

Case study

Integrating Simulation into Nursing Curriculum



Fulda University of Applied Sciences

Fulda, Germany

By: Ellen Thomseth, Laerdal Medical

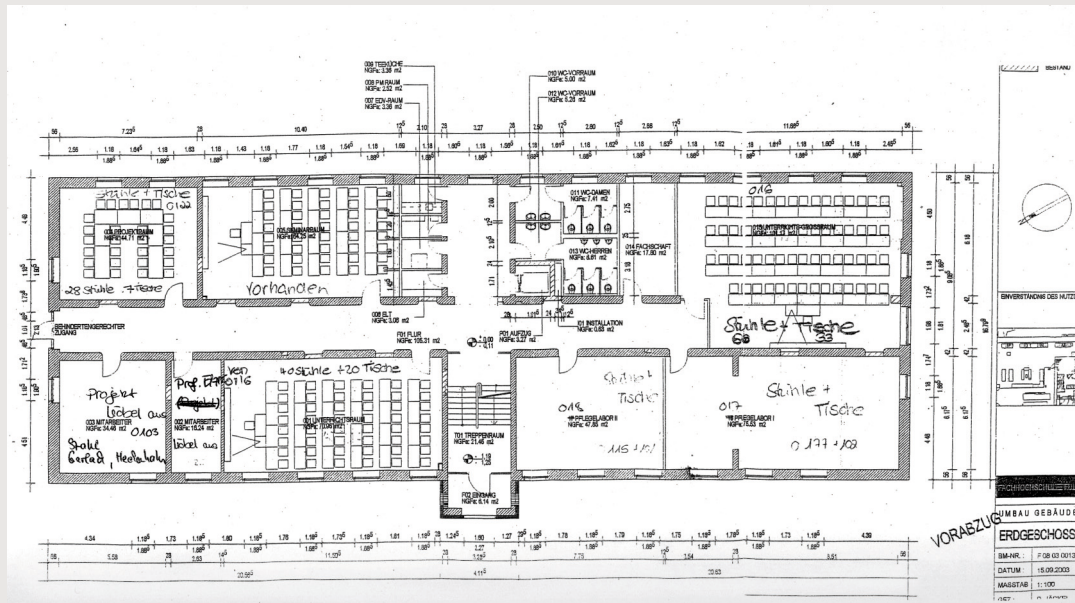
This case study is one, in a series of three, describing various aspects of simulation training integrated into nursing curriculum. The document was developed in collaboration with and approved by Fulda University of Applied Sciences.

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FULDA UNIVERSITY OF APPLIED SCIENCES IN SHORT

Fulda University of Applied Sciences (Hochschule Fulda) established the Department of Nursing and Health Sciences in 1994. The Department offers Bachelor Degree programs in Nursing and Physiotherapy and Master Degree programs such as Nursing Management, Healthcare Management, and Health Promotion. The Department seeks to contribute to improved healthcare education by pioneering the academic training of nurses and health professionals. Having experienced the benefits of simulation training, Fulda aims to move forward by extending this training in the future.

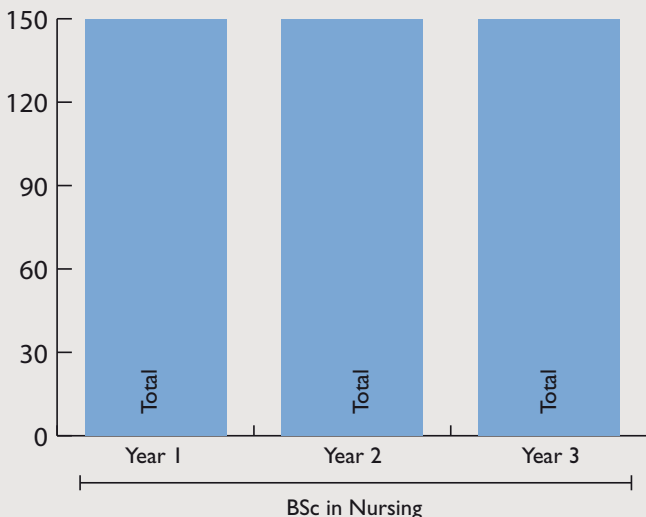
Floor plan



Simulation activities

Skill trainers are applied to learn and practice defined skills sets and full size manikins to translate and refine obtained knowledge and skills into clinical settings. Students (peers) are employed to portray patients when this is found more practical than using manikins.

