Yes We Can!

Maximizing Thinking Through Multiple Choice

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Time to Talk!

• Which critical thinking skills are developed in SLS 1501: College Success Skills?
Vocabulary

• Stem
  – Direct question
  – Incomplete sentence

• Alternatives/responses/options
  – Answer
  – Distracters/foils
Why Use Multiple Choice Tests?

• Memorized knowledge or conceptual understanding
  – *What do students need to memorize?*
  – *Will they retain what they’ve memorized?*
Why Use Multiple Choice?

• Faster to grade
• Options can help diagnose problem areas
• Application
  – Identify correct application or example
• Analysis
  – Identify correct cause, effect, or element
  – Identify why something occurs or is best
Start with a Test Blueprint

✓ Fair and balanced test (content validity)
  – *Content areas*
  – *Memorization vs thinking skills*

✓ Study guide
✓ Useful results
Time to Talk!

• Identify 3 course outcomes that require students to:
  – Identify relevant information AND/OR
  – Interpret information AND/OR
  – Assess strengths or weaknesses of information
Interpretive Exercise

= context-dependent item
= enhanced multiple choice item

One new stimulus (paragraph, chart)
that students must read or examine
to be able to answer all
the objective items that follow
• The material **MUST** be new!!!

• The student **MUST** have to read/examine the material to answer the questions!!!
Use Interpretive Exercises to...

• With **new** material or situations
  – *Apply* knowledge and understanding.
  – *Identify* correct *generalization, inference, or conclusion.*
  – *Use problem-solving and analysis skills.*

• Prepare for some standardized tests.
Time to Talk!

- What might be stimulus material for the skills we’ve identified?
Writing Effective Multiple Choice Questions

1. Remove all **barriers** that will keep a knowledgeable student from getting the item right.

2. Remove all **clues** that will help a less-than-knowledgeable student get the item right.
Barriers

To students who should answer correctly
Keep Items Concise. Minimize Unnecessary Reading.

- Which of the following is TRUE of the effect of 2,3-BPG binding to hemoglobin?
  - 2,3-BPG stabilizes the R-conformation of hemoglobin
  - 2,3-BPG stabilizes the T-conformation of hemoglobin

- What conformation of hemoglobin does 2,3-BPG binding stabilize?
  - R
  - T
  - W
Students should not have to read all options to figure out the question.

- The stem should ask a complete question.
- Change “Which of the following” to “What.”
Order Responses Logically

• Alphabetically
• Numerically
Avoid Negative Items

- Avoid “EXCEPT”
Avoid “All of the Above”

• Students may recognize A as correct and mark it without reading further.

• Students should not have to read through all options to determine the correct answer.
Avoid “None of the Above”

• Measures incomplete learning
  – *Students may correctly recognize these are wrong without knowing what is right.*
Avoid “K-Questions”

- Really true-false statements strung together
- Confusing
- Tests logical reasoning skill more than achievement of the competency

- Give students **LOTS** of practice!
- Work through them in class.
Clues

That help students who should answer incorrectly
Don’t Ask for Common Knowledge

• Which of the following selections reflect three different sterile sites in humans?
  – Bile, **mouth**, lungs
  – **Uterus**, lung, pancreas
  – Kidney, **nose**, large intestine
  – **Small intestine**, lung, liver
  – None of the above all reflect sterile sites in humans
A new beta-lactam has a peak serum concentration of 60 mcg/ml and a half-life of 1 hour. It is dosed every 6 hours. The MIC of the pathogen is 8 mcg/ml. Which beta-lactam class would this beta-lactam have to belong in order to meet the pharmacodynamic goal?

- **Carbapenems**
- **Penicillins**
- **Cephalosporins**
- **Both carbapenems and penicillins**
- **The new beta-lactam would not meet the pharmacodynamic goal of any of the beta-lactam classes.**
Time to Talk!
Time to Think!

- Identify up to 3 items that you agree need improvement.

- How do they fall short of the criteria for good items?
Convert Interlocking Items into Matching
Use Matching Items for Analysis

• Concepts & examples
• Causes & effects
• Parts & functions
• Problems & tools/ techniques needed to solve them
Effective Matching Items Have...

- Homogeneous material
- **Imperfect** match between questions and options
- Wordy material in the items, not the options
- Clear explanation of the relationship between questions and options
Reviewing & Using Test Results
Item Difficulty

• How many students got each question right?
• Celebrate the ones everyone got right!
• “Suskie 50% rule”
  – Look hard at any questions that less than half the class got right.
  – Set your own benchmark: 80% 60%?
• Should all students get certain items right?
Item Analysis Principles

• Students who do best overall should be more likely to get any one item right.
• Students who do worst overall should be more likely to get any one item wrong.
• Questions that both groups do equally well on don’t discriminate between top and bottom students.
• Questions that top students did worse on than bottom students are bad and should be thrown out and revised.
• Easy items cannot discriminate well.
Figuring Out What Went Wrong

• Is the problem the test question, your curriculum, or your pedagogy?

• Ask students WHY they got the item wrong.
Time to Reflect!