

Case study

Integrating Simulation into Nursing Curriculum



Girona University

Girona, Spain

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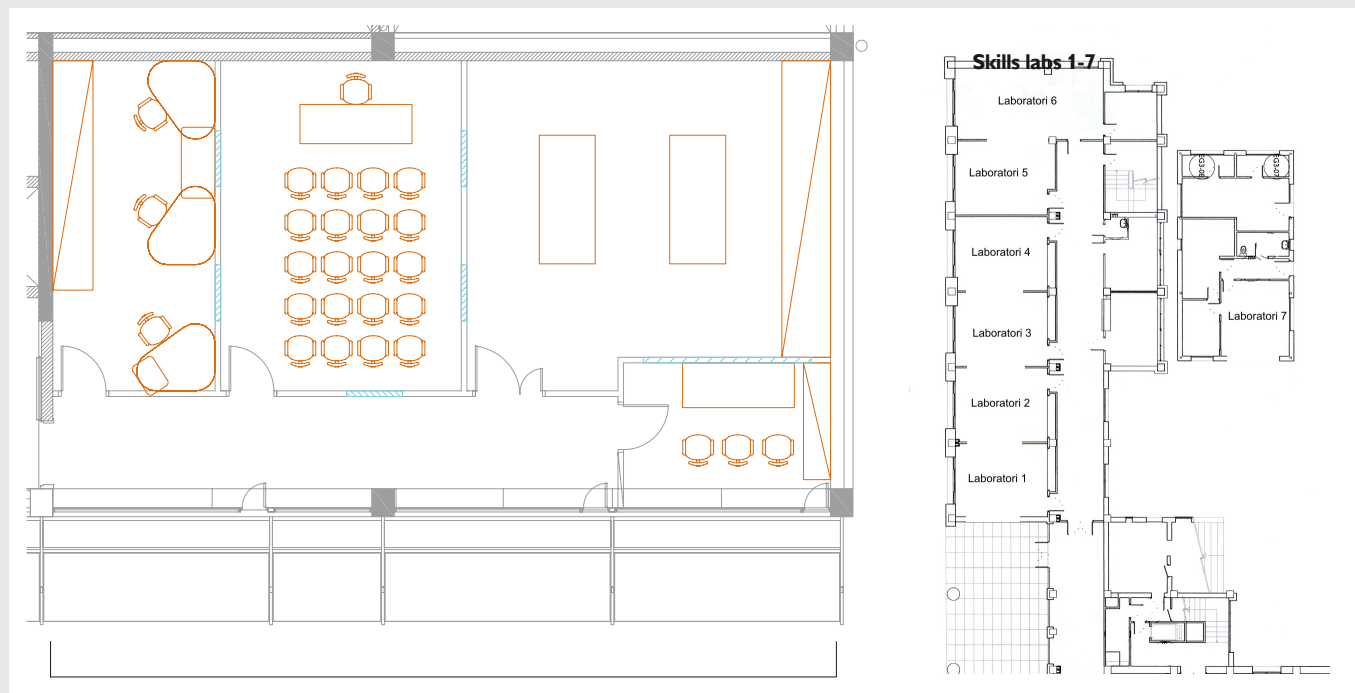
This case study is one, in a series of three, describing various aspects of simulation integrated into nursing curriculum. The document was developed in collaboration with, and approved by Girona University.

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GIRONA UNIVERSITY

Girona University is part of the Catalan public university system and is located in the city of Girona, on the northeast coast of Spain. The university has 14,000 students and offers courses within science, health sciences, social sciences, humanities and technical studies. In addition to having integrated simulation with pregraduate and postgraduate nursing programs, Girona also offers simulation training for healthcare professionals.

