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Healthcare Simulation Standards of Best Practice™ Simulation Design

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As the science of simulation continues to evolve, so does the need for additions and revisions to the Healthcare Simulation Standards of Best Practice. Therefore, the Healthcare Simulation Standards of Best Practice™ are living documents.

Standard

Simulation-based experiences are purposefully designed to meet identified objectives and optimize the achievement of expected outcomes.

Background

Standardized simulation design provides a framework for developing effective simulation-based experiences for participants. The method of simulation-based experiences incorporates best practices from adult learning[1], educa-

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tion,[2,3] instructional design,[4,5] clinical standards of care,[6,7] and simulation pedagogy.[8-11], and simulation pedagogy[12-16] Purposeful simulation design promotes essential structure, process, and outcomes consistent with programmatic goals and institutional mission and strengthens their overall value in all settings. All simulation-based experiences require purposeful and systematic yet flexible and cyclical planning. To achieve expected outcomes, their design and development should consider criteria that facilitate their effectiveness. Following this standard supports development of relevant/ educationally sound simulation-based experiences.

Criteria Necessary to Meet this Standard

1 Simulation-based experiences (SBE) should be designed in consultation with content experts and simulationists knowledgeable in best practices in simulation education, pedagogy, and practice.
2 Perform a needs assessment to provide the foundational evidence of the need for a well-designed simulation-based experience.
3 Construct measurable objectives that build upon the learner's foundational knowledge.
4 Build the simulation-based experience to align the modality with the objectives.
5 Design a scenario, case, or activity to provide the context for the simulation-based experience.
6 Use various types of fidelity to create the required perception of realism.
7 Plan a learner-centered facilitative approach driven by the objectives, learners' knowledge and level of experience, and the expected outcomes.
8 Create a prebriefing plan that includes preparation materials and briefing to guide participant success in the simulation-based experience.
9 Create a debriefing or feedback session and/or a guided reflection exercise to follow the simulation-based experience.
10 Develop a plan for evaluation of the learner and of the simulation- based experience.
11 Pilot test simulation-based experiences before full implementation.

Criterion 1: Simulation experiences should be designed in consultation with content experts as well as simulationists who are knowledgeable and competent in best practices in simulation education, pedagogy, and practice.

Required Elements:

- Simulation designers should have formal or informal training in simulation pedagogy and practices.
- Suggested methods for developing competency include (but are not limited to):
  - Joining professional simulation organizations.
  - Incorporating the Healthcare Simulation Standards of Best Practice™ (HSSOBP™).
  - Literature survey and review.
  - Mentorship and networking.[17,18]
  - Formal coursework or certification.[18,19]
  - Simulation conference attendance or workshops.[17,18]
  - Continuing education offerings focusing on pedagogy or andragogy.
- Be knowledgeable of ethical standards of simulation-based experiences and adhere to the Healthcare Simulationist Code of Ethics[19] (Follow the HSSOBP™ Professional Integrity).
- Content experts should have a general knowledge of simulation and scenario design principles, debriefing methods, and evaluation approaches.[18]
- Follow the HSSOBP™ Professional Development.

Criterion 2: Perform a needs assessment to provide the foundational evidence of the need for a well-designed simulation-based experience.

Required Elements:

- The needs assessment may include analysis of:
  - Underlying causes of concern (e.g., root cause or gap analysis).
  - Organizational analysis (e.g., Strengths, Weaknesses, Opportunities and Threats analysis).
  - Surveys of stakeholders, learners, clinicians, and/ or educators.
  - Outcome data (e.g., from pilot testing; certification or licensure exams, previous simulation-based experiences; aggregate health care data; patient safety data).
  - Standards (e.g., certifying bodies, rules and regulations, practice guidelines).
- The needs assessment includes examining knowledge, skills, attitudes, and/or behaviors of individuals; organizational initiatives; systems analysis; clinical practice guidelines; quality improvement programs; and/or patient safety goals.
- Use the needs assessment results to guide the development of an overarching goal or broad objective for the simulation, which directs the designer(s) in the development of simulation-specific objectives (Follow the HSSOBP™ Objectives and Outcomes).
- Use the results of the needs assessment to create relevant, innovative, and interactive simulation-based experiences that aim to:
  - Enhance curriculum in the classroom and/or clinical areas.
  - Provide just-in time training in the clinical practice setting.
  - Provide opportunities for standardized clinical experiences.
  - Address relevant and identified competencies.
  - Improve the quality of care and patient safety.
  - Promote readiness for clinical practice.

