Podcasts and Flipping the Classroom

ABA Basic Examination Preparation

Randy Schell, M.D., MACM
AACPD-November 7, 2014

Learning Objectives

- Describe how **podcasts** are used to provide **pre-"flipped classroom"** foundational information
  - Discuss the **"flipped classroom"** and how it might be used for ABA Basic Examination preparation
  - Recognize the importance of **active learning** for face-to-face **in-class** didactics

Lecture Halls without Lectures — A Proposal for Medical Education

Charles G. Prober, M.D., and Chip Heath, Ph.D.

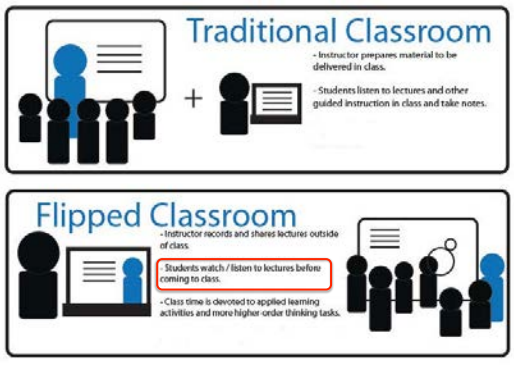
- In current era of near perfect video delivery platforms, **move lectures outside the lecture hall…**
  - and use **class time** for more **active learning**."

C. Prober (Stanford School of Medicine), C. Heath (Stanford Graduate School of Business)
N Eng J Med May 2012

PGY2 ABA Basic Exam Prep

2013/2014

- Tuesday Mornings (0600-0645)
- Flipped Classroom
  - **Pre-class: Podcast**
  - In-Class: Active learning techniques used
  - Educational materials posted on wiki
    - **Podcast access (iTunes)**
    - PowerPoint for podcast
    - PowerPoint for in-class active learning



Podcasts

- Audio and/or video educational materials that can be downloaded to portable media players (mini-iPads)
  - **Short** (≈15-20 minutes)
  - **"Just in time"** (Published ≈ 1 week in advance)
- "Anytime, anywhere" learning
- **Visual and auditory** learning, **repetition**, convenient **access** (some off-service)

Podcast: How Do I Make Them?

- Prepare PowerPoint presentation as usual
- Open PowerPoint on desktop
- Make sure you have working microphone
- Open Snagit software
  - Draw box around what you want to capture
  - Start capture and go through PowerPoint with audio input
- Save file
- Publish to iTunes

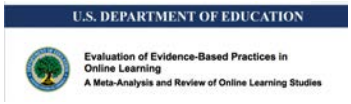
Format: Active Learning in Face-to-Face Classroom Time

- Summarize format and purpose of class time
- **Activate prior knowledge**
  - Pre-class podcast
    - Foundational knowledge to be used for interactive session
- Establish importance of information to learner
  - ABA Keywords
    - What they will be tested on
  - Clinical Application
    - Why they need to know this
- Use active learning educational techniques

Active Learning

- Instructors are **"Guide by Side"** rather than "Sage on Stage"
  - Examples:
    - PBL, Case Based, Questions (ARS), Paired activities and Peer teaching (think-pair-share), TBL
- Improved critical thinking skills, increased retention and transfer of new information, increased motivation, and improved interpersonal skills

What we know about On-line Learning?



- Instruction conducted entirely **on-line** is **as effective as classroom** instruction but no better (effect +0.05)

US Dept of Education 2010

Example Evidence

- Blends of on-line and face-to-face instruction ("**blended learning**"), on average, had **stronger learning outcomes** than did face-to-face alone (effect +0.35)
  - *US Dept of Education 2010*
- Learners and teachers **prefer** FC to the traditional classroom
  - *Martinelli et al 2014 (AUA; manuscript in submission)*
- **Improved learning** with active methods
  - *Deslauriers Science 2011*

"How we teach is more important that what we teach…"

