

Actively Engaging Learners through Simulation Education & Training

Thursday, September 18th- 2008

8:30 am – 11:15 am

Presenters:

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Actively Engaging Learners through Simulation Education & Training

Part 1: Principles and Concepts for Simulation Education

Carol Noe, MS

- **Simulation Training**
 - *Call To action*
 - *IOM Report, 1999*
 - *Medical Errors are 7th leading cause of death in US*
 - Aviation
 - Lowest error rate of any industry
 - Results of simulation in HROs- High Reliability Organizations

- **Levels of Fidelity in Simulation**
 - Low
 - Basic skill acquisition and development
 - Motor skills
 - Little to no technology
 - Moderate
 - High
 - Electronic/Computer based
 - Perform multiple tasks in a scenario

- **Two Types of Simulation Training**
 - Procedure or Task Training (e.g. IV access)
 - Scenario and Team Training (e.g. CRM- trauma or code scenario)

- **Fitts and Posner's: Three-stage Theory of motor skill acquisition**
 - Cognitive stage: Learner Intellectualizes the task
 - Integrative stage: Knowledge is translated into appropriate motor behaviors
 - Autonomous stage: Practice results in smooth performance

- **Virtual Reality/Task Training**
(adapted from Gallagher et al, 2005)
 - Didactic teaching of relevant knowledge (i.e. anatomy, physiology, pathology)
 - Instruction on details/steps of procedure or task
 - Defining/Demonstrating or illustrating errors
 - Test cognitive knowledge prior to skills training
 - Technical skills training on simulator
 - Proximate feedback when error occurs
 - Terminal feedback at the end of each trial
 - have a referenced performance goal as measure of success or failure

- **Simulation/Team Training Scenarios**
 - Static:
 - Dynamic:

- **Things to consider**

- All aspects of safe patient care
- What level of complexity you are trying to incorporate
- If scenarios... allow for adequate time (do not plan to teach in real time)
- Groups of 4-6 per session/station etc.
- Volume improves performance
- Desired method of facilitation

Templates for Simulation Scenarios

- **Case Information**

- Educational Rationale
 - Reason
 - Objectives
 - Target audience
 - Developers
 - Equipment
 - Support component

- **Scenario Set-Up**
 - Patient scenario
 - Clinical scenario
 - How the simulation plays out over time
 - Designed in states
 - You leave one state for another based on 'learner actions' (i.e.. time, drugs given, actions)

- **Patient Background Info and Baseline Simulation State**
 - Traditional H&P format-
 - It is what the team sees at the beginning of the exercise

- **Scenario Development**
 - Define each state:
 - Need to define what you want the learner to do
 - what the trigger would be to move to the next state
 - (if multiple scenarios increase in complexity)

- **Debriefing**

- Theory

- Transformational Learning- Jack Mezirow
 - Experiential Learning
 - Seeing effects of the actions
 - Reflect on actions to accommodate learning styles

- Facilitation/Coaching

- Questions that promote self reflection, critical thinking, and searching for answers
 - Telling removes power, asking elicits power
 - Provide psychologically safe environment

- Lessons Learned

- Limit Objectives
 - 20-30 minutes for simulation debrief- less for team training
 - Avoid limiting discussions

- **Potential Problems Surrounding Simulation**

- Standing around the mannequin and lecturing
 - Giving away too much info before it is needed (evaluate if user can determine what info they need or may be missing)
 - Not using scenario to full potential
 - Not debriefing
 - No checklist or objective evaluation tool!!!!

- **Findings in the Literature**

- Perceptually improved self efficacy
 - Improved confidence
- Combine skills with critical thinking
- Opportunity to learn infrequent occurrences

- **Other Opportunities**

- Increased retention and recruitment
- Decreased preceptor burnout
- Weed outs
- Standardization
- Research
- Innovations in practice

- **Outcome measures:**

- Perceived efficacy
- Kirkpatrick's Model
 - Reaction
 - Learning
 - Behavior
 - Results
- Measures now vs. needed measures

Actively Engaging Learners through Simulation Education & Training: Part 2

Practical Issues For Planning and Implementing the Simulation Environment

Carol Noe MS and Kathy Werner PhD, RN

- **Needs Assessment**
 - Target Users
 - Objectives
 - Patient Safety

- **Communicating the Need**
 - Administrators
 - Board
 - Community
 - Media
 - Elevator Speech

- **Stakeholders/Administrative Buy-In**

- **Funding Sources**
 - Foundations
 - Grants
 - City/State Resources
 - Facility

- **Space**
 - Convenience promotes use

- Contiguous space
- **Business Plan**
 - Capital needs
 - Operational needs
 - Hours of operation
 - Staffing
 - Cost Benefit Ratios
 - Internal/External Use Charges
- **Policies and Procedures**
- **Staff Development**
- **Design/Layout**
- **Scheduling**
- **Storage**
- **Audio Visual/Information Technology:**
- **OUTCOMES**

Issues Related to Establishing a New Program

I. Planning the Program

- What is the purpose of the program?
- Where/What is your community of service?
- What are the relevant needs in your community of service?
- Who/Where is your community of conflict?

