Modernizing Pedagogy in Cardiothoracic Surgical Training

Ara A. Vaporciyan, MD, FACS

Disclosure
I have no personal or professional financial relationships or interests with any proprietary entity producing healthcare goods/or services
Existing Model of Resident Education

- Dedicated Teaching Faculty
- Adequate Time for Exposure
- Abundance of Clinical Material
- National Organizational Oversight

Apprenticeship Model

- Dedicated Teaching Faculty
- Abundance of Clinical Material
- Adequate Time for Exposure
- National Organizational Oversight
Apprenticeship actually works

- Spacing Out
  The benefit of disrupted study
- Fluency Bias
  The power of the pretest and quizzing
- Interleaving
  Mixed learning beats learning in silos

Apprenticeship Model

- Dedicated Teaching Faculty
- Abundance of Clinical Material
- Adequate Time for Exposure
- Increasing focus on outcomes
- Competition for time
- National Organizational Oversight
- Increasing case complexity
- Rapidly expanding Body of knowledge
Pre-1910
• Proprietary medical schools dominate
• No organized educational structure

1910-1950’s
• Flexner Report closes > 70% of schools
• Education becomes the primary goal
• Existing design established

1950’s-1980’s
• Explosion of medical research
• Massive increase in research funding
• Education becomes 2nd priority

1980’s-2000’s
• Recession decreases research $%
• Patient care now maintains revenue
• Education becomes 3rd priority

Pre1910 to 2000’s
• Loss of the patients’ willingness to participate in the educational process
- Competition for time
- Increased focus on outcomes
- Increasing complexity
- Rapidly expanding body of knowledge

All exist in K-12 education
• Competition for time
• Increased focus on outcomes
• Increasing complexity
• Rapidly expanding body of knowledge

All exist in K-12 education

*Improved learning in a large-enrollment physics class
DesLauriers L et al. Science 2011; 332:862-4
• Competition for time
• Increased focus on outcomes
• Increasing complexity
• Rapidly expanding body of knowledge

All exist in K-12 education

Apprenticeship is Primed for Flipping

Knowledge, Facts, etc.

Teachers, Professors, etc.

Students, Trainees, etc.

Learn
Apprenticeship is Primed for Flipping

Knowledge, Facts, etc.

Teachers, Professors, etc.

Students, Trainees, etc.

Learn

“…it was never my vision that watching computer videos and working out problems should comprise a kid’s entire education. My hope was to make education more efficient…”

The One World Schoolhouse
Salman Khan
A Role for eLearning...

Organization and Delivery of Knowledge

Assessment of Knowledge

Students, Trainees, etc.

Teachers, Professors, etc.

Learn

Organization and Delivery

Creating
Evaluating
Analyzing
Applying
Understanding
Remembering

Total Citations in MEDLINE

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Organization and Delivery
Organization?

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Self Assessment

So…

How can we assist our trainees to learn basic knowledge more efficiently…

…while simultaneously freeing up our educators to do what they do best?

+ Many Volunteer Faculty
We Built a Prototype!

Initial Pilot Performed

4 US CT Training Programs
(19 Trainees)

Learning Took Place

Radiographic and Surgical Anatomy of the Trachea


Expanded the Platform

• Added all elements of CT training, launched Aug 1\textsuperscript{st}, 2013
  » 300+ Trainees enrolled across North America
  » 1000+ Faculty provided access across North America
  – Between Aug ’13 and June ’14
    » ≈ 290 login/wk
    » 15% of Trainees log on weekly, 75% log on monthly
  – At the start of this academic year (July, 2014)
    » Jump to ≈ 500 login/wk
Pitched Moodle, Found a New Partner!

Still Have Room to Improve!

- Rapidly changing content and educational needs
Still Have Room to Improve!

- Rapidly changing content and educational needs
  - Improved self assessments

Lung Cancer
Lung Metastasis
Benign Lung Disease
Still Have Room to Improve!

- Rapidly changing content and educational needs
  - Improved self assessments
  - Assessment-based readings

The source and dissemination of knowledge is changing!

John Lienhard
Still Have Room to Improve!

- Rapidly changing content and educational needs
  - Improved self assessments
  - Assessment-based readings
  - Upgrade knowledge dissemination

Wiki-textbook of Thoracic Surgery

Listen to Wikipedia
Final Thoughts…

Apprenticeship works but is under assault!

Thoughtful application of technology can…

• Streamline learning where apprenticeship is inefficient
• Provide increased opportunities for assessment
• Use assessments to guide and assist learning.

*Insanity: doing the same thing over and over again and expecting different results.*

Albert Einstein