Letter from the Editor-in-Chief: Don’t Panic, It’s Only an Exam

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“We must be careful not to discourage our twelve-year-olds by making them waste the best years of their lives preparing for examinations.” - Freeman Dyson (1988) Infinite in All Directions

Another exam is in the works. We just came out of a two hour review answering questions and working practice problems. Writing an exam can take days of preparation, longer than some of the students will study for it. We worry about the details. Will the exam be too hard, too long, too easy? Unfortunately, it is hard to prepare an easy exam.

Not only do students stress over exams, but instructors spend hours compiling, grading, and fretting over the exams. Exams are (often) part of our assessment of student learning and it certainly would be nice if we could close the assessment loop, especially after a final exam. There should be one more class in which we would review the final and review important missed questions.

Professors and students have been at opposite ends this process for many decades. Levine (1978) discusses some of the history of exams in colonial U.S. universities. It is interesting to read Levine’s account of how the German style of lectures took over the recitation-disputation form of instruction and assessment of student learning. For the most part, students participated in oral examinations on a regular basis as early as the mid-1600s at Harvard, the first colonial college. In 1804-05 quizzes were introduced at Yale and Levine (1978) noted that the word “cram” was first coined. A decade later, Yale began yearly tests on the curriculum. By 1830, written exams were being given at the end of both the sophomore and the senior year. In 1882 the University of Michigan introduced end of course examinations, which replaced the general exam.

The nature and type of exams have always been challenged. Today, Khan (2011) argues that while exams provide a snapshot of where students are, there are plenty of issues with the way we employ exams. Often, teachers move on and students are left to relearn earlier material on their own, if at all. A good student would correct the errors and hopefully learn from their mistakes. For example, when a large number of students do not get key points on my exams, as demonstrated by failing to answer an exam problem, I might assign extra credit for them to go back and work out the problems. The idea is to give them

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a chance to self-correct and learn from their mistakes. However, it is not possible to do this on final exams and a learning opportunity is missed unless this is the first of a sequence course.

There are a variety of test types: multiple choice, true-false, short answer essays. In the mathematics, physics, and some other STEM courses, instructors have students work out problems similar to what they had encountered in the exercises they have done and aimed at displaying their understanding of the methods or concepts in the material covered in the course. When multiple choice questions are given, they are designed to test a concept. Sometimes short answers are solicited also to test terminology, notation, or key formulae. It is surprising how little even good students understand simple concepts while being able to manipulate more complex problems at all levels of the curriculum.

Another source of amazement is the study habits of students. One might think that continual practice and keeping up with the material throughout the course is often not sufficient to prepare for exams. Many students “study” right up to the last few minutes before the exam. These students have all sorts of ways of preparing: creating crib sheets, writing all of the main ideas on a white board a few days before the exam, highlight the book or notes, or preparing notecards filled with equations or terms. A number of students stay up all night, thus not getting the rest that many of us suggest they should have. Cramming at the last minute is common practice.

Gurung, Weidert, and Jeske (2010) developed a 35-item Study Behaviors Checklist, based on other studies, and assessed a class of psychology students on their study techniques. They found that their students performed better when they attended class, answered questions on a study guide, used practice exams, and were able to explain the material. The number of study hours did not correlate to their scores. However, they also found that many of the study strategies that we might recommend had little, or negative, correlation with exam scores. High GPA students who highlighted material for later review did worse on the exam and low GPA students had several negatively correlated behaviors to exam score, such as highlighting important information to look over later, looking over class notes to fill in missing information, reading difficult material slowly, setting up a study schedule, requesting additional materials. Overall, the current studies seeking optimal study skills suggest that there are no strategies that work for every student. (Other studies noted by Gurung, Weidert, and Jeske (2010) are Gerung (2003), Hadine & Winne (1996), and Hattie, Biggs, & Purdie (1996).)

Another issue in testing is the use of finals. It is surprising that in 2010 there was much made in the media about Harvard’s recent decision not to require final exams. The faculty voted to allow instructors to not have final exam slots reserved if they chose to do so. It was noted (Harvard, 2010) that of 1137 undergraduate courses, only 259 final exams were scheduled. Out of over 500 graduate courses, only 14 had scheduled final exams. Typically, universities have a policy that faculty must give final exams, or at least meet their classes during that slot. In many disciplines final exams might be replaced by projects or papers as a more appropriate or useful, assessment tool.
Many of us have experienced final exams as students. Such exams can be stressful to students and often after grading these exams we might even wonder if the students learned anything. Final exams are used to assess what students have learned. There are alternative assessment tools that we can use, such as chapters tests, writing papers, doing presentations or performances, presenting a course portfolio, etc. Not all courses are assessed through a comprehensive, or cumulative, exam. However, students should be exposed to such exams at least for practice, if not for other benefits of taking such exams. Students entering college, or entering postgraduate programs, have to take standardized exams like the SAT, ACT, GRE, Praxis, LSAT, MCAT, or actuary exams in order move on to the next level of their career goal. Once in graduate school, medical school, or law school, students are faced with other comprehensive exams as gateway, or there may be courses in which there are only one or two exams. Without some practice at studying and taking such exams, students may not succeed. So, in part, the final can also be seen as learning how to digest multiple content areas and putting this information into perspective.

I’d like to think that the final exam gives students an opportunity to look back over previous exams and the entire course in order to put the material into perspective and perhaps see the whole picture at the end of four months of study of a subject. Unfortunately, student study habits or time management might not make this a reality. Very often students may put off studying for the final and not devote the time needed to get the complete perspective, but it is a good goal to have in mind.

There are studies indicating that cumulative exams may aid in student learning. Petrowsky (1999) surveyed students and found that the students believed that they spent more time studying and had obtained a fuller understanding of courses which had cumulative exams. Szpunar, McDermott and Roediger (2007) indicate the expectation of a cumulative final has an effect on how students process course material. Repeated testing and expectations of retesting can lead to improved performance on the final.

Khanna, Badura Brack, and Finken (2013) looked into the benefits of cumulative and noncumulative finals on student retention of material in introductory psychology courses. They found that students who had taken cumulative finals outperformed other students as much as eighteen months after the course. However, they did not notice quite the same effects in upper level courses.

There is still much to be learned about writing, grading, studying for, and taking exams. Perhaps some of our future authors are just now exploring research on these topics.

References


