Simulations & Beyond: Practical Considerations for Getting Started

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Disclosures

- Stacy L. Williams & Katie Ondo
  - Financial relationships with Allied Health Media LLC
  - Intellectual property rights for SimuCase
  - Royalty agreements with CWRU
  - SimuCase patented technology in 4 countries

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  - Research consultant with SpeechPathology.com
  - Member of CAPCSD taskforce ACE
  - Researcher in the area of simulations for student training
Learning objectives
Much has changed in 20 years...
The Generational Learner

52% of 0-8 year olds have access to mobile digital media devices

11% use digital devices daily

90% of 5-8 year olds have used a computer

Children spend 13 hours a week playing video games

www.commonsense.org/research
So what does that mean for how we educate them?
• RESEARCH HAS DEMONSTRATED THAT SIMULATIONS ARE EFFECTIVE METHODS OF INSTRUCTION

• SIMULATIONS HAVE POTENTIAL USE IN COMMUNICATION SCIENCES AND DISORDERS

• YOU CURRENTLY USE SIMULATIONS IN YOUR PROGRAM

• SIMULATIONS COST THOUSANDS OF DOLLARS TO CREATE
4 Best Uses for Simulation-Based Education

- Develop an understanding of big ideas and concepts
- Assist with dealing with time and scale
- Practice with decision making in a safe, controlled environment
- Take learners to a time and place unlikely to experience
Uses of Simulations

- Assessment and Interviewing Skills
- Patient Education Strategies
- Communication and Ethical Dilemma Skills
- Team Collaboration Skills
- Inter-Disciplinary Education
- Decision Making Skills
Who is Using Simulations?

- Naval Air Systems
- Medicine (Surgical Procedures)
- Emergency Medical Training
- Military Training (Doctors Without Borders)
- Dentistry
- Nursing
- Police
Advantages of Simulations

- Repeated practice
- Anxiety reduction
- Standardization
- Patient access
- Patient safety
- Student autonomy
- Authenticity (fidelity level)
- Consistency and accuracy
- Focus on learner’s performance
- Encouragement of active learning
- Retention
Serious Games / Computer Based Simulations

- Digitally Enhanced Mannequins
- Virtual Human Patient Simulation
- Standardized Patients/Simulated Patients

Total Immersion Virtual Reality
Standardized/Simulated Patients

Individuals who are trained to act as a real patient in order to simulate a set of symptoms or problems.
How do Standardized Patients work?

1. Faculty create a case study with scripts and learning objectives
2. Hire actors/actresses
3. Standardized patients (SPs) study a case scenario and learn scripts
4. Training may involve a video review
5. SPs are educated to complete informal and formal evaluations of each student
6. Follow up discussions/real-time feedback using video data for student
Virtual Patient Animation

- The manipulation and performance of digitally animated 2D or 3D figures in a virtual environment that are rendered in real time by computers.

Second Life: Animated VP
How do Animated Virtual Patients work?

1. Faculty create a case study with scripts and learning objectives
2. Faculty can puppet animated characters with voice changing software
3. Creation of computer avatars for puppeting
4. Computer logistics and set up (SecondLife, NeuroTV, ToonMX)
5. Follow up discussions/real-time feedback using video data for students
Digitally Enhanced Mannequins

- High-fidelity simulators, can be programmed to exhibit a wide range of clinical signs and symptoms, along with other real life functions.
How do Mannequins work?

1. Faculty create a case study with scripts and learning objectives

2. Mannequin set up and programming

3. Clinical environment set up (simulation center)

4. Faculty can control the outcome from a computer located within the lab setting

5. Follow up discussions/real-time feedback using video data for students
Computer Based Simulations

- Computer based representations of patients designed to determine or test clinical decision making.

- Serious games are simulations of real-world events or processes designed for the purpose of solving a problem.
How do Computer Based Sims work?

