Best Practices in Simulation Education

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Objectives

• Identify best practices in providing effective simulation education.

• Review models and constructs guiding course development

• No disclosures
From here, it’s possible.

At the Texas Tech University Health Sciences Center, health care professionals receive a hands-on education coupled with innovative research opportunities. Discover how we’re advancing the health of people in West Texas and beyond.
Adult Learning Principles

• Diverse Learning Styles
  • Visual (realism, fidelity of the environment)
  • Auditory (verbal responses)
  • Tactile (demonstrate)
  • Kinesthetic (handling equipment)
Adult Learning Principles

• Constructivism

Learning = process of constructing meaning

Educator functions as a collaborative facilitator
Includes experiential learning

Active engagement
Reflective thought
Philosophic Framework

- Kolb (1984)
  - Learning enhanced through a synergistic transaction between learner and the environment

- Bandura (1977)
  - Learning enhanced – self-confidence promoted with active learning
Philosophic Framework

• Dewey (1910, 1916)
  • Learning is dependent upon integration of experience with reflection and of theory with practice

• Schöhn (1987)
  • Learning promoted through the use of a “reflective practicum” – learning environment realistic in which faculty act as coach
Simulation as an Educational Strategy

- Requires faculty to:
  - develop new competencies
  - be risk takers
Best Practices

- Outcomes dependent on
  - Planning

- Structure/design
- Questioning / cueing
- Critique
- Evidence Based
- Practice

Hawkins, Todd, & Manz, 2008
Jeffries & Rizzalo, 2007
Best Practices

- Appropriate personnel

- Developing the case scenario
- Critiquing the case scenario
- Preparing the room
- Managing the simulator
- Critiquing the learners
- Conducting debriefing / guided reflection
- Modifying the case scenario
Best Practices

➢ Faculty Buy-In
  • Faculty development
  • Orientation to simulation/simulators

• Active participation
  - Planning scenarios
  - Observation of student performance
Best Practices

➢ Learners Buy-In

• Orientation

• Repeated experiences

• Introduce early in the curriculum
Best practices

Components of simulation promoting learning

- Feedback
- Repetitive practice
- Curriculum integration
- Effective use of difficulty
- Multiple learning strategies
Best Practices

Integration through-out the Curricula

- Develop a curriculum map
- Identify learning outcomes to be facilitated by simulation
- Determine placement within curriculum
- Match with theoretical content
- Conduct and gather outcomes
- Modify
## Concepts/Included in all scenarios

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Patient Safety</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Communication</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Resource Management</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Situation Awareness/Prioritization</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Therapeutic Interventions</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Assessment</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Critical thinking</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Others?</td>
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Models and Constructs

• Framework for single session
  - 90 minutes
    • Rapid sequence of 3 related simulations
    • Intermixed with two focused teaching sessions
    • Concluded with 15 min Reflective Session

  - 94% felt exercise should be routine part of curriculum

McMahon, Monaghan, Falchuk, Gordon, & Alexander, 2005
Models and Constructs

- Framework for clinical day *(TTUHSC)*
  - 3 Scenarios
    - Concept Mapping or Cause & Effect Diagramming
  - 20 minutes blocks
    - Concept map – Cause & Effect Diagramming
    - Simulated scenario
    - Concept map – integration
    - Debriefing (Alpha and Delta)
Student Comments

• “... educational and made me critically think”

• “The scenarios really opened my eyes...”

• “I enjoyed doing our concept maps together...because I’m a visual learning and seeing the pathophysiology and how it correlates with the signs and symptoms helps me understand the disease process...”
“Cause and Effect”

<table>
<thead>
<tr>
<th>Root</th>
<th>Impression</th>
<th>Outcome</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI, myocarditis, cardiomyopathies-decreased contractility</td>
<td>Confusion, fatigue, cyanosis, pulmonary vascular congestion, dyspnea, cough, frothy sputum, rales, S3 gallop, decreased cardiac output, cardiomegaly, decreased urine output, edema</td>
<td>Decreased Anxiety, Decreased Confusion, Increased O2 sat, Decreased cyanosis, Increased contractility, Increased cardiac output, Decreased HR, Increased urine production, Decreased reabsorption of water, Increased urine output, Decreased Edema</td>
<td>Raised HOB, O2 @ 3L/NC, Digoxin, Lasix</td>
</tr>
<tr>
<td>Renal failure, excess IV fluids, mitral valvular disease-increased preload and decreased contractility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased peripheral resistance-increased afterload</td>
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</tr>
</tbody>
</table>
Simulation Model
(Modified for TTUHSC)

