EDPS 340 Multiple Choice Items

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Multiple Choice

1. The capital city of Canada is
   a. Vancouver
   b. Montreal
   c. Toronto
   d. Ottawa

1. Stem: presents the problem
2. Keyed Response: correct or best answer
3. Distracters: appear to be reasonable answers to the examinee who does not know the content
4. Options: include the distracters & the keyed response.

Multiple Choice

• Characteristics:
  – Problem (stem)
  – Suggested solutions (options)
• Types:
  – Direct Question
  – Incomplete statement

Types of Multiple Choice Items

• Correct Answer*
  – Only one correct response
• Best Answer
  – requires examinee to select option closest to being correct
  – fine distinctions
• Multiple Answer
  – More than one correct or best answer

Multiple Choice

• Knowledge:
  – More complex (e.g., why questions) have more possible correct answers (i.e., choose the best answer)
• Types of knowledge assessed
  – Terminology
  – Specific Facts
  – Principles
  – Methods & Procedures

Multiple Choice

• Types of understanding & application assessed
  – Ability to identify application of facts & principles
  – Ability to interpret cause-effect relationships
  – Ability to justify methods & procedures
Ambiguity

**Extrinsic**
- Desirable quality in multiple choice items
  - Outside the item
  - Allows discrimination between those who know material & those who do not.
- **Intrinsic**
  - Undesirable
  - Should be avoided
  - Inside the item
  - Poor wording
  - More than one answer
  - Even those who know content have difficulty choosing correct answer.

Guidelines for Writing Multiple Choice Items

- Place most of the subject matter in the Stem
  - Ensures full statement of problem
  - Poor: Multiple-choice items
    - May have several correct answers.
    - Consists of a stem & some options.
    - Always measure factual details.
    - Does not have a problem or question posed in the stem.
  - Better: The components of a multiple-choice item are a
    - Stem & several distracters.
    - Correct answer & several distracters.
    - Stem, a correct answer, & some distracters.
    - Stem & a correct answer.

Guidelines for Writing Multiple Choice Items

- State stem in the form of a question.
  - Poor: Canada is
    - A country
    - Where you live
    - Between the Pacific & Atlantic oceans
    - All of the above
  - Better: Between which two oceans is Canada located?
    - Atlantic & Indian
    - Atlantic & Pacific
    - Pacific & Indian

Guidelines for Writing Multiple Choice Items

- Present the Problem in Novel Terms
  - Some novelty; but not too much!
  - If we use novel item types
    - Must make sure that students understand the new process
  - Eliminate irrelevant material from the Stem
  - To measure student achievement, not to present new material
  - Maximize use of time for demonstrating understanding, not reading ability

Guidelines for Writing Multiple Choice Items

- Avoid Negatively phrased Stems
  - Use only when learning outcome requires this type of differentiation
  - Poor: Which of the following is NOT a method of determining test reliability?
    - Coefficient of equivalence
    - Coefficient of stability
    - K-R #20
    - Split-halves procedure
    - Test-criterion intercorrelation
  - Better: The components of a multiple-choice item are a
    - Stem & several distracters.
    - Correct answer & several distracters.
    - Stem, a correct answer, & some distracters.
    - Stem & a correct answer.

Guidelines for Writing Multiple Choice Items

- Ensure similarity among options with regard to:
  - Grammatical structure
  - Length
  - Mode of expression
- Grammatical errors provide unintentional clues to the answer
Guidelines for Writing Multiple Choice Items

• Options should be Grammatically Parallel & Consistent with the Stem
  – Poor: A test which can be scored by a clerk untrained in the content area of the test is an
    a) diagnostic test.
    b) criterion-referenced tests.
    c) objective test.
    d) reliable test.
    e) subjective test.

• Eliminate Grammatical or Verbal Clues
  – Avoid parallel language between the Stem & the Correct Response
  – Poor: The major purpose of item analysis is to
    a) determine the distribution of test scores.
    b) analyze the patterns of examinee responses.
    c) determine whether the test content was appropriate.
    d) find out if the test is reliable.
    e) evaluate the overall difficulty of the test.

