Clinical Simulations and The State of the Science
Objectives

The participants will be able to:

• Define the simulation model and the new NLN/Jeffries Simulation Theory.
• Discuss the components of the new NLN/Jeffries Simulation Theory.
• Describe the findings from the NCSBN study that are impacting the direction for nursing education, research, and policy.
• Discuss policy implications from the NCSBN on nursing education.
Simulation Model


DESIGN CHARACTERISTICS and SIMULATION (intervention)

- Objectives
- Fidelity
- Problem-solving
- Student Support
- Reflection

OUTCOMES

- Learning (Knowledge)
- Skill performance
- Learner satisfaction
- Critical-thinking
- Self-confidence

TEACHER

- Demographics
  - Program
  - Level
  - Age

STUDENT

- Active learning
  - Feedback
  - Student/ faculty interaction
- Collaboration
  - High expectations
  - Diverse learning
  - Time on task

EDUCATIONAL PRACTICES

- Active learning
  - Feedback
  - Student/ faculty interaction
- Collaboration
  - High expectations
  - Diverse learning
  - Time on task
Simulation Design Features

Features found to be important in designing a quality simulation:

- Objectives/Information
- Fidelity
- Problem-Solving
- Student Support
- Reflection
Simulation Model moved to the NLN/Jeffries Simulation Theory

The NLN/Jeffries Simulation Theory

- Context
- Background
- Design
- Simulation Experience
- Facilitator and Educational Experiences
- Participant
- Outcomes

Simulation Characteristics: Context

Contextual factors are the circumstances and setting impact every aspect of the simulation and are important starting points in designing or evaluating simulations, e.g. purpose of simulation.
Background

Within the context, the background includes the goal(s) of the simulation and specific expectations or benchmarks that influence the design of the simulation, e.g. how the simulation fits within the curriculum, background informs the simulation design.
Simulation Design

Outside of and preceding the actual simulation experience are specific elements that make up the simulation design. Some elements may change during the implementation, there are aspects of the design that need to be considered for preparation.
Design Features include: Simulation Objectives

(For example, this will be a 20 minute simulation.)

The learner will be able to:

• Demonstrate how to assess for complications when caring for a post-thoracotomy patient.
• Implement priority nursing interventions when caring for a post-thoracotomy patient.
Simulation Design: Fidelity (Realism)

**Simulations need to:**

- Mimic reality
- Feel authentic
- Elements of physical and conceptual fidelity (equipment, moulage, and appropriate facilitator responses)
Simulation Experience

• This is characterized by an environment that is experiential, interactive, collaborative, and learner-centered
• Buying-in, suspending disbelief
• Promotes engagement and psychological fidelity
Facilitator and Educational Strategies

• Dynamic interaction between the facilitator and participant
• Facilitator attributes include skill, educational techniques, and preparation
• The facilitator responds to participant needs in simulation by adjusting educational strategies, cues, & debriefing
Participant

• Participant attributes affect the simulation learning experience
• Attributes include age, gender, level of anxiety, self-confidence, preparedness, & role assignment
Outcomes

Three areas of outcomes

• Participant
• Patient (care recipient)
• System
Influencing Drivers on Clinical Simulations Today
The NCSBN National Simulation Study

Jennifer Hayden, MSN, RN
Richard Smiley, MS, MA
Maryann Alexander, PhD, RN, FAAN
Suzan Kardong-Edgren, PhD, RN, ANEF, CHSE
Pamela Jeffries, PhD, RN, FAAN, ANEF
Aims

• Can simulation be effectively substituted in the undergraduate prelicensure curriculum?
• How much?
• What courses?
• Generalizable results
• Provide data for boards of nursing
Research Questions-Part I

1. Does substituting clinical hours with 25% and 50% simulation impact educational outcomes (knowledge, clinical competency, critical thinking and readiness for practice) assessed at the end of the undergraduate nursing program?

2. Are there course by course differences in nursing knowledge, clinical competency, and perception of learning needs being met among undergraduate students when traditional clinical hours are substituted with 25% and 50% simulation?

3. Are there differences in first-time NCLEX pass rates between students that were randomized into a control group, 25% and 50% of traditional clinical substituted with simulation?
Research Questions - Part II

1. Are there differences in clinical competency, critical thinking and readiness for practice among the new graduate nurses from the three study groups?

