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## About the CTEI

The Center for Teaching Excellence and Innovation partners with faculty, postdocs, and graduate students to extend instructional impact by connecting innovative teaching strategies and instructional technologies

CENTER for  
TEACHING  
EXCELLENCE &  
INNOVATION



## Writing Effective Multiple Choice Questions

Amy Brusini, Senior Instructional Designer, CTEI, JHU

### What it is

Writing test questions is a daunting task for many instructors. It can be challenging to correctly assess students on the comprehension of course objectives. Multiple choice questions are no exception; despite being very popular, instructors often struggle to create well-constructed questions.



### Why does it matter

Multiple choice questions have several advantages. They lend themselves to covering a broad range of content and assessing a wide variety of learning objectives. They are very useful when testing a student's lower level knowledge of a topic, such as factual recall and definitions, but if written correctly, they can be used to assess at the higher levels of analysis, evaluation, and critical thinking skills. Multiple choice questions are scored efficiently (even automatically, if an electronic test is used), therefore, they are frequently the evaluation method preferred by instructors of large courses.

There are some disadvantages, including the fact that this type of question can be time-consuming to construct. Multiple choice

questions are made up of two parts: the stem, which identifies the question, and the alternative responses which include the correct answer as well as incorrect alternatives, known as distractors. Coming up with plausible distractors for each question can be a difficult task. And, while some higher level thinking skills can be addressed, multiple choice questions cannot measure a student's ability to organize and express ideas. Another thing to consider is that student success when answering multiple choice questions can be influenced by factors unrelated to the subject matter, such as reading ability, deductive reasoning, and the use of context clues.

### How to use it

The following guidelines are offered to help streamline the process of creating multiple choice questions as well as minimize the disadvantages of using them.

#### I. Writing question stems

- A. When possible, prepare the stem as a clearly written question rather than an incomplete statement.

Poor example:

*Psychoanalysis is...*

Better example:

*What is the definition of psychoanalysis?*

- B. Eliminate excessive or irrelevant information from the stem.

Poor example:

*Jane recently started a new job and can finally afford her own car, a Honda Civic, but is surprised at the high cost of gasoline. Gasoline prices are affected by:*

Better example:

*Which of the following are factors that affect the consumer price of gasoline?*

C. Include words/phrases in the stem that would otherwise be repeated in the alternatives.

**Poor example:**

Which of the following statements are true?

- Slowing population growth can prevent global warming
- Halting deforestation can prevent global warming
- Increasing beef production on viable land can prevent global warming
- Improving energy efficiency can prevent global warming

**Better example:**

Which of the following techniques can be used to prevent global warming?

- Slowing population growth
- Halting deforestation
- Increasing beef production on viable land
- Improving energy efficiency

D. Avoid using negatively stated stems. If you must use them, highlight the negative word so that it is obvious to students.

**Poor example:**

Which of the following is not a mandatory qualification to be the president of the United States?

**Better example:**

Which of the following is **NOT** a mandatory qualification to be the president of the United States?

## II. Writing alternative responses

A. Make sure there is only one correct answer.

B. Create distractors that are plausible to avoid students guessing the correct answer.

**Poor example:**

Who was the third president of the United States?

- a. George Washington
- b. Bugs Bunny
- c. Thomas Jefferson
- d. Daffy Duck

**Better example:**

Who was the third president of the United States?

- a. George Washington
- b. Benjamin Franklin
- c. Thomas Jefferson
- d. John Adams

C. Make sure alternative responses are grammatically parallel to each other.

**Poor example:**

Which of the following is the best way to build muscle?

- a. Sign up to run a marathon
- b. Drinking lots of water
- c. Exercise classes
- d. Eat protein

**Better example:**

Which of the following is the best way to build muscle?

- a. Running on a treadmill
- b. Drinking lots of water
- c. Lifting weights
- d. Eating lots of protein

D. When possible, list the alternative responses in a logical order (numerical, alphabetical, etc.)

**Poor example:**

How many ounces are in a gallon?

- a. 16
- b. 148
- c. 4
- d. 128

**Better example:**

How many ounces are in a gallon?

- a. 4
- b. 16
- c. 128
- d. 148

E. Avoid using 'All of the above' or 'None of the above' to prevent students from using partial knowledge to arrive at the correct answer.

F. Use at least four alternative responses to enhance the reliability of the test.

## Other thoughts

If you are interested in using technology to create a test in an online environment, there are several programs available to help with this task. Blackboard, the university's course management system, has a robust test creation tool, which includes automatically graded multiple choice questions, as well as sixteen other types of questions to choose from. Respondus is an exam authoring program that allows you to create tests that can be imported into Blackboard or printed out on paper. Panopto, the university's video presentation and hosting platform, has recently introduced an interactive quizzing feature which includes multiple choice and other types of questions. CTEI staff are available to discuss the test creation process and/or help with any of these tools.

## Additional Resources

- Brame, C., (2013) Writing good multiple choice test questions. Retrieved December 14, 2016 from <https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions>
- Burton, S. J., Sudweeks, R. R., Merrill, P.F., and Wood, B. (1991). *How to Prepare Better Multiple-Choice Test Items: Guidelines for University Faculty*. Provo, Utah: Brigham Young University Testing Services and The Department of Instructional Science.
- "Multiple Choice Questions." *The University of Texas at Austin Faculty Innovation Center*, 14 Dec. 2016, <https://facultyinnovate.utexas.edu/teaching/check-learning/question-types/multiple-choice>.

## Author's Background

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Amy Brusini works at the Center for Teaching Excellence and Innovation (CTEI), a teaching and learning center for Homewood faculty. Amy

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