

Teaching Statement

Allen L. Mann

The two primary functions of the university are (1) to add to the collective body of human knowledge and (2) to transmit this body of knowledge from one generation to the next. Until World War II, universities in developed countries fulfilled the second function by educating a relatively small portion of the population, creating an elite class of citizens who would go on to become academics, politicians, and business leaders. After World War II, the decision was made to offer the benefits of higher education to the masses. Universities were suddenly asked to provide to the many what was once reserved for the few. In my opinion, universities are still struggling to make that transition.

Today, the university instructor is faced with the dual task of making courses accessible so that as many students as possible may learn the material, while at the same time maintaining high academic standards so that the better students will still be challenged and rewarded for their efforts. In the past, instructors had the luxury of only worrying about the latter task. Now the worthy goal of increasing the general level of education requires more of us. However, in the current academic climate, it is often easier to focus on making a course accessible at the expense of high standards. Grade inflation and curriculum erosion result.

In my teaching, I strive to balance both goals, but I am often torn between them. When lecturing, I attempt to present material in a clear and organized manner. I encourage my students to ask questions at any time. When a student does ask a question, I try to answer it fully. Before continuing my lecture I often ask: “Have I answered your question?” Whenever possible, I try to supplement my lectures with other forms of instruction such as group work, student presentations, or class discussions. Mixing different modes of instruction helps keep the course interesting by breaking up the routine. It also gives students who do not learn well by sitting through a lecture a chance to learn the material in a way that may be better suited to them, while at the same time reinforcing the material for all students. For example, when I taught *Spirit & Uses of Mathematics* (a course for prospective elementary teachers) I assigned problems of the week. Every weekend I posted a new nonstandard math problem on the course web page. Students were allowed to ask for hints throughout the week. On Friday the entire class period was devoted to students presenting their solutions at the board. I made a conscious effort not to “bless” any one solution. Rather when two different—often contradictory—solutions were presented, I gave both students the opportunity to defend their work. Then I allowed the class to discuss the solutions. I believe the problems of the week were a success because throughout the semester I noticed a significant improvement in my students’ problem-solving abilities.

From simple manipulatives to complex computer simulations, technology can be a useful tool in the classroom. However, instructors must be careful not to allow technology-for-technology’s-sake to supplant the learning that the technology is supposed to facilitate. I have taught Calculus 1 both with and without graphing calculators. In the standard calculus course (MATH 1300) calculators are not allowed. But in MATH 1310: Calculus 1 with Biological Applications, every student is required to purchase a graphing calculator. Every week the students write a new program using their calculators. Obviously, numerical techniques such as Riemann sums and Newton’s and Euler’s

methods are easier for students to understand if they can write a program to implement them. Even abstract concepts such as limits and summation notation are easier for students to grasp once they know how to write a for-loop. The trade-off is that students are not forced to think as abstractly when they have a concrete representation of something sitting in front of them.

When writing exams, I include a mix of easy, medium, and hard problems. I try to write the exam so that most students can complete it in the time allowed. I make it reasonable, only asking questions about material that has been covered, but at the same time I try to make the exam difficult enough that no student earns a perfect score.

I am interested in teaching every student who desires to learn. In fact, as someone who has been taught by many excellent professors, I feel I have a duty to teach others to the best of my ability. However, if a student is unwilling to put forth any effort, then there is little I can do. I try to give every student the opportunity to succeed, but I will also allow them to fail.

I have six years of teaching experience at CU-Boulder, two as a teaching assistant and four as an instructor. I have taught students at levels ranging from high-school juniors to college seniors. I have even assisted junior graduate students. For example, my talk “When is $\text{Aut}(H \times K) \cong \text{Aut}(H) \times \text{Aut}(K)$?” was designed to help first-year graduate students pass the algebra preliminary exam.

I am constantly striving to improve my teaching. As a graduate student, I took a Math Teacher Training seminar in which we read *How To Teach Mathematics* by Steven Krantz. I participated in thirteen Graduate Teacher Program workshops such as “The University Lecture,” “Leading Socratic Discussions,” and “The Art of Mentoring Women.” I enjoy reading and arguing about education. The three books that have most influenced my philosophy of teaching are the *Republic* of Plato, *The Closing of the American Mind* by Allan Bloom, and *The House of Intellect* by Jacques Barzun.

It is always difficult to serve two masters. The goal of democracy itself is to serve the interests of the many while protecting the rights of the few. It is fitting, then, that our education system should strive to do the same. Since the natural tendency of democracy is to slide into mob rule, we should erect institutions that err on the side of protecting the rights of the few. Similarly, as instructors we should err on the side of high academic standards at the expense making our courses accessible to all students.