Quality Indicators for the Design and Implementation of Simulation Experiences

Authors

Ms Carol Arthur
Professor Tracy Levett-Jones
Associate Professor Ashley Kable

Date

2010

Contents

Abstract
Introduction
Pedagogical Principles
Fidelity
Student Preparation and Orientation
Staff Preparation and Training
Debriefing

Source Acknowledgement

1. This resource was produced as a result of a Delphi study conducted as a component of a major study about Clinical Reasoning: Examining the Impact of Simulated Patients and Information and Communication Technology on Nursing Students’ Clinical Reasoning

Visit: newcastle.edu.au/project/clinical-reasoning

2. The results of this Delphi Study including this resource were presented at a Symposium in 2010

Visit: newcastle.edu.au/project/clinical-reasoning/symposium.html

Select: Identifying quality indicators for the use of human patient simulation manikins and ICT - Carol Arthur
Simulation is broadly defined as an educational technique in which elements of the real world are integrated to achieve specific goals related to learning or evaluation; simulation is an educational strategy, not a technology. The use of simulation to reproduce life-like experiences to enhance the education of healthcare professionals has developed at an unprecedented pace. One of the driving forces for this is the decreased availability of quality clinical placements and the potential for simulation experiences to supplement or replace some required placement hours. Decisions related to investment in and use of simulation must be informed by research and aligned with best practice principles.

The quality indicator statements outlined in this resource were developed with reference to contemporary literature and by using a modified online three round Delphi study to elicit the views of seventeen simulation experts from Australia, North America, Norway and Hong Kong. The quality indicators provide a coherent, evidenced based overview of the key elements of effective simulation design and implementation. This resource will be useful to academics, simulation educators and those planning to invest in simulated learning environments. Structured under the headings of pedagogical principles, fidelity, student preparation and orientation, staff preparation and training, and debriefing, the resource provides quality indicator statements with supporting rationales, as well as guidelines for further reading.
Quality Indicator Statements:

- Simulation experiences are aligned with the curriculum and course objectives.
- A coherent matrix illustrates how simulation experiences are integrated throughout curriculum.
- There is scaffolding of learning experiences throughout the curriculum; and the required knowledge, psychomotor skills, clinical reasoning and reflective thinking skills, and use of health care technologies are taught prior to their implementation in simulation experiences.
- Simulation experiences, in some form, are integrated into all clinical courses and progress in complexity throughout the program.
- Learning objectives guide all aspects of simulation design including: student preparation activities, clinical scenario, group size, inclusion of observers or students from other disciplines, selection of manikin fidelity and other equipment, level of student support during the simulation, and method of debriefing.

Rationale:
Simulation experiences should be developed as part of a coherent curriculum structure with the ultimate goal of developing graduates who are fit for practice. A curriculum matrix provides a way of ensuring alignment between program, course and simulation objectives.

Simulation experiences provide valuable opportunities for:

- The integration of clinical skills, content knowledge, communication, teamwork, situation awareness, and clinical reasoning in a realistic but non-threatening environment
- Exposure to time sensitive and critical clinical scenarios that, if encountered in a 'real' clinical environment, students could normally only passively observe
- Active involvement in challenging clinical situations that involve unpredictable simulated patient deterioration
- Mistakes to be made and learnt from without risk to patients
- Repeated practice of requisite skills and formative and summative assessment
- Debriefing and reflection on practice

Educational theory indicates the importance of determining learning objectives prior to the selection of teaching strategies. Educators should identify specific objectives for each simulation session and then select the appropriate scenario, design features and equipment to be used.

Scaffolding refers to the provision of sufficient support and coaching to promote learning when concepts and skills are first introduced, followed by a gradual withdrawal of support as the learner progresses and begins to assume an increasingly independent role. In simulation, scaffolding is exemplified by the difference between 'pause and discuss' approaches and fully immersive simulation experiences. Scaffolding also ensures that learners are adequately supported by prior educational experiences and have an appropriate level of knowledge and skills prior to the simulation session.

Application of experiential learning principles suggest that students benefit from exposure to simulation experiences at all stages of their program. Simulations for first year students may include the development of communication skills, physical assessment and history taking. In second year simulations can become more complex and require recognition and responding to clinical deterioration. In third year students can be exposed to simulation scenarios that are dynamic and require real time clinical decisions and immediate action.