"Much of what we are teaching our anesthesiology residents now will be irrelevant or possibly proven wrong in the future, but…. ***how we teach residents to learn will serve them for their lifetime."***

INNOVATIVE PREPARATION FOR THE BASIC EXAM: KHAN ACADEMY, ITUNESU PODCASTS, STARTPREP
CA-1 BASIC EXAM CURRICULUM FEATURING STARTPREP

ELIZABETH DRISCOLL, MD
ASSOCIATE PROGRAM DIRECTOR
ASSISTANT PROFESSOR OF ANESTHESIOLOGY
UNIVERSITY OF ALABAMA BIRMINGHAM

Disclosures
I have no financial conflicts to disclose.

Learning Objectives
- At the end of this presentation, participants will be able to:
  - Describe the successfully implemented CA-1 Curriculum at UAB
  - List at least two challenges noted by our residents after using STARTprep as a Basic Exam preparation aid
  - Describe changes addressed by STARTprep designed to make the product more useful

Summary
The education leadership of the University of Alabama at Birmingham (UAB) developed and implemented a successful CA-1 Curriculum emphasizing material for the ABA Basic Exam. Two main components of this curriculum included the Clinical Professor Workshops and participation in the Stanford AIM Lab's STARTPrep.

STARTprep was designed as a study to examine online episodic daily learning as a means to improve retention and lessen learner stress. UAB was one of the thirteen institutions to participate and contribute content in its first year. Key components of the STARTprep program include a web-based, accessible format with short daily reading assignments and self-assessment tools including electronic flashcards, daily summary questions, and monthly practice exams. Many of the difficulties encountered by residents in the first year of use, such as difficult menu design, variable lesson quality, inability to skip a section of content after falling behind, and daily required feedback surveys have all been addressed by the host program. This has resulted in much higher compliance among our current CA-1 residents.

The result of the UAB multi-faceted CA-1 Curriculum, including STARTprep was a 100% pass rate among our residents.

References
www.startprep.org

CA-1 Basic Exam Curriculum Featuring STARTprep

Elizabeth Driscoll, MD
Associate Program Director
Assistant Professor of Anesthesiology
University of Alabama at Birmingham

Disclosures

- I have no financial conflicts to disclose.

Objectives

- At the end of this presentations, participants will be able to:
  - Describe the successfully implemented CA-1 Curriculum at UAB
  - List at least two challenges noted by our residents after using STARTprep as a Basic Exam preparation aid
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Multifaceted Approach to Exam Preparation

- **Clinical Professor Workshops**
- **STARTprep**
- CA-1 Only Anesthesiology Grand Rounds
- Incorporation of Content Outline topics into existing structure
  - Morning conferences/keyword reviews
  - Rotation-specific conferences and intra-op teaching lists
  - Other Core Curriculum Grand Rounds for all residents

Clinical Professor Workshops

- Nine Workshops led by faculty who are consistently ranked as top teachers by the residents
  - Covered broad physiology topics (Respiratory, CV, ANS, Neuro, Renal, etc.)
  - Small groups of 5-9 residents
  - Very little formal didactics/PowerPoint; pre-assigned reading, followed by discussion and case-based learning
- Participating faculty rewarded with additional nonclinical time to prepare

STARTPrep

- www.startprep.org
- Created as a Stanford Anesthesia Informatics and Media (AIM) Lab Project
- An IRB-approved interim study looking at online episodic daily learning—details available on website
- 13 participating institutions in its first year that helped create the content
- Currently, an ongoing "Study," but with a deadline for registering as a program and an associated fee

