Simulation in Education: Just Do It!

Dr Zubair Amin
Dr Nicola Ngiam

University Children’s Medical Institute
Brief Outline

• Rationale of simulation

• Appropriate usages

• Features that make simulation works

• Simulation in pediatrics

• Developing and delivering a meaningful lesson
“To study phenomenon of disease without book is to sail in uncharted sea; while to study books without patients is not to go to the seas at all.”

Sir William Osler
Simulation

Device/conditions that aim to imitate anatomical models, physiological phenomena, patients, or clinical tasks.

- **Part task trainers:**
  - Harvey cardiac simulator

- **Anatomical models:**
  - Pelvis, thorax

- **Virtual reality:**
  - Endoscopy

- **Human patient simulators (HPS)**

- **Complex “integrated” simulator:**
  - virtual hospitals, virtual operating theatre
Rationale for Simulation Use

- Safe environment, mistake forgiving
- Trainee focused versus patient focused
- Controlled, structured, and proactive patient exposure
- Reproducible, standardized objectives
- Opportunity for immediate feedback
- Increase public trust in the profession

Scalese, Issenberg 2005; McGaghie 2007
Putting the Patient First: Repeated Practice
Putting the Patient First: Infrequent Clinical Situations
Putting the Patient First: Emergency Team Drills
Putting the Patient First: Privacy and Comfort
Putting the Patient First: Sharpening the Clinical Skills
Putting the Patient First: Complex Drill
Features that Make Simulation Works

- Integration within the curriculum
- Multi-modal and flexible training
- Immediate feedback and coaching
- Repeated practice
Integration within the Curriculum

Making of a Doctor

Knows

Knows How

Shows

Does

Knowledge

Practice

Making a Doctor

Yong Loo Lin School of Medicine
## Curriculum Integration & Progressive Exposure

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th>Available Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intubation</td>
<td>Video &gt;&gt; Simulator &gt;&gt; Real Patient (RP)</td>
</tr>
<tr>
<td>Suture</td>
<td>Plastic model &gt;&gt; Animal tissue &gt;&gt; RP</td>
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<tr>
<td>Heart sounds</td>
<td>Audio, video &gt;&gt; self-learning modules &gt;&gt; Harvey &gt;&gt; RP</td>
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<tr>
<td>Pelvic examination</td>
<td>Anatomical model &gt;&gt; Standardized patients &gt;&gt; Anesthetized RP &gt;&gt; RP</td>
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</tbody>
</table>
Multimodal and Flexible Training

- Large group instructor-led training
- Small group instructor-led training
- Peer teaching
- Self-learning
Feedback and Coaching

Comparative Effectiveness of Teaching and Learning Methods in Skill Attainment and Transfer (Joyce and Showers)
Repeated Practice and Skill Acquisition

Learn to see, learn to feel, learn to smell, and know that **practice** alone makes perfect.

Sir William Osler
Simulation in Our Campus

- Anatomical models
- Harvey in Dept of Physiology and Science 4
  - Book through Facility Booking
- Skills Lab
- Anesthesia SimMan
- ACLS trainer
- Khoo Teck Puat Advanced Surgery Training Centre
Why Simulation in Pediatrics?

• Training / skill acquisition

• Staff improvement
  – Ability to perform in a stressful situation
  – Trained to make decisions
  – Situational awareness
  – Conflict resolution
  – Communication

• Builds confidence

• Cost effective
In Paediatrics

- Used to teach acute paediatric emergencies
- Mobile unit
- Mock codes with MOs, registrars and nurses
- Done in a PICU room or in the general ward
Simulation

- Simulation is a learning methodology, not a technology
- Technology supports the methodology
Performance

Arousal

Bored  Alert  Rational  Irrational  Exhaustion  Panic
Circumplex Model of Affect

Simulation

Russell, J. A. 1980
Lesson Plan

• Formulate learning objectives

• Create scenario to meet these objectives

• Teach where learner is at

• Curriculum first, technology second

• Consider all aspects of reality
Planning for A Teaching Session

Intubation video

Familiarisation with equipment

Demonstration
(Emphasising need to see endotracheal tube passing through vocal cords)

Student attempts endotracheal intubation on an “easy” simulator
(Emphasising correct handling of laryngoscope)

Feedback on technique

Repeat until consistent satisfactory performance

Expose to different and difficult simulators/introduce alternative techniques and endotracheal intubation aids

Competence and confidence

Owen, Plummer; Medical Education 2002; 635-42
Feedback and Debriefing

• Immediately post-simulation as most will be retained

• Atmosphere dominated by mutual respect

• Facilitator acts as catalyst

• Facilitate self-discovery and self-critique
Feedback and Debriefing

- Better retention and learning
- Resolve conflicts
- Instructor evaluation important
Debriefing

- 3 phases

- Description
  - Express thoughts and feelings
  - Describe intentions
  - Common understanding of what happened
  - Listen for “pearls”
Debriefing

• 3 phases

– Analysis

• Systematically examine scenario in terms of knowledge, skills and attitudes
• Explore elements that were positive first
• Identify, analyze and explore potential solutions to problems
Debriefing

• 3 phases

  – Application
   • Summarize
   • Allow participant to tell you what they have learnt
   • Link learning objectives to clinical setting
Debriefing

• Techniques
  – Careful phrasing of questions
  – Encourage self analysis
  – Strategic silence
  – Explore concerns
  – Follow up on crew-initiated problems
Facilitator

• Allow enough time for debriefing
  – 25% simulation, 75% debriefing

• Ask the right questions

• Listen carefully

• Support individual learning needs

• Ensure learning objectives met
Future

• Incorporate simulation and clinical skill training into undergraduate and post-graduate paediatric education

• Better prepare students for their role as a doctor
“Learn to see, learn to feel, learn to smell
And know that **practice** alone makes perfect.”

Sir William Osler
Acknowledgements

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I’m a little stressed right now...
(Just turn around and leave quietly and no one gets hurt.)