2. Are there differences among new graduates from the three study groups in acclimation to the role of the professional nurse?
Fall 2011: Study Groups

Control Group
- Traditional clinical experiences
- Up to 10% simulation

25% Group
- 25% of clinical time spent in simulation
- 75% traditional clinical experience

50% Group
- 50% of clinical time spent in simulation
- 50% of time in traditional clinical experience
Core Courses

- Fundamentals of Nursing
- Medical-Surgical Nursing
- Advanced Medical-Surgical Nursing
- Maternal-Newborn Nursing
- Pediatrics
- Mental Health Nursing
- Community Health Nursing
Data Collection
Research Question 1

Does substituting clinical hours with 25% and 50% simulation impact educational outcomes (knowledge, clinical competency, critical thinking and readiness for practice) assessed at the end of the undergraduate nursing program?
Knowledge: Mean Scores-End of Program
ATI Comprehensive Predictor

<table>
<thead>
<tr>
<th></th>
<th>Control group</th>
<th>25% group</th>
<th>50% group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score</td>
<td>69.1%</td>
<td>69.5%</td>
<td>70.1%</td>
</tr>
</tbody>
</table>

p=0.478
Clinical Competency: End of Program Preceptor Ratings

<table>
<thead>
<tr>
<th></th>
<th>Control group (n=155)</th>
<th>25% group (n=171)</th>
<th>50% group (n=136)</th>
<th>Effect size</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Clinical Knowledge</td>
<td>5.12</td>
<td>0.73</td>
<td>5.18</td>
<td>0.60</td>
<td>5.09</td>
</tr>
<tr>
<td>Technical Skills</td>
<td>5.06</td>
<td>0.76</td>
<td>5.09</td>
<td>0.64</td>
<td>5.01</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>5.11</td>
<td>0.72</td>
<td>5.06</td>
<td>0.71</td>
<td>5.03</td>
</tr>
<tr>
<td>Communication</td>
<td>5.30</td>
<td>0.65</td>
<td>5.34</td>
<td>0.65</td>
<td>5.24</td>
</tr>
<tr>
<td>Professionalism</td>
<td>5.38</td>
<td>0.69</td>
<td>5.47</td>
<td>0.61</td>
<td>5.39</td>
</tr>
<tr>
<td>Management of Responsibilities</td>
<td>5.22</td>
<td>0.71</td>
<td>5.20</td>
<td>0.70</td>
<td>5.17</td>
</tr>
</tbody>
</table>

1=lowest rating, 6=highest rating
Research Question 2

Are there course by course differences in nursing knowledge, clinical competency, and perception of learning needs being met among undergraduate students when traditional clinical hours are substituted with 25% and 50% simulation?
Advanced Medical-Surgical Nursing: Knowledge Assessment

ATI Assessment Total Score (n=683)

Total Score

Control group 62.7%
25% group 64.1%
50% group 65.5%

p=0.005
Advanced Medical-Surgical Nursing: Clinical Competency

CCEI Scores: Clinical Setting

% of items scored as competent vs. # of weeks for different groups:
- Control Group
- 25% Group
- 50% Group
Maternal-Newborn Nursing: Knowledge Assessment

ATI Assessment Total Score (n=680)

- Control group: 68.4%
- 25% group: 69.2%
- 50% group: 71.1%

p=0.011
Pediatric Nursing Knowledge Assessment

ATI Assessment Total Score (n=620)

Control group: 63.7%
25% group: 65.0%
50% group: 67.1%

p = 0.002
Mental Health Nursing: Knowledge Assessment

ATI Assessment Total Score (n=633)

- Control group: 63.4%
- 25% group: 65.2%
- 50% group: 66.3%

*p = 0.011*
Research Question 3

Are there differences in first-time NCLEX pass rates between students that were randomized into a control group, 25% and 50% of traditional clinical substituted with simulation?
NCLEX: May-December 2013

NCLEX First Time Pass Rates

- Control group: 88.4%
- 25% group: 85.5%
- 50% group: 87.1%

p = 0.737
PART II: FOLLOW UP STUDY
Part II: Research Question 1

Are there differences in clinical competency, critical thinking and readiness for practice among the new graduate nurses from the three study groups?
## Overall Clinical Competency: 6 Month Manager Ratings

### Global assessment of clinical competency & readiness for practice (1-10 scale)

<table>
<thead>
<tr>
<th></th>
<th>Control group (n=72)</th>
<th>25% group (n=86)</th>
<th>50% group (n=84)</th>
<th>Effect size</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall rating</strong></td>
<td>Mean: 8.60 SD: 1.37</td>
<td>Mean: 8.36 SD: 1.46</td>
<td>Mean: 8.55 SD: 1.16</td>
<td>0.16</td>
<td>0.527</td>
</tr>
</tbody>
</table>

1=lowest rating, 10=highest rating
Conclusions

1. Up to 50% simulation can be effectively substituted for traditional clinical experience in all core courses across the prelicensure nursing curriculum.

