

# Case study

## Integrating Simulation into Nursing Curriculum



Birmingham City University

Birmingham, UK

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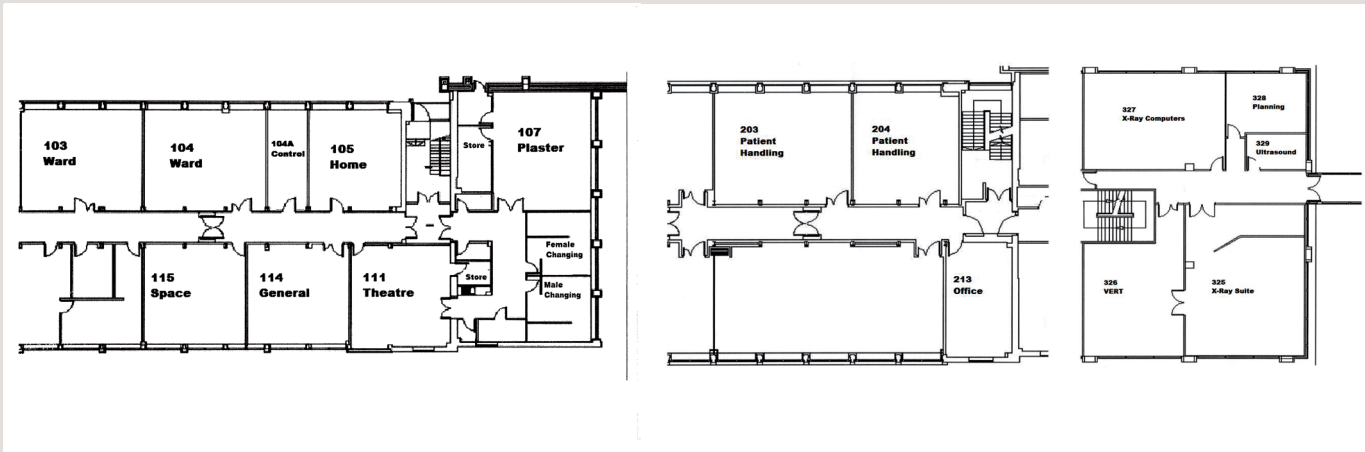
*This case study is one, in a series of three, describing various aspects of simulation integrated into nursing curriculum. The document was developed in collaboration with and approved by Birmingham City University.*

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## BIRMINGHAM CITY UNIVERSITY IN SHORT

Birmingham City University (BCU) with its 23,000 students is a large, multi-cultural, six faculty university, with Faculty of Health as the largest. In 2004 BCU was awarded substantial funding to become Center for Excellence in Teaching and Learning (CETL). This funding helped to develop and maintain simulation training and education to enhance nursing students' clinical performance. As BCU is convinced that simulation is a safe and effective means of learning, the university aims to weave fully immersive simulation training more thoroughly into the general teaching.