Criterion 3: Construct measurable objectives that build upon the learner's foundational knowledge.

Required Elements:

- Develop broad and specific objectives to address identified needs and optimize the achievement of expected outcomes. These objectives provide a blueprint for the design of a simulation-based experience.
- Use broad objectives to reflect the purpose of the simulation-based experience and are related to organizational goals.
- Create specific objectives for learner performance measures.
- During the design phase, determine which objectives will or will not be available to the learner(s) before the experience. For example, it may be appropriate to disclose general information and context for the learner (care of a postoperative patient), but specific critical actions (interventions for sepsis) may not be disclosed until the debriefing session. Objective disclosure will be determined by the overall purpose of the simulation-based experience.
- Follow the HSSOBP™ Objectives and Outcomes.

Criterion 4: Build the simulation-based experience to align the modality with the objectives.

Required Elements:

- Develop the simulation-based experience format based on the needs assessment, resources available, learning objectives, the targeted learners, and the type of assessment or evaluation method.
- Choose a theoretical and/or conceptual framework[20-22] based on the identified purpose and the targeted learners (e.g., adult learning, inter-professional teams.[23]
- Select the appropriate modality for the simulation-based experience. The modality is the platform for the experience and includes simulated clinical immersion, in situ simulation, computer-assisted simulation, virtual reality, procedural simulation, and/ or hybrid simulation. These modalities may incorporate, but are not limited to the following: standardized patients, manikins, haptic devices, avatars, partial task trainers, and so forth.[24]
- Develop all simulation-based experiences to include a starting point, structured learner activities, and an endpoint.
    - The starting point represents the patient's initial circumstances or situation when the learners start their engagement in the simulation-based experience.
    - Structured activities are designed for learner engagement (e.g., a simulated case or an unfolding scenario, and/or psychomotor skill teaching/evaluation).
    - The endpoint is the stage at which the simulation-based experience is expected to end; usually, when desired learning outcomes have been demonstrated, time is exhausted, or the scenario can proceed no further.

Criterion 5: Design a scenario, case, or activity to provide the context for the simulation-based experience.

Use a process to design a scenario, case, or activity that ensures the content's quality and validity and supports the objectives and expected outcomes.[25-27]

Required Elements:

- Design the scenario, case, or activity to include:
- A situation and backstory to provide a realistic starting point from which the structured activity begins.
    - The complete picture of this context may be given verbally to the learners, found in the patient's file, or be revealed if requested through adequate inquiry.
- A script for 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 objectives and affect the validity and/or reliability of the scenario or case, especially when the activity is expected to be run with consecutive groups of learners.
- Clinical progression and cues provide a framework for the advancing of the clinical case or scenario in response to learner actions, including standardization of cues to guide the learner(s).
    - Cues, if used, should be linked to performance measures and used to refocus learners when they stray from the intended objectives.[28]
    - Cues can be delivered to learners 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 laboratory results), and so forth (Follow the HSSOBP™ Facilitation).
    - Planned time frames serve to facilitate the progression of the scenario and ensure that there is a reasonable time to achieve the objectives.[12]
- Identification of critical actions/performance measures that are required to evaluate achievement of scenario objectives.[29]
    - Each measure should be evidence-based. Use content experts to strengthen validity of the simulation scenario and the critical performance measures.

