Simulation Design Characteristics:

**Perspectives**

Held by Nurse Educators and Nursing Students

Jane B. Paige PhD RN, CNE
University of Wisconsin-Milwaukee & Milwaukee School of Engineering
Key Background Points – Simulation Based Learning (SBL)

“a dynamic process involving the creation of a hypothetical opportunity that incorporates an authentic representation of reality, facilitates active student engagement, and integrates the complexities of practical and theoretical learning with opportunity for repetition, feedback, evaluation, and reflection” (Bland, 2010).
Motivation for study

• Research in SBL has proceeded without fully understanding the intervention itself

• Broad categories for simulation design exist, yet the particular means educators operationalize design characteristics are unknown

• Educators make decisions based on their teaching....

• Make decisions based on student feedback without fully understanding the student point-of-view in their evaluative comments
Without understanding perspectives....

• **Design and conduct poorly run SBL activities**
  – *Student could have false sense of learning the “confident incompetent”* (Clapper, 2010)

• **Waste faculty time and efforts**

• **Misunderstand other educators’ decisions**

• **Not hear all voices as best educational practices are established**

• **Make decisions based on student feedback without fully understanding the student point of view in their evaluative comments**
The purpose of this study was...

- To describe and compare nurse educators’ and nursing students’ perspectives about operationalizing design characteristics within simulation based learning educational interventions in nursing education.
Can Be

- Individual
  - A self-referent point of view based on inter-relational sets of beliefs and intentions that give direction and justification to actions

- Shared
  - A common point of view held by a group (clustering) of individuals
Research Approach - Q-Methodology

• Opinions are subjective and reflect a point-of-view or perspective
• Rank-ordering process
  – forces underlying beliefs into play
• By-Person Factor Analysis
  – clusters people together in how they think
The Concourse
(population of opinions)

• National League for Nursing - Jeffries Simulation Framework
  – Sphere one (student/teacher/educational practices) and Sphere two (five simulation design characteristics)

• Opinions gathered from
  – Interviews of 35 Nurse Educators from across the U.S. and Canada
  – Review of the SBL literature

• Population of 392 opinion statements
Matrix Design of Q-Sample

Sphere Two
Five Simulation Design Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Objectives</th>
<th>Problem Solving</th>
<th>Fidelity</th>
<th>Debriefing</th>
<th>Student Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student</strong></td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
</tr>
<tr>
<td><strong>Teacher</strong></td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
</tr>
<tr>
<td><strong>Educational Practices</strong></td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
<td>4 statements</td>
</tr>
</tbody>
</table>

Note. National League of Nursing-Jeffries Simulation Framework
Note. Q-Sample $N = (3) \times (5) \text{ matrix } \times (4 \text{ Repetitions}) = 60 \text{ opinion statements}$
Do not assign students roles outside their scope of practice such as doctor or respiratory therapist as they may not have a clear impression when or how they are required to act in this role.

Do not stop a simulation for any reason. What happens happens. It is then discussed in the debriefing.

Place "weaker" students in roles that force them to perform. Doing so allows nurse educators to better evaluate these students.

Students should be left to figure out problems on their own during the actual running of the simulation.

Do not grade simulations. There are too many variables that cannot be controlled to make it fair for all students.
P (people) - Sets

• Purposely selected
• Experience with SBL and size of nursing program
• Across the United States, Canada, South Africa
• 45 (44) nurse educators  
  – INACSL
• 45 nursing students  
  – NSNA
My question to you is, “What would you most recommend or most not recommend in the design of a simulation based learning activity in nursing education?”

Card Sort Grid

<table>
<thead>
<tr>
<th>Most NOT Recommend</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Most Recommend</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+3</td>
<td>+4</td>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>11</td>
<td>47</td>
<td>12</td>
<td>1</td>
<td>13</td>
<td>42</td>
<td>43</td>
<td>27</td>
<td>5</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>41</td>
<td>20</td>
<td>38</td>
<td>39</td>
<td>15</td>
<td>44</td>
<td>15</td>
<td>3</td>
<td>26</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>6</td>
<td>10</td>
<td>51</td>
<td>52</td>
<td>46</td>
<td>16</td>
<td>36</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>48</td>
<td>29</td>
<td>25</td>
<td>53</td>
<td>28</td>
<td>17</td>
<td>45</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>40</td>
<td>58</td>
<td>22</td>
<td>56</td>
<td>37</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>59</td>
<td>2</td>
<td>57</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>34</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>54</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Analysis Methods per RQs

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are <em>nurse educators’</em> perspectives towards operationalizing simulation design characteristics?</td>
<td>▪ Significant Factor Loadings in excess of +/- 0.33 or ((2.58 \times 1/ \sqrt{60}))</td>
<td>▪ Characterizing statements</td>
</tr>
<tr>
<td></td>
<td>▪ Factor Scores for each factor (z scores) and factor array (converted to grid scores)</td>
<td>▪ Post-sort narrative explanation of placement of cards at polar ends</td>
</tr>
<tr>
<td></td>
<td>▪ Distinguishing statements for each factor</td>
<td>▪ Factor naming</td>
</tr>
<tr>
<td></td>
<td>▪ Consensus statements</td>
<td>▪ Member checking with model Q-sort</td>
</tr>
<tr>
<td>2. What are <em>nursing students’</em> perspectives towards simulation design characteristics as operationalized by nurse educators?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results

- **Nurse Educators Perspectives** (39% of variance)
- Principle component (PCA) - unrotated

- 27 of 44 Nurse Educators loaded only on Factor A
- 15 Nurse Educators were confounded on Factor A and either Factor B or C
- 1 Nurse Educator did not load on any factor
Factor A “Facilitate the Discovery”

Nurse educators.....

