

The role of a teacher is to facilitate learning. In math classes, students learn much more than the content of the course they're taking. They also learn to problem solve, think creatively, express ideas, meet deadlines and work cooperatively. While I certainly want all of my students to succeed in learning the required course content and am disappointed when they don't, it disappoints me more when they don't learn skills that will help them in their adult lives, regardless of their chosen profession.

During a typical semester I facilitate learning through interactive lectures, inquiry based activities, group work, writing projects and asking students to present their work to their peers. One of my favorite inquiry based activities is using coins to demonstrate the Central Limit Theorem. I have done variations of this activity in both 100-level and 400-level courses and both sets of students find the activity informative and fun. (I get a kick out of watching some of the students flip coins!)

One of my goals when lecturing is to get students involved. I make it a point to ask a lot of questions and give students ample opportunity to ask questions. In the age of Google, Ted Talks, the Kahn Academy and the like, students have easy access to mathematical facts; hitting them with a fire-hose worth of information shouldn't be our primary roll in facilitating learning. Instead, our roll should be to make sure that students can properly use theorems, formulas and equations and understand how and why they work.

I also like to have students work in groups of two or three to complete in-class activities. These activities give students the opportunity to collaborate on projects that have deadlines - a skill they undoubtedly will need in their chosen profession. This not only reinforces what is covered in class by encouraging students to discuss math, but it also builds relationships so they can have someone to talk about math with outside of class or office hours. One of my high school history teachers once told our class that "you're smarter together than you are apart." His premise is that students bring different skills to the classroom. They have variable learning styles, unique ways to take notes, different levels of background knowledge, etc., and that by working together students can take advantage of the collaborative strengths of their classmates and arrive at a better understanding of the material.

One of my favorite parts of teaching is interacting with students outside of class. I encourage them to come to office hours to talk about math or anything else that may be on their mind. I enjoy going to events on campus (sporting events, concerts, plays, etc.) and exchanging pleasantries when I see students around campus or in town. My hope is that by being interested in students as individuals - their goals, struggles, things that interest them - that they become more interested in the things I'm interested in - mathematics and their success in life.

## Technology in Mathematics Education

Technology has a place in mathematics education. What that place is and the proper use of technology is different for each course and sometimes even differs for each student. For example, in Calculus, graphing calculators or mathematics software can be used to show relationships between functions and their derivatives, how the limit of Riemann sums gives

the area under a curve or to demonstrate how Newton's method finds roots of functions. In a differential equations class, computers can be used to draw vector fields, construct solutions using numerical methods (such as Runge-Kutta) and in abstract algebra, mathematics software can be used to find Cayley tables or study the group of symmetries of a regular polygon. Done properly all of these activities can be beneficial to students by not only teaching them mathematics, but also by teaching them computer skills.

During the Spring 2014 semester I taught a geometry class whose intended audience is sophomore and junior middle school and secondary education majors. As part of the curriculum, students were asked to complete a handful of assignments that require the use of GeoGebra, an open source mathematics program with a geometry focus. The goal of these assignments was to teach students that software can be used to test their intuition before embarking on writing the proof of a theorem as well as making them comfortable enough with the software to use it to enhance their own classrooms.

In the Fall 2014 semester I taught a 400-level probability course. Since about one-half the enrolled students were double majoring in computer science, one of their projects to write a computer program to simulate a Yahtzee hand, run the program 10,000 times and compare the experimental results with the theoretical results. This allowed students to be creative in solving a problem as well as emphasising the connection between "pure math" and the "real world."

Another type of technology that benefits students is online homework systems. These allow students the opportunity to practice skills learned in class and give them instant feedback on their understanding. Online homework also permits students to recognize deficiencies immediately and get help so that these deficiencies don't multiply and cause problems later in the semester.

## Undergraduate Research

Introducing students to research is an important part of undergraduate education. I find that many students give up on a hard homework problem after one or two attempts because they "get stuck" or they are "out of ideas." This is where undergraduate research comes in! A well organized undergraduate research project instills students with the freedom to fail and teaches them that in math - as in life - it often requires patience and persistence to arrive at a desired outcome.

## My Future in Mathematics Education

While I consider myself to be a "good" teacher, I strive for continuous improvement. Some of my goals are to increase the use of computer software and to add paper and presentation components to upper level classes. While developing these assignments, I am trying to answer questions like: What topics are appropriate for this class? Should students pick their topics or do I assign them? How much should grammar, punctuation and spelling be a part of the grade? What is the appropriate level of mathematical rigor? Will the

assignment be perfect the first time I give it? Probably not. However, each version of the assignment will be better than the previous.

I am excited to supervise undergraduate research projects! The academic advisors I have had throughout my education have made some of the biggest impacts on my academic career, and I believe that is because I had the opportunity to work with them outside of the classroom. I look forward to “paying forward” the hard work and dedication my teachers and advisors put into me.

A question that is often asked during the academic job search is “What classes do you want to teach?” My answer is all of them! I have taught a variety of classes and I don’t believe that there are any that I can’t teach. There are some that I will have to spend a lot of time preparing for, but that is fine. One of the best ways to learn a subject is to teach that subject to someone else. One of my goals is to learn a lot of math, so I’d better teach a lot of it!