How Can I Make My Multiple Choice Tests More Effective?

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Linda Suskie:

Hi, welcome to this Magna 20 Minute Mentor, How Can I Make My Multiple Choice Tests More Effective? This mentor is sponsored by The Teaching Professor. I’m Linda Suskie. I am the author of Assessing Student Learning: A Common Sense Guide, published by Jossey-Bass. I love talking about multiple choice tests, believe it or not.

Not a very trendy topic today. So I don’t often get a request to talk about them. I was delighted that the Magna folks asked me to do this mentor for you, because they're really underutilized and underappreciated. They're not always appropriate, but they're appropriate a lot more than you may think.

Let’s start out by talking about a little bit of the vocabulary with multiple choice tests. There is a technical vocabulary, but I think it will be a help to you. First of all, the question part of a multiple choice test is not called a question, because it’s not always a question. It is sometimes an incomplete sentence. So testing people call it the stem of the multiple choice question.

Then all the answers are not called answers, because if you're going to be technical about it, only one of them is really the answer. The others are incorrect. So all of them together are called either alternatives or responses or options. And the incorrect options are called distractors or foils, because if you have a student that doesn’t know the correct answer and doesn’t recognize it, the wrong options distract that student or foil that student from discerning what the correct answer is.

The first suggestion that I'm going to be giving you is to focus your multiple choice tests on what’s really important. And here my advice to you is very simple. Students learn what they're graded on. They're going to spend their time studying what they think will be on the test. So if you want them to learn how to reason, but you test them on memorization and recall, they will spend their time memorizing, and that’s what they're going to be learning from your course predominantly.

So and if you think chapter four is most important, but most of your test questions are on chapter two, they're going to spend their time studying chapter two. So you want to make sure that your multiple choice test really tests the most important goals you have for your students.

One of the tips that I’ll give you to help you figure out whether or not your test really focuses on the things you think are important is a lot of test questions that I see are simply a set of true-false statements. They’ll say, which of the following is true about mitosis? Or which of the following is false about George Washington?
That’s not really a test question, because it doesn’t really test a clear objective. If you see that on your tests, it’s a clue you need to think a little more clearly about what exactly do I want students to learn, and what exactly do I want them to demonstrate on this test.

The way to do this is to start with what I call a test blueprint. You have some supplemental materials with this mentor, and the first one is a sample of a test blueprint that I developed a number of years ago when I was teaching an introductory statistics class, a first-year course. You can see on the handout it lists all the things that I was looking for on the exam.

And it also tells students how many points on the exam will be spent on each objective. So, for example, four points will be spent on calculating the sample error or error margin of a proportion. Twenty-four points, a quarter of the exam, will be spent choosing the appropriate statistical analysis from those studied.

This is basically a study guide to the students. I give it to students with the exam. But what’s a lot more important is when you develop this and then write test questions to match this plan or this blueprint, you have a fair test. You're covering the content areas that are important, and you're having the right balance of focus on memorization versus thinking skills.

If you give it to students as a study guide, it becomes a fair study guide. It increases the fairness of the exam. And the other great thing is that when you get the results back from the test, you have useful results. Students can understand which objectives they did well on and which they didn’t, which ones they need to work on some more.

You have useful information on how your class did in achieving each of your objectives. Now when we test students, I think what we’re trying to get students to learn fall into three basic categories. One is memorize knowledge. We sometimes want students to recognize things, we want them to identify things. And there are some things they simply need to know in almost every discipline, so this is part of just about every course.

Then we want students to think. We want them to understand, which is a little more than memorized knowledge. We want them sometimes to apply what they’ve learned to a new situation they haven't seen before. We want them to analyze how parts interrelate, how ideas interrelate, how the pieces of a piece of equipment work together.

We want them to evaluate or judge whether something is accurate or appropriate, for instance, if a certain treatment is appropriate for a medical condition. And we want them to solve problems. We also want them to
show what employers call soft skills, things like interpersonal behavior, interpersonal skills, organization.

Now almost all of this you can test on a multiple choice test. Certainly memorized knowledge you can, general understanding you can. You can also use multiple choice to test students’ ability to apply, analyze, evaluate some things, solve some things.

Not all thinking skills are appropriate for multiple choice. Creativity, for example, is really, really hard if not impossible to assess on multiple choice. And a lot of those soft skills are hard to assess with multiple choice. But multiple choice is for more than just memorization and conceptual understanding.

