Does it ever fail to be true that none of the so-called "Quagmire Factors" sometimes come into play during a routine Helzog-Froomish analysis?

A. Yes, always  
B. No, never  
C. No, always  
D. All of the above  
E. None of the above  
F. "A" and "C"  
G. "D" and "E"  

VII. Sometimes, at low temperatures

Source: http://cte.uwaterloo.ca/teaching_resources/tips/designing_multiple_choice_questions.html
Designing Effective Multiple-Choice Questions (MCQs)

Teaching and Learning Services, McGill, with support from professors Marie Dagenais (Dentistry), David Ragsdale (Medicine) and Carolyn Samuel (Continuing Studies).
Workshop Goals

- Describe what can be tested with multiple-choice questions
- Evaluate multiple choice questions using commonly accepted criteria
- Become familiar with guidelines for writing effective multiple-choice questions

Focus: Formal (graded) testing
Your Experience with MCQs

• What has been your experience with MCQs as a student?
• As a TA or instructor?
What can be tested by MCQs?

- “I am wondering if there is any way to really use multiple choice tests meaningfully before I banish them from my classes forever”
Levels of Learning
(Bloom’s Taxonomy - Revised)


Image from Purdue University, Reflections on Teaching and Learning Webpage: http://blogs.itap.purdue.edu/learning/2012/05/04/review-of-idc-tools-to-assess-blooms-taxonomy-of-cognitive-domain/
Examples of MCQs at Different Levels of Learning

- See handout
Creating Effective MCQs

1. Defining the purpose
2. Writing the questions
Defining the Purpose

- What learning outcome do you want to test?

- Where could the learner go wrong?
  - (challenges, common mistakes, misconceptions)
Examples of questions with rationale

Calculate the **median** of the following numbers: 15, 27, 27, 44, 67, 75, 81.

A. 7
B. 27
C. 44
D. 48
Example

Learning Outcome: to make appropriate clinical decisions based on laboratory data.

A 62 year-old woman with a history of confusion and constipation comes to the office for a follow-up visit. Laboratory investigations reveal a serum calcium of 2.9mmol/L, a creatinine of 146 µmol/L, and a hemoglobin of 108 g/L.

Which one of the following would help confirm the diagnosis?

A. Parathyroid hormone
B. Serum protein electrophoresis*
C. 25-OH vitamin D
D. Serum creatinine
E. Abdominal ultrasound
Writing the Questions
Anatomy of a MCQ

3. What is chiefly responsible for the increase in the average length of life in the USA during the last fifty years?

- **distractor** — a. Compulsory health and physical education courses in public schools.
- **answer** — b. The reduced death rate among infants and young children
- **distractor** — c. The safety movement, which has greatly reduced the number of deaths from accidents.
- **distractor** — d. The substitution of machines for human labor.

One-Best-Answer Questions

- Stem
  - Vignette
  - Lead-in question

- 3-5 alternatives
  - 1 correct (best) answer
  - 2-4 plausible distractors
Stem

- Addresses a single problem/question
- Worded positively unless knowing what “not to do” is important
- Contains only relevant information
- A question that can be answered by hiding the alternatives
Alternatives

- Homogeneous in nature
- Mutually exclusive
- Plausible
Effective alternatives are designed to:

- Prevent students who DON’T know the answer from guessing it correctly.
- Prevent students who DO know the answer from being confused.

*(see checklist)*
Example

A test which can be scored by a clerk untrained in the content area of the test is an
1. diagnostic test.
2. criterion-referenced tests.
3. objective test.
4. reliable test.
5. subjective test.

A test, which can be scored by a clerk untrained in the content area of the test, is said to be
1. diagnostic.
2. criterion-referenced.
3. objective.
4. reliable.
5. subjective
Example

Which of the following songs did the Beatles compose?

a) Let It Be
b) Yesterday
c) Polythene Pam
d) All of the above
e) None of the above
Activity: Evaluating MCQs

What’s wrong with these questions? (see handout)
Conclusion

A good MCQ:

- Measures a learning outcome for which it is well suited
- Does not contain clues to the right answer
- Is clearly worded

References


- **This blog post is written by Jonathan Sterne, an associate professor in the Department of Art History and Communication Studies at McGill. He presents a fresh take on developing multiple-choice questions that go beyond recognition for use in a large lectures:** J. Sterne. (2013, January 10). Multiple choice exam theory (just in time for the new term) [Web log comment]. Retrieved from http://chronicle.com/blogs/profhacker/multiple-choice-exam-theory/45275


Thank You!!

- Please complete the workshop evaluation form