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Test Question Editing Workshop - Improve Your Test Item Writing Skills Through Editing

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Test Question Editing Workshop - Improve Your Test Item Writing Skills Through Editing

Abstract
This workshop will be 75% hands-on editing of test questions. After an overview of learning objectives for the session and instruction on identifying common errors, participants will be provided a list of test questions containing errors frequently found in exams. They will be asked to edit the questions to improve the overall quality of the test items. Edited questions will be shared with all attendees. Through this process, participants will hone their skills at both writing and editing items.

Disciplines
Pharmacy and Pharmaceutical Sciences

Comments
Presented at the Association for Assessment of Learning in Higher Education (AALHE) Conference in Lexington, Kentucky, June 2, 2015.

This conference proceeding is available at Fisher Digital Publications: https://fisherpub.sjfc.edu/pharmacy_facpub/76
TEST QUESTION EDITING WORKSHOP – IMPROVE YOUR TEST ITEM WRITING SKILLS THROUGH EDITING

AALHE
JUNE 2, 2015

Jennifer L. Mathews, Ph.D.
Jane M. Souza, Ph.D.
OVERVIEW: THE ASSESSMENT LOOP

- Develop clearly articulated written statements of learning outcomes
- Design experiences that provide opportunities to achieve learning outcomes
- Assess student achievement of learning outcomes
- Use results of assessments to improve teaching and learning

Adapted from the Middles States Commission on Higher Education
We rely heavily on exam data to make informed decisions about our courses, our curriculum, and our students.

How do we ensure the quality of that exam data?

Where are your exams “housed”?

Who sees them?
“Peer-reviewed articles provide a trusted form of scientific communication.”

“Even if you are unfamiliar with the topic or the scientists who authored a particular study, you can trust peer-reviewed work to meet certain standards of scientific quality.”
The process of peer review is generally considered essential to academic quality and is widely viewed as fair and equitable.

Pragmatically, peer review refers to the work done during the screening of submitted manuscripts, funding applications, promotional portfolios, and awards. The process provides for confirmation of meeting accepted standards and confirming the quality.

As academics we place value in the peer review process.

We should also place value in writing high quality, peer-reviewed assessments that truly reflect student learning.

For the student assessment data to be valuable, exams must be well written and the data must be analyzed.

Close the assessment loop!
ONE EXAMPLE OF A PEER-REVIEW PROCESS (WSOP)

- This is a voluntary process for faculty who want to participate
- 2-3 reviewers/exam
- Faculty are invested in the process
- Reviewers DO NOT make changes to exams, and item writers can choose not to make suggested changes
- Student data is more reflective of what was learned versus what could be deciphered by the students
## QUALITY OF QUESTIONS:
**PEER REVIEWED TEST ITEM**

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>Comments/Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is the question clear to the reader?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Are there typographical errors?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Is the question coded to the appropriate level of Bloom’s Taxonomy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Is the question coded appropriately to the learning outcome(s)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>If the question has a history, did it perform well in the past?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Is the content level appropriate for the course?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Other considerations: “positive” language, jargon free, limited abbreviations, double-jeopardy, exam time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PRTI: PEER REVIEWED TEST ITEMS

**ECG Waves**

ID: 3059 Rev 3, Creator: Lull, Melinda
Title: (PRTI) ECG Waves
Folder: Exam 4
Group: n/a
Status: Approved

**Essay Question**

(Short answer; 1 point; partial credit)
EV is a 54 year-old female who has an arrhythmia resulting from impaired repolarization of the atria. Briefly describe why this arrhythmia would be difficult to analyze using an ECG.

**Options**
Weight: 1.0
Character Limit: NO LIMIT

**Attachments**
No attachments have been applied to this question.

**Rationale**
n/a

**Internal Comments**
HOW TO LEARN FROM OTHERS

- Problem areas:
  1. FITB questions
  2. Short answer/essay (character limits)
  3. K-type questions
  4. Select all that apply questions
  5. In short – any question can potentially be problematic!
(FITB; 1 point; 0.5 point for each blank; ensure correct spelling)
From the given drug bank, identify **two** anesthetics that find application in dentistry.
(Drug Bank: Articaine, Bupivacaine, Cocaine, Levobupivacaine, Lidocaine, Prilocaine, Procaine, Tetracaine)

1
2

<table>
<thead>
<tr>
<th>Number</th>
<th>Correct Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Articaine</td>
</tr>
<tr>
<td>2</td>
<td>Articaine</td>
</tr>
</tbody>
</table>

04-13-2014 jmathews@ajtc.edu: Theoretically, the way this question is structured, a student could put articaine twice (blank 1 and 2) and you would have no way to know. ☹

04-13-2014 sanand@ajtc.edu: Thanks Jenn. That’s a great catch. I will revise the question to the short answer format. ☹
(Short answer; 1 point; partial credit)
EV is a 54 year-old female who has an arrhythmia resulting from impaired repolarization of the atria. Briefly describe why this arrhythmia would be difficult to analyze using an ECG.
• We now have a validated test bank.
• Over 2300 questions have been peer-reviewed!
WHAT DOES ASSESSMENT DATA TELL US?