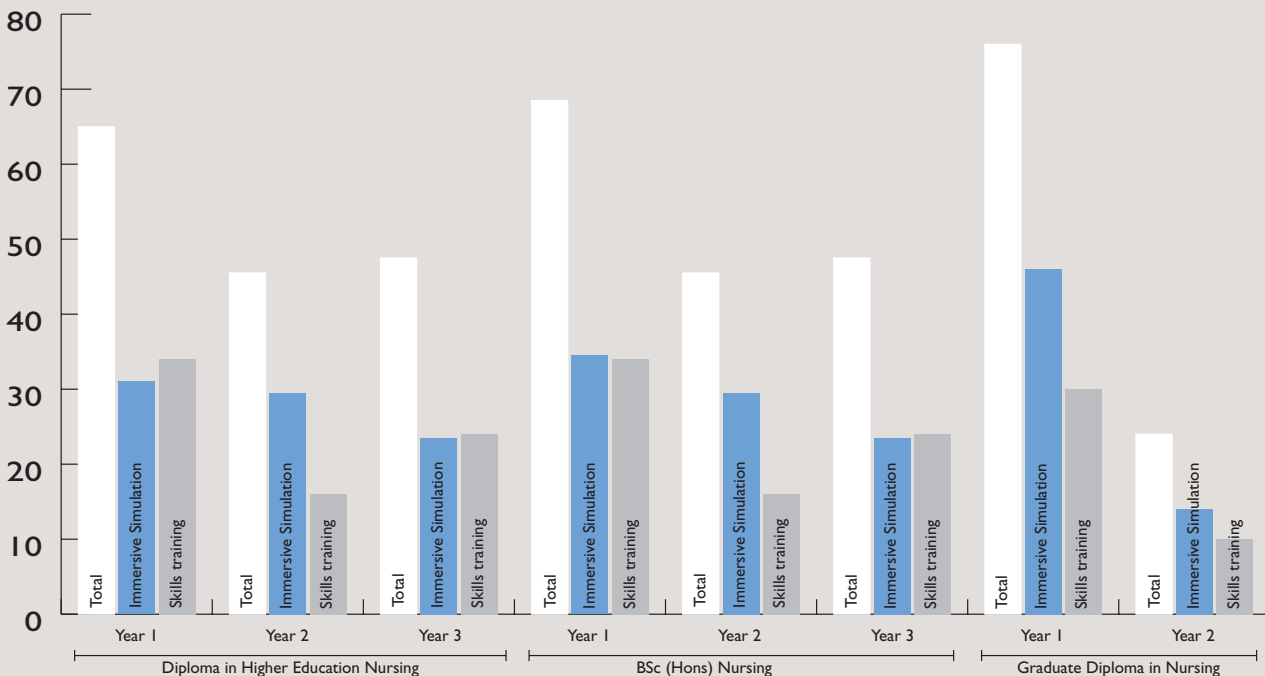
### Floor plan



### Simulation activities

Skill trainers are applied to learn and practice defined skill sets and full-scale manikins to translate obtained knowledge and skills into simulated clinical settings. All years include mandatory updates for Basic Life Support and Patient Handling.

### Time allocated to simulation training (hours)



## PREFACE

Birmingham City University (BCU)<sup>1</sup> integrated basic skills training in the 1990s and moved on to full-scale event-based simulation training in 1995. This case study describes how BCU managed to integrate simulation with the nursing curriculum, their achievements, and how they see simulation training develop in the time to come.

## WHY SIMULATION WAS INTEGRATED

Clinical practice is a crucial component in Nursing Education, however pressure for clinical placement has been a growing challenge in the UK for quite some time. Realizing that simulation training could potentially alleviate some of the capacity problems, Birmingham City University set out to integrate simulated practice learning with the nursing curriculum.

## HOW THE PROCESS EVOLVED

To learn more about simulation training, faculty members visited the WISER Institute for Simulation, Education & Research in Pittsburgh, which had implemented such training for healthcare personnel ten years earlier. The visit generated ideas and inspiration in terms of how to organize implementation of fully immersive simulation training at BCU. In 2005, the Nursing and Midwifery Council<sup>2</sup> (NMC) announced that a pilot study would be conducted in the UK the following year in order to evaluate whether simulation would be a safe and effective means of learning clinical skills. BCU applied to participate in the study and was chosen as one of the 16 pilot universities to integrate and try out simulation training across the adult, mental health, learning disabilities, and child nursing curricula.

## FINANCIAL MODEL

Birmingham City University, Faculty of Health provided the initial funding needed to develop the Clinical Skills and Simulation Learning Center at BCU. In 2004, the university was awarded three million pounds from the Higher Education Funding Council for England<sup>3</sup> (HEFCE)\* to become a Center for Excellence and Teaching. This funding helped to develop and maintain simulation training and education to enhance nursing students' clinical performance. The continuing funding will be deriving from BCU, Faculty of Health, as the University recognizes the importance for ensuring that nurses and allied health professionals are fit for purpose and fit for clinical practice.

\* HEFCE: Promoting and funding high-quality, cost-effective teaching and research meeting the diverse needs of students, the economy, and society.

## ORGANIZATIONAL MODEL

The simulation program is an integral part of Birmingham City University and answers to the Faculty of Health. The Clinical Skills and Simulation learning center is headed by the Head of Department. Fifteen members of the clinical skills and simulation department facilitate the simulation training alongside other members of faculty.

