Overcoming Challenges in Evaluating Active vs Observer Roles in Simulation-Based Education

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Objectives:
The purpose of this presentation is to identify the theoretical and methodological challenges for: 1) evaluating learners in observer versus active roles; and 2) implementing multi-site/multi-campus simulation-based experiences. Solutions will be proposed for these challenges.

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• No Conflicts of Interest

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• No Conflicts of Interest
State of the Science
1. Roles in Simulation

2. NCSBN National Simulation Study (2014)

3. Theoretical Assumptions
   - Constructivism
   - Kolb’s Experiential Learning Theory

4. Current Studies
“Assimilation and accommodation are the ultimate goals in a practice profession and the essence of reflection” (Dreifuerst, 2009, p. 111).
Assumptions

• Theory:
  • Are observers missing the concrete experience (Bong et al. 2017)?
    • What theories best support observational learning?
    • How do we operationalize KELT for the observer?

• Scenarios & Debriefing:
  • Apply learning in different contextual situations (INACSL Standards Committee, 2016)
  • Active Experimentation
    • Debriefing the ‘what if’ in a similar situation with different underlying structure (Dreifuerst, 2009; Forneris & Fey, 2017)
Purpose:
The purpose of this pilot study was to establish that two simulation experiences and the knowledge pre/post tests, involving a clinical situation with respiratory distress, were contextually equivalent scenarios.

- Challenges Identified:
  - Instrumentation
  - Validity/Reliability Limitations (Cognitive Knowledge)
  - Action List (Behavior Reproduction)
  - Facilitation and Debriefing
Instrumentation

• Scenarios
  • Selected 2 simulations from well-known library with expert reviewers
  • Both result in respiratory distress
  • Validated by content expert and local faculty

• Pre/Post-Tests
  • Questions from well-known test-item resources
    • Equivalent Bloom’s Taxonomy domains
    • Equivalent NCLEX-RN (2016) Integrated Processes

• Behaviors
  • List constructed with behaviors expected for a patient with respiratory distress
Challenges in Scenario Implementation

• Confounding variables
  • Scenario Facilitation
  • Debriefing Facilitation
• Overcoming Obstacles:
  • Identical execution of scenario
  • Structured debriefing method
Challenges in Pre/Post Test Equivalency

- Content validity established…but we need more than content validity!
- Criterion validity
  - Content vs. Instructional sensitivity (Waltz, Strickland, & Lenz, 2017)
    - Pre/Post Discriminant Index (PPDI)
    - Individual Gain Index (IGI)
- Reliability
  - McDonald (2014) lists factors that affect reliability
    - Length
    - Discrimination
    - Difficulty
  - Haladyna (2016)
    - Unidimensionality vs. Multidimensionality
### Example

<table>
<thead>
<tr>
<th>#</th>
<th>Sim 1 Pre-Test</th>
<th>Sim 1 Post-Test</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>95</td>
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</table>

**PPDI** | **IGI**
---|---
0 | .71

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<th>#</th>
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<td>76</td>
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</tbody>
</table>

**PPDI** | **IGI**
---|---
.23 | .73
Lesson Learned

No single statistic should be used to determine an instrument’s validity or reliability (McDonald, 2014)
## Behavior Reproduction

### Scenario 1

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert CN or provider</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Communicates clinical presentation correctly to interprofessional team (Opioid related resp, depress)</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Administer emergent med (Narcan)</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses level of consciousness</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses blood pressure</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses oxygen saturation</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses respiratory rate</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses heart rate</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses airway, lung sounds</td>
<td>+1</td>
<td>0</td>
</tr>
</tbody>
</table>

### Scenario 2

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Score 1</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Alert CN or provider</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Communicates clinical presentation correctly to interprofessional team (Anaphylaxis r/t antibiotic administration)</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Administer emergent med (Epinephrine)</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses level of consciousness</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Reassesses blood pressure</td>
<td>+1</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Reassesses airway, lung sounds</td>
<td>+1</td>
<td>0</td>
</tr>
</tbody>
</table>

Cronbach’s alpha: .692

Cronbach’s alpha: .795
Lessons Learned

• Simulation evaluation in groups results in clustered designs
  • Consistent with literature findings, more students are observers
  • More control needed in prospective studies
• Train! Train! Train!
  • “All faculty are content experts, not all are expert evaluators” (Kardong-Edgren et al, 2017)
  • Interrater reliability was not established
  • Evaluators reported differences in execution of scenario
  • Control is necessary over the execution
Overcoming Challenges, Next Steps

• Current theoretical frameworks need further exploration
• Instructional Sensitivity
• Multi-campus retrospective studies present challenges

“From the outside looking in, research looks easy!”
• Inconclusive data is still meaningful
• Perspective taking
• Site buy-in
• Experiential Learning
References Available Upon Request

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