

Jung-Ha An: Statement of Teaching

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1 Introduction

As an applied mathematician, mathematical education is an important aspect of practicing mathematics by connecting mathematical theory with real-life applications in the classroom. I have been devoted to teaching since my graduate training, and endeavor to conduct my teaching in a thoughtful, humorous and comprehensive manner. Included below is both my teaching statement and concise summaries of my prior experience, awards, and teaching related publications along with my future goals. May this information serve to give insight into what I consider so important about modern mathematical pedagogy.

2 Teaching Philosophy; True Teaching is More than Instruction

Throughout higher education there are many dedicated instructors who repeat material to their students, but how many actually teach? Teaching is much more than just the Socratic Method; it involves interaction between instructor and student and allows for a true exchange of ideas. What characteristics does one need to have to become a good teacher? Good teachers share many common traits, including mastery of subject, course preparation, verbal interaction using humor, flexibility, interaction as a true mentor, attentiveness to additional office instruction, connection between class material and every day application, and good follow-up.

The mathematics classes that I work with can become flights of the imagination where students see how rockets fly, populations grow, and infinity is revealed. Or they can become stale meetings filled with memorization of endless formulas and derivative tables. The difference between these two extremes is often a motivated and thoughtful teacher. I believe that the best way to learn and gain mastery of a topic is by teaching it. Interacting with students and handling difficult questions requires preparation by thorough review of the material and incorporation into a flexible lesson plan. Any good teacher is one who has taken the time to make sure that he/she understands the material completely before entering to the classroom.

Preparation and planning play a major role in any positive learning experience. A good teacher not only knows the subject material, but also understands the importance of delivering the knowledge to students effectively. Rather than simply show up to answer potential homework or test questions, I try to cover difficult points and instill students with some of the more real-world aspects of mathematics including mathematical physics, statistics, probabilities, game theory, optimization, and financial mathematics. This preparation also extends past regular class hours, as I commonly work with students during special classes where I hold review and practice test sessions with the study list handout. This handout gives students a good idea of how difficult the actual test will be and also raises their confidence.

The most important part of teaching actually comes during class experience itself. In the classroom setting, I use verbal questioning to play give and take with my students. I withhold some of the answers

and see if they can finish a problem in their own unique way. I question and I cajole. I pick on bored and active students alike and I aim to keep everyone involved in the learning process. I also joke with my students and try to use humor as my ally. I often start class with a funny story, fable, or something of humor that has happened at the university. This sharing allows everyone to relax and to discover that there can be funny aspects even deep within seemingly Augean equations. I endeavor to give my students various projects which relate to calculus problems common in daily life and ask them to present similar problems. Their results are often interesting and creative. I believe that these types of projects give my students an opportunity to think about the usefulness and importance of mathematics in everyday life.

I understand that people come to my class with many different backgrounds and experiences. It is of prime importance for an instructor to have flexibility in his/her teaching to relate to students of various upbringings. Some students struggle at every step while others sail through almost effortlessly. I believe that people learn at their own level and I try to work hard with those students who have difficulty with the concepts. I understand the challenges that sometimes face minority or disadvantaged students and I make sure that my course does not add to their burdens. As a female minority teacher myself, I hopefully provide a role-model for many diverse students who might become interested in a career in mathematics.

Many students at the California State University, Stanislaus are the first in their family to attempt a university level education. They often live locally with their families and sometimes experience quite difficult life challenges. In addition to work as a lecturer in the classroom, I strive towards being an able mentor for them. Therefore, when they run into difficulty or need advice that they could not easily obtain at home, I try to act as a sound mentor with the intention of enabling them to overcome their hurdles. I hope that my experience and a compassionate attitude may help to give them guidance that might ordinarily be unavailable elsewhere.

My teaching experience prior to my current position came during my doctoral studies at the University of Florida as a teaching assistant. There, I often held extra office hours for test review and homework inspection and since most of them had the primary role of being only students, attendance was often high. After one semester teaching at the California State University, Stanislaus, I have come to realize that many students here have different backgrounds. They often have full-time jobs and even families of their own. They have many roles and commitments that take place outside of the university. And it is almost impossible for me to schedule extra help sessions outside of regular class hours with many students. Therefore, instead of applying previous teaching methods, it is necessary for me to come up with new ways to maximize the effectiveness of lectures delivered from the classroom. One method that I currently employ, is to communicate through the Blackboard system online. This enables me to share information with students beyond the normal temporal restrictions of the classroom. In addition, I usually hold special online test review sessions before most major exams.