### Staff competency levels

All instructors are senior lecturers with a professional background in nursing and have also attended an in-house-developed three-evening course on scenario design and how to facilitate debriefing.

### Staffing

Head of Department Skills and Simulation  
8 Adult nurse lecturers  
2 Pediatric nurse lecturers  
3 Mental health nurse lecturers  
1 Learning disabilities nurse lecturer  
1 Skills service manager  
2 Technicians

### Facilities

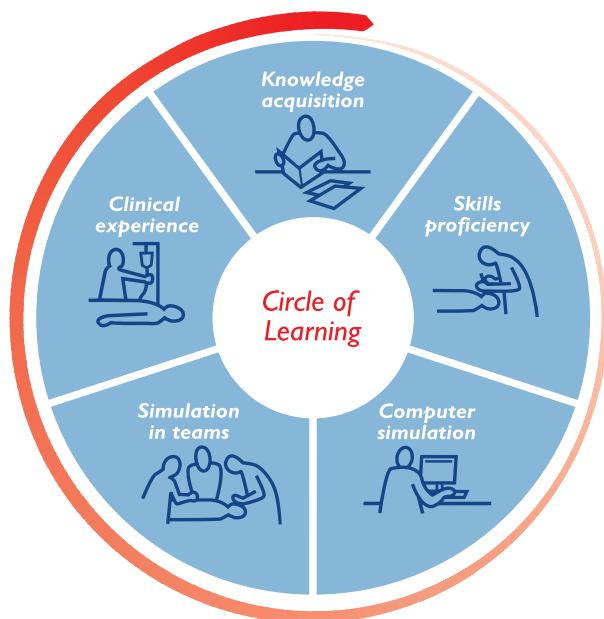
The training facilities comprise 2 four – bed patient rooms with equipment normally found in hospital rooms including a resuscitation trolley, a plaster room, 2 manual handling rooms, 1 control room, 1 home environment room and 1 operating theater used for training of Operation Department Practitioners (ODPs). In addition to this there is a Skills Practice and Clinical Enhancement room (SPACE) which acts as a skills library. Students can self refer to this facility.

### Curriculum

The simulations are developed at BCU and are aligned with the NMC UK nursing curriculum authorized in the UK. The scenarios are designed to reflect the students' different educational levels and their various needs.

## EDUCATIONAL ACTIVITIES

Birmingham City University (BCU) applies all five learning modalities reflected in the Circle of Learning (fig. 1) to help nursing students reach a defined level of competence. The **cognitive** parts of the curriculum (acquired via lectures, literature, and online virtual case scenarios) and the **clinical skills** (acquired in the skills lab) are put together during the **simulation training**. BCU has developed and integrated their own computer simulation program (Constructively aligned multiple modality model of simulation). The virtual case creator comprises 26 different cases and allows students to access patients online. With **clinical placements** taking place at regular intervals, all the above modalities are mixed together throughout the 3-year Bachelor Degree, 3-year Nursing Diploma and the 2-year Graduate Diploma programs.



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

## METHODOLOGY

### Simulation Training

All three years include annual mandatory updates of Basic Life Support and Patient Handling.

#### Year 1

**Essential clinical skills** are taught and include:

- Aseptic non touch technique
- Assessment and observations
- Basic Life Support
- Branch specific skills
- Clinical hand washing
- Communication
- Injection technique
- Manual blood pressure measurement
- Medication administration
- Nutrition and feeding
- Oral care
- Personal care
- Perceptions of dying
- Personal safety
- Patient handling
- Urinalysis

Formative simulation is used at the end of semester two to consolidate the range of aforementioned skills and allow the students to work as a team to provide essential patient care.

#### Year 2

The enhancement of essential skills continues and more advanced assessment techniques are employed. Knowledge acquisition is supplied by computer simulation (the virtual ward/virtual case creator). **Fully immersive simulation training** is now introduced, allowing 4-5 students to train in teams while their peers observe the ongoing performance via an advanced audio-visual system. This way the entire class may provide constructive criticism and thus play an active role during the debrief sessions that take place immediately after each scenario. Typically addressed conditions are respiratory arrest, cardiac arrest, and hypoglycemia.

