Standards of Best Practice

Standards of Best Practice: Simulation Standard IX: Simulation Design

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Standard Statement

Simulation-based experiences (SBEs) should be purposefully designed to meet identified objectives.

Rationale

Standardized simulation design provides a framework for developing effective SBEs. This design standard includes the best evidence from fields such as adult learning, education, instructional design, clinical standards of care, evaluation, and simulation. Purposeful simulation design promotes essential structure, process, and outcomes that are consistent with programmatic goals and/or institutional mission.

Outcome(s)

Effective health care simulation design facilitates consistent outcomes and strengthens the overall value of the SBE in all settings.

Criteria

The sequence for developing an SBE may vary according to the objectives or desired outcomes*
To achieve optimal outcomes, simulation design should consider the following elements (Figure):

1. Needs assessment
2. Measurable objectives
3. Format of simulation
4. Clinical scenario or case
5. Fidelity
6. Facilitator/Facilitative approach
7. Briefing
8. Debriefing and/or feedback
9. Evaluation
10. Participant preparation
11. Test of the design

Criterion 1: Needs Assessment

Guideline Statement
A needs assessment provides the foundational evidence of the need for a well-designed simulation. The results of the needs assessment guide the designer in developing an overarching goal or broad objective for the simulation, which in turn directs the designer in the development of simulation-specific participant objectives. For specific information, see INACSL Standards of Best Practice (SOBP): Standard III: Participant Objectives (2013).

Guideline 1: A needs assessment may include analysis of:
- Underlying causes of a concern (e.g., root cause or gap analysis)
- Organizational analysis (e.g., Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis)
- Surveys of stakeholders, participants, clinicians, and/or educators
- Outcome data (e.g., from pilot testing; previous SBE’s; aggregate health care data)
- Standards (e.g., certifying bodies, rules and regulations, practice guidelines)

Guideline 2: The needs assessment includes an examination of knowledge, skills, attitudes, and/or behaviors of individuals; organizational initiatives; systems analysis, clinical practice guidelines, quality improvement programs, and/or patient safety goals. The results of the assessment may assist designers to create innovative and interactive experiences, which address the identified needs to
- enhance curriculum in the classroom and/or clinical areas
- provide opportunities for standardized clinical experiences
- address competencies
- improve quality of care and patient safety
- promote readiness for clinical practice

Criterion 2. Measurable Objectives

Guideline Statement
Measurable objectives are determined from the needs assessment. Objectives are designed to address identified needs from a broad to specific scope. These objectives drive the design and the approach for the needed SBE. The facilitator assumes responsibility for guiding the achievement of the full set of objectives throughout the SBE. For specific information, see INACSL SOBP: Standard III: Participant Objectives (2013).

Guideline 1: Broad objectives reflect the purpose of the SBE and are related to organizational goals. Specific objectives are related to participant performance measures. Together, they provide a blueprint for the simulation.

Guideline 2: During the design phase, a determination is made regarding which objectives will or will not be available to the participant(s) before the experience.
- Objectives that provide general information and context for the learner should be disclosed (e.g., provide care for a patient with heart failure).
- Participant performance measures should not be disclosed (e.g., critical action checklist).

Criterion 3: Format of Simulation-Based Experience

Guideline Statement
Selecting the format of the SBE is based on the needs assessment, resources, and broad objectives, taking into account targeted participants and the purpose, theory, and modality. The format of an SBE provides the structure and process and allows the designer to identify expected outcomes of the experience.

Guideline 1: Purpose, Theory, and Modality
- The purpose of the SBE is to provide a formative and/or summative encounter.
- A theoretical and/or conceptual framework is chosen based on the identified purpose and the targeted participants (e.g., adult learners, interprofessional teams, etc.).
- The modality is the platform for the experience. Modalities can include simulated clinical immersion, computer-based simulation, virtual reality, procedural simulation, and/or hybrid simulation. These modalities are achieved using standardized patients, manikins, haptic devices, avatars, partial task trainers, and so forth.

