Welcome, Bienvenue, 形容

Teaching Academy  
Part Six:  
Effective Tests: A Tool for Learning

Today’s Big Idea

I was probably more scared of my high school exams than I was of the Oscars. At the time you think it's everything and if you don't do well, your life's over.  
~Hugh Jackman

THE struggle . . .

getting stuff from here to here

Result: Exam stress can distort results.

Teach and test so all students can show their true understanding of course content.

Readiness Assessment Test

Step 1
- Assign Reading or Problems

Step 2
- Students Take Individual Test
  Exposure to content during individual test helps reinforce students’ memory of what they studied.

Step 3
- Students Take Team Test
  During team tests students discuss reasons for their answer choices & are exposed to peer input that aids in either strengthening or modifying their schemata of key concepts.

RATs (cont.)

Step 3
- Students Take Team Test

<table>
<thead>
<tr>
<th>Number Attempts</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
RATs (cont.)

**Step 4**
- **Appeals**
  Students given opportunity to restore credit for questions missed by making a successful written appeal. Highly engaged in a focused re-study of course concepts.

**Step 5**
- **Instructor Feedback**
  Instructor provides feedback & clarification to resolve misunderstandings.

### RAT Procedure
1. Assign reading
2. Individual test
3. Team test
4. Appeals
5. Instructor feedback

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Multiple Choice Primer

**Stem**
A question or statement followed by a number of choices that answer the question or complete the statement.

**Alternatives**
All the possible choices to answer or complete the stem.

**Answer**
The correct answer.

**Distractors**
Incorrect choices.

### Example

If you were teaching a Geography course, which assessment technique would you use to assess students’ ability to create a scale model map?

- A. Concept Map
- B. Essay
- C. Performance
- D. True-False

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Multiple Choice Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Correct Answer</strong></td>
<td>All but one alternative is incorrect</td>
</tr>
<tr>
<td><strong>Best Answer</strong></td>
<td>Alternatives differ in degree of correctness—some completely incorrect &amp; some correct, but one is clearly more correct than the others.</td>
</tr>
<tr>
<td><strong>Negative Items</strong></td>
<td>Student identifies incorrect alternative or one that is the worst</td>
</tr>
<tr>
<td></td>
<td>- Not recommended for general use—mastery is more effectively measured when students identify correct response</td>
</tr>
<tr>
<td></td>
<td>- Negative items appropriate for health &amp; safety where knowing what NOT to do is important</td>
</tr>
</tbody>
</table>

**Guide for writing negative items**
- Place negative word in stem & emphasize with *italics*, **bold**, underline or **CAPITALS**
- Word alternatives positively

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Multiple Choice Types (cont.)

**Combined Response or Complex M.C.**
One+ alternatives is correct, other alternatives are distractors—students select combination of alternatives

**Problems with combined response**
- Disadvantages of all-or-none scoring & multiple response items
- Gives clues to students with partial knowledge

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Multiple Choice Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiple Response</strong></td>
<td>Two or more alternatives are correct &amp; remaining alternatives are distractors</td>
</tr>
</tbody>
</table>

**Scoring multiple response items**
- **All-or-none**—1 point if all correct alternative & no distractors selected, zero otherwise
- **Independently score alternatives**—one point for each correct alternative & for each distractor NOT chosen. Yields scores more representative of student’s mastery, but most scoring machines cannot score these items

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Multiple Choice Types (cont.)

Research Finding
- Working memory—where info is consciously processed—is limited & easily overload
- Tests require significant conscious attention
- Remove item elements that distract or unnecessarily increase cognitive load


Food for Thought
- What kinds of multiple-choice questions do you ask?
- Do they come mostly from your textbooks test-item bank or do you write them yourself?
- In either case, have you critiqued them to ensure that they are well written?

Content & Cognitive Levels

Table of Specifications
Chemistry Unit on Oxygen

<table>
<thead>
<tr>
<th>Bloom</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Properties</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td>Chemical Properties</td>
<td>12</td>
<td>9</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td>Preparation</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Uses</td>
<td>16</td>
<td>12</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td>Total %</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Helps avoid having too many knowledge items
- Coordinating test content & classroom coverage ensures content validity—tests what was covered

Flex: Item Writing Tips

Multiple-Choice Question Tips
- Avoid trivial items or ones which call for fact memorization only
- State the stem in positive form
- Include as much of the item in stem but don’t include irrelevant details
- Do not become needlessly wordy
- Word alternatives clearly & concisely
- Avoid alternatives “all of the above” and “none of the above”
- Use plausible distractors

Attending to technical problems helps you better assess ALL students’ mastery.

Flex: Test Writing Tips

- Begin writing items well in advance to allow time for revisions
- Do NOT assume items from textbook item bank are well constructed
- If items have been used before, analyze them for effectiveness
- Use a table of specifications to match items to outcomes AND to Bloom’s levels
- Make each item independent—answer should not be embedded in another stem
- Avoid using examples & exact wording from textbook
- Ask colleagues for feedback

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Want to Know More?

For basics on test items for higher order thinking, try:

For tips on how to write essay questions, T-F, matching or completion items, read:
http://www.indiana.edu/~best/pdf_docs/better_tests.pdf

Getting Students to Prepare

The Problem
- Students’ reading compliance has declined from +80% to -20% in the past 30 years¹
- National Survey of Student Engagement [NSSE] data indicates that +80% of seniors attend class without reading or preparation

The Solution—Reading Guides
- Look at the SLOs—create quiz questions, in-class activities, assignments
- What information will students need to know in order to do well on the quiz? Is there additional information student need in order to participate in discussions, or for class activities? For assignments?
- Create matching questions—group items together where appropriate, i.e., vocabulary
- Have students take quiz online BEFORE class or at beginning of class—encourage use of Reading Guides for quiz taking


For Next Time

DUE: Lesson plan that addresses a misconception or learning bottleneck in your target course—BRING a highlighter for use on a rubric

Read: Chapter 5. “Practice & Feedback”

Extension:
- Dimensions of Learning, Summative Assessments, and Formative Assessments
  (9:40)
- Ten Tips for Writing True/False Questions
  (4:43)
- Ten Guidelines for Writing & Grading Essay Tests
  (4:40)
- Getting More “Teaching” out of “Testing and Grading” (FYI. Select first, then download)

Notes & Reflection