Multiple Choice Questions—Some Key Principles

Multiple Choice Questions can be an efficient way to check students' recall of factual knowledge and their ability to perform routine procedures. They often work well for formative self-assessments and polling.

Advantages of Multiple Choice Quizzes and Exams

- They encourage less guessing than true-false questions
- They can be scored quickly using tools like Quiz Generator
- Students can receive immediate feedback
- Quiz data available with tools like Quiz Generator can reveal trends and sticking points

Disadvantages of Multiple Choice Quizzes and Exams

- Effective quizzes and exams are time-consuming to construct
- Poorly written questions cannot accurately measure or reinforce student learning
- Questions assessing higher-order thinking can be difficult to write
- They are not useful for measuring students' ability to
  - Articulate explanations
  - Display thought processes
  - Organize their thoughts
  - Generate original ideas
  - Provide unprompted examples

Best Practices for Creating Multiple Choice Quizzes and Exams

1. Decide exactly what you want to test (check your test questions against your learning objectives)
2. Write questions with a "stem" and 3-5 possible responses—one is the best answer and the others are "distracters"
3. Create distracters based up on common misconceptions and faulty thinking
4. Eliminate as many ambiguities as possible
5. Write feedback for your distracters explaining why they're wrong
6. Write feedback for the correct answer explaining why it's right
7. Ask a colleague, former student or TA to take the quiz/exam and solicit their feedback about the clarity consistency, accuracy, and organization of the questions
8. Allow time for revising the quiz/exam before sharing it with students

Notes:

While students may score better on self-assessment questions (especially when they are allowed multiple attempts), ideal exam questions are answered correctly by 60-65% of the test takers.

Providing feedback (explanations) for correct and incorrect answers greatly increases the quiz or exam's value as learning tool.

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Strategies for Writing Effective Multiple Choice Questions

Questions should contain a "stem" and 3-5 possible responses—one is the best answer and the others are "distracters"

Question Types

1. Remembering factual knowledge

   • Write the fact as a statement
   • Transform the statement into a question
   • Ask the student to select the appropriate answer

2. Understanding conceptual knowledge

   • Which of the following is an example of _____?

3. Applying procedural knowledge:

   • Prepare a short case study or example
   • Write a stem that asks the student to demonstrate the use of the procedural knowledge or solve a problem

4. Analyzing conceptual knowledge

   • Present the student with a diagram and ask for analysis—for example, "Given the following chart, which of the following is most likely to occur next?"

5. Evaluating procedural knowledge

   • Give the student a short case study
   • Ask "Which of the following would have been a better plan of action?"

Best Practices for Writing Effective Multiple Choice Questions

• Use only a single, clearly-defined problem and include the main idea in the question—students should know what the problem is without having to read the response options
• Write the correct answer before writing the distracters—this ensures you pay attention to formulating the one clearly correct answer
• Use the active voice
• Avoid extreme words like "all" "always" and "never"
• Avoid vague words or phrases like "usually," "typically" and "may be"
• Avoid negative phrasing such as "not" or "except"

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Best Practices for Writing Effective Multiple Choice Questions continued

- Don't try to be too clever (e.g. include a reference to Shakespeare in a physics quiz (unless that's what you are testing)
- Don't use your own capabilities as a yardstick and forget the years of practice to that went into honing your skills
- Don't insert humor unless you know your audience very well—students might misinterpret a question or answer that is meant to be funny
- Base each question on course learning objectives, not trivial information
- Avoid providing cues from one question to another; keep questions independent of one another
- Keep the length of options fairly consistent (preferably short)
- Consider alternatives to text only questions (incorporate diagrams, charts, tables, figures, audio or video)
- Consider the role of the questions

    o **Recall**: ability to recall or recognize previously learned (memorized) knowledge ranging from specific facts to complete theories

    o **Interpretive skills**: ability to utilize recalled knowledge to interpret or apply verbal, numeric or visual data, cause and effect relationships

    o **Problem solving:** ability to utilize recalled knowledge and the interpretation/application of distinct criteria to resolve a problem or situation, make an appropriate decision and/or justify methods and procedures

    o **Memory + application**: The ability to recall principles, rules, or facts in a real life context; place the concept in a life situation or context that requires the student to first recall the facts and then apply or transfer the application of those facts into a situation

Multiple Choice Question Stems

Typically, stems

1. Ask a question
2. Give an incomplete statement
3. State an issue
4. Describe a situation

Best Practices for Writing Stems

- Avoid superfluous information
- Typically avoid the use of personal pronouns such as "you"
- State stems in the positive form (negative statements are not characteristic of normal thought processes)
- Use questions rather than incomplete statements
- Write stems that fully state the problem and all qualifications (to make sure that the stem presents a problem, always include a verb in the statement)

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Best Practices for Writing Question Responses

- The *best* answer is the response the quiz writer (and experts) would consider the most appropriate answer
- The distracters (wrong answers) are logical misconceptions of the correct answer
- The distracters should seem plausible to learners who have partial, incomplete, or inappropriate knowledge
- If there are not three plausible distracters, then eliminate a 4th option rather than include an implausible option
- Distracters should be mutually exclusive and not overlapping
- Responses should be parallel in content length and category of information
- The grammatical structure of the responses should be a logical conclusion to the situation, question, or statement presented in the stem
- Avoid repetitive language within the responses (words which are repeated in every response may be placed in the stem)
- Avoid using "none of the above" as a response (this response does not test what students know, but only that they can recognize that the correct answer is not present).
- Avoid "all of the above" (students can recognize that two or more responses are correct without knowing the importance or correctness of the remaining responses)
- Responses should be written in a logical order (e.g. chronological, large to small, alphabetical if a single word, in order of magnitude if numerals, in temporal sequence, or by length of response)

Sources

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Checklist for Multiple Choice Questions

General

- ☐ Questions are aligned with course learning objectives
- ☐ Some questions assess higher order thinking
- ☐ Questions address learning objectives, not trivia
- ☐ There is feedback for each response (feedback for distracters explains why they're wrong, for correct responses, why they are right)

Question Stems

- ☐ Questions contain a single, clearly-defined problem or main idea
- ☐ Stems are in question format (rather than an incomplete statement)
- ☐ Stems state the problem and all qualifications (to make sure that the stem presents a problem, always include a verb in the statement)

Responses and Distracters

- ☐ Each question has 3-5 possible responses—one is the best answer and the others are "distracters"
- ☐ Implausible distractors have been eliminated (limit responses to 3 rather than include an implausible distracter)
- ☐ Distracters are based upon common misconceptions and faulty thinking
- ☐ Distracters reveal partial, incomplete, or inappropriate knowledge
- ☐ The length of responses and distracters is fairly consistent (preferably short)
- ☐ "None of the above" has not been used as a response or distracter
- ☐ "All of the above" has not been used as a response or distracter
- ☐ Distracters are mutually exclusive and not overlapping
- ☐ Responses and distracters are parallel in content length and category of information

Clarity

- ☐ Questions and responses are written in active voice
- ☐ Extreme words like "all" "always" and "never" have been avoided
- ☐ Vague words or phrases like "usually," "typically" and "may be" have been avoided
- ☐ Negative phrasing such as "not" or "except" have been avoided (if they must be used, capitalize the negative word/phrase, e.g. NOT)
- ☐ Repetitive language within the responses has been eliminated (words which are repeated in every response may be placed in the stem)
- ☐ Responses are written in a logical order (e.g. chronological, large to small, alphabetical if a single word, in order of magnitude if numerals, in temporal sequence, or by length of response)

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