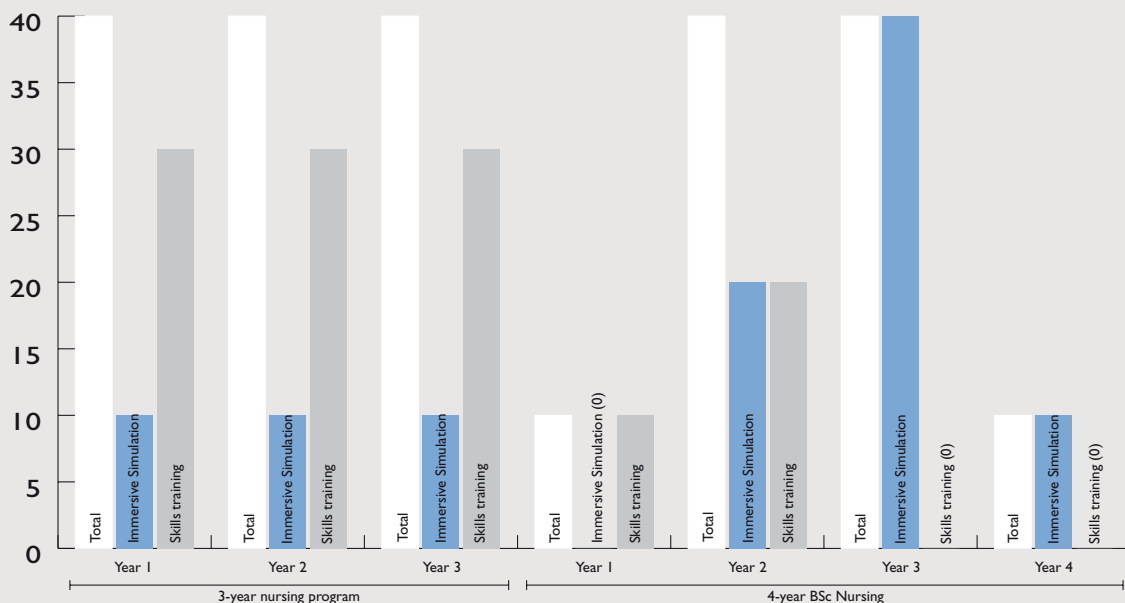
Floor plan



Simulation activities

Skill trainers are applied to learn and practice defined skill sets and full size manikins are used to translate and refine the obtained knowledge and skills into simulated clinical settings.

Time allocated to simulation training (hours)



PREFACE

Girona University¹ started basic skills training in the 1980s and a decade later full-scale event based simulations were in place. This case study provides insights into why and how Girona managed to make simulation training an integral part of the nursing curriculum, their achievements, and future prospects of simulation at the university.

WHY SIMULATION WAS IMPLEMENTED

Girona University was among the first schools in Spain to introduce skills training for nursing students. The incentives for advancing to fully immersive simulation were to prepare students better for clinical practice and to increase patient safety.

HOW THE PROCESS EVOLVED

Girona University expanded the simulation activities gradually. In 1992 the skills training was supplemented by intermediate simulation training, using basic and advanced life support manikins, and soon simulation was fully integrated with the nursing curriculum. Computer simulation was further introduced in 2002, and four years later the acquisition of an advanced human patient simulator enabled fully immersive simulation training at the university.

FINANCIAL MODEL

Undergraduate students

The university established a separate budget for simulation training as early as the 1980s, when skills training was originally integrated with the nursing curriculum. The current amount in this budget now averages € 18,000. Funding generated from research activity amounts to another € 30,000 per year. Thus, the simulation program for undergraduate nursing students administers altogether € 50,000 for daily management and investments on a yearly basis. Investments such as advanced, costly equipment and expanded training facilities still require long term planning.

Postgraduate students

Girona University provides a separate training budget of € 20,000 for postgraduate students who, incidentally, are required to perform more hours of simulation training than students at the bachelor level.

Healthcare professionals

Training for healthcare professionals (external participants) is delivered at cost price. This training is mostly paid for by the participants' employers, ie mostly hospitals. Individual healthcare professionals, who wish to enhance their personal clinical performance at their own expense, may however also sign up for training here. Quite a few nurses, physicians and general practitioners take advantage of this opportunity, partly because increased competence in turn may boost their professional careers.

ORGANIZATIONAL MODEL

The simulation program is fully integrated with Girona University and is headed by a full-time employed general manager who reports to the Director of Nursing. The general manager has a background in emergency nursing and also acts as instructor. Another six nurses facilitate fully immersive simulation training on a full-time basis in addition to six nurses and four physicians who work part-time, focusing emergency simulations. The skills training is organized by faculty from the respective departments at the university.

Staff competency levels

All instructors have a medical background. The main responsible is an ERC and AHA certified ACLS and BLS instructor; although no instructors have attended formal simulation instructor courses. As instructor training is regarded beneficial, the university will seek to obtain this competency in the future.

