TEACHING STATEMENT

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My methods of teaching are directly impacted by the audience I am teaching, my over-arching teaching philosophy, and my previous experience.

First and foremost, I strive to teach mathematics in the framework of critical-thinking skills and problem-solving. These critical-thinking and problem-solving skills allow the students to apply the material they have learned to situations both in and out of the classroom.

I also engage my students with group discussions, small group work, using technology and manipulatives, and by having students demonstrate problems or solution methods. Ideally, my classroom is an environment free of judgment, where students can use their problem-solving skills to conquer problems themselves without my just showing them a single solution path. I believe that this not only makes the students better problem-solvers, but also helps them truly learn the material.

I have implemented these methods with courses ranging from College Algebra to Calculus 2 with class sizes from 15 up to 75 students. Although the logistics and configuration differ for each class, it is still possible for me to engage the students to be active learners.

1. Teaching Philosophy

I approach my teaching mostly from a constructivist point of view. I prefer that my students discuss material with each other, challenge each others’ (and my own) thinking, and make the material their own. This is not always easy for a variety of reasons.

Often, students are used to, and even expect, a ‘traditional lecture’ in their mathematics classes. I dispel this idea on the very first day of class. I break the students into small groups of two to four students, which becomes the norm for each class. The first day of class is also used to introduce each other, and there is always a short group learning activity - whether it is a small puzzle, a short problem to introduce the first topic, or even a game on probability. This helps set the stage for the rest of the semester.

Regular classes are always interspersed with short problems for the students to do in their groups, or examples for the students to create on their own. Working in groups, and even different groups working together, allows for a sense of confidence in the individual group members – the ideas are not theirs alone, so there is not the fear of rejection if they discuss this with the class. They have the backing of their group.

The discussion in the groups, and later with the class as a whole, helps students construct the knowledge and make it their own. The very act of justifying their conclusions, and in some case teaching the other students, helps to cement the knowledge within the students’ minds. It is said that you don’t truly understand a topic until you can teach it to others. I allow the students this opportunity to teach each other.

The small groups also facilitate learning in another way. Sometimes students are shy to ask questions in class. By creating the classroom norm where the pairs talk with each other, the students are much more likely to ask their partners a question quietly without stopping class or bringing attention to themselves.

I have found this modality to be quite effective in the classroom. Students remain engaged, help each other learn, and gain a deeper understanding of the material.

2. Teaching with Technology

I previously stated that I use technology extensively in my teaching. Technology is a broad term, and for me it can mean many different things.

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For the past year and a half, I have been using an iPad when teaching. All notes and board work are saved electronically, and students have access to this. My experience has been that students still take notes on their own, but they also utilize the online notes.

The iPad is not only used for notes, but also for demonstrations – YouTube videos, websites, applets, the TI-nSpire CAS system, Educreations, and various other apps. These materials help engage the students, and, in my opinion, helps to keep class interesting. When discussing the Monty Hall Problem, for example, it is interesting to show an actual clip from the show Let’s Make a Deal and listen to Monty Hall himself explain the famous problem on NPR’s podcast.

I recommend that my students use technology during class as well, even if this is just a calculator. I want my students to be able to take a complex problem, translate it into something that the calculator or computer can solve for them, and then understand the answer that the technology gives them in the context of the original problem. For instance, when teaching linear algebra to a class of non-mathematics majors, I expect my students to be able to read a problem, write out the system of equations, enter the augmented matrix into their calculators, put the augmented matrix into reduced row echelon form, and finally be able to state the solution to the problem, if one exists. I believe that an overemphasis of the simple arithmetic operations drown-out the very concepts we are trying to teach the students.

Ideally, I wish that each student was equipped with a tablet computer (iPad, Surface, etc.) with a CAS calculator, spreadsheet software, and dynamic geometry software. These tools allow for the quick analysis of tremendous amounts of data. Another example is when I teach probability. After talking about sample spaces, I use the example of rolling two identical dice and summing the faces. I pass dice out to the groups and they run several experiments on their own. We look at the data as a class, usually around fifty trials, and see that not all of the numbers come up equally likely. I put this collected data into a spreadsheet and show a quick graph to the class. Then, using a different spreadsheet, I program the experiment again, but this time the technology allows me to run hundreds, if not thousands, of trials and graph the results. The students can easily ‘see’ the experimental probability. Running an experiment like this would not be feasible without the use of technology.

Finally, I encourage students to find technology that is useful for them and for the class. A discussion board allows individuals to post ‘useful technology links’ to share with the class. Sometimes, these are iPad or Google apps that are useful specifically to the class I am teaching, or just to the students in general. Websites, applets, even tips and tricks with the calculator, are posted and shared. At the end of the semester, these items are saved on a course website for future use.

3. Teaching Experience

I began teaching in 2006 as a graduate teaching assistant at Central Michigan University. I was given two sections of college algebra to teach, each with 35 students. At this time, being a green teacher, I taught in the way I was taught – pure lecture. Since then, my teaching style has changed drastically.

While at Central Michigan University, I had two great opportunities for my teaching to evolve. First, there was a two-week teaching workshop specifically for the mathematics department. This workshop was aimed at graduate assistants and gave a brief overview of teaching theory and methods that were applicable at the collegiate level. We discussed, and practiced, various teaching methods including class discussion, group work, and guided discovery. Various learning theories were discussed in this context.

I quite enjoyed this workshop, and found it extremely useful in my own teaching. This was the beginning of the evolution of my teaching style and philosophy. I was asked to attend the workshop the following year, but this time I served as a peer leader.

The other opportunity I had was taking two mathematics education courses at the graduate level. One was primarily on learning theories while the other focused on teaching methods. Both courses were geared towards teaching at the collegiate level.

At the University of South Carolina I continued to take graduate level mathematics education courses. One was the advanced study of teaching mathematics and another was technology and mathematics education. Both courses were useful and have broadened my repertoire of teaching methods and theory.
4. Future Plans

As mentioned, I have already begun using technology extensively in the courses I teach. I have created an almost paperless classroom, with all work being scanned, graded and returned electronically. This allows me to return work before the next class period and also keeps a permanent record of graded work for the student. I plan to study the effects of the instructor's use of technology on the conceptual learning of the students.

I also have a vision of a completely paperless classroom, where each student has a tablet. Lectures would not be static notes, rather there would be dynamic and interactive experiments and problem-solving done on the tablets. Work would be completed and submitted electronically. Various applications could be utilized and material shared electronically. Although a lofty idea, it is something that I am working towards.

I view my teaching style as dynamic rather than static. Each semester, course, and group of students compose a unique constellation. What has worked for similar courses in the past might not be the best choice for the current incarnation of the course. I pride myself on being flexible and attentive to these dynamics and to guide the class in a direction so that the students can meaningfully learn the material.

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