Item Writing Workshop

A GUIDE TO PRODUCING VALID AND RELIABLE EXAMINATION ITEMS
Purpose of the Workshop

• The purpose of this workshop is to introduce the process of writing items for a certification examination.

• Participants will earn 3 continuing education credit hours for completing the 3 portions of the workshop.

• Provide an opportunity for certified optometric staff to become a key member in the design and development of certification examinations.
Objectives

- Participants will:
  - Have an understanding of the process of writing items for a professional certification examination
  - Know how to label the anatomy of an item
  - Learn the advantages of multiple-choice items
  - Be able to construct items using best practices
  - Identify common item flaws
Prerequisites

- Participants should have a good knowledge in optometric assisting and/or optometric coding and billing
- All participants must be CPC certified at any level
- Must Participate
  - Part 1 – Presentation
  - Part 2 – Assessment and Evaluation
  - Part 3 – Item Submission
- All three activities must be completed in order to receive 3 continuing education credit hours
DISCLAIMER: The example questions shown throughout this presentation are not and never will be included on any CPC Examination. Example questions are used for demonstration only.
Multiple Choice

- Consists of:
  - Stem (question)
  - One Correct Answer
    - Always labeled “A”
  - Three Distractor Answers
    - Always labeled “B, C, & D)
    - Should be plausible but incorrect
Why Multiple Choice?

- Flexibility – allows efficient measurement of a variety of objectives
- Can be used to test many levels of candidates
- Can be used to determine a candidates weaknesses and strengths
- Can provide candidates with feedback
- Can cover a wide range of difficulty levels
- Can include a wide sampling of content or objectives
- A reduced guessing factor when compared to true-false items
Advantages

- Versatility in measuring all levels of cognitive ability
- Highly reliable test scores
- Scoring efficiency and accuracy
- Objective measurement of the test takers' achievement or ability
Disadvantages

• Difficult and time consuming to construct
• Do not allow the test taker to demonstrate knowledge beyond the options provided
• May encourage guessing as one option will always be right
• Some test takers may misinterpret questions
• Places a high degree of dependence on the candidate’s reliability and the item writer’s writing ability
So what is a test item?

Building blocks of an exam
Measures one unit of content
Composed of three parts
  Item Stem (question)
  Correct Answer
  Distractors (incorrect responses)
Anatomy of a multiple-choice item

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

A. Compulsory health and physical education courses in public schools.
B. The reduced death rate among infants and young children.
C. The safety movement, which has greatly reduced the number of deaths from accidents.
D. The substitution of machines for human labor.
General Guidelines for Item Construction

• Strive for clarity and readability

• Have a style guide and be consistent

• Use punctuation at the end of a stem (question mark or a colon)
General Guidelines for Item Construction – Do’s and Don'ts

• If the stem ends with a question mark, do not use a period at the end of the answer options unless they are complete sentences.

• If the stem ends with a colon, place a period at the end of each one because this is the sentence completion format.

• Include in the stem any word(s) that might otherwise be repeated in each option.

• Avoid biasness and stereotyping.
General Guidelines for Item Construction – Do’s and Don'ts

• Do not use “a(n)” or “is(are)” combination constructions in the stem. Instead, place the appropriate article in front of each option (e.g., A dog, An aardvark, etc.)

• Each group of answer options should have parallel construction, so that if the sentence completion format is used, each completed sentence would dovetail with the stem.

• If the stem is phrased in the negative, the answer options should not contain negatives.
Constructing the Item Stem

- Example of an open stem:

  APP-CO was founded in:
  
  A. 1958.
  B. 1959.
  C. 1960.
  D. 1961.

- Example of a closed stem:

  In what year was APP-CO founded?
  
