

Writing Good Multiple-Choice Questions

Well-constructed multiple-choice questions are not easy to create. But the quality of the multiple-choice questions you use in your Readiness Assurance test can make or break the tone of your class. Students who are not sure about TBL, but willing to try the experiment with you, can quickly become fierce opponents if you dash off some poorly constructed questions, inflict them on your students, and hope for the best. Nothing is more uncomfortable than rushing poor questions to the classroom and having to endure the inevitable student backlash. Good questions are absolutely essential to the success of TBL, and putting in the effort to write good questions is worth your time and attention.

In question-writing workshops, many teachers agree that it's not uncommon to spend one hour creating each question. With such a hefty time investment, teachers worry about question security and trying to ensure that the questions aren't leaked. Fortunately, the great thing about multiple-choice questions is that you can reuse them and improve them using the item analysis results (more on item analysis later).

Multiple-Choice Questions (MCQ) are often thought to only be useful for testing lower levels like knowledge and recall. Writing questions at a higher Bloom's level is difficult, but not impossible. This does take additional effort and care. Consider the following example:

Higher-Level MCQ Example:

In your argument, you are citing a number of cases from different courts. This is the first time you cite any of these cases. What is the most accurate citation sentence (use your citation manual)?

- a. Wyman v. Newhouse, 93 F.2d 313, 315 (2d Cir. 1937); Henkel Co. v. Degremont, 136 F.R.D. 88, 94 (E.D. Pa. 1991), Willametz v. Susi, 54. F.R.D. 363, 465 (D. Mass. 1972).
- b. Henkel Co. v. Degremont, 136 F.R.D. 88, 94 (E.D. Pa. 1991); Willametz v. Susi, 54. F.R.D. 363, 465 (D. Mass. 1972); Wyman v. Newhouse, 93 F.2d 313, 315 (2d Cir. 1937).
- c. Willametz v. Susi, 54. F.R.D. 363, 465 (D. Mass. 1972); Henkel Co. v. Degremont, 136 F.R.D. 88, 94 (E.D. Pa. 1991); Wyman v. Newhouse, 93 F.2d 313, 315 (2d Cir. 1937).
- d. Wyman v. Newhouse, 93 F.2d 313, 315 (2d Cir. 1937), Willametz v. Susi, 54. F.R.D. 363, 465 (D. Mass. 1972), Henkel Co. v. Degremont, 136 F.R.D. 88, 94 (E.D. Pa. 1991).

This example question was developed by Sophie M. Sparrow and Margaret Sova McCabe, University of New Hampshire School of Law

As you can see from this example question, testing higher Bloom's levels is possible. In the example, students are asked to select the citation that is *most* accurate, not which citation is accurate. All the provided citations have errors, so the students are really being asked to hypothesize which errors will have the greatest impact on the citation's accuracy.

Developing Question Stems

When beginning to construct a multiple-choice question, write the stem of the question first. A well-constructed stem is a stand-alone question that could be answered without examining the options. The wording of the stem and the verbs it contains determines the overall cognitive level tested by the question.

You can use Bloom's Taxonomy to help you prepare the stems to test concepts at the appropriate

cognitive level. In the first list are verbs that relate to different Bloom's levels, and in the second list, the Bloom's levels are related to possible question stems. The list of question stem verbs was originally developed from Linda Barton's excellent *Quick Flip Questions for Critical Thinking* (Barton, 2007).

Stem: sometimes called the question leader. Most of the time, it should be a stand-alone question that can be answered without seeing the answer options.

Distractor: incorrect question answers

Keyed response: correct question answer

Options: distractors plus keyed response

Item: The question stem and options; the whole multiple choice question

Bloom's Taxonomy - Verbs

Remembering	Understanding	Applying	Analyzing	Creating
know define	restate discuss	translate interpret	distinguish analyze	compose plan

memorize	describe	apply	differentiate	propose
list	recognize	employ	calculate	design
recall	explain	demonstrate	experiment	assemble
name	identify	dramatize	compare	construct
relate	locate	practice	contrast	create
		illustrate	criticize	design
		operate	solve	organize
			examine	manage
				judge
				appraise
				evaluate
				compare
				value
				select
				choose
				assess
				estimate
				measure

