

Multiple-choice Assessment

Introduction

Although many instructors prefer assessing learning with “authentic” assessments – open-ended assignments, projects, or presentations that require students to apply their learning to “real-life” or professional situations and products – those can be time-consuming to grade. Some instructors use a combination of “authentic” assessments and weekly quizzes to efficiently assess learning in a number of ways.

Academic Integrity

One of the concerns with objective-type quizzes is academic dishonesty. Several of the tips in this guidance document can minimize the opportunity for cheating, but cannot guarantee its prevention. A 2010 study in the Online Journal of Distance Learning Administration found that 32.7% of online students self-reported cheating at least once on a test, compared to 32.1% of those in on-campus classes. Interestingly, though slightly more students admitted to cheating in on-line courses related to the overall statements, for almost every individual survey statement, more students admitted to inappropriate behavior in face-to-face classes than in on-line courses. (<http://www.westga.edu/~distance/ojdl/spring131/watson131.html>)

Testing More Than Recall with Multiple-Choice Questions

Module assessments may include auto-graded quizzes or tests to ensure efficiency, especially if enrollments are large. Multiple-choice exams have the reputation of not assessing higher cognitive skills, and many multiple-choice exams deserve that reputation. However, carefully worded questions (“stems”) and choices (“distractors”) can, indeed, measure critical thinking, and do so in a very efficient way.

Addresses the following Quality Matters Standards:

- QM 3.1: The types of assessments selected measure the stated learning objectives and are consistent with course activities and resources.
- QM 3.4: The assessment instruments selected are sequenced, varied, and appropriate to the student work being assessed.
- QM 3.5: Students have multiple opportunities to measure their own learning progress.

General Tips

1. Write questions that assess more than recall. Check out the “Tips for Writing Multiple-Choice Items” resource provided below.
2. Create more questions aligned to objectives than needed, then have the LMS randomly select questions. As you create quiz items, group them by objective in your LMS testing

platform. Take the time to write a few extra questions for each objective, then use the randomizing feature of the LMS to automatically create a “custom” quiz for each student.

3. Randomize answer choices. This is an easy way to minimize academic dishonesty if your LMS has this feature. If so, do not use verbiage such as “all of the above,” or check to see if your LMS can allow you to designate a particular choice as the last one.
4. Establish quiz releases, deadlines, and timing. Minimizing the “open window” for a quiz will force students to take the quiz in a tighter space of time, thus decreasing the opportunity to share information about the quiz. However, keep in mind that your students may have varying work schedules and may reside in different time zones. A reasonable “open window” for a module quiz might be 24 hours, but you can decide based upon your own circumstances and professional opinion.

Set a limited time for the student to complete the quiz once it has begun. Be sure to allow sufficient time to carefully read and consider the questions and choices; some of your students may be taking the quiz in a non-native language, which might cause slower reading. If you have students with documented learning disabilities or challenges, you may need to allow additional time for those students to complete each quiz. Check with your university for suggestions on how to handle such cases.

Be sure that all quiz protocols are explained carefully in the online instructions and the course syllabus.

5. Establish an environment of academic integrity. Include your university academic honesty policy in the “Start Here” module. You may also include a statement such as the one below in the instructions for each quiz: “Submission of this quiz indicates my understanding of the academic honesty policy and my verification that all responses are my own.”
6. Use quiz data to improve both the quiz and the course. Not only are auto-graded quizzes easy to administer in online courses, they can provide rich performance data. Utilize the analytics features of your LMS to find out which questions may need revision or which objectives may need different or additional instructional efforts

Helpful tips for writing good multiple-choice items

1. **Make all distractors of similar length and format, and at least plausible.**

If one choice has specific details or uses content-specific language and the others do not, the correct answer will be obvious to students which is the correct answer, even if they do not fully understand the content. Alternative answer options should serve as distractors, but should not overlap with content in a way that makes students think that it is a trick question.

2. **Create situation-based or scenario-based questions.**

Expect students to be able to select the best solution (choice) to a problem situation based upon their learning of specific content knowledge and skills. Write the scenario in a way that has only one “best” resolution based upon the module content, but has plausible distractors. Then, instruct students to “select the best response” or “select the action that best represents...” so they carefully consider each of the choices.

3. Write cause-and-effect questions.

Create items that ask students to apply their learning by asking either why something happened (or is likely to happen) or what impact a particular action or event had (or would have). Some of these may be directly from their readings, your lectures or you could pose additional application-type situations.

4. Consider using multiple-answer questions, but use them sparingly.

Students must think critically to correctly select all choices with a particular attribute, especially if the distractors are carefully chosen. Use this type of question sparingly, though, because too many of these would be quite tedious and frustrating for students.

5. Limit the use of “all of these” or “none of these.”

Sometimes test-developers want to out-smart the test-takers by providing such choices, but these types of questions are rarely good discriminators between students who know the content well and those who do not. If you do use these choices, do so in an application-based or scenario-based question, and be certain that “all of these” or “none of these” is actually the correct answer!

6. Most importantly, proof your test!

Be sure that questions and choices are clear and correct answers are provided and marked.

Question Validity and Reliability

There are a number of advantages to providing multiple-choice questions, including increased reliability and validity.

- **Reliability:**
Measures how consistently test questions measure a learning outcome. This is due to the fact that students cannot as easily guess a correct answer, as there are multiple answer options. Additionally, there is no subjectivity in the scoring associated with the question, so the format lends itself to a more consistent score across scorers.
- **Validity:**
Measures the degree to which “a test measures the learning outcomes it purports to measure” (Brame). Since multiple-choice assessments can more quickly measure a fairly range of broad module material, it contributes to the validity of the assessment.

Item Analysis

In order to best gauge the effectiveness, validity, and reliability of a multiple-choice assessment, you may need to conduct an item analysis, which looks at the individual test questions to measure the effectiveness of the whole.

An item analysis may include a number of statistics and characteristics, including:

- Mean – “average” student response to an item
- Standard deviation – measure of student answer dispersion for an item
- Item difficulty – percentage of students who answer an item correctly (one correct answer) or average score of an item divided by the highest number of points for any one alternative (multiple correct answers)

Ideal Difficulty Levels Relative to Discrimination Potential (Range from 1 – 100 with 100 as easiest):

Format	Ideal Difficulty
Five-response multiple-choice	70
Four-response multiple-choice	74
Three-response multiple-choice	77
True-false (two-response multiple-choice)	85

(From Lord, F.M. “The Relationship of the Reliability of Multiple-Choice Test to the Distribution of Item Difficulties,” Psychometrika, 1952, 18, 181-194.)

- Item discrimination – measurement of the ability to differentiate high-scoring students from low-scoring students based on the material tested
- Alternate weight – points given for alternative responses
- Means – total test score minus the item for students
- Frequency and distribution – number and percentage of students who chose each alternative answer

Checklist for Multiple-Choice Assessments

To-Do	Check?
All distractors are plausible and around the same length and format.	
Include situation-based or scenario-based questions.	
Include cause and effect questions.	
Limit the number of true/false questions and questions that have “all of the above” or none of the above” to a reasonable amount.	
Use multiple-answer questions sparingly.	
Match ideal difficulty question levels with the difficulty of content.	

References

Brame, C., (2013). Writing good multiple choice test questions. Retrieved 5/22/19 from <https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/>.

<http://www.washington.edu/assessment/scanning-scoring/scoring/reports/item-analysis/>

Other Resources

To learn more, visit the resources below:

- Item Analysis: <http://www.washington.edu/assessment/scanning-scoring/scoring/reports/item-analysis/>
- Writing Good Multiple Choice Questions: <https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/>