1. Create a case study with scripts and learning objectives (branched narrative decision tree)

2. Use an existing software solution (SimuCase) or an authoring platform (DecisionSim, Smart Sparrow, iHuman)

3. Educate students on the simulation learning process/program

4. Follow up discussions/feedback using decision data from students
Computer Based Sims

- SimuCase (pre-defined case library)
- Smart Sparrow (authoring tool)
- DecisionSim (authoring tool)
- iHuman (authoring tool)
- WebSP (authoring tool)
- Virtual Case Creator (authoring tool)
CAVE Simulations

**Immersive virtual reality environment** where projectors are directed to three, four, five or six of the walls of a room-sized cube. An instructor or computer controls the actions of the objects or visual images on the screen.
Serious Games / Computer Based Simulations

Digitally Enhanced Mannequins

Virtual Human Patient Simulation

Standardized Patients/Simulated Patients

Total Immersion Virtual Reality
Highly Effective Simulations

- **Points of realism** targeted to drive experiential learning
- Dynamically **competitive** with decisions and results
- **Illustrative** not prescriptive or deterministic
- **Promotes discussion** of critical issues
- Relevant and **timely feedback**
- Strong **instructional design** elements
- **User driven** simulation experiences
- Designed for a **specific** target audience, level and learning needs
- **Outcome focused** - changes in learners’ mindset for concrete actions
- Enables and **builds community**

A Future Vision for Simulation-Based Education
Google Glass
Holographic Projection
Android Technology
A Future Vision for Simulation-Based Education

A Future Vision for Simulation-Based Education
SECRET WORD
Simulation-Based Education is…

Learning to **DO**

*not*

just Learning to **KNOW**
4 Pillars of Simulation-Based Education

- Learning to **Know**
- Learning to **Do**
- Learning to **Be**
- Learning to **Work Together**

[http://www.unesco.org/delors/fourpil.htm](http://www.unesco.org/delors/fourpil.htm)
Kolb’s Experiential Learning Cycle

(Kolb DA, 1984)
Simulations are the most powerful when used in combination with expert facilitation and feedback.

Fanning RM & Gaba DM, 2007
The Role of Feedback in Simulated-Based Education

Methodology:

• Compared two SLP graduate level courses at two universities targeting child language disorders using a virtual human simulation experience (SimuCase) within their curriculum.

• Graduate level course A (n=10) had limited faculty support during simulation experiences – encouraging students to work independently.

• Graduate level course B (n=10) had strong faculty support during simulation experiences – using facilitation techniques.

• Both SLP graduate level courses consisted of first year students with similar educational backgrounds and experiences.
Results

First year graduate students performed significantly higher on a virtual human simulation experience when provided faculty feedback compared to their counterparts.

Program A (M=72.98, SD=5.88) and program B (M=82.49, SD=6.38) for virtual human simulation performance scores [t (18)=2.878, p<.01]
Conclusion

Faculty feedback (debriefing) is the most important and frequently cited variable when using simulated-based education to promote effective learning.

(Issenberg SB, McGaghie WC, Petrusa ER, Gordon DL, Scalese RJ, 2005)
What is Debriefing?

The bridge between experiencing an event and making sense of it.
Debriefing is the ‘heart and soul’ of any simulation experience

(Rall M, Manser, T, Howard S, 2000)
Seven Common Structural Elements for the Debriefing Process

1. Debriefee
2. Participants to debrief
3. An experience (the simulation)
4. The impact of the experience (the simulation)
5. Recollection
6. Report
7. Time

(Lederman LC, 1992)
How to Implement Simulation-Based Education
The Locker Room
Pre-Brief Session

- Discuss purpose of the simulation
- Share goals of simulation and learning objectives
- Establish expectations
- Set ground rules and time frame
- Provide background information
- Build motivation
- Tie in clinical experiences
The Shallow End of the Pool
Introduction Session

- Discuss learning format and/or software interface
- Review critical components of the simulation
- Ensure relevancy to clinical experiences
- Prepare for frustration-resolution moments (highly emotional)
Quick! say aloud what color you see in every word, NOT the word you read.
The Frustration-Resolution Pair

- A moment of learning that is marked first by being frustrated at not being able to do something and then resolving that frustration.
The Frustration-Resolution Pair
THE DEEP END OF THE POOL

It's where you'll learn to sink or swim.
The De-Brief Session

- After each scenario always have an after action review

- Establish set de-briefing times
  - How did it go?
  - What did you do well?
  - What could you do better?
  - What will you do differently next time?
  - How does this apply to what you have already experienced or will experience?