Overall Advantages

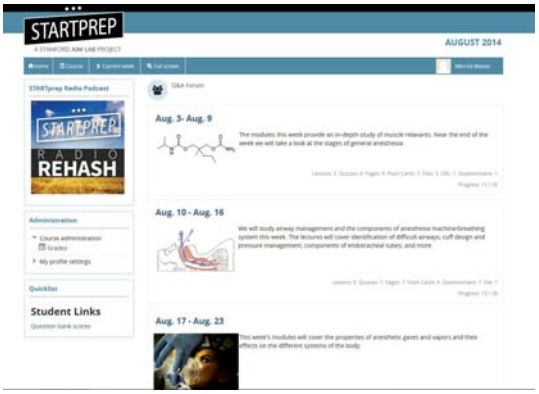
- Web-based and easily accessible
- Short topics
- Questions with detailed explanations after each reading assignment
- Monthly question banks to test assimilation of knowledge
- Flashcards available
- "Days off" built into the schedule

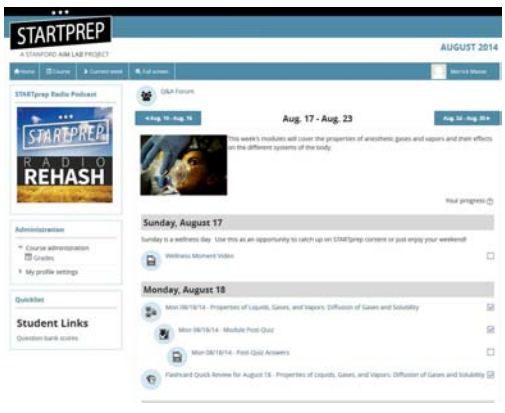
Difficulties Encountered

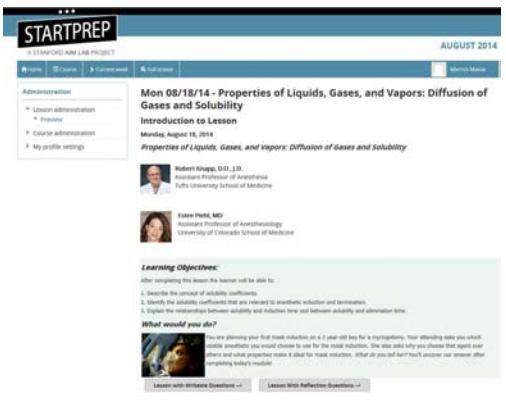
- Mobile device access used web browser not app
- Main menu page had only dates, no descriptions
- Could not skip a reading assignment, or series of topics, and then pick back up
- Variable quality of topics, often repetitive, disproportionate focus
- Had to complete end-of-month question banks before beginning next reading
- Daily feedback questions mandatory

Areas Addressed in 2014

- Mobile-device optimized format
- Menu is more user-friendly, descriptive
- Weekly reviews available
- Able to skip not only a single topic or series of topics, but can progress without answering each question in monthly review
- Feedback surveys are weekly and optional
- Addition of Podcasts on the website







Wed 09/17/14 - Cardiovascular System: Physiology: Blood Pressure: Systolic, Diastolic, Mean, and Perfusion Pressures, Intracardiac, Pulmonary, Venous, Systemic and Pulmonary Vascular Resistance, Viscosity, Baroreceptor Function

Resistance / Viscosity / Baroreceptor Function

Resistance

Systemic vascular resistance (SVR) is a representation of the resistance to flow through the whole systemic arterial tree. It arises from the collective resistance of the vascular beds leading to each organ. Large arteries, small arteries, large arterioles, small arterioles, and pre-capillary arterioles contribute, but the principal contributor to SVR is **small arterioles**. Vasoconstriction will raise SVR. Blood viscosity also contributes to SVR. SVR is not directly measured, but is calculated from cardiac output and arterial pressure: **SVR = (MAP - CVP) / CO**

Pulmonary vascular resistance (PVR) is analogous to SVR in the pulmonary circulation. Pulmonary vasoconstriction will raise PVR, as will extremes of alveolar ventilation (atelectasis or hyperinflation). It is calculated from cardiac output to the lungs and pulmonary arterial pressure: **PVR = ($P_{Pulmonary}$ – Left Atrial Pressure) / CO**

Viscosity

Blood viscosity is not easily represented by a simple equation, but depends on flow rate, hematocrit, plasma viscosity, temperature, and red blood cell deformability. It may be increased in disease states like sickle cell anemia or polycythemia vera, or in clinical settings with abnormal perfusion characteristics (e.g., non-pulsatile cardiopulmonary bypass). Hemodilution has been used to decrease blood viscosity when there is a concern that high viscosity may cause microvascular occlusion and tissue hypoperfusion. Examples include hypothermic cardiopulmonary bypass and surgery involving a microvascular anastamosis.