2. 50% simulation can be effectively used in various program types, in different geographic areas in urban and rural settings with good educational outcomes.
Conclusions

3. NCLEX pass rates were unaffected by the substitution of simulation throughout the curriculum.

4. All three groups were equally prepared for entry into practice as a new graduate RN.

5. Policy decisions regarding the use and amount of simulation in nursing needs to be dependent upon the utilization of best practices in simulation.
Factors for Success

- INACSL Standards of Best Practice
- Planned framework
- High quality simulations – use of high quality simulations
- Debriefing method grounded in educational theory
- Trained and dedicated simulation faculty
Implications for Schools of Nursing and Clinical Organizations

• What implications from these findings are there for policy and guideline decisions from our regulators?
• What standards or guidelines will be needed when integrating a simulation-based curriculum into your nursing or orientation program?
• What are the considerations faculty/administrators need to address when integrating simulations into the nursing program or clinical program?
National Council State Board of Nursing Guidelines for Simulations

- The evidence is discussed
- Simulation Guidelines
  - Guidelines
  - Evidence
  - Resources
- Faculty Preparation Checklist
- Program Preparation Checklist

NCSBN Simulation Faculty Preparation Checklist

• The Simulation program is based on educational theories associated with simulation such as experiential learning theory.

• The faculty are prepared by following the INACSL Standards of Best Practice: Simulation.

• A tool for evaluating simulated-based learning experiences has been designed based on the INASCL Standards of Best Practice: Simulation evaluation methods.

• The program curriculum sets clear objectives and expected outcomes for each simulation based experience, which are communicated to students prior to each simulation activity.
Faculty Guidelines continued

• The faculty are prepared to create a learning environment that encourages active learning, repetitive practice, and reflection, and to provide appropriate support throughout each activity.

• The faculty are prepared to use facilitation methods congruent with simulation objectives/expected outcomes.

• The program utilizes a standardized method of debriefing observed simulation using a Socratic methodology.

• A rubric has been developed to evaluate the students’ acquisition of KSAs (knowledge, skills and attitudes) throughout the program.
Faculty Guidelines continued

- The program has established a method of sharing student performance with clinical faculty.
- The program collects and retains evaluation data regarding the effectiveness of the facilitator.
- The program collects and retains evaluation data regarding the effectiveness of the simulation experience.
- The program provides a means for faculty to participate in simulation-related professional development such as webinars, conferences, journals, clubs, readings, certifications such as CHSE, participation in NLN Sim Leaders/ STTI NFLA with a focus on simulation.
Different State Regulations for Simulations

Arizona State Board of Nursing

- Must use INACSL standards
- Simulation scenarios must be integrated in the nursing program’s curriculum
- Simulation facilitators must be prepared
- Students participating in simulations should have equal opportunity to perform the role of the nurse
- Adequate personnel and resources are needed to set up and break down simulations
- Specific objectives are needed for each simulation scenario
- Programs shall evaluate and revise simulations based on the evaluation plan
Ohio Board of Nursing

Definition of Simulations

(Y) The term "Patient simulation" means the replication of a real world patient in situ through accurate representations of patient cues and stimuli that a student is to observe, analyze, interact, and respond to with right nursing judgments and actions. The replication may be provided through the use or combination of low fidelity, mid or moderate fidelity, or high fidelity experiences.
Ohio BON: Faculty must be prepared

Programs that use high or mid or moderate fidelity patient simulation for the specific lifespan periods of obstetrics, immediate newborn care, and/or pediatrics [within any specific course] instead clinical experience for that specific lifespan period must have faculty or teaching assistants conducting the simulation who have demonstrated knowledge, skills, and abilities necessary to conduct the simulation obtained from a recognized body of knowledge relative to the simulation. The program must maintain the faculty and/or teaching assistants documentation of having obtained the knowledge and skills necessary to provide the simulation. In providing the simulation in this manner, the program must adhere to all requirements of paragraph (F)(8) of Rule 4723-5-13, OAC.
D. Simulation for direct client clinical hours.

1. No more than 25% of direct client contact hours may be simulation. For prelicensure registered nursing programs, the total of simulated client care hours cannot exceed 125 hours (25% of the required 500 hours). For prelicensure practical nursing programs, the total of simulated client care hours cannot exceed 100 hours (25% of the required 400 hours).

