How Can I Make My Exams More about Learning, Less about Grades?

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Supplementary Marterials

Guidelines for Writing Multiple-Choice Items

Writing good multiple-choice test questions isn’t easy for teachers or for anyone else who tries to do so. Here are some guidelines that help those writing questions to avoid common mistakes.

The Multiple-Choice Question

--Write test questions on important, significant aspects of the content, not trivial details such as the author’s middle initial or some isolated fact mentioned once in a footnote.

--Write the stem (that what the test question itself is called) first. It should present a single, definite problem as a question or incomplete statement. It should include a verb.

  Bad example: In the history of coal mining in the Appalachians
  Good example: In the history of coal mining in Appalachias, how did unions typically deal with safety issues?

--Don’t use negatives (like the word “not”) in the stem. State the problem or question positively.

  Bad example: Which state is not north of the Mason-Dixon line?

The Answer Options

--Don’t make the correct option longer than those that aren’t correct.

--Make all the incorrect options plausible answers. Don’t include options that are obviously wrong or silly. They make it easier to guess the correct answer.

--Avoid using “all” “never” or “always” in the incorrect options. They can be hints that the option is incorrect.

--Avoid grammatical hints, like asking for an answer in the singular and then making some of the options plural.

  Bad example: The reason that best explains the current rise in unemployment is
  a. low labor costs overseas and the ease or transporting manufacturing goods anywhere

--Avoid the “all of the above” option. It’s too often the right answer. Don’t regularly use “none of the above” or combinations of options such as “a and b.” The combinations are especially confusing and easily misunderstood.

--When proofreading, mark the correct answers and then to make sure that they are evenly distributed between a, b, c and d. If there’s a pattern, or most of the time the correct option is “b” that enables test takers to get answers correct without knowing the correct answers.
How do you know if you’ve written a good question?

--Ask somebody else to answer it. Let them consult resources (class notes or the text). If they have any trouble understanding the question or answer options, ask them to explain what’s confusing.

---The best questions are those that make test-takers think. If the answer is an easily memorized detail, it’s probably not a good question. Remember the SAT questions?

Reference: These guidelines are a condensed version of those offered by Lucy Jacobs and Clinton Chase in Developing and Using Tests Effectively. Their Chapter 4 on Multiple Choice Items is a great resource for anybody who writes or uses multiple-choice test questions.

Getting Students to Write Exam Questions

Students tend to be very answer oriented. They want to know, “what’s the right answer.” They memorize answers sometimes without understanding what they are memorizing. Getting them to think about questions increases the effectiveness of their study time by encouraging them to consider what they will be asked on an exam and changing their focus from randomly memorizing answering to looking for answers that respond to the question.

Donna Green describes a system she devised in which students write potential exam questions throughout the course. Here’s how her system works.

- It’s an assignment, worth somewhere between 5 and 10% of the course grade
- Each student writes one exam question (short answer or multiple-choice) and answers it at the conclusion of each module within a course unit. These are submitted immediately after the module material has been covered.
- At the beginning of the course, students are given advice on writing test questions (like the preceeding set of guidelines). Green recommends a training session as well.
- All student questions (sometimes with teacher editing in case of poorly worded questions noted in brackets) are posted on a test bank data base. They are posted without answers, but with the question’s author named. Students have access to this test bank.
- The instructor decides which questions from the data base to include on the exam. She does so having determined beforehand what content areas merit questions. If no student question covers one of her designated areas, she includes one of her own. However, professor questions comprise no more than 25% of the exam. She also tries to have at least one question authored by every individual in the class.
- Student questions vary in level of difficulty and so the number of points the questions are worth reflect that level of difficulty. Harder questions are worth more points.