II. Organizing the Program

- Who will staff the program?
- How will the labor be divided? (who does what?)
- What is the organizational chart?
- Where will the office(s) be located?
- How will the program be financed? (salaries/equipment/construction-remodeling)
- Who will provide coverage (hours/days/nights/weekends/holidays)?
- How will equipment be obtained?

III. Implementing the Program

- How will you ensure continuity of care---communication with involved people?
- Who controls decisions about equipment and staffing?
- What is acceptable practice? (protocols, guidelines, etc)
- What program records need to be kept? (for trend identification, program stats)
- Where will program records be stored?
- How will participation/progress be documented?

IV. Maintaining the Program

- How will new staff be trained/oriented to the program?
- What (if any) follow-up will your program provide?
- What role will your program play with patients/families/community groups?
- Will the program participate in any kinds of research?
- What quality assurance mechanisms will the program employ?

References

Anthony G. Gallagher PhD, E Matt Ritter MD, Howard Champion MD, Gerald Higgins PhD, Marvin P Fried MD, Gerald Moses, PhD, C Daniel Smith MD, Richard M Satava MD. "Virtual Reality Simulation for the operating room: Proficiency-Based Training as a paradigm shift in surgical skills training." *Annals of Surgery* (2005) Volume 241(2) Feb 2005 364:372

Debra Spunt MS RN, Dawn Foster MS RN CCRN, Kara Adams MS ACNP "Mock Code: A Clinical Simulation Module." *Nurse Educator* (2004) Volume 29 Sept/Oct 2004 192-194

Standardize Patient Case Template. UTMB SP case development template

American Medical Association. "Initiative to Transform Medical Education: Recommendations for change in the system of medical education" June 2007

Janis C Childs, Susan Sepples "Clinical teaching by Simulation: Lessons learned from a complex patient care scenario." *NLN Nursing Education Perspectives* (2006) National League for Nursing, Inc. Volume 27, May/June 2006 154-158

Carlos Pellegrini MDD FACS, Ajit K Sachdeva, MD FACS, FRCSC, Kathleen A Johnson EdM. "Program for Accreditation of education institutes continues to grow." *Bulletin of the American College of Surgeons*. Volume 92 Number 3

Richard K Reznick MD, D.Ed, Helen MacRae, MD.. "Teaching Surgical Skills- Changes in the wind." *The New England Journal of Medicine* (2006) Volume 355:2664-2669 December 23, 2006 Number 25

Daniel J Scott, Gary L Dunnington. "The new ACS/APDS skills curriculum: Moving the learning curve out of the operating room." *The Society of Surgery of the Alimentary Tract 2007. J. Gastrointest Surg DOI 10.1007/s11605-007-0357-y*

Suzanne C. Beyea, PhD, RN, FAAN, Linda (Kobokovich) van Reyn, PhD, RN, Mary Jo Slattery, MS, RN. "A Nurse Residency Program for Competency Development Using Human Patient Simulation." *Journal for Nurses in Staff Development* (2007) Wolters Kluwer Health. Lippincott Williams & Wilkins. Volume 23 Number 2 77 82

Tuttle RP. Cohen MH. Augustine AJ. Novotny DF. Delgado E. Dongilli TA. Lutz JW DeVita MA. "Utilizing simulation technology for competency skills assessment and a comparison of traditional methods of training to simulation-based training." *Respiratory Care* (2007) Mar; 52(3): 263-70.

John Vozenilek, MD, J. Stephen Huff, MD, Martin Reznick, MD and James A Gordon, MD, MPA. "See one, do one teach one: Advanced technology in medical education." *Academic Emergency Medicine* (2004) Volume 11, Issue 11 1149-1154

M A DeVita, J Schaefer, J Lutz, H Wang and T Dongilli. "Improving medical emergency team (MET) performance using a novel curriculum and a computerized human patient simulator." *Quality and Safety in Health Care* 2005;14:326-331;doi:10.1136/qshc.2004.011148

Rabih A Chaer, MD, Brian G DeRubertis, MD, Stephanie C Lin, MD, Harry L. Bush, MD, John K. Karwowski, MD, Daniel Birk, Bam Nicholas J. Morrissey, MD, Peter L. Faries, MD, James F McKinsey, MD, and K. Craig Kent, MD. "Simulation improves resident performance in catheter-based intervention". *Annals of Surgery* (2006) Volume 244, Number 3

Neal E Seymour, MD, Anthony G Gallagher, PhD, Sanziana A. Roman, MD, Michael K. O'Brien, MD, Vipin K. Bansal, MD, Dana K. Andersen, MD and Richard M. Satava, MD. "Virtual reality training improves operating room performance: Results of a Randomized double blinded study." *Annals of Surgery* (2002) Volume 236 Number 4, 458-46. Lippincott Williams & Wilkins, Inc.

