TEACHING STATEMENT
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There are many things which make up my teaching philosophy. I have taught in a number of different settings and in different styles, but many of the same principles keep recurring. Both students and teacher have a responsibility to make the classroom work. Effective teaching involves both a mastery of the subject matter and a genuine enthusiasm and desire to share the subject with the students. As a teacher it is my job to help and encourage students to learn and to do the necessary work to master the mathematical ideas and techniques.

At both Harvard and the University of Illinois I have taught a range of courses, from introductory calculus classes through advanced undergraduate geometry classes. I've taught both small and large classes and in both traditional and active learning styles. No matter what the class I aim to help students take charge of their learning. This happens both inside and outside the classroom. Students appreciate this, one commented "Elizabeth teaches her students to *think* instead of memorizing equations".

Every student is different and learns mathematics in slightly different ways, so I find it best to try and give as many different perspectives as possible. (For example both speaking and writing mathematics and using both pictures and equations to explore ideas.) I have found that keeping students motivated, involved and interested in their learning is a key component to my teaching. This begins when first considering the curriculum for the class, continues through to the details of the choice of material presented in class, the way the material is presented and in what work I ask students to complete outside class. As a practical example of this, consider a typical multivariable calculus class. I have found students catch on to the ideas most quickly when they can visualize objects in three dimensions. Of course I draw pictures on the blackboard. However students become really involved in the material when I move away from the blackboard and introduce visual aids (such as an umbrella to represent a local maximum or minimum or a Pringle potato chip to represent a saddle surface). One multivariable calculus student commented "She is very energetic and she makes section fun".

I have a slightly informal style and strongly encourage class participation during lectures. For example, when calculating an integral in a calculus class, I ask the students to work out and call out the calculations. I act as a "scribe" at the board, repeating the students words and giving longer explanations when required. At the end of the process we have all solved the problem. Sometimes I stop to give the class a problem to work on to practice a new technique. Students work on the problem and talk with their neighbors to check their answers. This kind of interaction can be harder to generate in more advanced classes. However, I am experimenting with class discussion where I ask the students to suggest ways to prove theorems or I ask the students to come up with counter-examples

(for example, find a series for which the root test shows convergence but the ratio test gives no information). A well chosen question can lead to stimulating discussions that tie together material from several classes.

Interacting with students is one of the real joys of teaching. It is very rewarding to see students grapple with and then master new ideas. I try to make my office hours a place where students feel welcome to come for help. In any class, these one-on-one interactions can be the place where students sort out misconceptions. In class feedback, students often comment "she is very helpful and approachable". Conversations outside the classroom are also a place where you have the time to explore issues more thoroughly. Often these conversations can be brought back to the class as a whole — everyone benefits.

Over several summers I've been involved with undergraduate research. Over summer 2005 I advised a Harvard undergraduate in a project on introductory knot theory and over the summers of 2001 and 2002, I was a mentor to upper level undergraduate students as part of the Research Experience for Undergraduates group in geometry[1] at the University of Illinois. In many math courses students just see established results presented in a carefully ordered fashion. I think it is important to expose students early on to new mathematics and to the process of mathematical research.

I try to continually update my teaching skills and improve how I teach. The Derek Bok center for teaching and learning at Harvard University holds teaching conferences twice a year. These have been an invaluable source of help, exposing me to different teaching methods as well as clarifying what I find important in my own teaching. Teaching mathematics at any level takes a lot of preparation and energy to effectively communicate with students. I enjoy seeing students learn new ways of thinking and communicating. I believe that my love of mathematics and genuine enthusiasm to share mathematics enables me to successfully teach mathematics.

[1]Illimath 2001 and Illimath 2002.