



Constructing Effective Exams – excerpt from Quizzes, Tests and Exams¹

By Barbara Gross Davis, University of California, Berkeley

Many teachers dislike preparing and grading exams, and most students dread taking them. Yet tests are powerful educational tools that serve at least four functions. First, tests help you evaluate students and assess whether they are learning what you are expecting them to learn. Second, well-designed tests serve to motivate and help students structure their academic efforts. Crooks (1988), McKeachie (1986), and Wergin (1988) report that students study in ways that reflect how they think they will be tested.... A note on terminology: instructors often use the terms *tests*, *exams*, and even *quizzes* interchangeably. Test experts Jacobs and Chase (1992), however, make distinctions among them based on the scope of content covered and their weight or importance in calculating the final grade for the course. An examination is the most comprehensive form of testing, typically given at the end of the term (as a final) and one or two times during the semester (as midterms). A test is more limited in scope, focusing on particular aspects of the course material. A course might have three or four tests. A quiz is even more limited and usually is administered in fifteen minutes or less. Though these distinctions are useful, the terms *test* and *exam* will be used interchangeably throughout the rest of this section because the principles in planning, constructing, and administering them are similar.

Prepare new exams each time you teach a course. Though it is timeconsuming to develop tests, a past exam may not reflect changes in how you have presented the material or which topics you have emphasized in the course. If you do write a new exam, you can make copies of the old exam available to students.

Make up test items throughout the term. Don't wait until a week or so before the exam. One way to make sure the exam reflects the topics emphasized in the course is to write test questions at the end of each class session and place them on index cards or computer files for later sorting. Software that allows you to create test banks of items and generate exams from the pool is now available.

Ask students to submit test questions. Faculty who use this technique limit the number of items a student can submit and receive credit for. Here is an example (adapted from Buchanan and Rogers, 1990, p. 72):

You can submit up to two questions per exam. Each question must be typed or legibly printed on a separate 5" x 8" card. The correct answer and the source (that is, page of the text, date of lecture, and so on) must be provided for each question. Questions can be of the short-answer, multiple-choice, or essay type.

¹ Barbara Gross Davis, 2009, *Tools for Teaching*, Jossey-Bass. Reprinted by the University of Hawaii at Honolulu with permission, September 1, 1999 and retrieved on June 22, 2010 from <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/quizzes.htm>

Students receive a few points of additional credit for each question they submit that is judged appropriate. Not all students will take advantage of this opportunity. You can select or adapt student's test items for the exam. If you have a large lecture class, tell your students that you might not review all items but will draw randomly from the pool until you have enough questions for the exam. (Sources: Buchanan and Rogers, 1990; Fuhrmann and Grasha, 1983)

Cull items from colleagues' exams. Ask colleagues at other institutions for copies of their exams. Be careful, though, about using items from tests given by colleagues on your own campus. Some of your students may have previously seen those tests.

Consider making your tests cumulative. Cumulative tests require students to review material they have already studied, thus reinforcing what they have learned. Cumulative tests also give students a chance to integrate and synthesize course content. (Sources: Crooks, 1988; Jacobs and Chase, 1992; Svinicki, 1987)

Prepare clear instructions. Test your instructions by asking a colleague (or one of your graduate student instructors) to read them.

Include a few words of advice and encouragement on the exam. For example, give students advice on how much time to spend on each section or offer a hint at the beginning of an essay question or wish students good luck. (Source: "Exams: Alternative Ideas and Approaches," 1989)

Put some easy items first. Place several questions all your students can answer near the beginning of the exam. Answering easier questions helps students overcome their nervousness and may help them feel confident that they can succeed on the exam. You can also use the first few questions to identify students in serious academic difficulty. (Source: Savitz, 1985)

Challenge your best students. Some instructors like to include at least one very difficult question -- though not a trick question or a trivial one -- to challenge the interest of the best students. They place that question at or near the end of the exam.

Try out the timing. No purpose is served by creating a test too long for even well-prepared students to finish and review before turning it in. As a rule of thumb, allow about one-half minute per item for true-false tests, one minute per item for multiple-choice tests, two minutes per short-answer requiring a few sentences, ten or fifteen minutes for a limited essay question, and about thirty minutes for a broader essay question. Allow another five or ten minutes for students to review their work, and factor in time to distribute and collect the tests. Another rule of thumb is to allow students about four times as long as it takes you (or a graduate student instructor) to complete the test. (Source: McKeachie, 1986)

Give some thought to the layout of the test. Use margins and line spacing that make the test easy to read. If items are worth different numbers of points, indicate the point value next to each item. Group similar types of items, such as all true-false questions, together. Keep in mind that the amount of space you leave for short-answer questions often signifies to the students the length of the answer expected of them. If students are to write on the exam rather than in a blue book, leave space at the top of each page for the student's name (and section, if appropriate). If each page is identified, the exams can be separated so that each graduate student instructor can grade the same questions on every test paper, for courses that have GSIs.