In each class, I push my students to work on one real-life application project, which consists of applied physics or simple engineering problems related to the current class material. This semester, I extended this project to include a class presentation phase as well. This allows all students to become involved and in turn makes everyone more engaged in the learning process. The goal of this project is mainly twofold; It is my intention that they realize how mathematics is so often applied to our daily lives. With the hope that this imparts to them more motivation and encouragement for learning core mathematical concepts which underpin so much of our modern technology. I also want them to understand how those concepts were initiated. Through this process, they will gain the confidence to see mathematics as a crucial and interesting subject, rather than simply as a list of facts to be memorized or obtuse equations to be learned for an exam.

I believe that one of the best qualities a teacher can possess is the ability to connect to students who clearly face challenges inside the classroom and whose needs cannot always be through office hours. For

me, this means the availability of special help sessions, and conducting test preparation groups. Students feel so much better if they have the opportunity to come in for a group discussion of test topics three or four days before an exam. The confidence they can gain through one on one example problems and individual attention often means the difference between motivation and apathy.

For me, teaching is therefore, much more than a simple repeating of facts. It involves preparation, interaction, and follow-up. It is values cajoling students with humor, or showing them how AIDS might be fought in the future through variational calculus. It involves displaying to students the wonderment involved in math and making them feel that even if mathematics is not their fondest subject, they still will have a good time. Hopefully, everyone comes away having learned something. My students have taken their first step into the exciting world of mathematics, and in the end, I have become a better teacher.

3 Teaching Experiences

My teaching experiences have primarily come from the instruction of undergraduate students at the University of Florida as a teaching assistant and currently, as an assistant professor at the California State University, Stanislaus. I have taught various undergraduate mathematical courses to roughly 2500 students, including many from diverse and multi-cultural backgrounds. In addition, I was an Upward Bound Program instructor from 2001 to 2002 at the University of Florida, a faculty instructor at the Preparing Women for Mathematical Modeling Robotics (PWMMR) Summer Program in 2008, and at the Financial Awareness Means Equity (FAME) Summer Program in 2011 at the California State University, Stanislaus.

The following is the brief description of courses taught:

- 2007 - Present: Instructor in Intermediate Algebra for Math/Science (MATH 0110), College Algebra (MATH 1070), Trigonometry (MATH 1080), Precalculus (MATH 1100), Finite Mathematics (MATH 1500), Statistics for Decision Making (MATH 1610), Calculus with Applications I (MATH 1910), Introduction to Differential Equations (MATH 2460), Linear Algebra (MATH 2530), Geometry for Teachers (MATH 3030), Applied Mathematical Models (MATH 3350), and Complex Variables (MATH 4600) Courses at the Department of Mathematics, California State University, Stanislaus
- 1999 - 2005: Lecturer and Teaching Assistant in Trigonometry (MAC1114), Precalculus (MAC1147), Survey of Calculus (MAC 2233), Analytic Geometry and Calculus I (MAC 2311), Analytic Geometry and Calculus II (MAC 2312), and Elementary Differential Equations (MAP 2302) Courses at the University of Florida
- 2001 - 2002: Upward Bound Program Instructor at the University of Florida
- 1999 - 2005: Over Thirty Privately Tutored American Students
- 1996 - 1999: Extensive Teaching Experience in South Korea

4 Teaching Award

Anonymous teaching evaluations from my students over the years have been consistently enthusiastic, stressing my knowledge of the material, accessibility, extra help for test preparation, and effectiveness in teaching. This hard work was rewarded with the presentation of an Excellence in Teaching Award in March, 2003 and March, 2005 by the department of mathematics during my doctoral studies. In addition, I received

in April of 2005, the Graduate Student Teaching Award (University-wide) from the University of Florida. This is awarded to exactly twenty teaching assistants per year, from a pool of roughly 2500, and is based on nomination through the department with a faculty committee making the final decisions.

5 Published Articles Concerning Pedagogy

“Various Elements for the Effective Teaching [1]” and “Mathematical Modeling Using Difference Equations [2]” reflect my classroom instruction techniques and mentoring activities.

6 Future Educational Directions

My long-term educational goal is to increase the role of underrepresented populations in biotechnology and my short-term educational goal is to create a comprehensive and interdisciplinary research-based and industry-collaborative mentoring program. To obtain my short-term educational goal, I plan to pursue implementing the following objectives: 1) To develop a curriculum of applied mathematical modeling classes which also touch on my research specialty in imaging and use mathematical software including Matlab to conduct numerical computations; 2) To generate a comprehensive and interdisciplinary research-based mentoring program for students, especially targeting underrepresented students, with an industry based partner to create internship opportunities for students at the partnered sponsor.

References

- [1] An, J.: “Various Elements for the Effective Teaching,” Faculty Voices 6, California State University, Stanislaus, 2008 (2008) 9–11
- [2] An, J.: “Mathematical Modeling Using Difference Equations,” Journal of Central California Mathematics Project, 2010 (2010) 22–27