Staffing

- General Manager
- Administrative support from four different university departments

Instructors:

- 1 Emergency care nurse (General Manager)
- 6 Nurses (facilitate the full range of simulations on a full-time basis)
- 6 Nurses (facilitate emergency simulations on a part-time basis)
- 4 Physicians (facilitate emergency simulations on a part-time basis)

Facilities

The simulation facilities occupy altogether 240 sq meters in two separate buildings and comprise 2 full-scale simulation rooms, 7 skills labs, 1 separate room for BLS and ACLS training (with Resusci Anne Skills Station), an 80 sq meter classroom that may be divided into 4 smaller rooms for lectures and CPR training, and another 2 IT rooms with computers for self-directed learning. The simulation theaters have separate control- and debriefing rooms with audio-visual equipment and the skills labs are equipped with hospital beds, carts, care accessories, and a wide variety of manikins and skills trainers. Offices, board room, library and a student lounge are located in the main building. Underway: Girona University plans to set up a new building so the whole range of simulation activities can be gathered under one roof.



Figure 1. One of the seven skills labs.

Curriculum

Girona University develops their simulation scenarios in compliance with the Spanish national curriculum for nursing. The simulations are developed to focus selected learning objectives and are tailored to the students' various educational needs.

EDUCATIONAL ACTIVITIES

Up until recently the nursing program was a 3-year college course with a progressive amount of clinical practice. Due to the Bologna Process, however, Girona is currently transitioning into a 4-year BSc Nursing program, of which 50% clinical practice is compulsory.

To help nursing students attain a defined level of competence, Girona University has integrated all five learning modalities reflected in The Circle of Learning (Fig. 2). The students acquire the cognitive parts of the curriculum via lectures, literature, Moodle, microsimulation (using MicroSim by Laerdal and a self-directed interactive platform developed by Girona University). MicroSim has been integrated with problem based learning and students receive extra credits for passing MicroSim scenarios. The program encourages students to coach each other, which probably further enhances the learning outcomes. Subsequent **practical sessions** take place in the skills labs, where a defined curriculum is put to use. Later on the students are introduced to **fully immersive simulation training in teams**. The university has an agreement with six nearby hospitals and a number of other relevant public health institutions where students have recurring periods with **clinical practice**. Here, students are supervised by both hospital employees and faculty members who maintain their clinical proficiency by working part-time at hospitals. Unlike other universities, Girona has not experienced pressure for clinical placement, why replacing clinical practice with simulation has so far not been up for debate.

Evaluation: Students were earlier assessed by the level of skills they were able to demonstrate. Now they are instead graded by general competencies, which is also in accordance with the Bologna Process.

METHODOLOGY

Simulation Training

Preparation: Students prepare for the simulation training by attending subject related lectures, study literature, and by the use of interactive self-directed learning programs. Topics for upcoming scenarios are announced ahead. Members of faculty plan to use Moodle to introduce and prepare students for the simulation sessions.

Brief: Students spend 15-30 minutes in the simulation theater in order to familiarize themselves with the training equipment.

Simulation training: Groups of 10 students are divided into smaller groups of 3-4 who in turn work in teams. While one group of students is active simulating, their peers observe and learn from the ongoing action via a screen in the adjacent room. Each scenario lasts about 15 minutes and is repeated right after completion, but made somewhat more challenging the second time round.

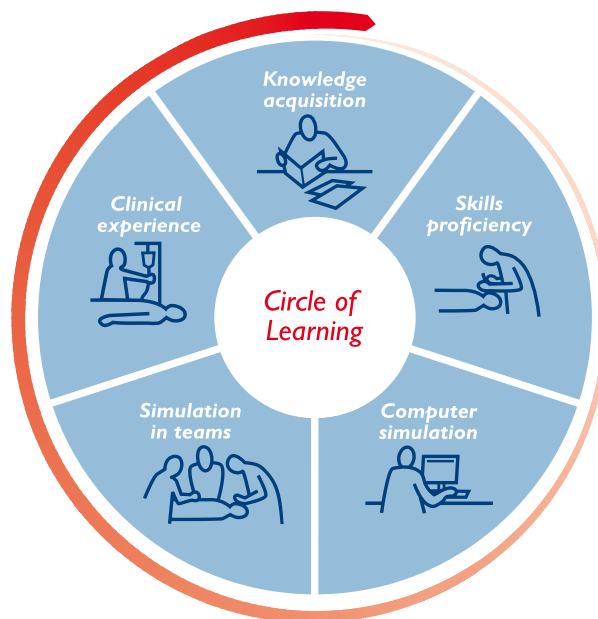


Figure 2. The Circle of Learning reflects the continuing process of attaining, enhancing, and maintaining clinical competencies.

Girona is into its 2nd year of transitioning into the four-year BSc Nursing program. Consequently, the university currently has both programs running in parallel. The below overview (next page) shows the amount of time allocated to simulation training each year for both programs.