• Insure that correct responses are not consistently shorter or longer than the distracters
  – Poor: A random sample is one in which
    a) subjects are selected by levels.
    b) each subject has an equal probability of being chosen for the sample.
    c) every nth subject is chosen.
    d) groups are the unit of analysis.

Example: Length of Alternatives

Poor: Neurotics are more likely than psychotics to
  a) be dangerous to society
  b) have delusional symptoms
  c) be dangerous to themselves
  d) have insight into their own inappropriate behavior but nevertheless feel rather helpless in terms of dealing with their difficulties

• Options Should be Mutually Exclusive
  – Poor: What should be the index of difficulty for an effective mastery-model test item?
    a) Less than 10
    b) Less than 20
    c) More than 80
    d) More than 90

• Make one of the options the most clearly correct or best answer
  – exception: multiple answer form
  – reduces intrinsic ambiguity
  – reduces frustration during test

• Make distracters plausible
  – desire to attract students who really do NOT know the answer to the question
  – create distracters from elements of the correct response
  – improves reliability of item
Guidelines for Writing Multiple Choice Items

- For discussion, but should not be included in an examination.
  - Poor: The most serious aspect of the energy crisis is the
    a) possible lack of fuel for industry.
    b) possibility of widespread unemployment.
    c) threat to our environment from pollution.
    d) possible increase in inflation.
    e) cost of developing alternate sources of energy.
  - Better: According to Professor Koenig, the most serious aspect of the energy crisis is the
    a) possible lack of fuel for industry.
    b) possibility of widespread unemployment.
    c) threat to our environment from pollution.
    d) possible increase in inflation.
    e) cost of developing alternate sources of energy.

Guidelines for Writing Multiple Choice Items

- Options should be presented in a logical, systematic order
  - What type of validity is determined by correlating scores on a test with scores on a criterion measured at a later date?
    a) Concurrent
    b) Construct
    c) Content
    d) Predictive

Guidelines for Writing Multiple Choice Items

- Randomly distribute answers across the option positions
  - The correct answer should appear in each of the option positions an approximately equal number of times, but in random order
  - inexperienced test writers emphasize “b” & “c” options (hide the answer!!)
  - do NOT use an interpretable order of keyed responses

Guidelines for Writing Multiple Choice Items

- Use qualifiers such as “all of the above” & “none of the above” sparingly
  - testwise students will use process of elimination to select answer
  - do NOT use to “pad out” the distracters because you cannot think of another one.

Advantages of Multiple Choice Items

- Allow more adequate sampling of content.
- Tend to more effectively structure the problem to be addressed
- Items can be more efficiently & reliably scored than supply items
- Different response alternatives can provide diagnostic feedback (item analysis)
- Items can be constructed to address various levels of cognitive complexity
Advantages of Multiple Choice Items

- **Over short answer:**
  - Reduced possibility of ambiguity because the alternatives structure the questions

Advantages of Multiple Choice Items

- **Over true/false:**
  - Students can not receive credit for simply knowing that a statement is incorrect
    - Best choice types make it possible to measure outcomes that are not true or false, but vary in the degree of appropriateness
  - Greater reliability per item

Advantages of Multiple Choice Items

- **Over matching:**
  - No need for homogeneous material

Disadvantages of Multiple Choice Items

- **Over true/false:**
  - Difficult & time consuming to construct good items
  - High degree of dependence on student's reading & instructor's writing ability
  - Can lead the instructor to favor simple recall of facts
    - Measuring synthesis & evaluation can be difficult

Disadvantages of Multiple Choice Items

- Requires selection of the correct answer
  - i.e., not good to use with problem-solving or ability to organize ideas
- Finding sufficient number of plausible distracters
  - particularly for young children
- Takes longer to answer than other types of questions
  - e.g., 3 true/false = 1 mc