Time allocated to simulation training (hours)



PREFACE

Fulda University of Applied Sciences (Hochschule Fulda)¹ has been facilitating basic skills acquisition and interactive simulation training since 1994. This case study provides insights into why and how simulation was integrated with the nursing curriculum, experience gained so far, and the future prospects for simulation training at this university.

WHY SIMULATION WAS INTEGRATED

Patient safety: Simulation training is seen as an important part of the educational program as students are able to practice in a safe and protected environment before they see real patients during clinical placement. In order to carry out clinical teaching responsibilities in the presence of patients, German law requires that nurse educators are employed by the hospitals where the placements take place. This works well for vocational nursing schools, because the nurse educators from these schools are employed by the hospitals owning them. Nurse educators from the universities are also allowed to supervise students in placement, however not with patients present. Hence, nursing students from the universities (Bachelor level) are not entitled clinical training of equal quality as compared with students from vocational nursing schools. Nurse educators at Fulda University recognize however that simulation training, to a certain extent, compensates for the guidance they cannot provide for the students during clinical placement.

HOW THE PROCESS EVOLVED

The clinical preceptor visited other teaching institutions to learn more about simulation before she started organizing the first clinical Skills Lab at Fulda University in 1994. The university provided the necessary funding to get started.

FINANCIAL MODEL

Fulda University Department of Nursing and Health Sciences provides funding for the Skill Labs. The amounts have so far been allocated at infrequent intervals and also varied in size, which have made long term planning more difficult for faculty. Now that the university no longer requires student tuition fees, there is some worry that the lower budgets will have a negative impact on future funding.

As a once off opportunity in connection with the ongoing world economic crisis, the Central Government recently allocated substantial funding to boost education in all the federal states. Fulda University is hopeful that Hessen Ministry of Education will allocate a principal portion of these funds to Nursing Education, and that the simulation program in turn will benefit from these assets.

ORGANIZATIONAL MODEL

The simulation program is fully integrated with Fulda University of Applied Sciences and answers to the Department of Nursing and Health Sciences. The Skill Labs are headed by a Lab Engineer who administers the training sessions and also acts as instructor. Two other faculty members facilitate simulations as well, with assistance from a group of external lecturers who contribute as instructors on a yearly basis.

Staff competency levels

The main instructors have a professional background in nursing although no formal instructor training. Master students in Nursing Management/Health Management and some 3rd and 4th semester nursing students help out as tutors.

Staffing

Administrator (Bachelor in Nursing Mgt.)

In-house instructors:

- 1 PhD Nurse Educator
- 1 PhD Nurse Scientist
- 1 Ma Nurse Scientist
- 1 Ma Nursing Mgt. student
- 1 Ma Health Mgt. student

External instructors:

- 1 Wound manager nurse
- 1 Diabetic counselor
- 1 Paramedic
- 2 Nurses

Facilities

The training facilities comprise two skill labs, each equipped with hospital beds, carts, and cupboards containing dressings and other care accessories.

Curriculum

One part of the curriculum is generic for all German universities and a second part is developed by each individual teaching institution. The Central Government allows the federal states to implement the German Nursing Act according to individual needs of healthcare and education. Hence, the individual states enjoy a high degree of flexibility and as a consequence, the nursing curriculum varies somewhat from state to state, albeit in accordance with the German Nursing Act. At a local level, the universities are then free to integrate simulation training with the nursing curriculum. When nurse educators at Fulda University develop simulation scenarios they ensure these are aligned with the overall curriculum approved by the Social Ministry in Hessen.

EDUCATIONAL ACTIVITIES

Fulda University has integrated all the different learning modalities reflected in The Circle of Learning (Figure 1), except computer simulations. The four learning modalities are mixed together throughout the 3-year Bachelor Degree: The **cognitive** part of the curriculum is acquired via lectures and literature and accompanied by subsequent **skill training** in the simulation labs. The next level is learning how to translate acquired knowledge and practical skills into a clinical context, and this takes place during instructor-led **simulation** scenarios. The simulations help students prepare for the clinical placements where they encounter real patients in real clinical environments. Students will in turn integrate the experience gained from the hospital wards into the continuing training that takes place at the university. This way the students can continually hone the skills and competencies they realize need refinement.