**Preparation:** Subject related lectures are provided and students are required to study relevant literature beforehand, usually on Moodle, where they are also introduced to the patient case studies.

**Simulations:** Patients are introduced via the virtual ward, where the students must make care decisions. The thought out actions are then applied and demonstrated during practical sessions where basic skills are integrated with the overall simulation activity.

**Interactive approach:** Students are allowed to pause the simulations in order to discuss care decisions with the lecturers as they move along.

**Assessment:** Some clinical skills are assessed using OSCE.

#### Year 3

**Fully immersive simulation** continues. The training is now focused around problem based learning and covers areas such as conflict resolution, breaking bad news, allocation of skill mix, the critically ill patient and management scenarios, which includes feedback from peers. The simulations are designed to aid the transition from student to staff nurse, and to manage medical care of individual patients and focus on the wider ward environment, both at the same time. The scenarios highlight the realistic challenges these situations entail. They also allow students to work through their emotional response in a supportive environment that will later enable them to manage these responses in a more effective manner when in clinical practice. Scenarios and outcomes focus on the promotion of best practice, promoting evidence based care. This further develops the link between theory and practice. Fully immersive simulation provides a comprehensive understanding of patient assessment and care, as students can see how their decisions impact the unfolding of the situation as a whole.<sup>4</sup>

## Most frequently used scenarios

- Acute myocardial infarction
- Advanced Life Support (Pediatric and Adult)
- 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
- Neurological observations
- Pneumonia/severe respiratory distress
- Post operative care
- Psychosis/dementia
- Respiratory arrest
- Stroke

## Debriefing

**Emphasis:** High.

20-30 minutes is devoted per group. It is perceived that the majority of learning takes place through group reflection, where self and peer critique is applied along with facilitator feedback. The ability to reflect on clinical experiences that cover a wide range of outcomes enables identification of key barriers relating to the scenarios and the solutions to overcome these barriers. Video is currently not applied during these sessions.

## REPLACING CLINICAL PRACTICE WITH SIMULATION

The Nursing and Midwifery Council (NMC) is set up by Parliament to safeguard the health and wellbeing of the public and as such also acts as a regulatory body. Several higher education institutions piloted simulation for the NMC (of which BCU was one pilot site) to test whether simulation could provide a safe and effective means of learning clinical skills. As a result of the pilot the NMC now allows nursing program providers to use up to a maximum of 300 hours of the 2300 hours practice component to provide clinical training with simulation training. Although the nurse educators at Birmingham City University utilize simulation extensively, this training is so far considered more of an adjunct modality than a replacement of traditional clinical practice. The BCU Radiography courses have, on the other hand, implemented simulation as a replacement for some clinical practice hours. Lecturers at BCU are convinced that nursing students do benefit from simulation training, and feel that the simulation activity should be increased within the curriculum. Rather than estimating how many practical hours simulation might replace, the lecturers currently focus on using the simulations to support practice hours.

## EXPERIENCE SO FAR

### Faculty Reflections

#### Identified Benefits

- Simulation reinforces professional behavior. It enhances communications between teams.
- When the students arrive they are nervous and full of trepidation – at the end of the simulation they say 'that was brilliant, we loved it!'
- Students will buy in when staff are enthusiastic.
- Anecdotally, simulation reinforces student learning. Activities that students are exposed to in simulation embed learning in the student's brain. Sometimes they refer to scenarios that took place 2 years ago!
- Simulation improves reflective thinking, especially after debriefing.

#### Identified Challenges

- Currently enough staff to carry out simulations at today's activity level, however not enough staff to expand simulation training.
- Time tabling can be challenging with skills and simulation rooms in high demand at peak times of the academic year.
- Ensuring all students are engaged while a small group is involved in the simulations directly.
- Cost of simulators, support and maintenance fees.

#### Identified Success Factors

- An enthusiastic staff.
- Commitment from Deanery to support simulation.
- Active engagement of practice partners in delivering simulation training.
- Active engagement of student partners in delivering simulation training.
- Student feedback used to inform and develop simulation scenarios.
- Members of staff actively engaged in research activities to evaluate and develop simulation.
- Use of e learning to support simulation (The virtual ward).

