliminates the need for expensive equipment and supplies.
- **Research opportunities:** to be used to research new treatments, procedures, and technologies.
- **Improved communication:** helps healthcare professionals to improve their communication skills and to improve teamwork and collaboration among healthcare professionals.

Simulation in patient education is another area

KIND OF DIMENSION	DESCRIPTION
Fantasy	This dimension includes the environment, the plot and the characters that appear. Fantasy allows players to see things from different perspectives, adopt different roles, and identify with fictional characters **Rules and objectives of the game** Clarity of the rules and feedback regarding the progress made towards achieving the goal are important characteristics of didactically meaningful games
Sensory Stimuli	This describes visual and auditory stimuli that are part of the game. Initially, they enable or intensify the interactivity of a game A high degree of interactivity is important for success
Challenges and Risks	Challenge is related to risk. The goal is an optimal level of difficulty, which can be individually adjusted for each player
Curiosity	Curiosity arises when things are new or initially inexplicable, or when unexpected effects occur. Again, this is best accomplished through different levels that a player can reach
Control	Learners should have an active role, which requires exercising control

Table 2: Key Dimensions of Educational Games

where it has several advantages. Here are some:

- **Improved patient outcomes:** helps patients to better understand their medical conditions and treatments.
- **Increased patient engagement:** helps patients to become more engaged in their own care.
- **Reduced anxiety:** helps patients to become more familiar with medical procedures and treatments, which can reduce anxiety and stress.
- **Improved patient satisfaction:** helps patients to feel more confident.

Challenges and Limitations

The cons of HiFi are the acquisition and maintenance costs and the inflexibility to change. Additionally, it is necessary to teach the facilitators and teachers and adapt their qualification profiles. The students often feel overconfident after the HiFi training, which could be an emerging risk in applying into practice.

Examples of Best Practices of Simulation Design

To prepare for simulation training, you need to do a needs analysis, plan the learning objectives and outcomes, design the simulation format and case, and choose the appropriate realism level. The simulation consists of prebriefing, simulation, and debriefing/feedback. The moderator guides the student and evaluates the performance. The student also reflects on their own learning (INACSL Healthcare simulation).

New Roles for Teachers and Mentors

Simulation training needs a skilled teacher/moderator who can facilitate learning, not just give information. The teacher/moderator should be trained in simulation moderation and help the participants reflect on their simulation experience. The teacher/moderator should ask questions in the debriefing, such as:

- Why did you act that way?
- What other options did you have?
- How can you do better next time?
- What difficulties did you encounter?

Enough Theory - Let's Start with Examples

Recruiting, Onboarding, New Jobs and Reintegration of Healthcare Professionals

Simulation is a useful tool for assessing and improving candidates' skills, knowledge and attitudes in a standardised way. It also helps them to adapt to new situations by trying different options and outcomes in a safe and fun environment. Simulation enhances learners' engagement, motivation

Phase	Purpose	Process	Example Script
Fantasy	Prepare students for simulation Set the tone	Provide info on the format Provide observation guide Review preceptor report	"Today, you will invite the standardised patient into the conference room at 6:00. You will have 15 minutes to complete..."
Debrief: React	Encourage participation/build rapport Allow learners to clear the air and save face	Use Delta-Plus process1 with two questions to examine what worked and areas for improvement	"What went well?" "What would you do differently?"
Debrief: Understand	Uncover the ideas, thought processes and other factors that lead to a behaviour (student 'frames') Help the learner find ways to improve performance	Advocacy-Inquiry 1. Observe an event or result 2. Comment on the Observation. Advocate for your position 3. Explore the drivers behind students' thinking (their 'frames'*) and actions that they think lead to the observed event or result 4. Discover, with the students, ways to attend to issues that arose and ways to replicate positive results	5. You notice that the patient seemed to disengage when the team started listing their recommendations 6. "I noticed that Mr. Moorhouse crossed his arms and didn't respond to many of the recommendations you suggested. To me, he seemed disengaged". 7. "What do you think was happening to him?" "Do you think he disengaged?" "What was happening that contributed to this result?" 8. "I agree that it's important to be clear about what the team recommends. I wonder how your team could approach recommendations to engage Mr. Moorhouse and to ensure clarity?"
Wrap-Up	Invite reflection on the experiences as a whole - solidify learning	Inquire about how students feel about the simulation as a whole and what learning they will take away	"How are you feeling about the scenario now?" "What's the biggest thing you'll take away from the simulation?"

Table 3: Debriefing using the advocacy-inquiry Method, adapted from the University of Alberta, Health Science Council 2007. Plus/Delta is a retrospective technique that challenges teams to use recent work to shape future processes.2 Frames are in the mind of the student and facilitator. They include assumptions, feelings, goals, knowledge base, situational awareness and context.

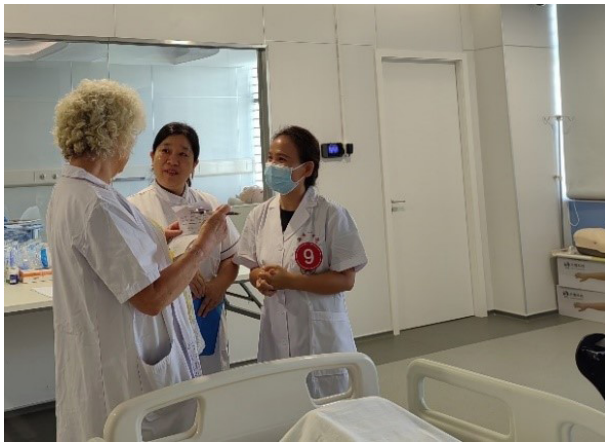

Figure 2: Debriefing with a student after simulation

and confidence and supports team collaboration and communication.

Compliance, Health and Safety Training

Simulation, especially gamified, boosts engagement and results in health and safety training. This topic needs regular instruction, but staff usually show low interest and perform poorly (Corporate eLearning Industry).

Theory/Practical Transfer/Circulation

Compared to traditional education and well-known simulation, there are more tools in gamified simulation that you should have a closer look at. For example, gamification for quizzes and feedback. Rolling out gamified quizzes is a great way to test your employees' skills and collect feedback through surveys. Also, gamification can create rewards and leaderboards to motivate employees to engage in training. Another very positive way is effective storytelling. Gamification can create engaging stories that help learners better understand and retain information and use them in their daily routines.

Gamified simulation offers helpful tools in addition to traditional education and simulation. For example, you can use gamification for quizzes, feedback, rewards, leaderboards and storytelling. These tools can help you test, motivate and teach your employees effectively.

Education Patient/Relatives

Simulation can educate patients and relatives, increase their motivation, promote interaction and empower them. Many start-ups have created tools for chronic and mental illnesses. For example, VR can treat phobias and post-traumatic stress disorder (PTSD) by exposing patients to fear in controlled doses (HealthCare-Technology).

Conclusion

Simulation can enhance nursing education and practice by offering realistic and safe scenarios. Simulation can improve nursing skills, confidence, feedback, competence, and performance. Simulation can also lower the risk of errors and adverse events, which can harm patient safety and quality of care. Simulation can also promote intercultural competence and communication, which are vital for working in diverse teams and settings. Thus, simulation can support nursing care development in Germany and Europe, address the healthcare system challenges and have a positive effect on reducing the shortage of nursing staff.

Conflict of Interest

None. ■

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