What you need to think about is on your exam, what balance do you want to see between memorized information and thinking skills? Personally, I think once students get to college, it’s not enough for them to memorize something. They need to use that memorized information. And that’s where thinking skills come in.

But you need to think for yourself, what do students absolutely need to memorize, stuff that they can’t look up after they pass your course? Also think about, will they really retain what they’ve memorized? Because something we know from brain research is when students memorize something, it goes into the shallow memory part of the brain. And if you ask them that test question a month later, chances are pretty good they will have forgotten it.

So are you really asking them to memorize something that they will immediately forget? And if so, why are you asking them to memorize it? We also want to find out, do they really understand the underlying principles of what you’re asking them to memorize, why this is important or why this should be appropriate?

So these are all, I’m not telling you what to test or what to teach, but the questions to think about. Now if you want to get at thinking skills, my favorite test format for doing this is something that I call an interpretive exercise. Some people call it a context-dependent item. Some people call it enhanced multiple choice. And here’s what it is.

And you’ve seen this if you’ve taken an exam like the SAT, the ACT, the GREs. Students are given a reading passage, a chart, a diagram, something they haven’t seen before. They have to read or study it, and then they have to be able to answer all the questions that follow.
The next sheet in your supplemental materials gives some examples of interpretive exercises. There’s a very simply little scenario presented at the top, just two, three sentences. And then there are three test questions that are based on those three sentences, that little scenario that I painted.

So this is asking students to apply what they’ve learned to this new situation that they haven’t seen before. Just like this, we’re getting beyond basic conceptual understanding and assessing students’ ability to apply what they’ve learned to a new situation.

The back of the handout has another scenario. Again, just a little two-sentence scenario, and then three questions that you really have to read that material to be able to answer. The key things about interpretive exercises is that the material, that little scenario, stimulus chart, reading passage, whatever, must be new. It must be something the students haven't seen before. And they have to read it in order to answer the questions.

That forces them to apply their learning to a new situation. I like to use interpretive exercises to apply knowledge and understanding to a new situation. I also like to use it to ask students to identify the correct generalization, inference, or conclusion, and use their problem solving and analysis skills.

Some of you are teaching courses that are going to lead to students taking some kind of a certification or licensure exam. A lot of those exams have this kind of question format. And if for no other reason, this is a really important tool that you need to use to help them prepare to succeed on those exams.

There’s another format that I really like to use to get at thinking skills. And this may surprise you, because you may not have seen this since elementary school. But these are matching items, believe it or not. The thing is, the kind of matching that I do is different than the kind you had in elementary school.

You may remember a matching set on, say, the Revolutionary War, where students had, the teacher listed a whole bunch of names, dates, facts, and figures in one column and then listed the definitions in another, and you had to match them up. And there might be 12 or 15 or 20, and pretty soon you got down to a process of elimination.

That’s not what I’m talking about. What I’m talking is giving students a set of concepts, definitions, examples, scenarios, and then what I call an imperfect match. Talk about that a minute, but if you look at the next handout in your packet, you’ll see some examples of matching items that I’ve used on exams.
The first one asks students to match research questions with the research methodology most appropriate for it. Pretty advanced thinking. And again, the research questions are ones they haven't seen before. I won't go through the rest. You can go through them all yourself, but I want to point out to you, this is from a graduate course. This is not, you know, dinky little matching like you had in elementary school.

These are all asking students to apply what they’ve learned to new scenarios, new situations that they haven't seen. And I've got two pages full of examples for you. Good matching items at the college level have the following characteristics.

First of all, they have homogeneous material, so it isn’t a long list of names, dates, facts, and figures. It’s all concepts, it’s all tools, it’s all people, it’s all something. And you saw in each of those matching examples in the supplemental materials, there was a clear explanation about what those things were.

Then there’s an imperfect match. What that means is every option can be used more than once or not at all. So basically, matching is a set of multiple choice questions with all the same options. One of the reasons I like them is they're a lot easier to write.

There’s also, the wordy material is in the question, not in the answers. Okay. The next handout in your packet gives some tips for writing good multiple choice questions. I'm not going to go through the whole list, but I will tell you, if you can do all these things, quit your job, move to Iowa City or Princeton, start writing questions for one of the really big test publishers, ACT, or ETS. This is really hard to do.