#### Student Reflections

- It makes me confident on the wards because we get to practice beforehand.
- You get time to practice here and an opportunity to ask questions, as opposed to on the wards during placement. And there is room for error.

## TRAINING SOLUTION

The training equipment currently includes:

### Simulators:

3 SimMan  
1 SimBaby  
1 ALS Baby  
1 Resusci Anne Simulator  
1 Resusci Anne Skills Station  
4 AVS systems

### Manikins:

Numerous Little Ann  
Numerous Little Junior

### Skill Trainers:

BLS manikins, catheterization trainer, delivery trainers, nursing manikins, hungry manikin, IV and BP arms, enema trainer, stoma abdomens, pediatric airway, choking child and adult. Numerous Laerdal suction units.

## SIMULATION ACTIVITY

The university has a current intake of approximately one thousand pre-registration nursing students per annum. Students in all three nursing programs are involved in simulation activities ranging from 14 - 46 hours of training per year. The current simulation solution provides sufficient training capacity for current activity levels. BCU aims however to increase the simulation training across all 3 years of the nursing course, as well as integration across all professions within the Faculty of Health.

## WHAT MAKES GOOD SIMULATION PROGRAMS

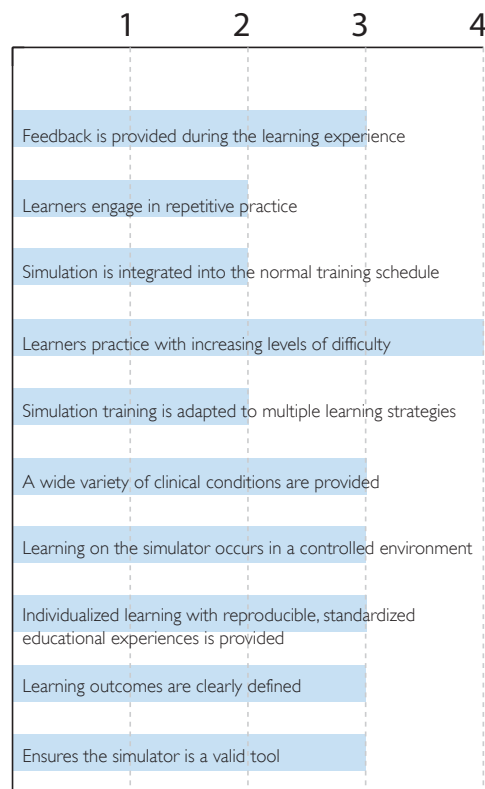
Issenberg et al<sup>5</sup> reviewed and synthesized existing evidence in educational science that addressed the following question: What are the features and uses of high-fidelity medical simulations that lead to most effective learning?

Issenberg argued 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
- Ensures the simulator is a valid tool



**Figure 2.** The bars indicate to which degree BCU delivers on each of the 'right conditions' as assessed by the university on a 4-point Likert scale.

Birmingham City University (BCU) further considers *Providing feedback* the most important and *Clearly defined outcomes* the least prominent feature for their simulation based learning, though "all factors will have a bearing on the success of simulation."

## FIVE YEARS FROM NOW

- Fully immersed simulation will be thoroughly woven into the general teaching at BCU.
- More time will be allocated to facilitate simulation.
- Simulation activities will have been evaluated and further developed as a result.

## RESEARCH ACTIVITY

### ARTICLES PENDING PUBLICATION

- Turner, P; Wanless, S; Adams, M. (2010). The use of simulation to enhance the teaching of management skills. *Nurse Education Today*.
- Chapman, J; Yardley, L. (2010) "The collaborative development of mental health nursing students' simulation activities. The student and staff experience." Accepted for the *International Journal of Clinical Simulation in Nursing*.

### REFERENCES

1. Birmingham City University website: <http://www.bcu.ac.uk/>
2. Nursing and Midwifery Council Circular; 2007: <http://www.nmc-uk.org/aDisplayDocument.aspx?documentID=3707>
3. Higher Education Funding Council for England: <http://www.hefce.ac.uk/>
4. Education through Simulation, Issue 9 – Autumn 2009 (Laerdal UK NewsLetter)
5. 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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