Experiential Learning and Simulation:
A Theoretical Foundation

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Framing the Relationship
Since the beginning of medicine....
Definition of Simulation

“Simulation is a technique – not a technology – to replace or amplify real patient experiences with guided experiences, artificially contrived, that evoke or replicate substantial aspects of the real world in a fully interactive manner.”

- David Gaba, MD
National Landscape

Most prominent innovation in medical education over the past 15 years

Every hospital has either a simulation center, simulation equipment, or a simulation based educational program

Simulation has the potential to revolutionize health care and address patient safety issues
Why simulation?

Diagram showing the level of involvement and what we tend to remember:

- Passive: Reading (10%), Hearing Words (20%), Looking at Pictures (30%), Watching a Movie (50%), Looking at an Exhibit (50%), Watching a Demonstration (70%), Seeing it Done on Location (70%), Participating in a Discussion (70%), Giving a Talk (90%), Doing a Dramatic Presentation (90%), Simulating the Real Experience (90%), Doing the Real Thing (90%)

- Active: 100% of what we do and experience.
Simulation and the Competence Gap

Experiences

Perceived

Competence Gap

Actual

Competence

Experiences

Medicine of the Highest Order

UNIVERSITY of ROCHESTER MEDICAL CENTER
Science of Simulation

Immersive and Experiential

Medicine of the Highest Order
Adults as Learners - Andragogy

SELF DIRECTION: Independent self-concept and can direct his or her own learning

EXPERIENCE: Life experiences that are a rich resource for learning

ROLES: Learning needs related to changing roles

IMMEDIACY: Immediate application of knowledge

MOTIVATION: Internal rather than external factors

Malcolm Knowles (1913 - 1997)
Where are we aiming our training?

Competent
- Do no harm
- Adherence to “rules”

Proficient
- Minimal supervision
- Case numbers
- In-service performance

Mastery
- Confident physicians
- Fluidity

Expertise
- Automation
- The art and craft of medicine

Modified from Dreyfus
Developing Expertise

- Extreme case of skill acquisition
- Domain specific
- Effortless
- Reflective
- Differences in knowledge organization
- Automated Performance

From Ericsson, *Development of Professional Expertise*, 2009
Attaining Expertise Using Simulation

“...it isn’t magic, and it isn’t born... a person of good intelligence can put in the sustained, focused effort it takes to achieve extraordinary mastery... And the one thing they always have is this incredible investment of effort.”

K. Anders Ericsson
A resident, nurse, etc. participates in a simulated code of an adult in ventricular fibrillation
During the debriefing after the simulation, the participant reflects on the good and not-so-good aspects of the simulated patient’s care with the help of a facilitator and the rest of the group.
Simulation - Abstract Conceptualization

- The events of the simulation are linked to the evidence-based algorithm developed by the AHA ACLS Course and the hospital’s policies and procedures for team-based resuscitation of an adult.

- This allows the learner to plan changes for the next time.
Simulation - Active Experimentation

The planned changes from the previous stage are implemented in a real or simulated patient to create a new concrete experience, restarting the cycle.
Process of Experiential Learning
Emotionality in Education
Circumplex Model of Emotion

Adapted from Russell and Feldman-Barrett 1999
Typology of Simulation Fidelity

**Equipment Fidelity:** The appearance and feel of the simulator

**Environment Fidelity:** The sensory information from the surrounding environment

**Psychological Fidelity:** The trainee’s perception of the simulation as a believable substitute
Simulation-based education

Quality & Safety
System Design
System
Team
Individual
Medical Knowledge
Teamwork/Communication
Skill Practice/Proficiency
Future Directions
Greatest Potential - Assessment

How do we know when adults are learning?
Current Relationship

**CLINICAL ENVIRONMENT**

Patients

Clinical Practice

Clinical Supervision

**SIMULATED ENVIRONMENT**

Tutor Support

Simulator-Based Practice

Simulators
Interactive Relationship

CLINICAL ENVIRONMENT

Patients

- Identifying Learning need
- Reapply skill
- Review
- Continue

Clinical Supervision

- Simulator based practice

Tutor Support

Simulators

Further practice as needed

SIMULATED ENVIRONMENT
Thank you

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