- High quality exams allow us to make data-driven decisions without second-guessing the quality of the input.
  - We can perform interventions to help students with content deficiencies.
- Didactic exams can give us many different pieces of information:
  - What was the quality of my exam questions?
  - How did the students perform?
  - Did they learn the material they way I thought they would?
  - Are there areas where I can improve my teaching?
### EXAM MAP: DO I HAVE AREAS OF CONCERN?

**Course learning outcome:** Based on the site and mechanism of action, predict the therapeutic and side effects associated with pharmacological agents used to treat various disease states.

<table>
<thead>
<tr>
<th>Course Activity</th>
<th>Lecture LO</th>
<th>Knowledge</th>
<th>Application</th>
<th>Synthesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lecture 2 (9.11.12 – 9.13.12) APPE lectures</strong></td>
<td>Lecture, TP, patient scenario</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EPO REMS</strong></td>
<td>Anemia Outcome 4</td>
<td></td>
<td></td>
<td>80%; 29.17% P = 0.55 *time was an issue; app. level</td>
</tr>
<tr>
<td>• pg.; Bank question 1420 (MC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Iron + Vitamin C</strong></td>
<td>Anemia Outcome 4</td>
<td></td>
<td></td>
<td>96%; 87.5% P = 0.91</td>
</tr>
<tr>
<td>• pg. 9; Bank question 1525 (FIB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anemia from RBC destruction</strong></td>
<td>Anemia Outcome 1, 2, 3</td>
<td></td>
<td></td>
<td>52.5%; 12.5% P = 0.29 *patient scenario, student missed key points.</td>
</tr>
<tr>
<td>• pg.; Bank question 1527 (SA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INSTRUCTOR REFLECTION

- Exam Statistics
  - Class average (high and low score)
  - Upper and lower 27%
  - KR20
  - P value for individual items
- Do I need to make changes to questions/items which were unclear?
- Are there concepts I felt were well covered but students still don’t understand?
- Were poor exam results due to the students’ work, my work, or a combination?
INSTRUCTOR REFLECTION

- If I have identified areas of weakness, what I am doing about it?
- Follow-up plan:
  - Revise questions which are ambiguous
  - Revise course materials for future use
    - Clarify handouts, supplemental learning tools
  - Review concepts again with current students
- This is a great example of using data to make positive change in your course
- Put the information in an exam/course map
  - Reference for future semesters
  - Reference to pass to others
- DOCUMENT, DOCUMENT, DOCUMENT!
They notice the quality of exams!

Shouldn’t have to spend time deciphering a question

Shouldn’t have to guess at an answer based on who wrote the exam item

Students have a lot of investment in the quality of an exam

“Your examsoft tests never have errors which is really appreciated”
A QUICK REVIEW
FOR WRITING HIGH-QUALITY TEST ITEMS

Fill-in-the-blank Questions
- Keep the blanks at the end or near the end of the statement.
- Be sure the correct response is a single objective answer without multiple options open for interpretation.

Open Response
- To learn specifically what the students know, ask them directly.
- Give clear guidance as to expectations for length of response.
- Have the ideal response drafted, but allow for creative solutions where appropriate.
A QUICK REVIEW
FOR WRITING HIGH-QUALITY TEST ITEMS

Multiple Choice Items

- The stem should be a complete sentence. Do not take shortcuts!
- Avoid writing in negative terms.
- Watch the verbs, especially “is” and “are”.
- Don’t give away the response with “a” vs. “an”.
- Avoid using “all” and “except” in the same sentence.
- Do not overuse abbreviations.
- Avoid jargon.
- Keep the stem concise and clear of useless information.
- Avoid using “all of the above” and “none of the above.”
- Keep the responses close to the same length.
- Keep the responses in a logical order.
- Test higher order thinking skills by asking for the BEST of several viable options.
- Remember you are testing content knowledge, not speed reading ability.
WHICH OF THE FOLLOWING STATEMENT(S) IS(ARE) TRUE REGARDING MULTIPLE-CHOICE TEST ITEM DEVELOPMENT?
SELECT ALL THAT APPLY.