In the case of a purely procedural or psychomotor activity:

- A clear and concise scripted explanation provides the context for the activity to be undertaken.
- A setting represents the clinical environment so the learner(s) can practice or undertake the task in an ergonomics matching the experience in the actual clinical setting.[30]

- Identification of critical actions/performance measures that are required to evaluate achievement of the activity objectives.[31]

Criterion 6: Use various types of fidelity to create the required perception of realism.

Required Elements:

- Design the simulation through attention to physical, conceptual, and psychological aspects of fidelity that can contribute to the attaining objectives. Specifically, this is less about specific "reality" and should instead focus on representing stimuli and cues that would typically be present to drive decision-making and action.[32] These aspects of fidelity must be considered from the perspective of the learners.[33-37]
  - Physical (or environmental) fidelity relates to how realistically the physical context of the simulation-based activity compares to[38] the actual environment in which the situation would occur in real life. Physical fidelity includes such factors as the patient(s), simulator/manikin, standardized patient, environment, equipment, embedded actors, and related props.[39-41]
  - Conceptual fidelity ensures that all elements of the scenario or case realistically relate to each other so that the patient 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 the content expert(s), and pilot tested before use with learners.[39,40]
  - Psychological fidelity maximizes the simulation environment by mimicking the contextual elements found in clinical environments. Some examples include an active voice for the patient(s) to allow realistic conversation, noise and lighting typically associated with the simulated setting, distractions, family members, other health care team members, time pressure, and competing priorities. Psychological fidelity works synergistically with physical and conceptual fidelity to promote learner engagement.[39,40]
  - Develop the simulation using the appropriate types of fidelity that create the required perception of realism that will allow learners to engage in a relevant manner.[33,36,37,39,42-45]
  - Fidelity should also be broken down to focus on patient, facility, and scenario. This framework would be used in conjunction with the concepts of physical, conceptual, and psychological fidelity to create the highest possible fidelity in each element of the simulation.
- As appropriate, use moulage to replicate features or characteristics of the patient situation and when possible, select manikins that respectfully represents the race and culture of the patients in the scenario to promote the sensory perceptions of learners and support the fidelity of the scenario.[44-46]
- It is important to reiterate the distinction between fidelity and modality or technology. These terms are independent of one another and need to remain so.[32,39] High-technology does not necessarily equate to high-fidelity, and any single modality (manikin, task trainer, etc.) may or may not be high-fidelity without caveat. Not every simulation requires the highest fidelity of realism. Determinations about the degree of fidelity and the implementation of this fidelity need to be determined through the examination of several factors.[33,36,37,39,42-45] These factors may include, but are not limited to:
  - Learner level
  - Learning objectives
  - Available time and resources
  - Available equipment
  - Desired learning outcomes
  - Clinical significance

Criterion 7: Plan a learner-centered facilitative approach driven by the objectives, learners' knowledge and level of experience, and the expected outcomes.

Required Elements:

- Facilitators who have formal training in simulation-based pedagogy.
- Determine the planned facilitative approach during the simulation in the design phase and include preparatory activities.[48]
- If the plan is to have more than one facilitator, applying a structured approach to preplan certain aspects of the prebriefing and debriefing session.[49]
- Facilitators should incorporate evidence-based components of cultural diversity within the simulation design or scenarios.
- Use a level of facilitator involvement that is appropriate to the learner's knowledge, competency and experience.[50,51]
- Predetermine the delivery of cues as part of the facilitation planning to be delivered during the simulation activity.[52]
- Facilitators should be aware and mindful of the learners' diverse cultural differences, values and responsibilities and consider that during the simulation design phase.[53]
- Facilitators should refer to the Healthcare Simulationist Code of Ethics with respect to confidentiality, mutual respect, and creating a safe educational environment.[19]
- Follow the HSSOBP™ Facilitation[47] and Professional Integrity.

Criterion 8: Create a prebriefing plan that includes preparation materials and briefing to guide participant success in the simulation-based experience.[54-58]

Prebriefing activities are intended to establish a psychologically safe learning environment by:

1) Situating the learners into a shared mental model and preparing participants for the simulation-based experience's educational content (preparation).
2) Conveying important ground rules for the simulation-based experience (briefing).