  A. 1958.
  B. 1959.
  C. 1960.
  D. 1961.
Constructing the Item Stem

A stem asks one question

• Undesirable:
  Which of the following product lines does ABC produce and when did production begin?
  A. Food processors, 1960
  B. Can openers, 1962
  C. Blenders, 1974
  D. Irons, 1984

• Desirable:
  Which of the following product lines does ABC produce?
  A. Food processors
  B. Can openers
  C. Blenders
  D. Irons
Constructing the Item Stem

Avoid Negatively worded stems:

- Examples of negatively worded stems:

- All of the following are acceptable ways to answer the telephone EXCEPT:
- Which of the following forms is NOT used for requesting materials?
- Which automobile is LEAST likely to increase gas mileage?
Avoid pronouns

• A good stem avoids the use of pronouns “it”, “he”, “she”, and “you”.
• In the case of “it”, “he”, and “she”, the candidate may be uncertain about the referent.
• Questions that ask “What would you do?” can have no right answer, since individual candidates could justify their individual responses.
Common Item-Writing Flaws

A tourist in New York City could visit all of the following EXCEPT:

A. Centennial Park
B. Grant Park
C. Central Park
D. Balboa Park
Common Item-Writing Flaws

Where is Atlanta located?

A. In the United States
B. In the South
C. In Georgia
D. In Fulton County
Common Item-Writing Flaws

Who was the President of the United States last year?

A. George Bush
B. Bill Clinton
C. Gerald Ford
D. Barack Obama
Constructing the Options

- Undesirable:

  What is the most general cause of low individual incomes in the United States?
  
  A. Lack of valuable productive services to sell
  B. Unwillingness to work
  C. Automation
  D. Inflation

- Desirable:

  What is the most general cause of low individual incomes in the United States?
  
  A. A lack of valuable productive services to sell
  B. The population’s overall unwillingness to work
  C. The nation’s increased reliance on automation
  D. An increasing national level of inflation
Constructing the Options

- Undesirable:
  How many product lines does ABC manufacture?
  A. More than 20
  B. More than 30
  C. Fewer than 40
  D. Fewer than 50

- Desirable:
  How many product lines does ABC manufacture?
  A. 25
  B. 30
  C. 35
  D. 40
### Constructing the Options

**Avoid clueing**

<table>
<thead>
<tr>
<th>Undesirable:</th>
<th>Renee Zellweger stars as a show girl in Chicago in which of the following films?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Wizard of Oz</td>
</tr>
<tr>
<td>B.</td>
<td>Sound of Music</td>
</tr>
<tr>
<td>C.</td>
<td>Chicago</td>
</tr>
<tr>
<td>D.</td>
<td>Music Man</td>
</tr>
</tbody>
</table>

**Desirable:**
Renee Zellweger stars as a show girl in which of the following films?

<table>
<thead>
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</tr>
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</tr>
</tbody>
</table>
Constructing the Item

**Item Development Form**

Please provide a complete classification for this item.

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
</table>

Correct Answer (mark one) ✓

A | B | C | D |  

**Month/Year Written:**

**Illustration? (mark if “yes”) ✓**

**Item Writer (last, first):**

**Item Writer ID:**

**Source Name:**

**Source Page #:**
Linking Items to Test Content Outline

Test Items

- Job
- Test Content Outline
- Content Validation Study for a Test
Linking Items to Test Content Outline

- Can the item be classified according to the test content outline?
- Is the item critical to practice?
- Is the item technically accurate?
- Does the item have only one correct answer?
Linking Items to Test Content

Outline

- Evidence for Reliability
  - Is the stem focused?
  - Does the stem ask only one question?
  - Has superfluous information been eliminated from the item?
  - Are the options mutually exclusive (free from overlap)?
  - Are the options homogeneous?
  - Have internal clues been eliminated?
Key Points for Creating Test Items

Ensure that the stem of the item:
- contains important content.
- is at the appropriate level.
- is focused.
- avoids “window dressing” (superfluous information).

Ensure that the item options:
- have one correct answer.
- are plausible.
- are homogeneous.
- are free of clueing.
- are free of overlap.
Key Points for Creating Test Items

• Ensure that the items are at the correct cognitive level by identifying the level they are written at, deciding if it is the correct level, and if not, rewriting the item in order to raise the cognitive level to the level required.

• Avoid bias and stereotypes by reviewing each item and if at all possible, have someone else review the item.

• Write rationales for all of the items.

• Justify the answer key for all items.

• Link all items to the test content outline and, if possible, have someone who did not participate in the item development do so.