Integrating simulation training into the nursing curriculum

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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

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

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

Figure 1. Linking simulation learning to Miller’s pyramid (1990).
Debriefing  Debriefing large focus of faculty development workshop

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Key Concepts</th>
</tr>
</thead>
</table>
| 1 – Nursing Foundations I     | • Equity to patients and clients  
|                               | • Recognize need to refer to appropriate healthcare professional          |
| 2 – Nursing Foundations II    | • Demonstrate and understand confidentiality  
|                               | • Discuss professionalism                                                   |
| 3 – Caring for Patients with  | • Recognize needs of those with disabilities  
| chronic illness and beliefs   | • Promote equity irrespective of culture, religion                          |
| of others                     |                                                                              |
| 4 – Care of mother and child  | • Identify legislation in relation to child  
|                               | • Recognize ethical dilemmas                                                |
| 5 – Critical care             | • Manage complex decisions related to ethical dilemmas  
|                               | • Recognize limitations of self                                             |
| 6 – Preparation for Practice  | • Accept responsibility for own actions  
|                               | • Impact of legislation on own practice                                     |

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
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.

Nursing and Midwifery Council (2004) Standards of Proficiency of Pre-Registration Education. NMC, London

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).