Jefferies (2007)
Thoughtful Practice

- Thoughtful Thinking
- Simulated Learning Experience with Reflection-in-Action
- Action
- Reflection
- Action
- Reflection
- Action
- Reflection

Progression through the Curriculum

Learner’s Foundation

Decker (2007)
Correlation of Critical and Reflective Thinking

Critical Thinking (Student Groups)

Critical Reflectors (Student Groups)

Critical Reflectors (Student Groups)

Situation Specific Thinking (Student Groups)

Reflectors (Student Groups)

Reflectors (Student Groups)

Task Oriented Thinking (Student Groups)

Non-Reflectors (Student Groups)

Non-Reflectors (Student Groups)

Stages of Critical Thinking

Stages of Reflection-In-Action

Stages of Reflection-On-Action

SYMPOSIUM ON NURSING SIMULATION

WISER
Peter M. Winter Institute for Simulation, Education & Research
### Stages of Reflective Thinking

#### Critical Reflectors
- Assimilated experiential knowledge
  - "I felt from past simulations we need to work together. That is how I approach other simulations and clinical situations now."
- Verbalized a positive mind-set
  - "I think we could have done better...we should have really looked at the vital signs..."

#### Reflectors
- Some integration of experiential knowledge
  - "I think we’ve kind of had to somewhat prioritize our actions..."
- Verbalized an improved mind-set
  - "I don’t feel like I’m totally there yet."

#### Non-Reflectors
- Demonstrated no evidence of reflection
- Verbalized a negative mind-set
  - "I felt like I was trying but felt even though I thought I was making the right decisions it never seemed to work."
# Debriefing Models

- **Plus - Delta**

<table>
<thead>
<tr>
<th>Plus –</th>
<th>Delta –</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of good behaviors</td>
<td>Behaviors to improve on</td>
</tr>
<tr>
<td></td>
<td>Include both what and how</td>
</tr>
</tbody>
</table>

![Image of two people at a whiteboard, writing and pointing to diagrams.](image-url)
Structured and Supported Model

- Gather
  - Gather the data
  - Ask probing questions
- Analyze
- Summarize
Debriefing Models

• Advocacy – Inquiry
  • “I noticed ....”

• “I’m concerned...”

• “I was wondering...”
Gibbs (1988) Reflective Cycle

**Description**
What happened?

**Feelings**
What were your thinking & feeling?

**Evaluation**
What was good & bad about the experience?

**Analysis**
What sense can you make of the situation?

**Conclusion**
What else could you have done?

**Action Plan**
If it arose would you do?
Driscoll, 2000
The WHAT Model Of Reflection

WHAT?
Describe the event

Purposeful reflection

SO WHAT?
Analysis the event

NOW WHAT?
Proposed action

Experience

New learning

Discover what learning emerges from the reflection
Johns, 1995, 1996
(Based on Carper’s Ways of Knowing)

• Aesthetics “learning and knowing self” grasping, interpreting, envisioning and responding”

• **Describe what influenced your actions during the scenario.**

• Personal “understanding personal dynamics and the ability to cope with the situation”

• **Discuss your satisfaction with your actions during this scenario.**
Johns,

- **Ethics** “knowing what is right and wrong and being committed to take action on this basis”

> **Describe how your personal values and beliefs influenced your actions during this experience.**

- **Empirics** “identifying and acknowledging lack of knowledge”

> **Describe the knowledge and skills you have that influenced your decision making during this experience.**
Johns,

- Reflexivity “resolve the contradictions between what the practitioner’s aim to achieve and actual practice, with the intent to achieve more desirable and effective practice”

Describe situations you have experienced as a student nurse that influenced your decision making during this experience.

