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Healthcare Simulation Standards of Best Practice™ Outcomes and Objectives

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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

All simulation-based experiences (SBE) originate with the development of measurable objectives designed to achieve expected behaviors and outcomes. A SBE is defined as "An array of structured activities that represent actual or potential situations in education and practice. These activities allow learners to develop or enhance their knowledge, skills, and attitudes, or to analyze and respond to realistic situations in a simulated environment".[1] Current literature demonstrates the use of simulation in educational settings, to facilitate achievement of cognitive, psychomotor, and affective skills.[2]

Background

The development of the simulation-based experience (SBE) originates after an educational need has been identified. The needs assessment informs the learning objectives. The SBE is constructed through the development of objectives, as guided by the identified outcomes. Outcomes are influenced by the accrediting bodies, program, clinical agency, course, or patient care needs. For learners to achieve intended objectives and/or outcomes, simulationists need to create or use valid and reliable scenarios.[3,4,7-9]

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Outcomes

Considered essential to learning, outcomes are a "measurable result of the learners progress toward meeting a set of objectives."[5] An integral component of instructional and research design, outcomes are used by simulationist, clinicians, and researchers to determine the impact of simulation-based experiences.[6] Expected outcomes are the change in knowledge, skills, and/or attitudes as a result of the SBE.[7-8] The New World Kirkpatrick Model[10] provides four sequential levels of evaluation: (1) *Reaction* – measures the degree to which learners find the training favorable, engaging, and relevant to their jobs; (2) *Learning* - measures the degree to which learners acquire the intended knowledge, skills, attitude, confidence and commitment based on their participation in the training; (3) *Behavior* - measures the degree to which learners apply what they learned during training when they are back on the job; and (4) *Results* - measures the degree to which targeted outcomes occur as a result of the training, support, and accountability.

Objectives

Once SBE outcomes have been determined, the next step is to develop objectives. Objectives are the blueprint for simulation design.[11] Objectives are guiding tools to facilitate achievement of simulation-based learning outcomes and the hallmark of sound educational design.[11] Defined as "statements of specific measurable results that learners are expected to achieve during SBE", written objectives may encompass cognitive (knowledge), skills (psychomotor), and affective (attitude) domains of learning that advance the learners' level of knowledge, skills, and experience.[5] All objectives should be created to facilitate transfer of knowledge to prepare for practice of safe patient care.[1-2]

Learning objectives also assist in determining what type of simulation tool/model/manikin and fidelity should be utilized. Choosing a simulation tool, model, or manikin with appropriate modality or characteristics to enable the achievement of learning objectives is salient to the design process.[12-14]

Objectives created for the SBE should be articulated and goal-directed to achieve the desired outcome. To maintain psychological safety, simulationists should disclose essential information and objectives with the learners before engaging in a formative or summative SBE.[15-17] In general, this will include broad information and context, but may not include critical actions before the initiation of the simulation activity. In addition, learning objectives must consider the needs of the learner. Moreover, during simulation design, learning objectives are developed in alignment with Blooms' Revised Taxonomy[18-21]

Blooms' Revised Taxonomy [20-21] provides a framework for developing and leveling objectives to meet expected outcomes. The taxonomy classifies three domains of learning: cognitive (knowledge), psychomotor (skills), and affective (attitudes)[18-21]. Each learning domain has a hierarchical taxonomy applicable to simulation activities. The revised Blooms' Taxonomy [19] hierarchy progresses from the lower level objectives, remembering and understanding, to the higher-level objectives, applying, analyzing, evaluating, and creating. These action verbs provide structure and communicate the knowledge, skills, and attitudes (KSA) the learner is intended to achieve as a result of involvement in a simulation-based activity. [18-21]

Furthermore, when creating learning objectives, scaffolding SBE objectives requires the simulationist to guide the learner to apply their knowledge and skills by building upon foundational knowledge.[22-23] By doing so, the overall cognitive load imposed during the SBE can be reduced and therefore improve integration of new knowledge.[24-26] Alignment of cognitive load with learner's readiness promotes improved expertise development and problem-solving during SBE.[24-27] Moreover, learning depends on sufficient room in memory stores to process new information.[28-29]

Vygotsky's theory of the zone of proximal development encourages effective learning by advancing the learner through the learning process step-by-step until they can conduct themselves without assistance.[30] This zone of proximal learning allows the learner to safely advance while building on prior knowledge.

