# Teaching Philosophy- Judith Elena Canner

The first time I stepped into a classroom as the teacher, I was a sophomore at Shippensburg University in Pennsylvania. I volunteered as a developmental algebra instructor to help other undergraduates prepare for the math placement exam. Before each class, I asked myself how I would effectively teach the information. I spent ten weeks, twice a week, lecturing on the basic principles of algebra. I only know for certain that one of my students passed, after she approached me in the dining hall, hugged me, and thanked me for helping her to finally understand math. I was humbled and thankful that, somehow, at least a few lessons were coherent enough for one student to understand. I believe this experience is common for first-time teachers: an instructor enters the classroom bearing the burden of how he or she will convey the information effectively to the class. I now realize that my motivation should not necessarily be how I will teach a course, but how the students will learn and grow within and through the course.

**Overall, I hope to encourage my students to be active participants in the learning process**. In order to encourage students to be active learners, it is important to create a comfortable learning environment for the students. I praise correct answers, but I also positively reinforce students who answer incorrectly. I will point out the correct ideas of the answer and then attempt to guide the student towards the correct answer. I often have the students discuss questions in groups so that the student is more confident in an answer if called. In general, I try to be accessible to the students. I attempt to hold small conversations with the students prior to class and use humor to create a relaxed atmosphere. A comfortable learning environment allows me to help my students achieve three main goals through my course.

**My first goal is that students understand when and how to use the necessary tools to solve a problem.** Students need the proper toolbox of formulas and methods necessary to solve a problem. In some ways, it is akin to the need to memorize French verb conjugations. The rules of conjugation are often tedious to learn but are necessary in order to speak proper French. In a general statistics class, I may teach students how to calculate sample statistics or how to conduct a hypothesis test or to define a sampling distribution, seemingly rote calculations and definitions, but vital to the "language" and understanding of statistics. The best method to teach the course foundations is often through a lecture, but it is important that the lecture remains student-centered. For instance, I may ask the students to guide me through each step to calculate a confidence interval. Instead of listening to a lecture, the students are now an active part of the lecture and can practice application of the material under my supervision and guidance. Another necessary tool to teach students is programming. In reality, most of mathematics and statistics research and application require a computer. Therefore, I incorporate technology with theory in order to provide students with experience in programming and the tools necessary to solve problems.

**My second goal is that students understand the big ideas of mathematics and statistics.** Every course has its big idea - in statistics it is the sampling distribution and in calculus it is the limit - and students can directly relate everything they learn in those courses back to the big idea. Therefore, I challenge my students to relate each topic back to the big ideas of the course. For example, in one activity I provide my students with coins and ask them to record the number of heads in 50 coin flips. I then have each group post their proportion of heads on a histogram. After all the students post their counts, they can see that the distribution of the sample

proportions is roughly symmetric and centered at 0.5. Instead of simply instructing the students to calculate a z-statistic for a sample proportion, the students now understand that the reason we can calculate that test statistic is because we know the sampling distribution for sample proportions is normally distributed and centered at the true proportion. I relate each formula and calculation done in my statistics class back to the concept of the sampling distribution because that is why we can make inferences based on the data. The formulas and calculation are simple to look up (and nowadays are mostly done with computers), but if the students do not understand the big idea of the course, they will not be able to effectively solve problems that are not "obvious."

**My third goal is that students become effective problem solvers and critical thinkers.** My instruction will seem useless to students unless they are able to apply what they learn. Traditional forms of evaluation, such as exams, quizzes and homework, are useful ways to test comprehension of a subject, but, in addition, I conduct evaluations of the students' problem solving skills through projects and in-class assignments. For example, I may give my students the following problem to consider as a group (three or four students): I have a tree plantation and I need to determine which trees are large enough to harvest. In one grove I have multiple stands of different tree types of the same age and in another grove I have stands of different ages of the same tree type. The groups must choose a sampling technique (discussed in lecture) in order to select a representative sample (another big idea in statistics) so that I know which tree types and ages to harvest in each grove. Up to this point, most examples on sampling techniques require the students to apply a specific technique or to recognize when and if a specific technique is used in an example; this project requires the students to think more critically about how and when to apply certain techniques and what constitutes a truly representative sample of a population. It also allows me to assess the students' understanding of the sampling techniques through both observation of the group work and the collection of a report from each group. Group work is an important part of such projects because it allows students to learn by teaching each other. In addition, in any career, whether in the mathematical sciences or other disciplines, students need to be able to work collaboratively to solve problems effectively and efficiently.

**My own goals for advancement as a teacher**

There are several facets of my instruction I hope to expand and improve as I continue to gain experience. I hope to continue to incorporate technology in the classroom, particularly since technology and programming is vital to research in statistics and mathematics and students must be proficient in such things to be competitive in the field. I also continue to collect relatable and interesting datasets and examples in order to provide student with pertinent applications of the course material to their everyday lives and academic majors. Although my own specialty is mathematical ecology, I intend to develop curricula that are relatable to multiple disciplines. Particularly, I want to develop interdisciplinary courses, both in my own specialty and in collaboration with faculty in other disciplines of the biological and social sciences. Such courses could be team taught and would contain a large project component in order to provide the students with research experience. I hope that each course I teach creates a comfortable learning environment that promotes critical thinking through activities and instruction that appeal to a diverse student body.