Baroreceptor Function

Stretch receptors in the carotid sinuses are responsible for the baroreceptor reflex. When blood pressure increases above a homeostatic set point, the baroreceptors activate a feedback loop (via the medulla) that decreases heart rate, cardiac contractility, and systemic vascular resistance. This is the basis for reflex bradycardia from acute hypertension or from medications that are pure vasoconstrictors (e.g., phenylephrine). Volatile anesthetics inhibit this response

Check your understanding!

- Which group of arterial vessels make the biggest contribution to systemic vascular resistance?
- What factors contribute to blood viscosity?
- What compensatory changes does the baroreceptor reflex produce?

Question 1

Marked out of 1.00

Flag question

Write a personal note

save question note

Send feedback to teacher

send feedback

Question # Q1L1D659W12

Which of the following conditions enhances passive diffusion of carbon dioxide from the pulmonary capillaries into the alveoli?

Select one:

- A. Bohr effect
- B. V/Q ratio changing from 1.5 to 1.0
- C. Nitrous oxide discontinuation
- D. Increased hemoglobin concentration

Question 2

Marked out of 1.00

Flag question

Write a personal note

save question note

Send feedback to teacher

send feedback

Question # Q2L1D659W12

Which of the following mechanisms BEST explains why carbon monoxide is useful for assessing diffusion capacity of the lungs?

Select one:

- A. High hemoglobin affinity
- B. Relatively non-toxic
- C. Causes left shift in Hgb-O_2 dissociation curve
- D. Rapid nitrogen displacement from alveoli

Question 3

Marked out of 1.00

Flag question

Write a personal note

save question note

Send feedback to teacher

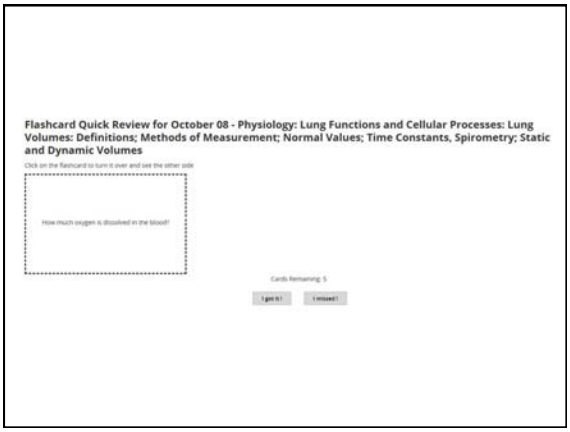
send feedback

Question # Q3L1D659W12

Which of the following physiologic parameters is the MOST important cause of the increase in minute ventilation associated with exercise?

Select one:

- A. Cerebrospinal fluid PaO_2
- B. Carotid body PaO_2
- C. Aortic body $PaCO_2$
- D. Cerebrospinal fluid pH



Flashcard Quick Review for October 08 - Physiology: Lung Functions and Cellular Processes: Lung Volumes: Definitions; Methods of Measurement; Normal Values; Time Constants, Spirometry; Static and Dynamic Volumes

Click on the flashcard to turn it over and see the other side

How much oxygen is dissolved in the blood?

Cards Remaining: 5

I got it! | I missed!

Conclusion

- STARTprep combined with our Clinical Professor Workshops and other adjustments to didactic curricula resulted in 100% pass rate among our residents and an above-average mean score from a group that was average on their USMLE Step 1
- Only 1/3 of our 21 residents were able to take full advantage of STARTprep through June/July
- Nearly all of this year's CA-1 residents are using the tool regularly in their learning, as a result of the changes to the program