Robert E. Sedlack MD, Joseph C Kolars MD. "Computer simulator training enhances the competency of Gastroenterology Fellows at Colonoscopy: Results of a Pilot Study." *The American Journal of Gastroenterology*. (2004) Volume 99 Issue 1;33-37, January 2004.

K Moorthy C Vincent and A Darzi. "Simulation based training." *BMJ* (2005) Volume 330; 493-494, doi:10.1136/bmj.330.7490.493 <http://bmj.com/cgi/content/full/3307/7490/493>

Diane B Wayne MD, John Butter, MD, Viva J Siddall MS, Monica J. Fudala BA, Leonard D Wade MS, Joe Feinglass PhD, William C McGaghie PhD. "Mastery learning of Advanced Cardiac Life Support Skills by internal medicine residents using simulation technology and deliberate practice." Wayne et al., ACLS Training of Internal Medicine Residents – (reprints) Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL; Department of Anesthesiology, Galter 3-150, 251 E Huron Street, Chicago, IL 60611 (email;Dwayne@northwestern.edu).

Mike Moyer, MS, EMT-P. "The Simulation Story" (2006) Jul *EMS* – www.emsresponder.com

Jerome Groopman. "A Model Patient: how simulators are changing the way doctors are trained". *The New Yorker* 2005-05-02

Contemporary OB/GYN. "Simulating laparoscopic and hysteroscopic surgery". April 12, 2005 Volume 50. www.contemporaryobgyn.net

Susan M Stevens, Timothy E Goldsomith Kenneth L Summer, Andrei Sherstyk, Kathleen Kihmm, James R Holten, Christopher Davis, Daniel Speitel, Christina Maris, Randall Stewart, David Wilks, Linda Saland, Diana Wax, Panaiotis, Stanley Saiki, Dale Alverson, Thomas P Caudell. "Virtual reality training improves students' knowledge structures of medical concepts." Department of Psychology, University of New Mexico, Center for high performance computing, University of New Mexico

Roger Kneebone, Jane Kidd, Debrra Nestel, Suzanne Asvall, Paraskevas Paraskeva , Ara Darzi. "An innovative model for teaching and learning clinical procedures." *Medical Education* (2002) 36:628-634, Blackwell Science Ltd.

Alinier Guillaume MPhys PGCE MinstP CPhys ILTM, Barry Hunt BPharm (Hons) PhD MRPPharmS Ray Gordon BSc CEng, MIEE Mipem Colin Harwood BA RMN SRN ILTM. "Effectiveness of intermediate-fidelity simulation training technology in undergraduate nursing education." *Issues and Innovations in Nursing Education*. 2006 The Authors. Journal compilation. 2006 Blackwell Publishing Ltd.

Treloar D, Hawayek, J, Montgomery JR, Russell W. "On-site and distance education of emergency medicine personnel with a human patient simulator." *Military Medicine* (2001) Nov; 166(11): 1003-6 (12 ref). database CINAHL

Carol I Vandrey MS, RN, CCRN, Karen M. Whitmann MS, RN, CS. "Simulator training for novice critical care nurses: Preparing providers to work with critically ill patients." *American Journal of Nursing* (2001) Sept Volume 101(9); 24GG-24LL

PKM Ravert. "Use of human patient simulator with undergraduate nursing students: A prototype evaluation of critical thinking and self-efficacy." *The University of Utah* (2004); PhD. 142. Database CINAHL

S Madorin, C. Iwasiw, "The effects of computer-assisted instruction on the self-efficacy of baccalaureate nursing students". *Journal of Nursing Education* (1999) Sept; 38: 282-5. Database CINAHL

Harry Owen, John L Plummer. "Improving learning of a clinical skill: the first year's experience of teaching endotracheal intubation in a clinical simulation facility." *Medical Education* (2002); 36:635-642

TU Suvinen, LB Messer, E Franco. "Clinical simulation in teaching preclinical dentistry." *European Journal of Dental Education*. (1998) Feb 2(1):25-32

Actively Engaging Learners through Simulation Education & Training: Part 3

Application of Simulation Technology to Driver's Education in the Community

Maria A. Wojtczak BA

- **Statistics related to vehicle collisions**
 - General population
 - Teen population
 - Societal impact
 - Economic impact
 - Impact on Health Care

- **Driver Education**
 - History of Driver training
 - Current State
 - Future Direction

- **Learning Model**
 - Retention rates
 - Learning Principles

- **Use of technology in the training process**
 - Driving simulator applications
 - Applying the technology to the novice, commercial and mature driver sectors
 - DrivingMBA's instruction model utilizing simulation-based training
 - Novice
 - Commercial

- Senior
- Rehabilitation

- **Developing Skills & Competencies**
 - Types of simulators used

 - Scenarios

 - Learning objectives

 - Transfer of skills from virtual to reality

- **Outcomes achieved to date**
 - Planned research projects

- **Q&A**

References

Department of Transportation/Motor Vehicle Division Crash Stats

National Highway Traffic Safety Administration Studies

National Safety Council

National Transportation Safety Board

AAA Foundation

Allstate Foundation

MPRI

Simulator Systems Incorporated