But if you follow even some of these principles, you’ll come up with better test questions. Here are the two overriding principles for all of these tips. First of all, if you’ve got a student that has really learned what you want them to learn, you want them to get the item to correct. You want them to answer correctly.

If you have a student who hasn’t learned the material, you want them to get it wrong. You don’t want them to figure out through some inadvertent clues what the right answer might be. If you follow those two tips, you're going to be fine.

Let me go a little bit more into the barriers that we don’t want to have in exams. We, again, if somebody knows the answer, they should be able to get it right. Keep the material concise. You don’t want somebody to be penalized on your exam simply because they're a slow reader.
And here you can see, these are basically two questions on the same topic. Don’t worry if you don’t know the answer. I don’t know either. The key point though is the second question is a lot easier to read and understand than the first question and gets at the same thing.

The next suggestion I have for you is that while a lot of professional exams have five options for every question, four options may be enough. I show you here the percentage or the probability that a student can blind guess any question correctly. And you can see, it really pays to have four options rather than two or three. But the benefit from five options compared to four is not that great.

So if you come up with the right answer and three decent options, that’s fine. The next tip I have for you is that the stem should ask a complete question even if it’s phrased as an incomplete statement. They should not have to read all the options to figure out what the right answer is.

Try covering up the options, read the question, and see if students would be able to just figure out the answer in their head and then find the answer from the list. That’s the way a good multiple choice should work. Real simple little tip for you, if you have numerical answers, list them in numerical order.

If you have single-word answers, list them in alphabetical order. That will help a student who knows the answer find it more quickly and effectively, especially if the answers are numerical. Next suggestion I have for you, keep, try not to use negative items, like which of the following is not a good idea? Which of the following except this should be appropriate? They really trip up the students. They’re not used to thinking in terms of negatives, and you don’t want to trip up students who know the right answer.

So there’s sometimes where it’s really important to know what not to do, what’s an inappropriate treatment, what might hurt a patient, for example. But a lot of times all they do is confuse students, and this is not an aptitude test, this is a test to make sure students have learned what you’ve been trying to teach them.

My next suggestion is to avoid K questions. And what I mean by a K question are the kind that give option A, B, then the next option is A and B, next one is A, B, and C, A or C, all of the above, none of the above. You’ve seen those. They still are on some certification licensure exams, but more and more, everyone is recognizing and research is showing that they really test logical reasoning skill rather than the material that you’ve been trying to teach them.
So unless you're specifically teaching course in logical reasoning or logical reasoning is one of the objectives of your course, you really don’t want to include these. The only other reason I’d use them is if students do have a licensure or certification exam that are, and that will include these kind of items, and they need to practice them.

If you do, just don’t include these questions on the exam. Give these as homework. Give students a lot of practice with them, go over them in class, help them develop the logical reasoning skills that they need to do well on these kinds of questions.

Okay. Some tips about keeping the students who don’t know the material from picking up clues that will help them guess the right answer, even though they really don’t know it. My first question, suggestion to you is don’t ask for common knowledge. This was on a medical exam. I've never studied medicine, and I could figure out the right answer. I know that the uterus, lung, and, I'm sorry the small intestine, the nose, and the mouth are not sterile sites, so I was able to eliminate three out of four options really easily. Another suggestion I have for you is to keep options roughly the same length. Sometimes the right answer is the one that we really have to go into in depth to give a really nice qualified answer. Students can guess that.

Now if you can write a nice, well-qualified answer that’s one of the wrong options, that’s a great distractor or foil for students who really don’t know the material. My final suggestion for you is to avoid what testing people call interlocking items. If you see the same option or a similar option or a reference to a similar concept popping up on multiple test questions, students can pick up on that, and the test-wise ones will put the pieces together and say, well, that was the right answer there, so it can't be the right answer here.

I would convert these into matching. And again, make very clear that for matching, all of the options may be used more than once or not at all, and that eliminates that problem. For more ideas, again, I've given you that handout with a lot of tips on writing good multiple choice questions.

If you'd like to get in touch, here is my e-mail address and my website. And Magna would love to hear what you think about this 20-Minute Mentor. So please click on the link here, fill out a brief survey, and tell them your reactions. Thank you.