A. Each item stem should be as clear and concise as possible.*
B. Vocabulary should be as difficult as possible.
C. The stem should ask a complete question.*
D. Careful attention should be paid to grammar and punctuation.*
E. The use of negative terms should be avoided.*
F. You do not need to have the same number of options for each question.*

*(Note that all options are complete sentences with correct punctuation.)*
IRRELEVANT MATERIAL

Mitochondria evolved from free-living bacteria that could carry our oxidative phosphorylation. For this reason, they have circular genomes that reproduce independently of the nuclear genome. What characteristic is relatively constant in mitochondrial genomes across species?

A. Content (i.e., types of genes)
B. Organization
C. Size

http://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/
THE STEM SHOULD ASK A COMPLETE QUESTION

In addition to the nucleus which of the following organelles contains DNA?

- is found in the golgi bodies
- is found in mitochondria
- is found in ribosomes

- golgi bodies
- mitochondria
- ribosomes

http://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/
NEGATIVE PHRASING

All of the following are true about mitochondria except

A. They contain DNA.
B. They make some of their own proteins.
C. They are static.

http://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/
FOR ADDITIONAL RESOURCES ON CONSTRUCTING MC QUESTIONS

http://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/
(FITB; 1 PT.) WHEN WRITING FILL-IN-THE-BLANK QUESTIONS, IT IS BEST TO HAVE THE BLANK TOWARD THE __________ OF THE SENTENCE.

A. middle
B. beginning
C. end*

(Note that these options are NOT capitalized since they appear within the sentence.)
(TRUE/FALSE; 1 PT.) STUDENTS LOVE POORLY CONSTRUCTED EXAMS.

- True
- False*
We will go over a few quick tips on constructing different types of questions.

Work in your groups to determine how you could improve each of the sample questions.

We will spend about _____ minutes working.

We will come back together to go over the questions and determine what the groups have suggested for revisions.
How would your group improve each of the following questions?
ALL OF THE FOLLOWING WORDS ARE VERBS EXCEPT:

A. Run
B. Jump
C. Talk
D. Paper
E. Write
(PRTI) ALL OF THE FOLLOWING WORDS ARE VERBS EXCEPT:

A. Run
B. Jump
C. Talk
D. Paper
E. Write
VIRUSES:

A. are classified based on their genus and species.
B. that are enveloped only possess RNA genomes.
C. evade the immune response by increasing the host cell’s expression of MHC class I.
D. have no means to produce energy and express a few enzymes at most.
A. are classified based on their genus and species.
B. that are enveloped only possess RNA genomes.
C. evade the immune response by increasing the host cell’s expression of MHC class I.
D. have no means to produce energy and express a few enzymes at most.
WHICH OF THE FOLLOWING ARE BONES IN THE HUMAN BODY?

A. Femur
B. Aorta
C. Skin
D. Eyes
(PRT1) WHICH OF THE FOLLOWING ARE BONES IN THE HUMAN BODY?

A. Femur  
B. Aorta  
C. Skin  
D. Eyes
QUADRANGLE:

A. A type of four wheeler
B. A 4 sided shape
C. A four egged bug
D. Where college students hang out
(PRTR) QUADRANGLE:

A. A type of four wheeler
B. A 4 sided shape
C. A four egged bug
D. Where college students hang out
WHAT IS THE WORD FOR THIS MEANING: HAPPENED?

A. Occurred
B. Weird
C. Seemed
D. Tried
WHAT IS THE WORD FOR THIS MEANING: HAPPENED?

A. Occurred
B. Weird
C. Seemed
D. Tried
WHAT IS THE MULTIPLICATION TRICK FOR 9?

A. Purple
B. All the digits equal nine example: 9×9=81 8+1=9
C. 9×1=1
D. All multiples of nine are prime numbers.
WHAT IS THE MULTIPLICATION TRICK FOR 9?

A. Purple
B. All the digits equal nine example: $9 \times 9 = 81$, $8 + 1 = 9$
C. $9 \times 1 = 1$
D. All multiples of nine are prime numbers.
THIS EXPENSIVE SPICE CONTAINS CROCIN AND GIVES A BEAUTIFUL GOLDEN YELLOW COLOR TO FOOD:

A. Cayenne pepper
B. Cumin
C. Saffron
D. ginger
(PRTI) THIS EXPENSIVE SPICE CONTAINS CROCIN AND GIVES A BEAUTIFUL GOLDEN YELLOW COLOR TO FOOD:

A. Cayenne pepper
B. Cumin
C. Saffron
D. ginger
IN WHICH COUNTRY DO YOU THINK YOU CAN FIND THE 15TH CENTURY INCA SITE MACHU PICCHU?

A. Peru
B. Brazil
C. Mexico
D. Peru
E. California
In which country do you think you can find the 15th century Inca site Machu Picchu?

A. Peru
B. Brazil
C. Mexico
D. Peru
E. California
WHICH OF THE FOLLOWING IS NOT THE NUMERIC VALUE FOR THE ROMAN NUMERAL XIX?

