Quality Indicators for the Design and Implementation of Simulation Experiences

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Contents

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

Abstract

Simulation is widely used in nursing education. Previous studies have examined the impact of simulation on the acquisition of psychomotor skills, knowledge, critical thinking and non-technical skills such as teamwork. Challenges associated with the integration of simulation into nursing curricula have also been examined, however only limited research addresses the most effective simulation design and teaching strategies for quality educational outcomes. This resource documents the results of a Delphi study that synthesises expert opinion on the pedagogical principles and teaching strategies required during clinical simulation; presented as a set of Quality Indicator Statements for use in the design and implementation of clinical simulation sessions.

Key words:
Delphi; Nursing; Quality indicators; Simulation

Introduction

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 into 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:

Parker, B. & Myrick, F. (2009). A critical examination of high-fidelity human patient simulation within the context of nursing pedagogy. *Nurse Education Today,* 29, 322-329.

Nehring, W. & Lashley, F. (2010). *High-fidelity patient simulation in nursing education.* Ontario: Jones and Bartlett Learning:

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.

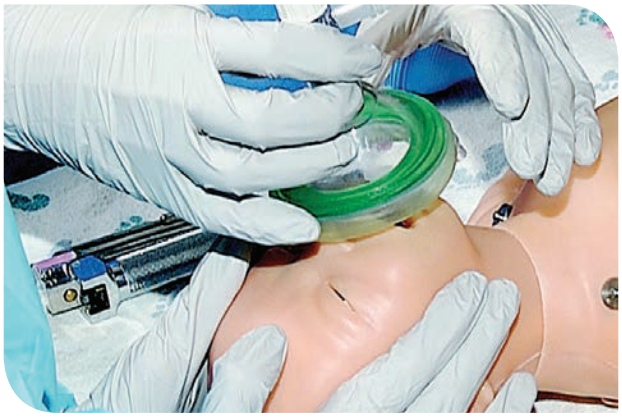
These findings and the related financial considerations should be factored into decision making by those planning simulated learning environments. Educators should make use of the range of simulation technologies available, selecting the most suitable equipment to meet the specific learning objectives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

Further reading:

Kardong-Edgren, S., Lungstrom, N. & Bendel, B. (2009). VitalSim versus SimMan: A comparison of BSN student test scores, knowledge retention and satisfaction. *Clinical Simulation in Nursing. 5*, e105-e111.

Lapkin, S., Levett-Jones, T., Bellchambers, H. & Fernandez, R. (2010). The effectiveness of using human patient simulation manikins in the teaching of clinical reasoning skills to undergraduate nursing students: A systematic review. *JBI Library of Systematic Reviews.* (JBI000287), 8(16)661-694.

Seropian, M., Brown, K. Gavilanes, J. & Driggers, B. (2004). Simulation: Not just a manikin. *Journal of Nursing Education,* 43(4), 164-169.



There is evidence that simulation experiences have a positive impact on students' psychomotor skills, knowledge acquisition, satisfaction & self confidence.

Student Preparation and Orientation

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:

Alfes, C. (2008). Setting the stage for clinical simulation: Developing an introductory video. *Clinical Simulation in Nursing 4*, e65-e67.

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:

Arthur, C. Kable, A. & Levett-Jones, T. (2010). Human patient simulation manikins and information communication technology use in Australian schools of nursing: A cross sectional survey. *Clinical Simulation in Nursing* doi:10.1016/j.ecns.2010.03.002

Seropian, M., Brown, K. Gavilanes, J. & Driggers, B. (2004). An approach to simulation program development. *Journal of Nursing Education*, 43(4), 170-174.

Simulation courses:

Flinders University Rural Clinical School: Graduate Certificate, Graduate Diploma and Masters in Clinical Education (Simulation), available at, som.flinders.edu.au/FUSA/GP-Evidence/rural/education/postgrad/clinicaled/index.htm

National League for Nursing: Simulation Innovation Resource Center (SIRC) online credentialing course available at sirc.nln.org/

Simulation Industry Association Australia (SIAA): SIAA Guide to Professional Skills Development in Australia May 2008. Available at www.siaa.asn.au/documents/SIAA_2008_Guide_to_Simulation_Professional_Skills_Development_in_Australia.pdf

Quality Indicator Statements:

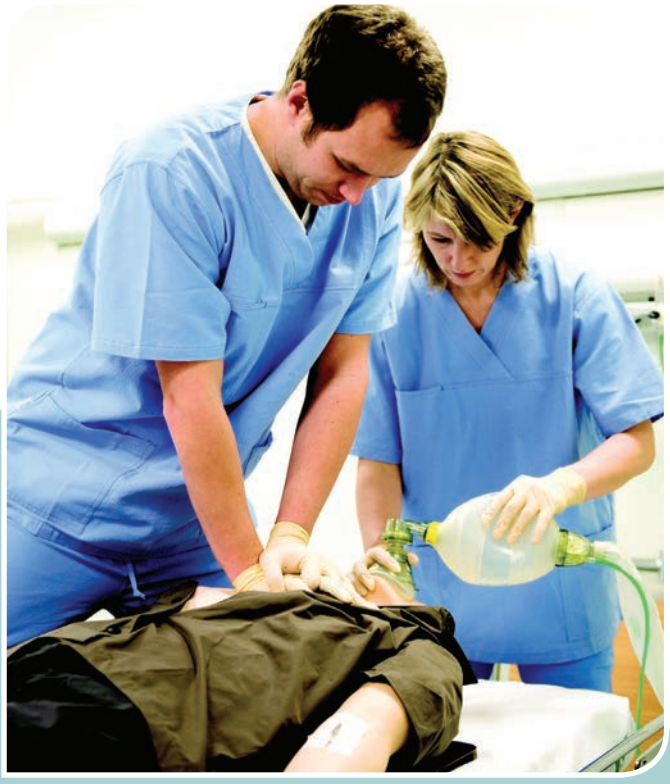
- A structured debriefing is provided immediately following the simulation.
- The debriefing facilitates students' reflection on practice, self evaluation and feedback on their perceptions of the experience.
- Depending on the simulation objectives, opportunities for discussion of students' non-technical skills such as clinical reasoning, situation awareness, communication, leadership and teamwork are included in debriefing.

Rationale:

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:

Cantrell, M.A. (2008). The importance of debriefing in clinical simulations. *Clinical Simulation in Nursing*, 4, e19-e23.

Debriefing Assessment for Simulation in Healthcare (DASH)© Handbook and debrief evaluation forms, available at: www.harvardmedsim.org/dash.html

Dreifuerst, K.T. (2009). The essential of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives*, *30*(2), 109-114.

Levett-Jones, T., Hoffman, K. Dempsey, Y. Jeong, S., Noble, D., Norton, C., Roche, J., & Hickey, N. (2010). The 'five rights' of clinical reasoning: an educational model to enhance nursing students' ability to identify and manage clinically 'at risk' patients. *Nurse Education Today.* 30(6), 515-520.

Owen, H. & Follows, V. (2006). GREAT simulation debriefing. *Medical Education,* 40(5), 488-489

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

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

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