3-year Nursing program

Year 1	30 hrs basic skills training 10 hrs fully immersive simulation training in teams
Year 2	30 hrs basic skills training 10 hrs fully immersive simulation training in teams
Year 3	30 hrs basic skills training 10 hrs fully immersive simulation training in teams

4-year BSc Nursing

Year 1	10 hrs basic skills training 0 hrs fully immersive simulation training in teams
Year 2	20 hrs basic skills training 20 hrs fully immersive simulation training in teams
Year 3	0 hrs basic skills training 40 hrs fully immersive simulation training in teams
Year 4	0 hrs basic skills training 10 hrs fully immersive simulation for competency assessment *

* Students were earlier assessed by their skill master level, whereas now they are evaluated by competency levels. Assessments are performed using fully immersive simulation, where students are exposed to six different simulation scenarios that each portrays several identified competencies the students must be able to demonstrate prior to graduation.

The first year in the BSc program the students acquire basic knowledge about health. In the second year they are introduced to the complexity associated with illness and to clinical situations in hospital care. The third year students are challenged with critical care, emergencies, pediatric and neonatal care in both knowledge acquisition and in clinical practice. The fourth year is basically spent in clinical placement, except during exam periods.

The high number of attending BSc students causes time constraints, which in turn allows for a somewhat limited simulation activity at the bachelor level. Students attending masters and post-graduate programs, on the other hand, are required to perform a certain amount of simulation training, why these groups perform relatively more fully immersive simulations than the BSc students do at the moment. All students are however encouraged to perform individual skills training and microsimulation, in addition to attending classes organized by the faculty.

In addition to using simulators, Girona regularly employs student peers, university employees, and students' grandparents to act as standardized patients during team training.

Most frequently trained skills include:

- Advanced life support (3rd year)
- Advanced monitoring
- Aseptic non-touch technique
- Assessment and observations
- Basic Life Support
- Branch specific skills
- Burns
- Cardiac rhythms (SR, VF, supra ventricular/ventricular extra systoles)
- Central venous catheter insertion and removal
- Clinical hand washing
- Colostomy care
- Communication
- Consciousness (various levels)
- Delivery
- Foley catheter insertion and removal
- Injection technique
- Manual blood pressure measurement
- Maternal care
- Mechanical ventilation
- Medication administration
- Nutrition and feeding
- Oral care
- Pediatric care
- Personal care
- Perceptions of dying
- Personal safety
- Patient handling
- Trauma care
- Urinalysis
- Wound care (surgical dressings and chronic wounds)

Most frequently used scenarios

- Acute myocardial infarction
- Advanced Life Support (Pediatric and Adult)
- Apoplexia
- Arrhythmia
- Breaking bad news
- Cardiac arrest
- Chronic Heart Failure
- Conflict resolution
- Deep vein thrombosis
- Diabetic patient
- Discharge management
- Drug administration
- Handover
- Holistic patient assessment
- Managing time pressure
- Myocardial infarction
- Neurological observations
- Pneumonia/severe respiratory distress
- Post operative care
- Psychosis/dementia
- Respiratory arrest
- Stroke

Girona University plans to introduce ready made scenarios developed by the American National League for Nursing (NLN) as soon as the Spanish translation is completed.

Debriefing

Emphasis: High.

Duration: 15 minutes or shorter, depending on the group. Prior to embarking on higher levels of education, the younger students are normally more concerned with 'delivering what the preceptor wants' than actively reflecting on self-performance. Understanding the purpose of debriefing is therefore somewhat difficult for them to start with, but the students soon discover the advantages and adapt to the new way of thinking.

The debriefing takes place immediately after each scenario and the sessions are facilitated by faculty. Video clips from the simulations are used to illuminate episodes that went well, to discuss areas in need of improvement, and to disclose knowledge deficiencies. After each group has had individual debriefing, a final debrief session is facilitated with all three groups present.

EXPERIENCE SO FAR

Faculty Reflections

Identified Benefits

- Lecturers used to demonstrate to the students. With simulation this has changed; the students are much more active now, and we have evaluation and more control.
- Students are more enthusiastic with simulation. The feedback is especially appreciated.
- Students who transfer from other schools value Girona higher and postgraduate and master students wish to study here because we offer simulation training.
- In the past students 'learned by doing' in the hospital – now they simulate before entering clinical practice. Simulation builds confidence and increases patient safety.
- Students are more used to working with simulations now.

Identified Challenges

- Simulation is not merely a test for students; it's also a test for faculty who facilitate the training.
- Persuading more colleagues to get involved in simulation training, so more faculty can share the work load.
- All instructors need updated clinical experience. Finding the time to ensure this is difficult.

