The Role of Simulation in Nursing Education: A Regulatory Perspective

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Goals

• Compare and contrast different types of simulation
• Identify potential advantages/disadvantages of simulation as a teaching strategy over actual clinical experience
• Discuss the use of simulation as an evaluation tool
Simulation

• Simulation:
  – “… as a strategy – not a technology – to mirror, anticipate, or amplify real situations with guided experiences in a fully interactive way.”

• Simulator:
  – “…replicates a task environment with sufficient realism to serve a desired purpose”

-(http://www.ahrq.gov)
The Role of Simulation

• A teaching strategy
• An evaluation tool
Trends in Nursing Education

• Providing more experiential learning opportunity than instruction
• Increased use of learning technology
• More emphasis on outcome-based then process-based education
• More evidence-based education strategies and curriculum
NCSBN Supports

“...the inclusion of innovative teaching strategies that complement clinical experiences for entry into practice competency.”

– NCSBN position paper on clinical education, 2005
Rationale

• To ensure patient safety
• To promote better preparation of new nurses
• To support innovative teaching strategies
• To overcome faculty and preceptor shortages and lack of clinical sites
Types Of Simulation

- Screen-based/PC-based simulation
- Virtual patients
- Partial task trainers
- Human patient simulator
- Standardized patients
- Integrated models
Principles of Selecting Type of Simulation to Use

• Should be driven by the educational goal/objective
• Should match the level of the student
• The higher the realism, the more effective it is in engaging the student
Strengths and Limitations of Different Types of Simulation
1. PC-Based Simulation

Strengths

• Easy, flexible and unlimited access
• Useful for knowledge acquisition and critical thinking
• Accommodating to individual pace of learning
• Good for lower/entry level students
• Relatively low cost

Limitations

• No physical interactivity
• Low fidelity
• No experiential learning
2. Virtual Patient Simulation

Strengths

• Easy access
• Economic for teaching multidisciplinary care
• Accommodating to individual pace of learning
• Good for lower level of students

Limitations

• Limited physical interactivity
• Low fidelity
• Limited experiential learning
3. Task Trainers

Strengths
- Low cost
- Good for procedural practice

Limitations
- Low fidelity
4. Human Patient Simulation

Strengths
• High fidelity
• Interactive experience
• Animating theoretical knowledge within the context of clinical reality
• Using emotional and sensory components of learning
• Good for critical thinking, decision-making and delegation
• Good for knowledge integration and higher levels of students

Limitations
• Costly
• Limited access
• Dependent on availability of human instructors/operators
• Limited realistic human interactions
5. Standardized Patient (SP)

Strengths

• Higher realism in the interpersonal and emotional responses
• Good for communication skills and interpersonal relationships training
• Good for evaluation

Limitations

• Signs do not match symptoms
• Inversed power dynamic
Principles should stay consistent but strategies flexible.
Factors Facilitating Teaching with High-Fidelity Simulation

- Feedback
- Repetitive practice
- Curriculum integration
- Range of difficulty level
- Multiple learning strategies
- Capture clinical variation
- Controlled environment
- Individualized learning
- Defined outcomes or benchmarks
- Simulator validity

Issenberg et al, 2005
Simulation Fidelity

• The physical, contextual, and emotional realism that allows persons to experience a simulation as if they were operating in an actual healthcare activity.

- 2007 SSH summit
A Question for Regulation

• What is the role of simulation in nursing education in relation to clinical education?
Potential Advantages of Simulation Over Actual Clinical Experience

- Reduces training variability and increases standardization
- Guarantees experience for every student
- Can be customized for individualized learning
- Is more accurate reflective learning especially with HPS
- Is student-centered learning
- Allows independent critical-thinking and decision-making, and delegation
- Allows immediate feedback
Potential Advantages of Simulation Over Actual Clinical Experience (cont.)

• Offers opportunity to practice rare and critical events
• Can be designed and manipulated
• Allows calibration and update
• Can be reproduced
• Occurs on schedule
• Offers opportunities to make and learn from mistakes
• Is safe and respectful for patients
• Allows deliberative practice
• Also uses the concept of experiential learning
“Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.”

