Continuing Nursing Education

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Disclosures

• Ashley Franklin
  – Current funding for simulation faculty development from the Texas Higher Education Coordinating Board
• Mary Ann Cantrell – reports no conflict of interest
• Kim Leighton – reports no conflict of interest
• Greg Gilbert – reports no conflict of interest

This work originated in work of the INACSL Standards Committee
• Conflict of Interest
  – Julia Greenawalt (INACSL Conference Administrator & Nurse Planner) reports no conflict of interest
  – Leann Horsley (INACSL Lead Nurse Planner) reports no conflict of interest

• Successful Completion
  – Attend 90% of session
  – Complete online evaluation
At the completion of this presentation the learner will be able to:

1. describe the foundational elements in developing the conceptual basis of simulation-based study with an emphasis on theoretical frameworks
2. identify strategies to maintain intervention fidelity in simulation-based research studies
3. discuss measurement rigor in simulation-based research studies
4. acknowledge the importance of using published standards of best practices in developing a simulation-based research study
Why this Pre Con?

• This 4 hour pre-conference resulted from the recognized need to educate novice researchers in simulation-based research to advance the science in this area.

• There are themes in common “pitfalls” in early nursing publications about simulation-based


This invited article is a product of the INACSL standards committee.
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<td>Theoretical Frameworks for Simulation</td>
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<td>Role of Theoretical Framework in Research</td>
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• Provide mentorship to avoid common pitfalls in simulation research to enable participants to conduct methodologically rigorous studies.
• Simulation research has moved beyond studies examining learner satisfaction, self-confidence and self-efficacy.

• The current state of the science in simulation-based research calls for intervention studies that examine skill development and skill transfer from simulation to actual patient care settings to support positive health outcomes in patients.
A set of interrelated concepts that symbolically represent and convey a mental image of a phenomenon (Alligood, 2013).

A theoretical framework:
• Guides the conceptual basis for study
• Describes how variables relate to one another
• Provides a rationale for predictions about the relationships among the study variables [predictors and outcome variables]
Crabby Behavior

Long Lines ➔ Snow

Low Food Supply ➔ Time

Snow ➔ Motivation

Motivation ➔ Regret

Regret ➔ Long Lines

INACSL June 2016
• Existing theory

OR

• Constructed by researcher from what is known about the relationships among the variables from past research studies
Theoretical Frameworks in Simulation
Theoretical Frameworks

NLN/Jeffries Simulation Theory

- Learner and Facilitator Factors
- Educational Practices
- Design Characteristics and Simulation (Intervention)
- Outcomes
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<th>Theoretical Frameworks</th>
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<tr>
<td>Other Commonly Used Theoretical Frameworks</td>
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<tr>
<td>• Clinical Simulation Practice</td>
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<tr>
<td>• Kolb’s Experiential Learning theory</td>
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<td>• Deliberate practice, Mastery Learning Theory</td>
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<td>• Benner’s Novice to Expert</td>
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<td>• Piaget’s Constructivist Theory</td>
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<td>• Cognitive Load Theory</td>
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<td>• Social Cognitive Theory</td>
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<tr>
<td>• Debriefing for Meaningful Learning</td>
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<td>• Debriefing with Good Judgment</td>
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<td>• Tanner’s Clinical Judgment Model</td>
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<td>• Lasater’s Clinical Judgement Model</td>
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Choosing a Theoretical Framework: Questions for the Research Team to Consider

- What theories have been tested in the problem under study?
- What theories might be interesting to inform the design of your study?
- What concepts have been identified in the literature review related to your problem statement?
- What frameworks exist that incorporate those concepts? Do you need to develop your own framework? [NOT RECOMMENDED]
- Developing a research question that is supported by the framework
Theoretical Framework: Role in Research

• Guides the conceptual basis for study
• Connects with the research design
• Describes how variables relate
• Provides a rationale for predictions about relationships among variables
Problem Statement Emerges
Simulation faculty want to use video-assisted debriefing to examine how video enables participants to reflect on their clinical performance.

Brainstorming
- What is the effect of using video in debriefing immediately after a simulation?
- What is the effect of using video debriefing on nursing students’ reflection-on-action?
- Are their participant characteristics that influence video-assisted debriefing?
- Does the number of participants in video-assisted debriefing impact reflection?

Literature Review
- Video is an effective technique to help participants see their actions as they related to key objectives (Center for Medical Simulation, 2011).
- Goal of video debriefing is to allow participants to relive the simulation experience, viewing it from multiple perspectives.
- Use of video debriefing has remained controversial with concerns of cost, privacy, and technology concerns (Dusaj, 2014).
- Undergraduate nursing simulation participants prefer individual video-assisted debriefing compared to within-team or peer observation (Ha, 2014).
- Video-assisted debriefing provides improvement of both technical and non-technical skills (Ha, 2014).
- Video-assisted debriefing alone may be less effective than video used in combination with verbal/traditional debriefing (Chronister & Brown, 2011).