Guideline 2: Structure: All SBEs include a starting point, structured participant activities, and an end point. The starting point represents the initial circumstances of the patient or situation when the participants start their engagement in the SBE. Structured participant activities
are designed for participant engagement. (e.g., a simulated case or an unfolding scenario, and/or psychomotor skill teaching/evaluation). The end point is the stage at which the SBE is expected to end, usually when expected learning outcomes have been demonstrated, time is exhausted, or the scenario can proceed no further.

Criterion 4: Clinical Scenario or Case

Guideline Statement
Development of the clinical scenario or case provides the context for the simulation experience. The designer should use a process that ensures quality and validity of the content and maintains the reliability and standardization of objectives. The clinical scenario or case story may include a situation and backstory, clinical progression and cues, time frames, script, and identification of critical actions:

Guideline 1: The Situation and Backstory provide a realistic starting point from which the structured activity begins. The full picture of this context may be given verbally to the participants, found in the patient’s file, or be revealed if requested through adequate inquiry on the part of participants.

Guideline 2: Clinical Progression and Cues provide a framework for the advancement of the clinical case or scenario in response to participant actions, including standardization of cues to guide the participant(s). These cues should be linked to performance measures and used to refocus participants when they stray from the intended objectives. Cues can be delivered to participants in a variety of ways, including verbally (e.g., through the patient, provider, or embedded participant), visually (e.g., through changes in vital signs on a monitor), through additional data (e.g., new lab results), and so forth.

Guideline 3: Time Frames are established as part of the design to ensure there is reasonable time to achieve the objectives.

Guideline 4: The script of a scenario or case is developed for consistency and standardization to increase scenario repeatability/reliability. Variation from the planned dialogue may add distractions that could interfere with the learning objectives and affect validity and/or reliability of the scenario or case.

Guideline 5: Identification of Critical Actions/Performance Measures is required to evaluate achievement of scenario objectives. Each measure should be evidence-based. Use of subject matter experts will strengthen validity of the simulation scenario and the critical performance measures.

Criterion 5: Fidelity

Guideline Statement
Various types of fidelity should be considered to create the required perception of realism. This perception of realism allows participants to engage in a relevant manner. The design of the simulation is enhanced through attention to physical, conceptual, and psychological aspects of fidelity to contribute to the attainment of objectives.

Guideline 1: Physical fidelity relates to how realistically the physical context of the simulation-based activity replicates the actual environment in which the situation would occur in real life. Physical fidelity includes such factors as the patient(s), simulator, standardized patient, environment, equipment, embedded participants, and related props.

Guideline 2: Conceptual fidelity ensures that all elements of the scenario or case relate to each other in a realistic way so that the case makes sense as a whole to the learner(s) (e.g., vital signs are consistent with the diagnosis). To maximize conceptual fidelity, cases or scenarios should be reviewed by subject matter expert(s) and pilot tested before use with learners.

Guideline 3: Psychological fidelity is maximized when the simulation environment mimics contextual elements found in clinical environments, for example, an active voice for the patient(s) to allow realistic conversation, noise, distractions, family members, other health care team members, time pressure, and competing priorities. Psychological fidelity works synergistically with physical and conceptual fidelity to promote participant engagement.

Criterion 6: Facilitator/Facilitative Approach

Guideline Statement
In the design phase, the facilitative approach is determined. The specific facilitation method selected should be participant centered and driven by the objectives, participant’s knowledge/level of experience, and the expected outcomes. The level of facilitator involvement is inversely proportional to the participant’s knowledge and experience. The facilitative approach should be consistent among facilitators for each scenario, case, or SBE. For more specific information on facilitation or facilitator, see INACSL Standards of Best Practice (INACSL SOBP): Standard IV: Facilitation and Standard V: Facilitator (2013). For the most effective outcomes, facilitators should receive formal training in simulation-based pedagogy.

Criterion 7: Briefing

Guideline Statement
Briefing is an integral part of the SBE. Briefing sets the stage for the SBE by identifying participants’ expectations and may differ depending on the level of experience of the participant(s) and theoretical framework. Briefing is structured, planned for consistency, and completed immediately before the scenario/case.
Guideline 1: Briefing activities include the establishment of an environment of integrity, trust, and respect. Briefing includes identification of expectations for the participant(s) and the facilitator(s). This includes establishment of ground rules and a fiction contract.