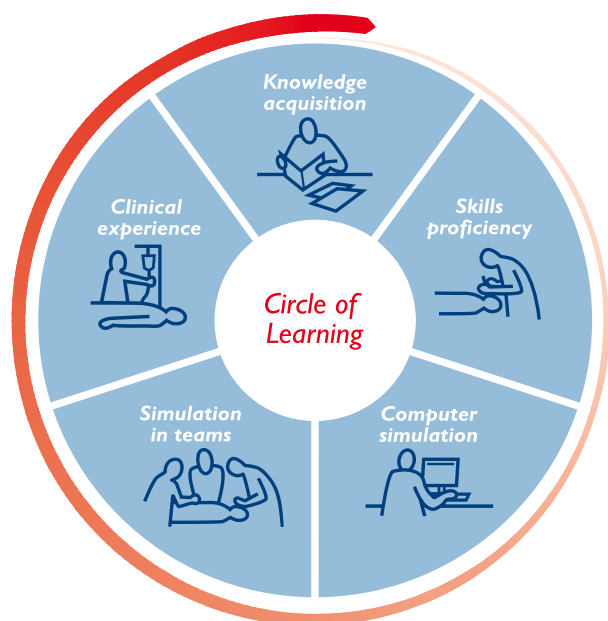


Figure 1. The Circle of Learning reflects the continuing process of attaining, enhancing, and maintaining clinical competencies.

METHODOLOGY

Simulation Training

Semesters 1 – 3

Knowledge acquisition takes place via lectures and literature and the students receive 150 hours of simulation training during this period. The training is adapted to the theoretical part of the curriculum. **Pertinent procedures** are initially demonstrated by the instructor and afterwards students practice these skills on skill trainers and full size manikins. The simulation training is conducted on **special teaching days**, where students either practice doing revolving stations in groups of five, or practice one selected procedure throughout the whole day. Advanced students supervise the less competent peers, and all students are encouraged to request extra instructor-led training at the skill labs. Scenarios are employed to have students practice translating the acquired knowledge and skills into a (simulated) clinical setting. Clinical placements take place in between.

Semester 4

Theoretical teaching coupled with simulation training continues.

Semester 5

Clinical placement with reflection sessions throughout the whole semester. No lectures take place.

Semester 6

Theoretical teaching coupled with simulation training continues. **Problem based learning:** To enhance the understanding of complex processes, students develop care plans, such as case studies with real patients in the community.

Most frequently trained skills

- Administering injections
- Bed care (washing, feeding, lifting, moving immobile patients)
- Cardiac rhythms (SR, VF, supra ventricular/ventricular extra systoles)
- Consciousness (various levels)
- Communication
- Fit anti-thrombosis stockings
- Foley catheter insertion and removal
- Nasogastric tube insertion
- Obtain vital signs (body temperature, HR, BP, RR)
- Postoperative patient care
- Resuscitation procedures
- Wound care (surgical dressings and chronic wounds)

Most frequently used scenarios

- Apoplexia
- Arrhythmia
- Myocardial infarction
- Pneumonia
- Respiratory arrest

Debriefing

Emphasis: Medium/high.

Debriefing is considered very important, and is compulsory during placement of the 5th semester. During training sessions, it is considered to be more of a medium importance.

Fulda University uses the term 'reflection' rather than 'debriefing', as they know it. Guidance is provided along the way during the training sessions and the time allocated for feedback afterwards is 5-15 minutes. The university does not make use of audio-visual recordings for their feedback sessions.

EXPERIENCE SO FAR

Faculty Reflections

- We can identify the weak students and take special precaution before they enter clinical placement.
- We can identify the good students. These can supervise other, weaker students. They do this themselves.
- Simulation takes place in a safe environment.
- The students learn so much more from doing procedures on manikins than having just theory.
- Students are afraid to encounter new situations in clinical practice, and the nurses don't have much time to show them. Having learned the skills beforehand increases their confidence.
- I would have preferred to have simulated when I was a student. Therefore I would recommend that every nursing school implements simulation.

Identified Challenges

- Teaching communication skills
- Obtaining sufficient realism
- Finding the time to write scenarios
- Providing a sufficient amount of simulation training
- To conduct sufficient training the following is needed:
 - Additional manikins
 - More equipment
 - A third skill lab
 - Alleviation of other tasks

Student Reflections

- It doesn't matter if you make mistakes in the simulation lab.
- Simulation training is important because learning the skills here helps us prepare for our hospital training.