- Confucius, 450 BC
Limitations of Simulation Compared to Actual Clinical Experience

• Not real
• Limited realistic human interaction
• Students may not take it seriously
• No/incomplete physiological symptoms
Vision for the Future:
Continuum of Learning

Class → Simulation → Clinical → Real world

• Integrated into mainstream healthcare education
Simulation as a Teaching Strategy: Challenges

- Initial capital expenditures
- High financial cost
- Faculty development
- Ongoing faculty/administrative/technical support
Research on Simulation:
Kirkpatrick Criteria (1998)

- Reaction
- Learning
- Behavior
- Results
Future Research:
Simulation as a teaching strategy

• Impact on competence
• Impact on patient care
NCSBN’s Research Initiative on Simulation

• Goal: To explore the role of high fidelity simulation in basic nursing education in relation to real clinical experience
The Question

• Can high fidelity simulation experience be counted as real bed-side clinical experience?
Specific Objective

• Compare and contrast the effects of simulation alone and in combination with clinical experience on knowledge acquisition/retention, self-confidence, and clinical performance
Design

• A randomized controlled study with repeated measures pre- and post-simulation/clinical to compare the effect of simulation alone and in combination with clinical on knowledge acquisition/retention, self-confidence, and clinical performance.
Figure 1. Study Scheme

Front-load didactic instruction

Baseline assessment

Randomization

Simulation alone
Simulation+clinical
Clinical alone

Outcome measures

1. Knowledge acquisition/retention
2. Self-confidence
3. Clinical performance via standardized patient
Groups

1. Simulation without clinical (30 hours of simulation)
2. Simulation + clinical (15 hours of simulation and 15 hours of clinical)
3. Clinical without simulation (30 hrs of clinical)
Outcome Measures

• Knowledge acquisition/retention
• Confidence
• Clinical performance
Knowledge acquisition/retention

- Assessed with written examinations before (after didactic instruction, which is frontloaded) and after clinical/simulation experiences.
- The examinations were equivalent in content.
Confidence

• Assessed with a Likert-type self-confidence scale which consisted of 12 items.

• Reflect the student’s confidence in assessing, intervening and evaluating pts with critical illness.
Performance Evaluation with SPs

- Three stations
- Each station provided one scenario
- 10-15 min each scenario
- Focused on symptom recognition, assessment and intervention
- Performance evaluated by a faculty member on-site and videotaped for further analysis by two additional faculty members
- Staff: 6 faculty and 6 SPs
Format

• All students enrolled in the course
• Occur over 2 days
• Rush CON labs
• Each student – 3 scenarios using SPs
• One hour commitment for each student
Each Station

- Has the chart outside the pt room
- The chart has info on pt hx, meds etc
- Each pt room has essential equipment
- Faculty member acts as evaluator and MDs if needed
Three Scenarios

• A pt with CP (hx of knee replacement)
• A pt with sudden onset of SOB (hx of abdominal surgery)
• A pt with a change of LOC (hx of fall at night)
A Survey of Boards of Nursing Nehring, 2006

• Purpose: examine the status of regulation changes concerning the use of simulation in nursing programs and if no regulation changes, the presence of approval for use of simulation

• 44 states plus the District of Columbia, and Puerto Rico participated
A Survey of Boards of Nursing (cont.)

• Five states and Puerto Rico have changed nursing regulations to allow a percentage of clinical time with the simulators (Nehring, 2006)

• One state specified a percentage of 10% of clinical time to be replaced by simulation experience (Nehring, 2006)
A Survey of Boards of Nursing (cont.)

• While no changes in regulation, 16 states give permission for schools to use a percentage of their clinical time with the simulation experience (Nehring, 2006)

• The percentage is determined on a case-by-case basis (Nehring, 2006)
The Role of Simulation

• A teaching strategy

• A competence assessment tool
Competency Assessment: Miller’s Pyramid (1990)

- Knows
- Knows how
- Shows how
- Does
Common Assessment Methods

• Written exam (MCQ)
• Checklist evaluation
• Portfolios/Record review (e.g., skill’s checklist)
• Simulations (Standardized patients and models)
Common Assessment Model with Simulation

- Checklist
  - Global rating
  - Process measure
- Checklist
  - Global rating
  - Outcome measure
- Combined Criteria
Types of Simulation Models for Competency Assessment

- OSCE
- Computer-based simulation
- Computerized mannequin
Potential Advantages of Using Simulation for Assessment

• Able to measure more than knowledge level
• Performance-based
• Standardized (same conditions for all test takers)
• Measures integrated KSA
Challenges of Using Simulation as an Assessment Tool

• Measurement issues
  – Reliability
  – Validity

• Cost

• Feasibility
Future Research:
Simulation as an Assessment Tool

• Establish valid content, structure and scoring metrics
• Cost-effectiveness compared to other tools
The Future

Integrated models for both teaching and assessment using simulation
Setting standards and guidelines for various kinds of learning and assessment
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