Identified Success Factors

- Having a proper project plan generates funding more easily.
- Drawing on experience from simulation training with master students has benefited the bachelor program.

Graduate Student Reflections

- I like the fact that we can repeat and that I get more involved with the manikins.
*Graduate student
Cristina Pujol Pretel*
- I would have liked to do more emergency and critical care training.
*Graduate student
Joana Pujolras Aguasca*
- We learn protocols, skills and behavior and feel ready to start our careers as nurses, but more simulation training during school would have been beneficial. I feel safer now, but need additional clinical experience to be more confident.
*Graduate student
Albert Bartina I Planells*

TRAINING SOLUTION

The training equipment currently includes:

Simulators:

- 1 SimMan
- 1 ALS advanced
- 1 ALS MegaCode
- 1 HeartSim 2000
- 1 Resusci Anne Skills Station
- 4 Resusci Anne Skill Reporter
- 2 Advanced video system (AVS)
- 60 computers with MicroSim (pre- and in-hospital scenarios)
- 1 VitalSim ALS Simulator Advanced *

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

Manikins:

- 8 Little Anne
- 1 Resusci Anne Q-CPR/D Training System
- 2 Resusci Junior
- 4 Baby Anne
- 4 Resusci Baby
- 1 ALS Baby
- 1 Ultimate Hurt
- 1 Nursing Anne (Nasco)
- 2 full size and 3 nurse baby (brand unknown)

Skills Trainers:

2 Intubation Trainers, 2 Cricoid Stick Trainers, 2 Choking Charlie, 1 IV Torso, IV Arms, Fr2, MRx, AED trainers, Training ventilator, 4 BLS Ambu manikins, Central Line Man, Vascular Access Family, TraumaMan System, Birthing simulator.

SIMULATION ACTIVITY

Girona University has an annual intake of 140 nursing students. The amount of time the 560 students are involved in facilitated simulation activities ranges from 10 – 40 hours per year.

The current training solution is considered sufficient for today's training needs; however next year, when the four-year program is fully integrated, Girona will need to expand the solution as the university will have an altogether higher number of students to facilitate simulation training for.

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 with reproducible, standardized educational experiences is provided
- Learning outcomes are clearly defined
- Ensuring the simulator is a valid learning tool

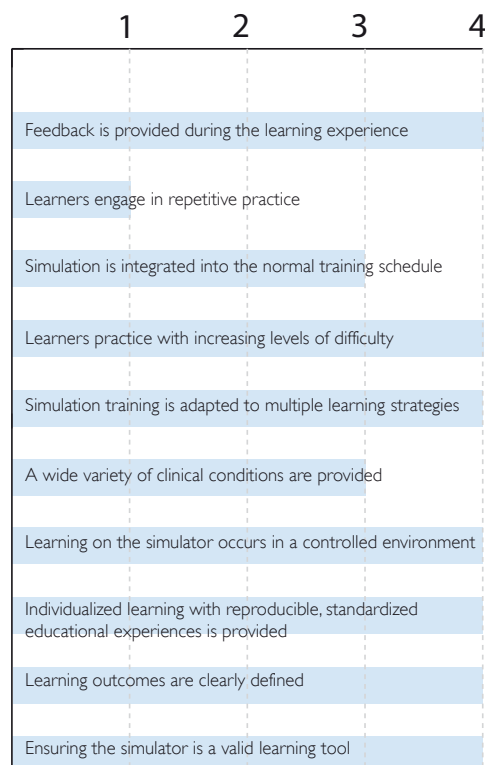


Figure 3. The bars indicate to which degree Girona University delivers on each of the 'right conditions' as assessed by the university on a 4-point Likert scale.

Providing feedback is further considered the most important feature and *Learners engage in repetitive practice* the least prominent feature for Girona University's simulation based learning. In their experience, it is however the combination of factors that matters the most.

FIVE YEARS FROM NOW

- More staff have adopted simulation
- It is a requirement for new employees to get involved in simulation
- A separate health department building for nursing and medical students is built (in 5-10 years)
- Nursing students and medical students train together in teams
- Students and professionals perform in situ team training in hospitals
- A position designated to multidisciplinary training is in place
- Research activity on simulation is increased
- A SimMan 3G is procured
- 90 computers for self-directed learning are available to students

RESEARCH ACTIVITY

'Clinical simulation as a training and evaluation tool' is an ongoing PhD project aiming to develop an evaluation tool for emergency competencies.

REFERENCES

1. Girona University (Universitat de Girona) www.udg.edu/infermeria
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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