- Provide formal thought time/reflection for students to recollect and report ‘lessons learned’
Simulation research shows that learners who do NOT participate in a de-brief process fail to improve their skills and transfer learning

(Savoldelli, G.L., et al 2006)
Free Swim
Repeated Practice

- Encourage repeated practice to hone skills
- Applaud mistakes and pushing the envelope of learning
- Make students responsible for critically analyzing their own performance
- Provide ongoing access to simulations
- Consider contests for high scores
- Empower creation of new scenarios
Using Educational Simulations

Engagement

Practice

Background

Introduction

Aldrich, C 2005
The goal of clinical simulations is to **stimulate** the creation of mental models within the learner by having them discover rules and principles through experimentation. Instructors should constantly be asking themselves, ‘How do I help the learner discover this principle and then verify that they know it?’

James Hadley, IT designer at JHT Incorporated
Certified Simulation Healthcare Educators

SLP/Audiology
‘Simulations can be an immensely powerful learning and teaching tool, but is no magic bullet, which when fired in the direction of a course or curriculum will instantly solve all issues.’

Adrich M, & Wanless S, 2012 pg 15
SECRET WORD
You are HERE...

and over here

and here, here and here

and here...
What would it look like in my program?
Steps for Planning

• Define the problem
• Determine the learning objectives
• Select assessment and evaluation methods
• Design simulation event
• Select simulation type/modality
• Identify resources
Define the Problem

Assessment of Clinical Competencies

Independent Learning and Practice

Exposure to low – incidence case types

Problem-based Learning

Interprofessional Education and Practice

Part of remediation Plans

Authentic Assessment in Classrooms
Determine the learning objectives
Select assessment and evaluation methods

Design simulation event
• Select simulation type
• Identify additional resources
What’s available

- SecondLife
- DecisionSimulation
- SimuCase
- Virtual Human Toolkit
- iHuman
- X-Box Kinect (SDK)
No or low cost
Live “puppeting”
Record and export
Join an existing community
DecisionSim Introduction

- **Web-based Simulation Platform** – scalable, **proven**
- **Training and Assessment** – effective and engaging, easy to build
- **Adaptable and Broad** – customizable - audiences, delivery, content
- **Extensive and Deep** - relevant outcomes data - effectiveness, gaps, insights
- **Flexible Engagement Model** – from platforms to programs, efficient, cost-effective
Branched Narratives
Virtual Case Studies

Select a simulated case study below to learn more about that virtual patient and their referral information.
Virtual Human Toolkit
X-Box Kinect and Avatar Kinect
Planning Worksheet: Simulation Based Education
Steps for Planning a Simulation
(The Society for Simulation in Healthcare)

1. Perform a needs assessment for your course
2. Define your learning goals
3. Create your learning objectives
4. Select your assessment method (formative vs. summative)
5. Select your evaluation methods (de-brief, feedback, etc)
6. Select your evaluation tools (instruments, rubrics, checklists, etc)
7. Design your simulation event (course, class, session, etc)
8. Select your simulation modality/type (standardized patient, computer based, etc)
9. Identify additional resources needed (content experts, location, technology, etc)
10. Organize your simulation team (SPs, technology, faculty, etc)
   • Recruit
   • Orient
   • Train
11. Prepare materials for learners and simulation team
   • Instructions
   • Equipment
   • Setting
12. Conduct simulation pilot activity
   • Dress Rehearsal
   • Field test
   • Run Through
Create a Plan

1. What is one thing you can do immediately after this presentation?

2. Who are two people you need to contact?

3. What are three questions that you need to have answered before moving forward?