

Statement of Teaching Philosophy – Eric Ruggieri

Mathematics is an action subject - the only way to truly learn mathematics is to do mathematics. A deep understanding and a mastery of a subject can only come after you have successfully applied an idea or a theory to a problem.

The students that I may meet in a college classroom have joined my class for many reasons. Some come because they need to fill a requirement, others come because they have chosen math as a concentration, still others may be there because they have an interest in trying something new. These students will have different learning styles and will enter my class with distinct sets of knowledge about the subject matter. In essence, no two students will ever be alike. As a teacher, this means that I have to be flexible in my methods of instruction and realize that the same lesson might not work on two different sets of students. Lessons need to be constantly updated and diligent notes must be taken on what was effective and what was not as clear. It also means that the way to best reach my students is to get to know them as individuals.

My ideal lecture is one that builds intuition into a problem, presents the major results, and then provides examples on how to apply what was just learned to solve problems. When I entered graduate school, I made the decision to study applied mathematics rather than pure mathematics. For me to fully grasp and appreciate a concept or result, it must be put into context. I want to see why the mathematics that I am learning is meaningful and how it governs the world around me. I bring this same approach into the classroom. The physical notions of Force and Work, as well as Consumer Surplus and Blood Flow problems have proved to be effective examples of Integration in my Calculus classes. In Statistics, casino and lottery games can be used to illustrate basic probability, while clinical trials can be a great example for more advanced statistical topics. With each new topic, I try to build intuition or develop a strategy that can help students solve a problem. There is an expression that says “if you give a man a fish then you feed him for a day, but if you teach that same man to fish, then you feed him forever.” While a student may one day forget the main result of a given lecture, if I can help them to develop a mathematical way of thinking, then I have given them the tools to work out the result for themselves. After presenting the main theorem or result, I try to work through several examples so that the students can see our result in action and have a model to follow when working out problems on their own.

Keeping students involved in their own learning is the action of mathematics. As a way to ward off students falling behind, I give weekly quizzes and homework assignments. While the weekly assignments serve as a way to see what the students have learned, they can also serve as a way to see what I have taught. Sometimes, a message just does not resonate the way that I thought it did. This provides a wonderful opportunity for me as an instructor to go back to a topic that was not clear the first time around. At the start of the semester, I had given what I thought was a clear lecture on ‘The Trapezoid Rule’. However, when quiz time arrived, I saw the lesson for the disaster that it truly was. I realized that as an experienced learner of Calculus, I had begun to group information and disseminate it in that format. What I forgot and soon after corrected, was that first time learners of a topic need to have the information broken down into as simple pieces as possible. I try to structure the homework assignments so that the questions asked fill in any gaps in the information I would expect a student to know when entering my class. For example, I would expect my Calculus students to have learned the basic aspects of trigonometry. To help them review these concepts, I would ask questions that would necessitate the use of a trigonometric identity to solve. Practicing new concepts and connecting them to ideas already learned is a good way to reinforce and have students kept up to date on their mathematical knowledge.

It is one thing to say on the first day of class that you encourage questions and quite another thing to create an environment that encourages questions and discussion in the classroom. The number of questions asked in class is likely in proportion to a student's interest in the subject matter and the comfort level that they have with their teachers. There are a few things that I have done to try and create an engaging environment. First, dismiss the notion that there is ever a stupid question. Every student needs to feel that their opinions are valuable. If nothing else, by answering the question I will have provided review for everyone else in the class while at the same time, not letting an individual fall behind. New mathematics often builds upon mathematics that we have already learned. If I do not take the time to answer questions, then I am likely to lose the students one at a time, until they all are lost. Secondly, I try to take a few minutes either before or at the start of class to talk about something not necessarily mathematical, but important to the students nonetheless, such as course registration, campus sports, or news stories. While some may argue that this is a loss of valuable class time, I would instead argue that this helps to build a comfort level and sense of community that encourages questions and actual learning. Finally, I repeatedly mention throughout the semester that my door is always open to them and give them a wide range of times to find me in my office each week. Based on student evaluations, my openness to questions proved incredibly useful to them.

One of the most important things to remember when entering a classroom is that each student is a unique product of their past experiences. Most importantly, my teaching styles and beliefs are a product of my life experiences: the teachers I liked, the methods and style of learning that worked for me, and those that did not. Perhaps the most important thing that I can do as a teacher is to never be satisfied. There is always more that can be learned, whether new teaching methods or new mathematics. Every class will bring new challenges. The key to reaching students is to have my enthusiasm and love of the subject matter rub off on them. Teach them how to think. Invite questions. Show them how to solve problems and why a particular topic is important. Establish the attitude of 'yes, you can do this'. But most importantly, give them the opportunity to *do* mathematics, for it is only then, that they will truly *learn* mathematics.