

Statement of Teaching Philosophy and Experience of Ann Michelle Norris

I have learned a lot since I first stepped into an introductory statistics classroom at CSUS as a very green and nervous instructor in 1995. Some I have learned from students in my own classes, some from professors who helped me learn how to teach, some from my own experiences as an observant student, and some from casual conversations with people who have had good or bad experiences learning mathematics.

When I first started teaching, I was far too concerned with covering every little detail in the section so the students wouldn't be surprised by a problem that wasn't similar to the types I had covered. As I taught more and observed other professors, I realized that communicating the concept was far more important than teaching a procedure for every imaginable circumstance. In my own education, I noted that in courses where concepts were stressed as opposed to procedure, I retained the knowledge longer, could apply it better and enjoyed the learning process much more. As an instructor, I have come across a number of students who dislike math. When I dig deeper, I often find that they have been taught or learned math as a set of unrelated rules to memorize and follow, and they have no sense of math as a logical body of knowledge established by inductive reasoning. It is often a struggle to get them to give up their view of math as a set of procedures to memorize and to get them to appreciate the structure of mathematics and to focus on understanding concepts. But one of the best rewards of teaching comes, when students who are able to make this transition, say things like "Math didn't make sense before, but now it does. Thanks." or "I was horrible at math in high school but now I'm good at it."

I really want learning mathematics to be fun for my students. Some students see the intrinsic beauty in mathematics and enjoy learning it with little external motivation. Others have had discouraging experiences with learning mathematics, fail to see it as relevant or just plain think it's boring. Although my first goal when preparing lessons is to communicate concepts clearly, my second is to address these issues so students will be more motivated to learn mathematics. When teaching students with mathphobia, particularly in developmental mathematics courses, I work to convince them that they *can* do mathematics and that I will be supportive of their efforts. In an elementary algebra course I taught, I found it worked very well to have the students try a few practice problems after each section. While they worked the problems, I went around the room and checked their progress. Not only was I able to correct many of their mistakes before they had the chance to make them permanent, but the practice gave many of the fearful students confidence to tackle the homework. I realize this approach is not appropriate for every class, but in that context it was quite effective.

On the other hand, I expect students in more advanced mathematics classes to function more independently, and I challenge them with difficult problems. It would be wrong to lead them to believe that all of mathematics is easy, or even solved, for that matter. I feel it is my responsibility to help these mathematically adept students realize their full potential, and I aim to push them to the edge of their mathematical capabilities -- this takes a bit of balance and creativity in a class of students of mixed abilities. As with all

types of students, I work to provide the tools and support for them to succeed, adapting to the needs of the situation at hand.

Relevance is something else students often struggle with, and I use a variety of tools to convince them that learning mathematics is a worthwhile endeavor. When the ubiquitous “When am I ever going to use this stuff?” question comes up, I will often describe my experience working as a sampling statistician for the California Department of Conservation and explain the crucial role that mathematics and statistics plays in the effective operation of many government agencies and how many of my co-workers, though not statisticians, needed good quantitative skills to advance and do well at their jobs. In broader terms, I explain that good quantitative skills will serve them well in a range of jobs from finance to marketing to nursing and that the problem-solving skills are universally needed in any occupation. When possible, I bring in journal or newspaper articles that illustrate the use of concepts we are learning in class. Reports of medical studies are easy to find and fit nicely into statistics courses. When teaching about polynomials, I found a paper where forensic scientists had constructed a polynomial regression model to predict time of death based on body temperature; this paper both stimulated interest and showed a real-world application of what seemed like an abstract topic to the students.

To stave off boredom, I am always on the hunt for examples and ways of presenting topics that will interest students. I have some standards that I use in statistics such as the Monte Hall problem, computer simulations demonstrating the Central Limit Theorem, the Birthday Problem and card games. I had a Statistics 50 class at CSUS once that really took off with card games. In fact, one student asked if his strategy of doubling his bet every time he lost at a card game was a sound strategy. This question stimulated a lot of discussion, and I had to actually do a little research to find that the strategy could only be sustained by an infinite amount of money (in any realistic situation). This question ended up being an excellent framework for discussing mathematical expectation with the added bonus that the calculations involved geometric series.

The environment I create in my class is very important to me. I work to create an environment of mutual respect where students feel safe to ask and answer questions. One of my favorite aspects of teaching is interacting with the students and without establishing a safe classroom environment this is impossible. I especially enjoyed my years of teaching at CSUS because the classes were small enough that I could get to know my students, and they could get to know me. I believe it makes a difference if a student knows I know their name and I care whether or not they are attending class and learning the material. I realize now that teaching is a lot more about connecting and communicating with students and stimulating them to think, rather than being a walking dispenser of information. I truly am enthusiastic about mathematics and statistics, and it is one of my greatest joys to share the discovery of this amazing subject with students of all different backgrounds.