Teaching to the Test?
March 13, 2019
The Academy promotes excellence in teaching and mentoring by developing, supporting, and recognizing dedicated educators and mentors in order to ensure world-class training for the next generation of physicians, researchers, and educators.

http://med.Stanford.edu/academy.html
### 3rd Annual Medical & Bioscience Education Day

**bit.ly/MedEdDay2019 - 8 AM to 5 PM, May 4, 2019, LKSC**

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<td>Diane Lam, Vice Provost for Teaching &amp; Learning</td>
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<td>Unpacking the Mysteries of Mentorship</td>
<td>Bonnie Halpern-Felshker, Pediatrics and HRP</td>
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<td>Gender Inclusive Classroom Environments</td>
<td>Inge Hansen, Weiland Health Initiative</td>
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<td>Enhance Teaching &amp; Learning with EdTech</td>
<td>EdTech Team</td>
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<td>8 “Microtweaks” to Improve Your Teaching</td>
<td>Jay Phelan, UCLA Life Sciences Core Education</td>
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<td>Having Culturally Sensitive Mentoring Conversations</td>
<td>Steve Lee, School of Humanities &amp; Sciences</td>
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<td>Navigating Emotion in the Clinical Encounter</td>
<td>Rachel Schwartz, SCHP &amp; PCOR</td>
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Teaching to the Test?
Five Easy Pieces

1. Should we teach to the test?
2. What is the goal?
3. Which type of question is best?
4. Are there tools for grading?
5. What are the overarching principles?

32 slides; this is #4
Should we teach to the test?

Some say NO

- Lost joy of learning
- Harmful focus on the test
Should we teach to the test?

YES, if done carefully

• Prepare students for the “summative” Final Exam
  • Avoid a high-stakes Final Exam
  • Set expectations with “formative” Qs

• Integrate formative questions throughout the course

? This means Q for you
Should we teach to the test?

YES, if done carefully

- Prepare students for the “summative” Final Exam
  - Avoid a high-stakes Final Exam
  - Set expectations with “formative” Qs
- Integrate formative questions throughout the course
  - Assign Qs to teaching videos
  - Assign Qs prior to small group discussions
  - Use Qs during lecture to highlight key points
What is the goal?

Problem-solving

Reasoning

Evaluating

CRITICAL THINKING
What type of question is best?

- MCQs (multiple-choice questions)
  - Pros: ?
  - Cons: ?
- Short answer (with a strict word limit)
  - Pros: ?
  - Cons: ?
- Open-ended questions
What type of question is best?

- **MCQs (multiple-choice questions)**
  - **Pros:** rapid grading, objective scoring
  - **Cons:** test-taking skills, “rabbit holes”

- **Short answer (with a strict word limit)**
  - **Pros:** no guessing
  - **Cons:** cumbersome grading

- **Open-ended questions**
Guides for writing questions

• Bloom’s taxonomy
  Knowledge > Comprehension > Application > Analysis > Synthesis

• Vanderbilt guide for MCQs
  [Link](https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/)

• Other on-line guides
Let’s examine a multiple choice question
MCQs need the right menu
(alternative choices)

Five Easy Pieces:
Jack Nicholson wants a side order of toast

I want a chicken salad sandwich on wheat toast, no mayo, no butter, no lettuce...
hold the chicken... and bring me the toast
In addition to the nucleus, ______ are organelles that contain DNA.

A. Golgi bodies  
B. Mitochondria and chloroplasts  
C. Ribosomes
Can we improve the “stem”?

In addition to the nucleus, which organelles contain DNA?

A. Golgi bodies
B. Mitochondria and chloroplasts
C. Ribosomes
Can we improve the alternative choices?

In addition to the nucleus, which organelles contain DNA?

A. Golgi bodies
B. Mitochondria and chloroplasts
C. Ribosomes
Can we improve the alternative choices?

In addition to the nucleus, which organelle contains DNA?

A. Golgi body
B. Mitochondrion
C. Ribosome
Let’s examine a short answer question
Can you analyze the Kaplan-Meier curve?

- Course: Molecular Foundations (MoFo)
- MCQs linked to videos prepared students for this question

![Kaplan-Meier Curve Diagram]

Patients with metastatic lung cancer

Hazard ratio with standard care = 1.70

p = 0.01

Overall Survival (%)

Early palliative care

Standard care

Months
Can you analyze the Kaplan-Meier curve?

