Teaching Philosophy

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Over the course of seventeen years of teaching at regional state universities, my teaching philosophy has evolved from what I had as a graduate student at Brown University, but at its core it remains fundamentally unchanged.

The goal of all education should be to tap into the natural curiosity in the students and to motivate them by showing the variety of fascinating questions arising in mathematics. This goal can be accomplished at every level of instruction. For students in lower level courses, I find that students are interested in immediate applications. This past spring I gave a presentation involving elementary number theory to a group of high school students. I found that such material lends itself to interesting yet accessible problems with little background.

For students at the upper division level, I feel it is important to present challenging courses which contain challenging problems to the students. I have never believed in offering watered down courses in a watered down curriculum: If the material is not interesting to me, I find it impossible to make it interesting to the students. On the other hand, I have had considerable success presenting highly interesting material in complex variables, topology, geometry, and various upper division algebra courses.

In addition to this basic goal, I have some foundational beliefs on how to accomplish such a goal.

First and foremost, education should be challenging. If the material in the course doesn't stretch the students' abilities, it doesn't give the good students the necessary sense of accomplishment or the sense of enjoyment.

Secondly, education should be fun. I try to stress to my students that problem-solving at every level can be a rewarding experience. There is a basic enjoyment in taking a challenging problem, planning a solution, and then implementing that solution, finally conquering the problem in much that same way a mountain climber might conquer a mountain peak.

Thirdly, students need individual attention and feedback. They need to feel that their intellectual needs are being met and their intellectual accomplishments are being acknowledged and rewarded. Although all the students in a given course receive the same instruction, different students learn through different means and have different abilities, and therefore need to have their education tailored in different ways. Perhaps the most difficult part of my job is to assess how each of my students learns and to adapt my individualized teaching techniques to each of my students in turn.

Fourth, I am a firm believer in active learning. I stress to the students over and over again that mathematics must be learned through active participation. I tell them that they have to do their homework in order to learn the material. Mathematics is not learned by reading about it in a book or by watching a teacher work problems or write proofs on a blackboard, but by the active engagement of the students' minds in understanding the material and

solving the problems. No matter how gifted a teacher I might be, I cannot succeed unless the students actively participate in their own education.

Fifth, I am a solid believer in making students write. Students frequently ask me why they should have to write in a mathematics class. I tell them that writing is how we express and communicate our ideas to others. Of course, I have an ulterior motive: By forcing students to take the time to write down their understanding of the material I also force them to take the time to form that understanding into a logical and coherent whole. In order to write well, it is necessary that the students think well. That, likewise, should be the goal of education.

Sixth, I am a staunch supporter of the concept of liberal arts and sciences education. Earlier this week one of my students asked me why he should learn material he would never use. My response was that the purpose of a university education is to prepare students not for one specific job or profession, but to prepare students for whatever life might present them. I told him that several years ago there was a survey that showed that the average worker has seven different jobs and three different careers, so I claim that each student really has no idea what they might end up doing five, ten, or twenty years down the road. I believe that an essential facet of education is that it be sufficiently broad-based to prepare students not for a career, but for life. I believe this is best done by giving students a broad and challenging liberal arts and sciences curriculum.