2. No more than 50% of the total clinical hours for any course may be used as simulation.
3. Skills acquisition and task training alone, as in the traditional use of a skills laboratory, do not qualify as simulated client care and therefore do not meet the requirements for direct client care hours.

4. Clinical simulation must be led by faculty who meet the qualifications specified in 18VAC90-27-60.

5. Documentation of the following shall be available for all simulated experiences:
   a. Course description and objectives;
   b. Type of simulation and location of simulated experience;
   c. Number of simulated hours;
   d. Faculty qualifications; and
   e. Methods of debriefing.
Simulation Scenario Development/Implementation

- Use of a simulation framework using a theoretical basis
- Creation or purchase of simulation scenarios that correlate with course concepts and behaviors
- Use of a standardized simulation template when developing simulations for consistency across courses and nursing programs
- Adopt a theoretically-based debriefing approach/structure for training and implementation –
- Consider integrating major concepts in the simulation scenarios that cut across courses, e.g. QSEN competencies, communication strategies, e.g. SBAR, cultural competencies, etc.
Simulation Training/Skills Development

• Use of simulation experts to conduct the initial core training to ensure quality and best practices

• Dedicated time set aside for training/skills development – (3-4 day workshop)
  • The opportunity for faculty to learn new roles, practices, and strategies when integrating simulations into the curriculum
  • Educate all faculty on the evaluation tools that may be used in your simulation-based curriculum (clinical and simulation faculty)

• Set education/training agenda outlining set competencies needed for the faculty, e.g. debriefing
Selection of Educators/Faculty to conduct Simulations

• Strongly encourage the development of a simulation team of individuals who are trained and enthusiastic to implement simulations

• Designate a simulation coordinator/manager of the simulation team to ensure preparedness, communication with the simulation team, and to provide feedback to course faculty where simulations are integrated.

• Develop a simulation learning community, e.g. create an online platform, team meetings, etc. with the simulation team members, key faculty course coordinators, multimedia specialists, simulation technologists, etc. to facilitate communication, best practices, and to incorporate new innovations and processes
Simulation Integration into a Program

• Reframe simulation for all faculty as on campus vs. off campus clinical
• Clinical workload for simulation faculty
• Clinical faculty attend simulation with their students
Recommendations for Educators and Regulators

• Formally trained faculty in simulation pedagogy
• Use of theory-based debriefing methods using subject matter experts
• Adequate numbers of simulation faculty to support the learners
• Equipment and supplies to create a realistic environment
The NCSBN National Simulation Study: A Longitudinal, Randomized, Controlled Study Replacing Clinical Hours with Simulation in Prelicensure Nursing Education

Jennifer B. Hayden, MSN, RN; Richard A. Smiley, MS, MA; Maryann Alzadeck, PhD, RN, FAAN; Susan Koenig-Fedlin, PhD, RN, ANEF, CHSE; and Pamela A. Jeffries, PhD, RN, FAAN, ANEF
Barriers to Changing Education and Regulation

- Sacred Cows
- Lack of Evidence
- Resources
- Funding/Dollars
- Time Commitment
- Administration Buy-In
Future Opportunities in Simulation

**Holoportation**
http://www.wired.com/2016/04/microsoft-holoportation-star-wars-hologram/?mbid=social_fb

**Robotic simulations**
You can read their blog here: http://nursing.duke.edu/news/duke-university-school-nursing-uses-robots-nursing-education or watch their case study video on YouTube: https://youtu.be/KOLcTKhPEhE
Simulation has emerged!

The Future of Simulations

• The future for clinical is promising!
• Over time, more evidence will be disseminated on the use, implementation, and best practices of incorporating clinical simulation into a nursing curriculum.
Goal for Using Simulations: Optimal Student Learning for High Quality Patient Care
References


M.A. Alexander; Carol F. Durham, EdD, RN, ANEF, FAAN; Janice I. Hooper, PhD, RN, FRE; Pamela R. Jeffries, PhD, RN, FAAN, ANEF; Nathan Goldman; Suzan “Suzie” Kardong-Edgren, PhD, RN, ANEF, CHSE; Karen S. Kesten, DNP, APRN, CCRN, PCCN, CCNS, CNE; Nancy Spector, PhD, RN, FAAN; Elaine Tagliareni, EdD, RN, CNE, FAAN; Beth Radtke; and Crystal Tillman, DNP, RN, CPNP, NCSBN Simulation Guidelines for Prelicensure Nursing Programs, Journal of Nursing Regulation, 6(3), pp. 39-42.


Questions & Answers