Professor Ad-Hoc asserts that early palliative care improves survival 2-fold at 18 to 32 months. You wonder if Ad-Hoc is right. How many patients remained at 32 months? Write your answer in the boxes below. (2 points)

Standard care patients -
Palliative care patients -

Patients with metastatic lung cancer
Hazard ratio with standard care = 1.70
p = 0.01

Early palliative care
32 months

Standard care
Can you analyze the Kaplan-Meier curve?

Professor Ad-Hoc asserts that early palliative care improves survival 2-fold at 18 to 32 months. You wonder if Ad-Hoc is right. How many patients remained at 32 months? Write your answer in the boxes below. (2 points)

Standard care patients - 1
Palliative care patients - 3
Students preferred mixed-format exams

Student evaluations of MoFo final exam

<table>
<thead>
<tr>
<th>Year</th>
<th>MCQ short answer</th>
<th>MCQ</th>
<th>MCQ short answer</th>
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<tbody>
<tr>
<td>2009</td>
<td>4.1</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>4.0</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>3.9</td>
<td>3.6</td>
<td></td>
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<td>2013</td>
<td>3.8</td>
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<td>3.4</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>4.0</td>
<td>3.5</td>
<td></td>
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</table>
MCQs identified failures, but just barely
Mixed-format identified failures better and increased the median
Mixed-format required more time than MCQ

<table>
<thead>
<tr>
<th>Activity (person hrs)</th>
<th>MCQs</th>
<th>Mixed</th>
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<tbody>
<tr>
<td>Loading exam online</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Grading</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Discussing failed Qs during grading</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Discussing failed Qs with students: 12 min x 5 teachers</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total for teachers</strong></td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>Discussing failed Qs with teachers: 12 min x 30 students</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total for teachers plus students</strong></td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>
GradeScope helps mixed-format grading
GradeScope helps mixed-format grading
GradeScope helps mixed-format grading

Correct
GROUP 1  GRADED
✓ All 81 Answers Confirmed
🔗 Rename  ⇣ Merge  ✗ Dele

Partial Correct
GROUP 2  GRADED
✓ All 7 Answers Confirmed
🔗 Rename  ⇣ Merge  ✗ Dele

Incorrect
GROUP 3  GRADED
✓ All 2 Answers Confirmed
🔗 Rename  ⇣ Merge  ✗ Dele

# Burkitt’s lymphoma can arise from a chromosomal rearrangement that places the c-myc gene near the immunoglobulin heavy chain (IgH) gene. What DNA element in the IgH gene locus promotes activation of c-myc? (1 point)

Enhancer in IgH!

# Burkitt’s lymphoma can arise from a chromosomal rearrangement that places the c-myc gene near the immunoglobulin heavy chain (IgH) gene. What DNA element in the IgH gene locus promotes activation of c-myc? (1 point)

Promoter region (in conjunction with enhancers that bind activators in B-cells)

# Burkitt’s lymphoma can arise from a chromosomal rearrangement that places the c-myc gene near the immunoglobulin heavy chain (IgH) gene. What DNA element in the IgH gene locus promotes activation of c-myc? (1 point)

Excitatory domain
5 Easy Pieces (for Gradescope)

• Invisible student name promotes objectivity
• Grading one question fosters consistency
• Grading rubrics can evolve
• Partial credit recognizes partial knowledge
• Software provides data on questions
MCQ for you

What is your biggest issue with exams?

A. Unfair questions
B. Divergence from learning goals
C. Undetected mistakes
D. Difficulty in writing questions
E. Other
What are the overarching principles?

- Critical thinking
- Conceptual learning
- Active learning
- Fairness
Thanks to Student Assessment Committee

Co-chairs: Gil Chu, Tina Cowan
Faculty: Hannes Vogel
Students: Nagehan Ayakta, Maria Filsinger Interrante, Aviva Sarah Mattingly, Charlotte Rajasingh, Mary-Grace Reeves, Tatiana Rosenblatt, Steven Sloan
OME: Mohamed Sow

Thank YOU for participating