

Integrating simulation training into the nursing curriculum

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Abstract

The use of simulation is gaining momentum in nurse education across the UK. The Nursing and Midwifery Council is currently investigating the use of simulation in pre-registration nursing. This article gives a brief history of simulation, discusses competence issues and why simulation is best placed to teach nurses in today's health service. An innovative approach to implementing simulation into the nursing curriculum is introduced.

Key words: Simulation ■ Pre-registration curriculum

The challenges facing nurse education in the 21st century are numerous. Universities that offer nursing and midwifery are faced with increased intakes, decreased clinical placements and a shortage of patient availability. Student nurses and midwives are competing with other learners in the workplace (e.g. medical students and anaesthetic practitioners) to gain the essential knowledge and skills to become a registered practitioner. The Nursing and Midwifery Council (NMC) recently reviewed if students are fit for practice at the point of registration (NMC, 2005). Concerns have been raised regarding the variation in competence in such areas as communication, medicine administration and decision making.

Following this review and acting on feedback from students, practitioners and lecturers, support for the use of simulation has grown to assist pre-registration students to consolidate their learning. In March 2006, the NMC asked for expressions of interest from Higher Education Institutions (HEIs) to investigate the use of simulation. The programme, *Simulation and Practice Learning Project for Pre-Registration Nursing Programmes*, will be piloted at 13 universities over a three-month period and they will report their findings to the NMC in early January 2007 (NMC, 2006).

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History of simulation: a brief overview

'Simulator (noun): any device or system that reproduces the conditions of a situation for the purposes of research or training' (Collins, 2005)

Simulation has been gaining momentum in education for the last 40 years. The first simulators were computer based and were used by industry (e.g. aircraft and the military). Mrs Chase™, the first simulator to teach physical assessment to student nurses in the UK, was introduced in the 1950s (Peteani, 2004). Harvey™ was introduced in the late 1960s to allow medical students to determine heart and lung sounds and is still in use today (Peteani, 2004). The first simulator for anaesthesia was invented in 1969 (Sim-One™) to allow endotracheal intubation to be practised (Peteani, 2004). From the 1960s onwards advances have been made in simulator technology as surgeons and doctors from anaesthesia and emergency medicine have used simulators to practise skills and techniques (Bradley and Postlethwaite, 2003). The use of simulators in nursing has been growing from the 1980s onwards (Rystedt and Lindstrom, 2001).

Simulation and competence

Simulation allows multiple learning objectives to be taught in a realistic clinical environment without harming patients. Students are exposed to a realistic situation that could be community or hospital based and will need to combine their assessment and clinical decision-making skills with communication, teamwork and management to care for the simulated patient(s). Following the simulation, the learners are able to reflect on their performances with a facilitator. By discussing their areas of strength and development in line with current evidence, they can begin to improve their competence, and ultimately, confidence. This learning can be consolidated back into practice. This definition of competence as suggested by Miller (1990) in relation to simulation is demonstrated in *Figure 1*.

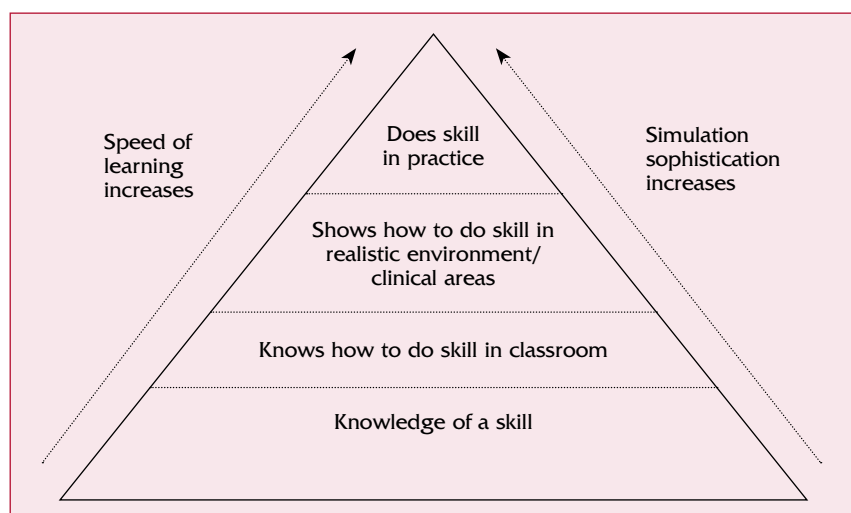
Why simulation?