Her conclusion: “Student-generated test question and examination are novel and highly involving. Both improve learning throughout the term and may help students move beyond acquisition of knowledge to its analysis, synthesis, and evaluation. . . .The end result is an opportunity for more in-depth learning by students and a more enjoyable teaching environment for the professor.” (p. 53)

Here’s a great strategy that gets students involved in correcting their answers on an exam, in this case the final. It’s also a very creative way of making sure that students see something more than just their score on this most important test. The article was originally published in the August/September 2010 issue of the *Teaching Professor*.

**Final Fitness and the Louisiana 2-Step**  
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It has always bothered me, as a student and now as a teacher, that students seldom get feedback on their final exam performance. In most college courses, the final is scheduled after classes have ended so there is no “next” class to return the exam and discuss the results. Posting exam solutions on the course website may interest some students but most just scan for answers rather than analyzing the solution process and comparing it to their own. More often than not, a student only thinks about the final exam in terms of how it affected the final grade.

I teach a mathematics content course for pre-service elementary teachers where problem-solving and reflections are part of what I emphasize across the entire course. My overarching goal for these students is a mental “fitness” to solve problems. I struggle with how to use every exam experience to both assess and expand my students’ problem-solving abilities. I also want them to reflect on their exam performance. The Louisiana 2-Step, a state fitness initiative to promote the overall health of its citizens, sparked an idea as to how I might better use the final to improve the math fitness of my students.

I redesigned my final exam in this class so that it required two steps; a student step and a teacher step. The student step was the traditional “you take the test.” Students spent the first part of the exam time responding to the problems. Since this was a mathematics problem-solving course, there were no short answer questions. All problems required a multi-step process. After completing the exam, students traded their lead pencils for colored pencils and the key to the exam both of which were used in step two.

The teacher step was a self-assessment component (SAC) which allowed students to evaluate their solutions from the teacher’s perspective. Students were instructed to assess each question and their answer based on the key provided. Most of the problems could be worked in more than one way but the key offered only one method. Students were reminded that their solution strategies could differ from the key but the answers should be the same. In some cases, this allowed students to see an alternative solution process while, for others, it provided reinforcement of their chosen strategy.

Students were allowed to award points for their solution strategies and answers. In every case they were required to make comments that explained and justified the points awarded, even if they got the solution “right.” This enhanced their communication skills and provided the
opportunity to examine and expand their own thinking as they compared solutions and evaluated the worth of minor or major mistakes and misconceptions.

The final exam was submitted to me after the completion of both steps. Although students did not know their exact score when they left (I still needed to grade the exams) they did have a good idea. More importantly for me, students had a chance to analyze their solutions and reflect on their problem-solving strategies.

As this 2-Step final was a new idea, I used a short web-based survey to assess my students’ views of its worth and to provide another opportunity for reflection, theirs and mine. On the email survey, sent out immediately following the exam, students were asked to indicate their level of agreement—(Strongly agree, agree, strongly disagree, disagree)—with the following items: 1) The self-assessment component (SAC) provided immediate feedback for my performance; 2) The SAC enhanced my problem-solving abilities by requiring me to reflect on my solution processes; 3) I learned more by completing the SAC; and 4) The SAC was a valuable activity. The survey was completed by 80% of the class with 100% responding with Strongly agree or Agree to all the items. There was also a section available for student comments. One student wrote, “It helped me see what I got wrong and the reason why I got it wrong. It helped a bunch and I think you should do it for your classes next semester.” Another added, “It is a great way to assist in the understanding of the problems.”

The final exam often carries the most weight and takes the most time (study-time and test-taking time for the student; prep-time and grading-time for the teacher), but students reflect least about this cumulative course experience which can be instrumental in integrating content across the course. Including a self-assessment component in my 2-Step final exam provided my students with immediate feedback on their solutions, enhanced their problem-solving skills as they examined and compared solution processes, and assured they spent time reflecting on their performance on the final and in the course.

**Discussion Questions**

--Would this approach work with exam content other than problems? How might it need to be modified?

--If a student’s assessment, explanation and “grading” of his or her answers was thorough and accurate, might that merit a few bonus points on the exam?