



Writing Effective Test Questions Series

PART 1: Basic Principles for Designing Effective Exam Questions

Tests and quizzes are among the most prevalent forms of assessment instruments in use on college campuses. Whether **summative** (assessment of student learning at the conclusion of a unit, course, or program) or **formative** (assessments meant to *provide* timely and effective feedback during the term or class), tests and quizzes represent a key form of information for students and instructors about learning in the classroom (McKeachie & Svinicki, 2013). Ultimately, the goal of any assessment should be to *promote* students' learning of course content and improve students' performance in the classroom (e.g., Handelsman, Miller, & Pfund, 2007; McKeachie & Svinicki, 2013). Therefore, assessment design is of paramount importance. This resource series will provide you with strategies and suggestions for writing effective test questions and designing assessment instruments that will enable you to better monitor your students' progress throughout the term.

Best practices for assessment design

The first step in designing equitable and transparent approaches to assessing student learning is to examine the constructive alignment of the course: "In this model, each individual assignment within a specific course hits on particular course outcomes in a vertical relationship; the learning expressed in the course outcomes is related to the assignments, and expectations for course-embedded assignments are related to course activities that allow students to develop learning prior to assessment" (Jankowski & Marshall, 2017, p. 57).

There are a few skills that instructors need when writing tests questions (Nilson, 2016; Suskie, 2010):

- A thorough grasp of the subject matter and the content meant to be assessed
- A clear understanding of the instructional goal for the course and/or unit
- An ability to write both clearly and concisely when needed

Additionally, effective exams exhibit four main characteristics (CRLT, "Framework," n.d.). Specifically, exams should be:

- **Valid**, with answers that are aligned with the learning objectives of the course, and that provide instructors with "useful information about student learning,"
- **Reliable**, with test questions designed to "consistently measure student learning and distinguish between levels of achievement,"
- **Recognizable** to students, in that prior instruction (both inside and outside of class) "has prepared students to expect and perform well on required tasks," and
- **Realistic**, so that students can complete the required tasks of the exam in a realistic amount of time, employing a reasonable amount of effort.

Here are a few general best practices for designing effective tests and quizzes:

Strategies	Explanation	Teaching Suggestions
Develop clear scoring keys, rubrics, and/or other guidelines for yourself and your TAs	Clear scoring keys, grading criteria, and/or rubrics are essential to creating equitable opportunities for students to demonstrate their learning; to that end, use a "norming" process to increase consistency across graders (McKeachie & Svinicki, 2013) as well as reliability of the instrument. Clearly explain your exam expectations to students (Nilson, 2016).	It is important that you "norm" yourself and your TAs to the rubric. Additionally, to ensure that students understand your expectations, Handelsman, Miller, & Pfund, (2007) suggest providing students with copies of the grading criteria/rubrics along with the test or study guide, if possible (for example exam rubrics, see below).



Test students early and often	Testing students early and often reduces the impact of a single poor performance on a student's cumulative grade, while also giving them valuable feedback that they can use to improve their outcomes later on, and you valuable information about students' progress (Handelsman, Miller, & Pfund, 2007; McKeachie & Svinicki, 2013; Nilson, 2016). McKeachie (2013) also suggests gradually reducing the number of assessment tasks throughout the term, so that students learn to consider course content beyond just studying for an exam.	Rather than relying on 1-2 midterms and a final, consider employing smaller weekly or biweekly exams. This will spread the time you and your TAs spend designing and grading exams more evenly throughout the course, especially if you develop a bank of test questions to pull from (see below). Additionally, research has shown that this model improves students' outcomes and retention in courses (Myers & Myers, 2007).
Link test questions to specific course learning outcomes	The type of question you employ should depend on the kinds of thinking you're asking students to do (McKeachie & Svinicki, 2013). Therefore, an effective exam will employ a variety of different question types, so as to provide students with the opportunity to demonstrate their grasp of course content in a variety of different ways.	Consider consulting <i>Bloom's Taxonomy</i> to help you identify the types of thinking you're interested in having students engage in (Freeman, Haak, & Wenderoth, 2011; O'Neill, Birol, & Pollock, 2010). Barbara Mills, Test Specialist with CEE, notes that multiple-choice questions can be useful when testing on a large body of material, and for a range of Bloom's levels (see also, Clegg & Cashin, 1986). Constructed response questions are also useful when asking students to analyze and synthesize course information (see Parts 2 & 3 for more on multiple-choice and constructed response test items).
Preview test expectations	It can be helpful to preview the test structure with students a few days prior to the exam, so that they can study with test conditions in mind. This can be done in class, through a Canvas message, on a study guide, or through other means.	For example, notify students of whether notes, calculators, dictionaries, books, or other materials are admissible prior to the exam so that they can study with or without these materials.
Give clear, detailed written instructions on all tests	Make sure all key, relevant exam instructions are clearly written on the exam itself, and that students have time or the ability to ask questions if necessary.	For example, Nilson (2016) suggests notifying students of how many questions of each type there are and where their responses should be recorded, how much total time is allotted for the exam, as well as recommended time limits for each section, and how many points will be awarded for each test item.
Develop a "bank" of questions, in a variety of formats, that you can draw from	Developing a "bank" of test questions that you can pull from and adapt when designing assessment instruments can make the process of test design both easier and quicker.	Try developing several test questions immediately after you've covered the requisite material in class, when it is fresh in your mind (Nilson, 2016; Weimer, 2014). Doing this with books and notes closed can also help ensure that your questions don't focus on minute details. Nilson (2016) also suggests employing a variety of



		question types to provide multiple pathways for students to demonstrate knowledge, and so that students can feel more comfortable with the test format.
Create more than one version of an exam	Creating several versions of an exam to use within a single term, and/or over several terms, is key for avoiding cheating or other academic integrity violations.	To prevent cheating, distribute different versions of the exam to each course section, and/or alternate from desk to desk so that students sitting next to each other have different versions (McKeachie & Svinicki, 2013). Also, developing a “bank” with several versions of the same question using different examples, scenarios, or number sets can make it easier to create several versions to hand out.
Carefully consider what is a realistic amount of time and effort for students to complete the assessment task	Asking too many questions might increase students’ anxiety and cause them to perform in ways they might not normally (McKeachie & Svinicki, 2013). Additionally, different types of questions will require different lengths of time for students to complete. For example, international or multilingual students may need more time for questions that require a lot of reading.	Consider asking your TAs for their perspective on what is reasonable, in terms of the amount of time to budget per question, and how many questions to ask on the exam. Barbara Mills notes that “some test designers say to allow 45 seconds per question, but this depends on how much reading and how much calculating is required.” She also suggests having your TAs or another instructor take to test, and then budgeting at least double that time for your students.

Additional resources

- For example exam rubrics, see Handelsman, Miller, & Pfund, 2007; Nilson, 2016; Tierney & Simon, 2004; Walvoord, 2010.
- At UC Davis, instructors can contact Barbara Mills, Testing Specialist (bjmills@ucdavis.edu) in the Center for Educational Effectiveness for support in designing test questions.
- This resource was designed with the help of Kara Moloney, PhD, Assessment Lead in the Center for Educational Effectiveness (kmoloney@ucdavis.edu).

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