In order to have achievable outcomes, clearly defined, measurable objectives are necessary. In the field of corporate management, Doran[31] created the acronym S.M.A.R.T. (specific, measurable, assignable, realistic, and time related) as a framework to develop meaningful, measurable objectives. Organizations have adapted the principles with differing, yet similar criteria. [22] The S.M.A.R.T framework is used to write and contextualize desired KSAs that simulation learners should demonstrate upon completion of SBE [22,31,32]

The Center for Disease Control[33] provides academia and the healthcare industry with the following S.M.A.R.T. criteria for writing objectives: [21-22,30-32]

- *Specific*: What exactly are we going to do for whom? Is the objective clearly worded using strong action verbs? Are terms concrete, well-defined, and learners informed of what is expected?
- *Measurable*: Is it quantifiable and measurable? Consider numbers and units of measure for comparison.
- *Achievable*: Can the SBE be completed in the proposed time frame with the resources and support available? What are the limitations to consider?
- *Realistic*: Will the SBE have an effect on the desired goal or outcome? Are the resources required available for this activity?
- *Time phased*: When will this objective be accomplished? What is the stated timeline?

Potential consequences of not following S.M.A.R.T. criteria within this standard can lead to ambiguity, unintended outcomes, and failure to meet objectives of the SBE.[21,31,33] This may include skewed evaluation results; decreased learner satisfaction; failure to achieve desired KSA's; and/or lack of change in quality and safety indicators.

Criteria necessary to meet this standard:

1 Establish learner outcomes influenced by accreditation, program, curriculum and/or patient care needs that are measurable and appropriately scaffolded to learner knowledge, skills, and attitudes. [3,6-9,11,23-26,34]
2 Create objectives for the simulation-based experience to meet defined outcome based on formative or summative evaluation. [4,8,10-12,16,17,31,33]
3 Identify appropriate simulation modality to meet the learning objectives/outcomes.[12-14]
4 Identify appropriate fidelity to meet the learning objectives/outcomes. [12-14,34-38]
5 Establish guidelines for facilitation of SBE to meet objectives.[15-20,39]

Criterion 1: Establish learner outcomes influenced by accreditation, program, curriculum and/or patient care needs that are measurable and appropriately scaffolded to learner knowledge, skills, and attitudes. [3,6-9,11,23-26,34]

Required Elements for Outcomes are:

- Consistent with the mission & vision of the program.
- Based on programmatic goals.
- Based upon needs assessment, evidence-based practice, clinical partners, and stakeholders.
- Representative of equity, inclusivity & diversity.
- Consistent with an identified framework i.e. New World Kirkpatrick's Model (reaction, learning, behavior, & results).
- Aligned with Healthcare Simulation Standards of Best Practice™ (HSSOBP™) Simulation Design (Follow the HSSOBP™ Simulation Design).
- Driven by objectives within educational or clinical setting.
- Communicated purposefully to learners in advance of SBE.

Criterion 2: Create objectives for the simulation-based experience to meet defined outcome based on formative or summative evaluation. [4,8,10-12,16,17,31,33]

Required Elements for Objectives are:

- Goal-driven.
- Scaffolded appropriately, incorporating level of attainment based upon the revised Bloom's Taxonomy model. Remembering being at the lowest level, understanding, applying, and analyzing in the middle, and evaluating and creating being the highest.
- Reflective of S.M.A.R.T. strategies.
- Aligned by mapping with outcomes established for the course, program, institution and/or accrediting body.

Criterion 3: Identify appropriate simulation modality to meet the learning objectives/outcomes.[12-14]

Examples of simulation modality are:

- Low technology (i.e. task trainer, case study, role play).
- High technology (i.e. high complexity simulation manikin mimicking human body functions).
- Simulated Patient (i.e. live patient versus virtual patient technology).
- Virtual/Augmented Simulation (i.e. three-dimensional (3D) immersion using Head-mounted Display VR (HMD VR), haptic enhanced task trainers, computer screen-based, immersive rooms, interactive clinical case scenarios with branching case structure).

Criterion 4: Identify appropriate fidelity to meet the learning objectives/outcomes. [12-14,34-38]

Examples of fidelity are:

- Conceptual (i.e. vital signs and lab results reflect the diagnosis).
- Physical/Environmental (i.e. setting of in-situ versus simulation lab, equipment, tools, sensory props, manikin, moulage).
- Psychological (i.e. evokes underlying emotions, beliefs, and self-awareness of learners).

Criterion 5*:* Establish guidelines for facilitation of SBE to meet objectives.[15-20]

Required Elements:

- Aligned with Healthcare Simulation Standards of Best Practice™. (Follow the HSSOBP™ Simulation Design).[39]
- Fundamental guides for teaching or evaluation.
- A clear understanding of expectations for the SBE learners.
- Simulationists that are trained and deemed competent in facilitation of simulation-based experiences, as described in the HSSOBP™ Professional Development.

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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.