TRAINING SOLUTION

The training equipment currently includes:

Manikins:

- 3 Adam-Rouilly nursing manikins
- 1 Laerdal Nursing Anne
- 2 Laerdal VitalSim *
- 1 Laerdal Resusci Baby
- 1 Laerdal Resusci Junior

Skill Trainers:

- 4 IV arms, tracheotomy trainer

* VitalSim simulates ECG, heart sounds, fetal heart sounds, breath sounds, bowel sounds, blood pressure and pulses.

SIMULATION ACTIVITY

Fulda University of Applied Sciences has altogether 105 students and they all perform simulation training. The students have altogether 150 hours of simulation training each year, including skill training and scenario based simulation training. The current training solution is not considered fully capable of meeting the training needs.

WHAT MAKES GOOD SIMULATION PROGRAMS

Issenberg et al² reviewed and synthesized existing evidence in educational science that addressed the question: What are the features and uses of high-fidelity medical simulations that lead to most effective learning? Issenberg argues, that the weight of the best available evidence suggests that high-fidelity medical simulations facilitate learning, when training is conducted under the "right conditions."

The right conditions include:

- Feedback is provided during the learning experience
- Learners engage in repetitive practice
- Simulation is integrated into the normal training schedule
- Learners practice with increasing levels of difficulty
- Simulation training is adapted to multiple learning strategies
- A wide variety of clinical conditions are provided
- Learning on the simulator occurs in a controlled environment
- Individualized learning and team learning are provided
- Learning outcomes are clearly defined
- Ensures the simulator is a valid learning tool

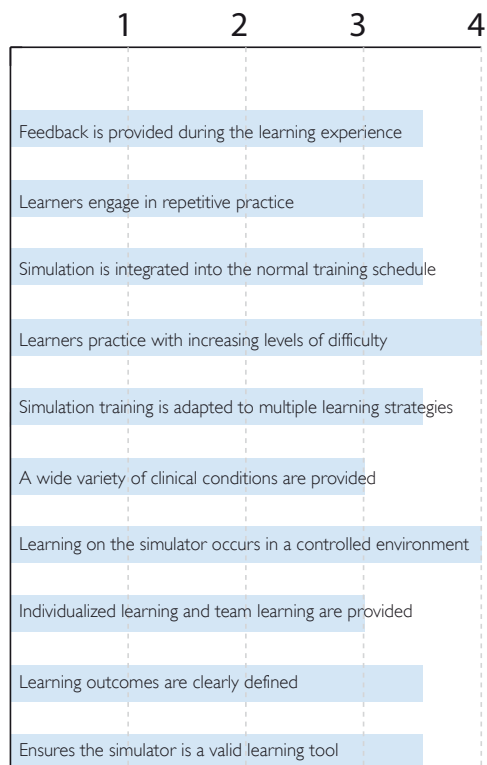


Figure 3. The bars indicate to which degree Fulda University of Applied Sciences delivers on each of the 'right conditions' as assessed by the university on a 4 - point Likert scale.

Fulda University further considers Controlled environment as the most important feature for their simulation based training, and that identifying a potentially least prominent feature is not really possible, as it is the combination of all the listed 'right conditions' that matters the most.

FIVE YEARS FROM NOW

- Students have more training days in the skill labs
- The labs look even more like hospital rooms
- A third skill lab is built (intensive care)
- A nurse educator teaching Critical Care is place
- Additional equipment is procured (SimMan 3G, Medical cart, CPAP training system)
- Students perform additional training on their own

RESEARCH ACTIVITY

Fulda University of Applied Sciences is planning a project on the use of simulation in teaching anatomy and physiology.

ARTICLE PENDING PUBLICATION:

Loewenhardt, C. Evaluation of simulation – how students learn from simulation training.

REFERENCES

1. Fulda University of Applied Sciences (Hochschule Fulda): [www.http://www.fh-fulda.de/](http://www.fh-fulda.de/)
2. Barry Issenberg et al. (2005) Features and uses of high fidelity medical simulations that lead to effective learning: a BEME systematic review, *Medical Teacher*, Vol. 27, NO.1, pp. 10-28.

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Case Study



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