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Teaching Statement

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Objectives and Goals:

The teachers that have had the greatest impact on my outlook toward mathematics have been those who have very visibly demonstrated a passion for the subject. They have shown tremendous knowledge as well as an eagerness to transfer their knowledge and fascination of mathematics to others. They invested a considerable amount of their time helping their students understand concepts, and guided them so that they could navigate through the maze of little details, but at the same time be able to comprehend the big picture. The time spent imparting this knowledge seemed to be rewarding in itself. Their curiosity for learning was infectious and their interest in our opinions, successes and little contributions was gratifying. These teachers have tremendously influenced the way I feel about mathematics. The respect that I have for their love of the subject along with the humility that they display, in spite of their successes, defines the objectives and goals that I believe a good teacher should possess.

Teaching mathematics effectively to foster logical and analytical thinking is probably one of the most challenging objectives that members of mathematics departments in academia face. Part of the problem is the preference of an ethic in which memorization of formulas is the chosen way to approach problems. This is encouraged by the accelerated pace in an academic setting. The lack of time is a limiting factor in the amount of effort spent in teaching as well as learning. My approach to teaching involves providing an understanding of both concepts from first principles and critical thinking. Also, I believe that generating curiosity about the reasons for the development of mathematics by learning about the history of mathematics is an essential component in students' mathematical education. In addition, emphasis on real world applications is instructional in understanding how mathematicians derive new theoretical techniques, replace outdated ideas with more relevant ones, and sometimes break from tradition to create entirely new areas of mathematical study. These techniques for teaching mathematics require creating a paradigm shift from the ethic based on superficial methods of memorization of definitions and formulas.

There is also the question of teaching non-mathematics majors. How much should such a student be required to learn? Derivation of formulas involving complicated mathematics is not essential in this case. However, as before, memorization is as harmful here and should not be advocated. Rather, I believe that the emphasis should be on applications that demonstrate the necessity and usefulness of mathematics in solving practical everyday problems in an efficient manner. Using an approach based on logical and analytical thinking to understand fundamental concepts as opposed to resorting to rote will also prepare these students for a deeper understanding of other sciences.

I view teaching as a part of the process of expanding my own knowledge of the subject, and of improving my ability to effectively communicate that knowledge in the classroom. Thus teaching plays an important part in the building of a mathematical personality. Viewed in this fashion, the success of students becomes a personal success; the quality of the knowledge

accumulated by them, and the genuine interest to further that knowledge, becomes a measure of the effectiveness of the teacher.

Methods, Techniques and Measures of Success:

Having stated my principles and objectives as a teacher of mathematics, it is important to be able to convert these goals into useful and practical methods to be implemented in the classroom. The model that I use is the one that has worked for me as a student of mathematics. Aristotle said, "We are what we repeatedly do. Excellence, then, is not an act, but a habit". I believe that a good way to learn mathematics is to develop a habit of repeatedly working out problems till one obtains an insight, an "aha" experience, into the big picture. This takes time and effort, but it is time well spent in building a strong mathematical foundation and one that I personally have often used. In the classroom, I encourage students to practice solving problems, and require that they submit regular homework assignments. To aid them in their work I prepare handouts that put a heavy emphasis on notation, along with detailed explanations of all the steps involved. This is important as, initially, learning by example is a powerful technique in creating correct notational habits and writing skills. As with any other language, in order to understand and effectively communicate concepts and ideas, it is important to have a good grasp of the grammar and the semantics of the language. I spend time in class explaining how notation should be used correctly, common notational mistakes that students make and how these mistakes communicate incorrect ideas. This method has proved very effective in my classrooms. The students appreciate that they are able to communicate and comprehend concepts correctly.

During the course of my Master's and Ph.D. programs I have taught several undergraduate courses. At New Mexico State University I taught Calculus I, Calculus II, Business Calculus, and Matrices and Linear Programming. At the University of Houston, I taught Finite Mathematics and Elements of Mathematics. Some of my classes had over 100 students in them. Teaching such large sections was challenging at times. The most common positive evaluation that I received in my classrooms is that I "explain concepts very precisely". The improvement in notational and writing skills, along with the improvement in grades, that I observed as each semester progressed is an indication of the usefulness of the particular methods that I use. There will always be students who do not help themselves and do not take advantage of the various resources that I make available to them. However, I have noticed higher success rates in students that do take advantage. It is also very important to give students positive feedback and constructive criticism in place of negative comments or harsh corrections in order for them to develop a genuine appreciation for the subject as well as respect for the teacher. It is essential to infuse students with confidence, enthusiasm and encouragement.

Teaching has not always been easy for me. I have struggled with it. It can be frustrating at times, exasperating at others, and then it can be very rewarding and exhilarating. This is especially true when I get a thank you card from a student for having made a difference in their lives. This does not happen very often but when it does, it makes the whole endeavor worthwhile. I have grown to be a better public speaker and a better mathematician through the process of teaching. I shall strive to continue improving in all aspects of my mathematical career, especially as a teacher of one of the most complex and brilliant products of civilization.