- feel most strongly about getting at students’ thinking processes
- allow students to do most of the talking during the debrief
- develop student thinking by enough time to process information and not cue too soon
- creating reality is important and is in the detail of assuring technology is functional, educators know how to use, and pilot tested
- concern how students feel
Bipolar Secondary Factors B and C

- Aspects of Simulation Design Held in Opposition
  - Role assignments
    - *family members, known to each other, across levels, assignment of ‘weaker’ student*
  - Offering student support
    - *figure out problems on their own, educator in the room*
  - Stopping or repeating a simulation
    - *that is the question*
Results

Nursing Students Perspectives (42% of variance)
PCA with varimax rotation

- 27 of 45 nursing students loaded only on one factor
- 15 students loaded on two factors
- 3 students did not load on any factor

Factor 1 "Let Me Show You"
Factor 2 "Stand By Me"
Factor 3 "The Agony of Defeat"
Factor 4 "Let Me Think it Through"
Factor 5 "I'm Engaging and So Should You"
Unknown
Factor 1 “Let Me Show You”

• Students holding this perspective ........
  – want to figure things out on their own
  – receive minimal assistance and cueing
  – let the simulation happen as it happens
  – want to talk during the debriefing to figure out what they know
  – prefer verbal debriefing rather than written most likely related to their comfort talking.
Factor 2 “Stand By Me”

- Students holding this perspective......
  - want structure to and guidance in their learning
  - want orientation and opportunity to practice
  - desire specific simulation objectives
  - okay to stop a simulation to correct mistakes and misassumptions when they happen
  - count on the educator to ask questions to get at their thinking process and prefer not to do all the talking
Factor 3 “The Agony of Defeat”

• Students holding this perspective......
  – are most concerned about how they feel following the simulation experience
  – want to feel good about them self as opposed to feeling defeated
  – least likely to value pre-simulation assignments
  – do not recommend singling out weaker students as “it puts too much pressure on them and could be embarrassing.”
Factor 4 “Let Me Think it Through”

• Students holding this perspective.....
  – prefer not being interrupted as it throws off their train of thought.
  – prefer not stopping a simulation or having others think aloud
  – recommend written in addition to verbal debriefing, are less interested in being questioned during debriefing
Factor 5
“I’m Engaging and So Should You”

• Students holding this perspective.....
  – have the strongest feelings about realism
  – reality created in the detail and functioning of the equipment
  – ‘pretend’ is not acceptable
  – Okay to use simulation for 1:1 learning, grade simulations, & consequences if not taken seriously

—indifferent in whether ‘weaker’ students are placed in roles that force them to perform
  — “weaker student need help! Simulation is a wake-up call for them.”
# Analysis Methods per RQs

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. How do perspectives towards simulation design characteristics vary between nurse educators and nursing students?</td>
<td>- Correlation coefficients between factor arrays of nurse educators and nursing student.</td>
<td>- Visual inspection of factor arrays between nurse educators and nursing students</td>
</tr>
<tr>
<td></td>
<td>- Second order factor analysis</td>
<td></td>
</tr>
</tbody>
</table>
## First-Order Factor Correlations & Second-Order Factor Analysis

<table>
<thead>
<tr>
<th>First-Order Factor Correlations&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Second-Order Factor Loadings&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Let Me Show You</td>
<td>1.00</td>
</tr>
<tr>
<td>2 - Stand by Me</td>
<td>0.97</td>
</tr>
<tr>
<td>3 - The Agony of Defeat</td>
<td>0.97</td>
</tr>
<tr>
<td>4 - Let me Think it Through</td>
<td>0.98</td>
</tr>
<tr>
<td>5 - I’m Engaging and so Should You</td>
<td>0.96</td>
</tr>
<tr>
<td>A - Facilitate the Discovery</td>
<td>0.94</td>
</tr>
<tr>
<td><strong>Total Explained Variance 83%</strong></td>
<td>29% 19% 18% 17%</td>
</tr>
</tbody>
</table>

<sup>Note</sup>.<sup>a</sup> Principle Component Analysis (PCA) extraction with varimax 4 factors rotated<sup>b</sup>. Correlation and Loadings > ±0.33. Significant (p < 0.01) in boldface/parenthesized.
So.... by understanding

• Design more effective and efficient simulation activities
• Reduce cost and save time
• Understand and evaluate the diversity in students
• Invest in the *human capital* for a highly trained and competent workforce
  – Improve patient outcomes!
Implications – *Educational Practice*

• **Student Preparation**
  – Pre-simulation assignments
  – Role assignments
  – Student support
    • instructional and emotional
  – Clarity on simulation purpose

• **Understand and evaluate the diversity in students**
Implications - Critical Reflection on Perspectives of Teaching

**Actions**
- ♣ Design learning activity to challenge students’ thinking.
- ♥ Assign pre-simulation assignments.

**Intentions**
- ♣ Locate gaps in knowledge and provide corrective action.
- ♥ Set students up to be successful.

**Beliefs**
- ♣ Students are resilient and can tolerate direct feedback shared respectfully.
- ♥ Students find value in preparation even as they view it as a time investment.

**Commitment to Teach**
Future Research

- How far to let students fumble before having to stop a simulation?
- Role Assignment
- Varying learning styles, tendencies to lose train-of-thought
- Perspectives from the context of:
  - Formative assessment vs. summative or high stakes evaluation