Bloom's Taxonomy - Question Stems

(adapted from Barton, 2007)

Remembering recalling, defining, recognizing, listing, describing, retrieving, naming	What is...? How is...? Where is...? When did ... happen? How would you describe...? Can you select....?
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	Why did....?
Understanding explaining ideas or concepts, interpreting, summarizing, paraphrasing, classifying, explaining	How would you classify...? What facts or ideas show....? Interpret in your own words...? Which statement supports...? How would you summarize...? What is the main idea of...?
Applying using information in another familiar situation, implementing, carrying out, using, executing	What is the best first step? What is the most significant problem? What would be the worst thing to do? Would it be a mistake to...? What is the most common mistake? Which test would you order next? What is the most common diagnosis? How would you use...? How would you solve? What is the most logical order? What approach would you use..? What would result if....? What facts would you select to show...?
Analyzing breaking information into parts to explore understandings and relationships, comparing, organizing, deconstructing, interrogating, finding	Why is this the best first step? How is X related to Y? What is the theme of X? What are the parts of X? What inferences can you make...? What conclusions can you draw...? What is the relationship between X and Y? What is the function of X? What ideas justify X?

<p>Creating generating new ideas, products, or ways of viewing things, designing, constructing, planning, producing, inventing. evaluating, justifying a decision or course of action, hypothesizing, critiquing, judging</p>	<p>What changes would you make to solve X? How would you improve X? How would you adapt X to create a different Y? What could be done to minimize X? Formulate a theory for X. What would be the outcome if X? How would you prove X? How would you prioritize X? How would you justify X?</p>
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Rules for Question Stem Development

For good MCQs, consider following these rules for question stem development:

- Stems should be stand-alone questions.
- Stems should be grammatically complete.
- Negative stems should be used with caution.
- If a key word appears consistently in the options, try to move it to the stem.
- Word the stem such that one option is indisputably correct.

Developing Options: Some Considerations

Once the stem has been constructed, you can begin to create the correct and incorrect options. Options should focus on testing the understanding of important concepts and testing common misconceptions. Creating plausible distractors is one of the most difficult aspects of creating good MCQs. Collins (2006) suggests

that the best distractors are either accurate statements that do not meet the full requirements of the problem, or incorrect statements that might seem right to the student. The following guidelines can help when preparing options:

Bury the verb!

There is a rather simple way to write multiple-choice questions at higher-levels. First identify the verb in the question, then switch the verb to a noun. Change the verb to a “-tion” noun form. For example, change “describe” to “select the best description” or “explain” to “select the best explanation”. This clever twist raises a question from simple understanding to evaluation and discrimination. This put students in the role of having to evaluate the possible answers against a specified criterion. For example: “Which description best exemplifies the basic tenets of social constructivism?”

- Make sure each incorrect option is plausible but clearly incorrect.
- Make sure that the correct answer (keyed response) is clearly the best.
- Avoid, if possible, using “all of the above”.
- Use “none of the above” with caution.
- Try to keep options similar lengths, since test-wise students will pick the longest option if unsure of the answer (“too long to be wrong”).
- Make sure options are grammatically consistent with the stem (question leader) and use parallelism.
- Make sure that numerical answers are placed in numerical order, either ascending or descending.

When developing the options, it is useful to map them on a continuum from correct to incorrect. This mapping will allow you to visualize the “correctness” of a given option. If all the distractors are clustered around the incorrect end of the

spectrum, then the question will be unambiguous and will likely not stimulate team discussion or debate



Question Options Clustered near Incorrect Response

As the options begin to cluster at the correct end of the continuum, the stem will need to include superlatives like “most” or “best”. Which is *most* significant? What is *most* important? What would be the *best* solution? These kinds of questions will require finer discrimination by the students– they can lead to spirited discussion but can also lead to potentially unhappy students. Use this with caution.



Question Options Clustered near Correct Response

The last step of the test construction phase is to rearrange the questions and options to match the pattern on the IF-AT card. Some questions require a specific order, such as numerical lists. We typically first find a place for these questions on the IF-AT, and then rearrange the remaining questions. Poorly-written questions are often difficult to rearrange.