Further reading:

**Quality Indicator Statements:**

- The range of simulation technologies and approaches used are consistent with learning objectives, resource availability and cost-effectiveness. These include but are not limited to, low, medium or high fidelity human patient simulation manikin or part-task trainers.
- Environmental fidelity is developed in line with the learning objectives of the simulation session.
- Contextually appropriate clinical equipment and the availability of hardcopy or electronic patient information and charts are used to enhance the realism of the simulation experience.

**Rationale:**

*Fidelity* refers to how authentic or life-like the manikin and/or simulation experience is. Attention to fidelity or authenticity when designing simulation experiences allows students to suspend disbelief and become fully immersed in the unfolding scenario. The fidelity of the manikin is only one aspect of replicating reality however. The provision of realistic equipment and charts are also important to creating environmental fidelity. The availability of a specifically designed simulation unit that replicates a ‘typical’ hospital environment, although not imperative, does create a familiar setting and provide the necessary equipment for students to deliver the required care. Where possible the equipment and patient charts should be the same as those found in the clinical environment where students undertake clinical placements. Access to information and communication technology such as electronic health records and links to software and websites commonly used in clinical settings also enhances the fidelity of simulation experiences.

There is evidence that simulation experiences have a positive impact on students’ psychomotor skills, knowledge acquisition, satisfaction and self confidence. There is conflicting evidence about the impact of level of fidelity on learning outcomes however. While student satisfaction is generally high irrespective of the level of manikin fidelity, high fidelity manikins appear to promote higher order skills such as critical thinking and teamwork.

These findings and the related financial considerations should be factored into decision making by those planning simulated learning environments. Educators should make use of the range of simulation technologies available, selecting the most suitable equipment to meet the specific learning objectives of the simulation. Additionally, virtual worlds, hybrid simulations, actors and standardised patients also provide valuable learning opportunities.

**Further reading:**


Quality Indicator Statement:

- A structured orientation is provided for students prior to the simulation session and, depending on the students’ prior exposure to simulation activities, includes: introduction to and an opportunity to become familiar with the learning objectives, structure, timing and process of the session; the simulation environment, equipment, manikin, monitoring devices, and information and communication technology to be used.

Rationale:

Orientation to the simulation experience is essential but its importance is not reflected in the literature and too often overlooked in practice. Students often feel anxious prior to engaging in a simulation experience and this anxiety can impede their learning and active engagement. Students need to be provided with clear learning objectives and their roles and expectations clearly explained. Educators need to ensure that students are familiar with the manikin and any equipment that is to be used. A short video can be a useful way to set the scene for the simulation activity. Students also need a written, recorded or verbal handover report and access to hardcopy or electronic patient charts. An opportunity for students to ask questions and have any concerns addressed prior to commencing the simulation is essential to creating an experience conducive to learning.

Further reading:

Staff Preparation and Training

Quality Indicator Statements:

- Staff who design scenarios, conduct the simulation sessions, facilitate debriefing and manage the technology have each undertaken appropriate training.
- Staff who design simulation scenarios and program manikins are familiar with curriculum and course objectives, have relevant clinical knowledge and understand the technological capabilities of manikins.
- Staff who facilitate simulation sessions have relevant clinical knowledge, understand course objectives, and possess expert clinical teaching skills to enable students to relate theory to practice during debriefing.

Rationale:

Simulation experiences typically involve a number of different staff members including tenured academics, part time and casual clinical educators, technical staff and IT staff. However, insufficient training has been identified as the most significant barrier to successful implementation of simulation into undergraduate curricula. The quality of the students’ simulation experience is dependent on the quality of the staff designing and implementing the simulation.

Staff training is therefore crucial, but can be time consuming and expensive. Consideration should be given to the roles that staff will be required to perform, and training targeted at the skills required to perform those roles. Postgraduate studies, online courses, short courses and simulation workshops each provide a level of staff training. Train-the-trainer sessions are frequently used but may be less effective. Simulation certification and credentialing are increasingly being used to develop and validate the expertise of simulation staff.