Describe how this experience could have been handled differently.
Decker’s (Based on Johns Work)

1. Talk to me about the problem your patient was having.
2. What was your main goal during this simulation?
3. Tell me what influenced your actions during the scenario.
4. Talk to me about how this experience made you feel and how satisfied you are with the actions you initiated.
5. Talk to me about how your personal values and beliefs influenced your actions during this experience.
6. Talk to me about the knowledge and skills you have that helped you provide patient care during this simulated experience.
7. Talk to me about experiences you have had that influenced what you did during this scenario.
8. What would you do different if we went back into the patient’s room and repeated the scenario right now?
Factors Identified by Student Groups as Affecting Critical and Reflective Thinking During a Simulated Learning Experience

<table>
<thead>
<tr>
<th>Factors Identified</th>
<th>Percent of Groups a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Response to Stress</td>
<td>50%</td>
</tr>
<tr>
<td>Perceived Self-Confidence</td>
<td>25%</td>
</tr>
<tr>
<td>Skills Competence</td>
<td>25%</td>
</tr>
<tr>
<td>Urgency of Task</td>
<td>17.8%</td>
</tr>
<tr>
<td>Experiential Knowledge</td>
<td>17.8%</td>
</tr>
<tr>
<td>Theoretical Knowledge</td>
<td>14.3%</td>
</tr>
<tr>
<td>Potential Legal Implications</td>
<td>10.7%</td>
</tr>
</tbody>
</table>

\(^a\ (N=28)\)

Decker, 2007
Additional Factors Identified

- Tunnel vision (fixations),
- Resistant to change,
- Defensive attitude,
- Poor communication skills,
- Inability to access appropriate resources both technical and human, and
- Cultural background.

Decker, 2007
Shift Report
Medical Records

2 Minutes
First-Line Prompt
- Vague

-1 Minute
- Second-Line Prompt
- More Specific
-- Repeat if Needed

Problem Identified
(Focused Assessment)
Required Inter-disciplinary Communication

Figure 4 Suggested interactive relationship.

**Figure 7.** Scenario 7: Reclaiming and recombining the territories.

- Simulation based learning for complex skills
- Classroom based learning is work based learning

Can we merge ‘classroom’ and ‘workplace’ through developing ‘live’ contexts such as the Linkoping student-run ward for the elderly?
Best Practices

• Inter-professional Simulations
  - Team Training and Patient Safety

The Joint Commission, 2008

“Studies show that well functioning teams make fewer mistakes than do individuals.”
Teamwork Training

- Knowledge
- Skills
- Attitude
- Didactic – knowledge and attitude
- Experiential Learning with guided feedback – knowledge, skills, & attitude
Teamwork Training: Spectrum of Activities

Verbal exercises
Role playing
Simulation

Problem-based Learning
Case-based Learning
Simulation-based Learning

Simultaneously make decisions, perform procedures, and interact with team members
Links previous work experience
Promotes understanding of different roles
Facilitates reflective thinking
Teamwork Training

Approaches

“Single Discipline” Training
“Others” played by actors or faculty

“Combined-Team” Training
“Team” learns together
Teamwork Training: Meta-analyses

- Critical principles
  - Identify critical competencies (KSA)
  - Emphasize teamwork over tasks
  - Desired outcomes should guide the process
  - Provide guided active learning
  - Mirror the work environment (simulation)
  - Feedback – relevant and timely
  - Evaluate the outcomes
  - Reinforce

Salas, DiazGranados, Weaver, King, 2008)
Models

- Curriculum - 4 sessions over 4 weeks
  - 20 students
  - Small group format
    - Exchange perspectives - socialization
    - Role playing - Discussion
  - One time visit with patient and family
    - Discussion related to visit
    - Group Debriefing

Results: Increased in perceived role understanding

Fineberg, Wenger, Forrow, 2004
Simulation Training, Research, and Technology Utilization System clinical performance pyramid.

Overview of the Simulation Module for Assessment of Resident Targeted Event Responses (SMARTER) processes for training teamwork in EM. Adapted from Rosen et al.\textsuperscript{16} EM = emergency medicine; KSAs = knowledge, skills, and attitudes.

Overview of event-based approach to training (EBAT) process for teamwork training in emergency medicine (EM). KSA = knowledge, skills, and attitudes.

Best Practices

- Licensure
  - Patient based MCQ
  - Computer based case simulations
  - Standardized Patients
  - Life-size integrated simulators
  - Virtual Reality
Best Practices

- Competency Assessment
  - Joint Commission
  - Licensure
  - Certifications
Best Practices

- Research needed to address:
  - Determine who should be assessed
  - Determine what assessment tools should be used
  - Identify core competencies
  - Develop and validate “appropriate testing scenarios"