A. 16  
B. 12  
C. 21  
D. 19
Which of the following is not the numeric value for the Roman numeral XIX?

A. 16
B. 12
C. 21
D. 19
IN MED CHEM N-ALLYL SUBSTITUTIONS YIELD REDOX PRODUCTS. WHICH SCOTTISH SCIENTIST DISCOVERED PENICILLIN IN 1928?

A. Louis Pasteur.
B. Isaac Newton.
C. Marie Curie.
D. Alexander Fleming.
IN MED CHEM N-ALLYL SUBSTITUTIONS YIELD REDOX PRODUCTS. WHICH SCOTTISH SCIENTIST DISCOVERED PENICILLIN IN 1928?

A. Louis Pasteur.
B. Isaac Newton.
C. Marie Curie.
D. Alexander Fleming.
KERMIT THE FROG:

A. Was created by Jim Henson.
B. Is part of the Simpsons.
C. Was originally on the Punch and Judy Show.
D. Appeared on Sesame Street.
(PRTI) KERMIT THE FROG:

A. Was created by Jim Henson.
B. Is part of the Simpsons.
C. Was originally on the Punch and Judy Show.
D. Appeared on Sesame Street.
ALL OF THE FOLLOWING ARE PALINDROMES EXCEPT:

A. Hannah
B. Eye
C. Racecar
D. Madam
E. God
(PRTI) ALL OF THE FOLLOWING ARE PALINDROMES EXCEPT:

A. Hannah
B. Eye
C. Racecar
D. Madam
E. God
A 2 YO GETS INTO HER GRANDMOTHER’S BP MEDICINE AND SWALLOWS TWO PILLS. WHAT WOULD YOU DO?

A. Call poison control.
B. Induce vomiting.
C. Go to the ED.
D. Let her sleep it off.
(PRTI) A 2YO GETS INTO HER GRANDMOTHER’S BP MEDICINE AND SWALLOWS TWO PILLS. WHAT WOULD YOU DO?

A. Call poison control.
B. Induce vomiting.
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D. Let her sleep it off.
AALHE is an Assessment Conference in KY 6/1 – 6/3 which is attended by educators from MSCHE, SACS, NEASC and other accrediting bodies. However, you may also meet people from the USDOE, NILOA, and AIR. What vendor is sponsoring a conference immediately following this one?

A. Live Text  
B. Johnson & Johnson  
C. Pearson  
D. ExamSoft
AALHE is an assessment conference in KY 6/1 – 6/3 which is attended by educators from MSCHE, SACS, NEASC and other accrediting bodies. However, you may also meet people from the USDOE, NILOA, and AIR. What vendor is sponsoring a conference immediately following this one?

A. Live Text
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_________ IS A FLAG THAT IDENTIFIES A SHIPS CREW AS PIRATES?

A. Excalibur
B. Union Jack
C. Black Bart
D. Jolly Roger
(PRTI) __________ IS A FLAG THAT IDENTIFIES A SHIPS CREW AS PIRATES?

A. Excalibur
B. Union Jack
C. Black Bart
D. Jolly Roger
Was a legendary 16th-century astronomer.
(PRTI) ___________ WAS A LEGENDARY 16\textsuperscript{TH} – CENTURY ASTRONOMER.

A. Albert Einstein
B. Copernicus
C. Mozart
D. Obama
WHICH OF THE FOLLOWING ARE PRIMARY COLORS. SELECT ALL THAT APPLY.

A. Pink  
B. Orange  
C. Purple  
D. Green  
E. Gray  
F. Yellow
(PRTI) WHICH OF THE FOLLOWING ARE PRIMARY COLORS. SELECT ALL THAT APPLY.

A. Pink
B. Orange
C. Purple
D. Green
E. Gray
F. Yellow
WHICH OF THE FOLLOWING ARE PRIME NUMBERS. SELECT ALL THAT APPLY

A. 3
B. 311
C. 5
D. 13
E. 37
F. 19
WHICH OF THE FOLLOWING ARE PRIME NUMBERS. SELECT ALL THAT APPLY

A. 3
B. 311
C. 5
D. 13
E. 37
F. 19
SUMMARY: BENEFITS OF PEER REVIEWING TEST ITEMS

- High-stakes external exams are always peer-reviewed.
- For administration
  - Assessment data reported is more reliable
  - Content coverage data is more reliable
- For faculty
  - A quality exam means assessing student knowledge is being assessed.
  - Content deficiencies are exposed and can be addressed.
  - Allows for data-driven decisions – with confidence.
- For students – these exams are high-stakes for them!
  - Quality exams test knowledge, not ability to do mental gymnastics.
THANK YOU.
QUESTIONS?

Photo credit: http://blogs.democratandchronicle.com/youngprofessionals/