Teaching using simulation needs to occur in a realistic environment so that when the learners return to the workplace, they can easily apply what is learned. The landmark experiment that is used by simulation teachers occurred in 1975 with divers in the Royal Navy. Godden and Baddeley (1975) illustrated that divers who had memorized information under water were better able to reproduce the information than those who had memorized

it on land. The 1975 experiment demonstrated that when learning occurs in a realistic environment related to work, learning is retained and reproduced; simulation works best when ‘microworlds’ are created related to the learner’s work place. Therefore, the more realistic the environment is to the learner’s own area of work, the more successful the learning will be. This was one of the first reported occasions when it was seen that by learning in a realistic environment enhanced the educational experience. Simulation allows the creation of realistic simulations to allow greater retention of what is learned

Learning using simulators needs to occur in a realistic learning environment (Schumith and van der Vleuten, 2003). Simulation pioneers believe that simulation offers this realism. Gordon and Cooper (2004) explore the concept that simulation sessions can provide ‘microworlds’ whereby important patient/doctor/nurse interactions can be highlighted, illustrated, explained and replayed. This important concept of simulation mimicking real life is seen as a major strength and is cited by many authors (Schumith and van der Vleuten, 2003; Gordon et al, 2004). For simulation to be successful, learners need to suspend

Figure 1. Linking simulation learning to Miller’s pyramid (1990).



reality and interact with the simulator as though it was a real patient. Social interaction in learning is seen as crucial to the internalization of thoughts (Long, 2000). Numerous studies have illustrated that when the realism is suspended,

Table 1. An Illustration of the domains of nursing and simulated clinical experience within the PNCI Roadmap

Semester	Concept	Professional and ethical practice	Care delivery	Care management	Personal and professional development
1	Nursing Foundations I	Abnormal variations in a 16 year old	Basic assessment of the hip-replacement patient	Integrated into SCE	Integrated into SCE
2	Nursing Foundations II	Pre-operative care of the patient scheduled for a cholecystectomy	Post-operative care of the patient with DVT	Basic assessment of the asthma patient	Integrated into SCE
3	Caring for Patients with Chronic Illness	Care of the patient on home antibiotic therapy with osteomyelitis	Care of the patient with heart failure and COPD	Care of the cardiac rehab. patient	Care of the patient with AIDS who develops respiratory distress
4	Care of Mother and Child	Care of the abandoned new born Placental abruption	DKA and pneumonia in the child Septic baby due to prolonged rupture of membranes	Near drowning Post-partum haemorrhage	Amputation secondary to osteosarcoma, child receiving total parenteral nutrition. Amniotic embolus
5	Critical Care	Cardiogenic shock	Acute renal failure	GI bleeding with varices secondary to liver failure	Septic Shock
6	Preparation for practice	Anaphylaxis	Heat exhaustion in the elderly	End of life care	Bio-terrorism

Table 2. Key concepts in the Professional and Ethical Practice Domain

Semester	Key Concepts
1 – Nursing Foundations I	<ul style="list-style-type: none"> • Equity to patients and clients • Recognize need to refer to appropriate healthcare professional
2 – Nursing Foundations II	<ul style="list-style-type: none"> • Demonstrate and understand confidentiality • Discuss professionalism
3 – Caring for Patients with chronic illness and beliefs of others	<ul style="list-style-type: none"> • Recognize needs of those with disabilities • Promote equity irrespective of culture, religion
4 – Care of mother and child	<ul style="list-style-type: none"> • Identify legislation in relation to child • Recognize ethical dilemmas
5 – Critical care	<ul style="list-style-type: none"> • Manage complex decisions related to ethical dilemmas • Recognize limitations of self
6 – Preparation for Practice	<ul style="list-style-type: none"> • Accept responsibility for own actions • Impact of legislation on own practice

learners are able to develop their critical-thinking skills, decision-making skills and communication skills (Vandrey and Whitman, 2001; Gordon et al, 2004; Peteani, 2004).

Programme for Nursing Curriculum Integration (PNCI™): an introduction

Medical Education Technologies, Inc® (METI®) recognized that simulator teachers required not only pharmacological and physiological simulators but also educational packages to help integrate simulation into their curricula. METI began to develop and create what was to become the Programme for Nursing Curriculum Integration (PNCI). In 2004 METI worked with leading nurse educators across the US to develop an educational package covering the pre-registration curriculum in line with the US nursing regulatory bodies. One of the primary partners was Texas Woman’s University who were early adopters of nursing simulation and along with both East and West coast schools developed a comprehensive educational package that was launched in 2005.

In 2005 a small group of simulation enthusiasts in the UK recognized that an educational package linked to the NMC Requirements of Pre-Registration Programmes would enhance the use of simulation in undergraduate education. In January 2006 the UK Simulation Project began to adapt

the original PNCI and create new simulations as required in line with the UK nursing curriculum. The primary partners for this innovative project are Thames Valley University, University of Glamorgan and Bristol Medical Simulation Centre.

PNCI: an overview
The Integration Roadmap

This is organized by the four domains of nursing as identified by the NMC in 2004 *Standards of Proficiency of Pre-Registration Education* and covers six semesters as shown in *Table 1*. Within the six semesters all the European Directives are incorporated (i.e. medicine, surgery, child, maternity, mental health, elderly care and community). The Roadmap is used to assist with the identification of a Simulated Clinical Experience (SCE) that could be used to achieve that learning concept. Within the PNCI there are 90 SCE to choose from which cover all age ranges and locations (e.g. community, hospital, hospice). If a specific SCE is not identified then the remaining SCEs identified in that semester will encompass those domains.