References

- Anderson, S. B. "The Role of the Teacher-Made Test in Higher Education." In D. Bray and M. J. Blecher (eds.), *Issues in Student Assessment*. New Directions for Community Colleges, no. 59. San Francisco: Jossey-Bass, 1987.
- Berrenberg, J. L., and Prosser, A. "The Create-a-Game Exam: A Method to Facilitate Student Interest and Learning." *Teaching of Psychology*, 1991, 18(3), 167-169.
- Bloom, B. S. (ed.). *Taxonomy of Educational Objectives. Vol. 1: Cognitive Domain*. New York: McKay, 1956.
- Boniface, D. "Candidates' Use of Notes and Textbooks During an Open Book Examination." *Educational Research*, 1985, 27(3), 201-209.
- Brown, I. W. "To Learn Is to Teach Is to Create the Final Exam." *College Teaching*, 1991, 39(4), 150-153.
- Buchanan, R. W., and Rogers, M. "Innovative Assessment in Large Classes." *College Teaching*, 1990, 38(2), 69-73.
- Clift, J. C., and Imrie, B. W. *Assessing Students, Appraising Teaching*. New York: Wiley, 1981.
- Crooks, T. J. "The Impact of Classroom Evaluation Practices on Students." *Review of Educational Research*, 1988, 58(4), 438-481.
- Ericksen, S. C. "The Teacher-Made Test." *Memo to the Faculty*, no. 35. Ann Arbor: Center for Research on Learning and Teaching, University of Michigan, 1969.
- "Exams: Alternative Ideas and Approaches." *Teaching Professor*, 1989, 3(8), 3-4.
- Fuhrmann, B. S., and Grasha, A. F. *A Practical Handbook for College Teachers*. Boston: Little, Brown, 1983.
- Geiger, T. "Test Partners: A Formula for Success." *Innovation Abstracts*, 1991, 13 (11). (Newsletter published by College of Education, University of Texas at Austin)
- Gronlund, N. E., and Linn, R. *Measurement and Evaluation in Teaching*. (6th ed.) New York: Macmillan, 1990.
- Hendrickson, A. D. "Cooperative Group Test-Taking." *Focus*, 1990, 5(2), 6. (Publication of the Office of Educational Development Programs, University of Minnesota)
- Jacobs, L. C., and Chase, C. I. *Developing and Using Tests Effectively: A Guide for Faculty*. San Francisco: Jossey-Bass, 1992.
- Jedrey, C. M. "Grading and Evaluation." In M. M. Gullette (ed.), *The Art and Craft of Teaching*. Cambridge, Mass.: Harvard University Press, 1984.
- Keyworth, D. R. "The Group Exam." *Teaching Professor*, 1989, 3(8), 5.
- Liska, T., and Simonson, J. "Open-Text and Open-Note Exams." *Teaching Professor*, 1991, 5(5), 1-2.

Lowman, J. *Mastering the Techniques of Teaching*. San Francisco: Jossey-Bass, 1984.

McKeachie, W. J. *Teaching Tips*. (8th ed.) Lexington, Mass.: Heath, 1986.

Milton, O., Pollio, H. R., and Eison, J. A. *Making Sense of College Grades: Why the Grading System Does Not Work and What Can Be Done About It*. San Francisco: Jossey-Bass, 1986.

Murray, J. P. "Better Testing for Better Learning." *College Teaching*, 1990, 38(4), 148-152.

Savitz, F. "Effects of Easy Examination Questions Placed at the Beginning of Science Multiple-Choice Examinations." *Journal of Instructional Psychology*, 1985, 12(1), 6-10.

Svinicki, M. D. "Comprehensive Finals." *Newsletter*, 1987, 9(2), 1-2. (Publication of the Center for Teaching Effectiveness, University of Texas at Austin)

Svinicki, M. D., and Woodward, P. J. "Writing Higher-Level Objective Test Items." In K. G. Lewis (ed.), *Taming the Pedagogical Monster*. Austin: Center for Teaching Effectiveness, University of Texas, 1982.

Toppins, A. D. "Teaching by Testing: A Group Consensus Approach." *College Teaching*, 1989, 37(3), 96-99.

Wergin, J. F. "Basic Issues and Principles in Classroom Assessment." In J. H. McMillan (ed.), *Assessing Students' Learning*. New Directions for Teaching and Learning, no. 34. San Francisco: Jossey-Bass, 1988.

More material on this topic and other topics can be found in the CTL Library located in the Mason Room at the Smith House.