Concepts of Interest
Debriefing
Reflection-on-Action
Participant Characteristics
Theoretical Framework
3D Model of Debriefing: Defusing, Discovering, and Deepening (Zigmont, Kappus, & Sudikoff, 2011).

Research Question
For undergraduate novice nurses, does video-assisted debriefing have greater efficacy in improving reflection-on-action than verbal/traditional debriefing after simulation?

Figure 1. Organization of research problem into concepts, theoretical framework, and research question. Adapted from LoBiondo-Wood & Haber (2014).
Theoretical Framework: Role in Research

– Informs the development of the intervention [simulation exposure]
– Explains how concepts of interest/dependent variables are measured
– Guides the data analysis plan
– Contextualizes the results
– Did the framework guide the methodology of the study?
– Are the concepts linked with variables that are measured?
– Are the concepts represented in hypotheses, research questions, and/or objectives?
– Do the hypotheses, research questions, or objectives emerge from framework propositions?
– Are the hypotheses, research questions, or objectives tested statistically?
Writing the Results

– Are the findings for each hypothesis, question, or objective consistent with those proposed by the framework?

– If the findings are not consistent with the framework, is the methodology adequate to test the hypothesis, question, or objective?

– Are the findings consistent with those of other studies using the same framework (or testing the same propositions)?
– Do the study findings relate back to the framework?

– Is there discussion connecting the findings to specific elements of the framework.

– Within the discussion of the study’s findings, is there evidence of the implications of the findings in terms of supporting or challenging the framework’s propositions.
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<th>Design Element</th>
<th>Important Considerations</th>
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<tr>
<td>Critical Analysis of Literature</td>
<td>Conduct a literature review to gain a working knowledge of what studies have already been conducted is critical. The review and inclusion of simulation literature outside the discipline of nursing should be reflected in the review.</td>
</tr>
<tr>
<td>Statement of the Research Problem</td>
<td>Emphasize specific outcomes. Problems under study should go well beyond learner satisfaction and move the science of simulation-based learning to current issues related to research investigations that address the transfer of knowledge generated to actual practice environments.</td>
</tr>
<tr>
<td>Purpose Statement and Research Question(s)</td>
<td>The purpose statement should flow from the problem statement. Describe the purpose of the study, variables, and sample. Phrase the research question clearly, concisely and completely.</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>Ensure the conceptual and operation definition for the study variables are congruent. For example, if a study is measuring learners’ clinical judgment, the instrument used has to specifically measure clinical judgment versus a different outcome such as critical reflection.</td>
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Intervention Fidelity

• Intervention Fidelity is the degree to which an intervention [the simulated learning experience] is implemented as originally designed.
• Research protocol
  – Research team
  – How to validate scenario
  – Detailed script and cues
  – Props
• Dry run scenarios
In simulation-based research intervention fidelity is maintained by:

• Having a specified, written, detailed protocol
• Clear role delineation of research team member, including SPs
• Validation of a scenario by content experts and pilot tested with participants who are similar to the target population
• Detailed script and cues for each person enacting a scenario
• Consistent use of props in a scenario
• Conducting dry run of a scenarios
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<td><strong>Design</strong></td>
<td>Select a research design that will enable you to answer the research questions(s) and test the hypothesis(es).</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>Describe the simulation lab or in situ environment, human resources, manikin resources, and other pertinent logistics.</td>
</tr>
<tr>
<td><strong>Procedures</strong></td>
<td>Write a study protocol to clarify the conditions of the scenario must remain constant to maintain intervention fidelity. Decisions on how to maintain constancy of the scenario(s) needs to be determined before the study are implemented.</td>
</tr>
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Sample Size

• Dependent on:
  – \( \alpha \) level
  – Effect size
  – Power (.80)
  – Variability

• 10—20 observations per variable (Harrell 2001)
• Nonparametric test never require more than 15% additional subjects (Lehmann & D’Abrera 1998)
• “Just enough”
• Effect size of >1 acceptable for educational studies (Cohen 1988)
• \( \alpha = .10 \) is “good enough” for educational research (Welke et al. 2009)
Two-sided two-sample z-test:

\[ n \geq \left[ \frac{2\hat{\sigma}^2}{(\mu_1 - \mu_2)^2} \right] (z_{\alpha/2} + z_{\beta})^2 \]

where:
- \( n \) is the sample size in each group,
- \( \hat{\sigma}^2 \) is the estimate of the standard deviation,
- \( \mu_1 \) and \( \mu_2 \) are the means of the two groups,
- \( z_{\alpha/2} \) is the value from the Standard Normal table corresponding to \( \alpha/2 \), and
- \( z_{\beta} \) is the value from the Standard Normal table corresponding to \( z_{\beta} \).
• Usual method vs. simulation
• Estimate variance from the literature to be 10
• 3 point difference between exams
• $\alpha = .10$; we look up .10 in a table and find the corresponding value to be 1.28
• $1-\beta = .80$ therefore $\beta = .20$; we look up .20 in a table and find the corresponding value to be .84
Substituting these values into our formula:

\[
\begin{align*}
n &\geq \left[ \frac{2(10)}{3^2} \right] (1.28 + .84)^2 \\
&= \left[ \frac{20}{9} \right] 2.12^2 \\
&= \left[ \frac{20}{9} \right] 4.4944 \\
&= (2.2222) 4.4944 \\
&= 9.9876 \\
\cong 10 &\text{ per group for a z-test or} \\
10(1.15) &\text{ = 12 per group for a Wilcoxon Rank Sum test}
\end{align*}
\]
• Credentials and training
  – Seek a mentor
  – Institutional credentials vs. from a professional society
  – Responsibility for research protocol belongs to Principal Investigator
• The Simulation Effectiveness Tool (SET-M)
• Indiana University Simulation Integration Rubric (IUSIR)
• The Sweeny-Clark Simulation Performance Evaluation Tool
• The Clinical Simulation Evaluation Tool (CSET)
• The Lasater Clinical Judgment Rubric (LCJR©)
• The Creighton Simulation Evaluation Instrument (CCEI™)
• The Clinical Learning Enlivenment Comparison Survey (CLECS)

• Reliability: Consistency over time and use
• Validity: measuring the intended concept
• Measuring performance in simulation
  – Validity of checklists
  – Inter-rater reliability
• Tool development → methodological research
• G-theory
• Describe the instrument(s) selected and how they correspond to each variable.

• Provide a description of the instrument including rating scale options, validity and reliability, how the instrument will be used, who will complete it, how you will receive permission for use, and how scores are calculated and interpreted.

• If you have designed an original data collection instrument, **which is not advised**, identify the content domains and methods you would use to assess its reliability and validity.
2013 INACSL Standards

- Standard I: Terminology
- Standard II: Professional Integrity of Participant
- Standard III: Participant Objectives
- Standard IV: Facilitation Methods
- Standard V: Simulation Facilitator
- Standard VI: The Debriefing Process
- Standard VII: Participant Assessment and Evaluation
- Standard VIII: Simulation-Enhanced Interprofessional Education
- Standard IX: Simulation Design
Human Subjects

- Guided by Institutional Review Boards (IRB)
- Ethics training for researchers
  - University of Miami Collaborative Institutional Training Initiative (CITI Program)
  - NIH Protecting Human Research Participants
- Simulation specific ethical concerns
- Research misconduct
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<tr>
<td>Instruments</td>
<td>Describe the instrument(s) selected and how they correspond to each variable. Provide a description of the instrument including rating scale options, validity and reliability, how the instrument will be used, who will complete it, how you will receive permission for use, and how scores are calculated and interpreted. If you have designed an original data collection instrument, identify the content domains and methods you would use to assess its reliability and validity.</td>
</tr>
<tr>
<td>Treatment of Data</td>
<td>Describe how you will analyze the data with careful attention to logical flow from your research question. Identify how you will use descriptive statistics to describe your sample. Describe the procedures you will use based on the research question and measurement methods. Provide details about commercially available software where relevant.</td>
</tr>
<tr>
<td>Ethical Implication/Protection of Human Subjects</td>
<td>Discuss the ethical implications of the proposed study including how and when you will obtain informed consent, how you will protect human subjects, and any major risks and benefits to participants and how to mitigate risk.</td>
</tr>
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Recommendations

• Review literature within and beyond your discipline
• Collaborate across disciplines and in academic-practice partnerships
• Adopt and use consistent terminology
• Disseminate positive and negative results
• Seek a mentor
• Seek a statistical consultant
Future Research

• Current calls for simulation research
  – Intervention studies that build on previous descriptive research
  – How simulation pedagogy is best used with students
  – Transfer of learning to practice

The purpose of this quasi-experimental study was to assess the preliminary effectiveness of a theory-based role-modeling intervention on enhancing student nurse competency in responding to a simulated response to rescue event.
1. The description of the literature review and gaps that this pilot study intended to address in this area of simulation research were made evident in the article.

2. The variables of interest were evident in the lit review section and the authors’ conceptualization of the problem statement leading to the research question/purpose was clear.

3. The theoretical framework is presented clearly in the background section and the link was made to tie the theoretical framework to the intervention.
4. A thorough discussion of the research protocol was provided.

5. Fidelity to protocol was strong, which would allow replication studies in the future and also helps build confidence that the authors took measures to decreases threats to internal validity.
6. The psychometric properties of the instrument were addressed, which they had previously developed.

7. Content validity of the video intervention and some inter-rater reliability of experts rating the intervention video were provided.

8. Ethical considerations were mentioned in the manuscript, as well.

9. The statistical program used was discussed, although there was no mention of a stats consultant.
6. Power analysis was provided.

7. In the discussion section, ethical considerations of their research was again discussed.

8. The authors related the discussion of the study’s results back to the theoretical framework.
Questions?

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Please refer to the handout that has a list of references that supported this presentation, which also can be used to support you in your future research endeavors.

Thank you for participating!