As the curriculum progresses the learner is expected to demonstrate increased knowledge and skill base for the four domains of nursing. *Table 2* illustrates this by using the Professional and Ethical Practice Domain as an example.

The Simulated Clinical Experience (SCE)

The Simulated Clinical Experience (SCE) is a tool that allows the lecturer/facilitator to teach multiple learning objectives using simulation. The tool provides a framework that allows the teacher to set up and run the simulator, provide learners with pre-simulation reading, offer teaching questions, suggest minimal behaviours and enhance the evidence base. The SCE can be used for both teaching and assessment. Each SCE is provided in a standard format and includes the following components:

- Software scenario name
- Identification of which pre-configured ‘patient’ should be applied to the simulation
- Synopsis of the simulation for faculty with key teaching and learning points
- ‘Patient’ background information and history
- Healthcare provider’s orders
- Simulator set-up and instructor notes
- Scenario, including minimum behaviors expected and prompts for teaching
- Questions for learner preparation
- All evidence based.

All the SCEs are evidence based using best practice. The SCEs are provided electronically so that they can be adapted to local variations in practice and/or procedures. The learner’s pages may be used on a university intranet to integrate into any established learning packages that may already be in use.

METI, in conjunction with the following American institutes, developed the original SCEs:

- Texas Woman’s University, Dallas, Texas
- Prairie View A&M University, Houston, Texas
- Rutgers, The State University of New Jersey, Newark, New Jersey

Table 3. Comparison between Jeffries (2005) and the METI Programme for Nursing Curriculum Integration

Jeffries study findings	PNCI
Objectives	Objectives using an educational taxonomy
Fidelity	Simulator, supplies, set up and notes
Complexity	Increase from Semester I to VI as students progress through their programme
Cues	Instructor prompts, questions and teaching points
Debriefing	Debriefing large focus of faculty development workshop

- Mount Carmel College Of Nursing, Columbus, Ohio
- Delgado Community College, New Orleans, Louisiana
- Fox Valley Technical College, Appleton, Wisconsin
- Golden West College, Huntington Beach, California.

After METI launched the PNCI in 2005, the result of a significant research study was published in the US. Jeffries (2005) examined which teaching and learning practises led to a positive simulation learning experience including the role of the teacher/facilitator. Jeffries suggested a framework that is shown in *Table 3* which shows that the PNCI fulfils the criteria cited by Jeffries in her framework.

Integrating the PNCI into your curriculum

METI recognizes that supplying the simulators and the educational programme is not enough. To assist the integration of simulation into any curriculum two on-site visits are included as part of the educational package. An experienced simulator educator will work with the local faculty to integrate the SCEs. METI recommends that the first visit occur after the faculty have participated in the foundation basic training for either the Human Patient Simulator (HPS) or the Emergency Care Simulator (ECS) training courses.

Objectives for first visit:

- Review current curriculum and individual modules to identify where simulation would enhance learning
 - Identify where specific SCEs can be integrated
 - Develop an integration plan and timeline
 - Faculty development on using simulation to facilitate learning
 - Demonstration and role modeling of SCE
 - Address logistical concerns, e.g. group size, room space.
- Objectives for second visit (this is designed to occur at or near the completion of initial implementation):
- Review and adjust integration plan along with timeline
 - Evaluation of actual implementation of SCE with learners
 - Strategies to address issues encountered
 - Demonstration and role modeling of SCE
 - Address logistical concerns encountered with implementation
 - Plan for continued implementation and integration

Following the visit, a written report on the simulation will be given to the lead faculty member with suggestions and recommendations.

METI also runs two major meetings: the European Human Patient Simulation Network (HPSN) Conference that this year is being held in Mainz, Germany on 17–18 November. Every year the annual Human Patient Simulation Network Conference is held in Tampa, Florida with the next conference from 23–23 February, 2007. At both of these meetings healthcare professionals from all disciplines share their research findings, run workshops and seminars, and provide networking opportunities. METI also attends both the UK National Association of Medical Simulators (NAMS) and the Society in Europe for Simulation Applied to Medicine (SESAM) meetings, as well as the Royal College of Nursing Education Conference.

Summary

The Programme for Nursing Curriculum Integration has been designed to assist in the integration of human patient simulation throughout the pre-registration nursing curriculum. The PNCI along with the METI family of simulators allows faculties of health and social care to easily and effectively develop an evidence-based simulation curriculum to prepare nurses for caring in the 21st century and beyond.

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KEY POINTS

- Simulation has been gaining momentum in education for the last 40 years.
- The first simulators were computer based and were used by industry, such as the military and the aircraft industry
- When learning occurs in a realistic environment related to work, learning is retained and reproduced
- For simulation to be successful, learners need to suspend reality and interact with the simulator as though it was a real patient.
- Within the Programme for Nursing Curriculum Integration, there are 90 simulated clinical experiences to choose from which cover all age ranges and locations (e.g. community, hospital, hospice).