Further reading:

Simulation courses:
National League for Nursing: Simulation Innovation Resource Center (SIRC) online credentialing course available at sirc.nln.org/
Debriefing has been identified as a critical component of the simulation experience. It should be conducted in a way that participants feel is ‘safe’ and it should be student-centred. Debriefing is an opportunity to methodically review what happened and why and to clarify and consolidate the learning from the simulation. In debriefing participants explore and analyse their actions and thought processes, emotional states, and other information to improve performance in real situations. Educators can use debriefing to foster deep learning and the likelihood of transfer to practice. In debriefing educators revisit the learning objectives of the session and make an implicit comparison between the desired and the observed level of performance. Debriefing provides opportunities for both reflection-on-action and reflection-for-action. Reflection-on-action involves thinking through a situation that has occurred, evaluating the experience and deciding what could have been done differently. Reflection-for-action helps the student to consider how future actions might change as a result of their learning from the simulation experience.

There is no consensus in the literature as to the most appropriate debriefing approach, however conceptual analysis of the debriefing process has identified six key attributes of effective debriefing: release of emotion, reflection on performance, reception of feedback, integration of the experience into a conceptual framework, and assimilation of the new learning to allow transfer to practice. Many debriefing sessions include the use of clinical protocols, algorithms or structured cognitive/clinical reasoning processes. Generally, the length of the debrief should be at least as long as the actual simulation session.

It is important to note that the ability to facilitate an effective debrief is a learnt skill; it requires training, practice and feedback on performance. Educators engaging in simulation should be trained for their role and seek regular feedback on performance.

Further reading:


Debriefing course:
National League for Nursing; Simulation Innovation Resource Center (SIRC) online Debriefing and guided reflection course, available at: sirc.nln.org/mod/resource/view.php?id=97
The following simulation experts are acknowledged for their valuable contribution to the Delphi study that formed the basis of this resource:

**Dr Vico Chiang**
Teaching Consultant
Department of Nursing Studies
The University of Hong Kong

**Associate Professor Christopher Churchouse**
Clinical Manager Edith Cowan University
Centre of Excellence in Healthcare Simulation
School of Nursing Midwifery and Post Graduate Medicine Edith Cowan University, Western Australia
Committee Member, Australian Society for Simulation in Healthcare (ASSH)

**Assistant Professor Cheryl Feken Dixon**
Nursing Clinical Laboratory Coordinator
Tulsa Community College, United States
Board Member, International Association for Clinical Simulation and learning (INACSL)

**Assistant Professor Suzan Kardong-Edgren**
College of Nursing
Washington State University, United States
Editor in Chief, Clinical Simulation in Nursing

**Dr Michelle Kelly**
Director, Simulation and Technologies
University of Technology, New South Wales, Australia
Committee Member, Australian Society for Simulation in Healthcare (ASSH)

**Dr Kim Leighton**
Dean of Instructional Technology and Co-Director of the Center for Excellence in Clinical Simulation
Bryan LGH College of Health Sciences
Lincoln, Nebraska, United States
President, International Association for Clinical Simulation and Learning (INACSL)

**Dr Cate McIntosh**
Director, Simulation Program
Hunter New England Skills and Simulation Centre
John Hunter Hospital, New South Wales, Australia

**Dr Jennifer Newton**
Senior Research Fellow,
School of Nursing and Midwifery,
Monash University, Victoria, Australia

**Clint Moloney**
Lecturer (Nursing),
Faculty of Health Sciences,
University of Southern Queensland, Queensland, Australia
Associate Director
Australian Centre for Rural and Remote Evidence Based Practice.

**Associate Professor John O’Donnell**
School of Nursing
University of Pittsburgh, United States
Associate Director
Winter Institute for Simulation, Education and Research (WISER)

**Ms Angela Sheedy**
Lecturer, School of Health Sciences
Charles Darwin University, Northern Territory, Australia

**Associate Professor Marcus Watson**
Senior Director
Skills Development Centre, Queensland Health, Australia
Chair, Australian Society for Simulation in Healthcare (ASSH)

**Dr Karen Wotton**
Senior Lecturer
School of Nursing and Midwifery
Flinders University, South Australia, Australia

This resource was developed as a component of a Masters of Philosophy study undertaken by Carol Arthur, The University of Newcastle. The resource also forms part of an Australian Learning and Teaching Council project led by Associate Professor Tracy Levett-Jones and Dr Kerry Hoffman.

Support for this project was provided by the Australian Learning and Teaching Council Ltd, an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this paper do not necessarily reflect the views of the Australian Learning and Teaching Council.

For further information please contact:
Carol.Arthur@newcastle.edu.au
Tracy.Levett-Jones@newcastle.edu.au
Ashley.Kable@newcastle.edu.au

also visit:
newcastle.edu.au/project/clinical-reasoning/Delphi-study.html