Required Elements:

- Prebriefing should be developed according to the purpose and learning objectives of the simulation-based experience.[54–58]
- Consider the experience and knowledge level of the simulation participant when planning the prebriefing.[54-59]
- Develop preparation materials to assure that participants are prepared for the experience and can meet the scenario or procedural objectives based on the experience's needs assessment and purpose.[54-58,60,61]
- Convey important information to participants regarding expectations, agendas, and logistics before beginning the simulation-based experience.[54-57,59,60]
- Conduct a structured orientation to the simulation-based learning environment including the modality.[55,56,60]
- Establish a psychologically safe learning environment during the prebriefing.[55,57-59]
- Follow the HSSOBP™ Prebriefing: Preparation and Briefing.

Criterion 9: Create a debriefing or feedback session and/or a guided reflection exercise to follow the simulation-based experience.

Required Elements:

Identify the most appropriate debriefing, feedback, or reflective method for the simulation-based experience during the design phase.[62,63]

- Use a planned debriefing, feedback session, or a guided reflection exercise to enrich learning and contribute to the consistency of the simulation-based experiences for learners and facilitators.[64]
- Debriefing and feedback are different, but both are critical elements that should be structured using best practices. In the case of a skills-based or testing simulation activity, debriefing may be replaced by feedback, so the learners are guided to improve further or confirm their practice.[65,66]
- Guided reflection is an intellectual and affective activity that explores the critical elements to gain understanding and insight. It can be integrated with debriefing or accomplished after the event through journaling or open discussions.[65]
- Debriefing facilitators should have formal training in debriefing techniques.[65,67]
- Follow the HSSOBP™ The Debriefing Process

Criterion 10: Develop a plan for evaluation of the learner and of the simulation-based experience.

Required Elements:

- Determine the assessment and evaluation processes in the design phase to ensure quality and effectiveness of simulation-based experiences.[27]
- Consider an assessment framework to guide the selection and/ or development of a valid and reliable tool to measure expected learner outcomes.[68]
- Ensure that participants understand the method of assessment (formative, summative, and/or high stakes) before or at the onset of the simulation.
- Follow the HSSOBP™ Evaluation of Learning and Performance.
- Plan an evaluation process to determine the quality or effectiveness of the simulation- based experience Use evaluation data for continuous quality improvement. Include feedback from participants, peer clinicians and educators, stakeholders, and simulation program faculty and staff[68–70] in the evaluation process.

Criterion 11: Pilot test simulation-based experiences before full implementation.

Required Elements:

- After the design is complete, pilot test the entire simulation-based experience to ensure that it accomplishes its intended purpose, provides opportunity to achieve objectives, and is effective when used with learners.
- Select a participant similar to the target learner group for the optimal test environment.
- Select any tool(s), checklists, or other measures to assess for validity and to ensure consistency and reliability (i.e., content validity, expert review, inter-rater reliability).
- During pilot implementation, identify any confusing, missing, or underdeveloped elements of the simulation-based experience.
- Make improvements based upon the pilot and revise before the full implementation of the simulation-based experience.
- Recognize that it may not always be possible to pilot test simulation-based experiences prior to facilitation (For example, just in time training or with limits to time and resources).

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About the International Nursing Association for Clinical Simulation and Learning

The International Nursing Association for Clinical Simulation and Learning (INACSL) is the global leader in transforming practice to improve patient safety through excellence in health care simulation. INACSL is a community of practice for simulation where members can network with simulation leaders, educators, researchers, and industry partners. INACSL also provided the original living documents INACSL Standards of Best Practice: Simulation℠, an evidence-based framework to guide simulation design, implementation, debriefing, evaluation, and research. The Healthcare Simulation Standards of Best Practice™ are provided with the support and input of the international community and sponsored by INACSL.