Guideline 2: Briefing should include orientation of the participant(s) to the space, equipment, simulator, method of evaluation, roles (participants/facilitator/standardized patient), time allotment, broad and/or specific objectives, patient situation, and limitations.

Guideline 3: A written or recorded briefing plan standardizes the process and content for each scenario/case.

Criterion 8: Debriefing and/or Feedback

Guideline Statement
In the design phase, a debriefing or feedback method is identified. Debriefing and feedback are different, but both are critical elements that should be structured using best practices. Effective debriefing is enhanced by adequate training and preparation of the facilitator. Using a planned debriefing or feedback session enriches learning and contributes to the consistency of the SBE for participants and facilitators. In the case of a skills-based or testing simulation activity, debriefing may be replaced by feedback so the participants are guided to further improve or confirm their practice. For specific information, see INACSL SOBP: Standard VI: The Debriefing Process (2013). Debriefing facilitators should have formal training in debriefing techniques.

Criterion 9: Evaluation

Guideline Statement
In the design phase, evaluation processes are determined to ensure quality and effectiveness. Adoption of an evaluation framework guides selection/development of a valid tool that is used to measure outcomes. Participant evaluation may be formative, summative, and/or high stakes. Methods of evaluation should be clear to the participant(s) before or at the onset of the simulation.

The evaluation process should include an evaluation of the participant(s), facilitator(s), the SBE, the facility, and support team. Evaluation includes input from participants, peers, and stakeholders. These data are used to assist in evaluating the simulation program for quality process improvement. For specific information, see INACSL SOBP: Standard VII: Assessment and Evaluation (2013).

Criterion 10: Participant Preparation

Guideline Statement
In the design phase, inclusion of participant preparation should be determined once all the elements of the SBE have been identified. Preparation is designed to promote the best possible opportunity for participants to successfully address the simulation objectives. The designer and facilitator are responsible for ensuring that preparatory activities address the knowledge, skills, attitudes, and behaviors that will be expected of the participants during the SBE. Preparation activities should support the participant(s) ability to achieve the objectives of the SBE and are completed in advance of the SBE briefing.

Guideline 1: Participants should be prepared with a basic understanding of the concepts related to the SBE. Preparation may include the following:
- Activities related to the content (e.g., reading assignments, coursework, didactic sessions, answering simulation-specific questions, watching preparatory audiovisuals, completing a pre-test, etc.)
- Information regarding codes of conduct, confidentiality, and expectations. For more information, see INACSL SOBP Standard II: Professional Integrity of Participant(s) (2013).

Criterion 11: Pilot Testing of the Simulation-Based Experience

Guideline Statement
On completion of the design, the entire SBE should be pilot tested to ensure it accomplishes what is intended, meets objectives, and is effective when used with participants. Any confusing, missing, or underdeveloped elements of the SBE can be identified during the pilot testing and addressed before the actual simulation encounter. An optimal test
environment would be an audience similar to the target participant group. Testing may also include the evaluation tool, checklists, and other measures to assess for validity and to ensure consistency and reliability (i.e., content validity, expert review, interrater reliability, etc).

**Design Templates**

A template may be selected to guide the evidence-based design and standardize the design process. A sample of template resources is available in the references (Alinier, 2011; Al-Shidhani, 2010; Meukim & Mariani, 2013; NLN, 2010; Waxman, 2010).

SBEs, similar to all educational experiences, should be deliberately planned, guided by objectives, and tested. This standard provides guidance for educators by outlining the many factors and elements to be considered when designing a SBE to optimize the participants’ learning outcome. This simulation design standard article provides guidance regarding 11 crucial criteria to ensure the effectiveness of such learning experience based on current best practice.

**Acknowledgments**

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**References**


**Guideline References and Supporting Materials**

**Criterion 1. Needs Assessment**


**Criterion 2. Measurable Objectives**


**Criterion 3. Format of Simulation**


**Criterion 4. Clinical Scenario or Case**


**Criterion 5. Fidelity**


**Criterion 6. Facilitative Approach**


**Criterion 7. Briefing**


**Criterion 8. Debriefing**


**Criterion 9. Evaluation**


**Criterion 10. Participant Preparation**


**Template References**


