

Teaching Statement

Antar Bandyopadhyay

Philosophy : To me teaching is an integral part of academic life. Coming from a family where both my parents are professors of Physics, I learned to appreciate and value the hard work it requires. The willingness of a teacher to give his/her expertise to the students without expecting to get anything in return, also made me admire academic community.

One part of my experience as a PhD student at the University of California, Berkeley which I appreciated a lot, was the opportunity to work as a *graduate student instructor* for various undergraduate and graduate courses in Probability Theory and Statistics, and later becoming instructor for an undergraduate course in Probability Theory. These experience have not only helped me to develop my own teaching style but, also helped me to see how various concepts of basic Probability Theory fit together. I think the various stages we go through in doing research, the questions we ask, are very parallel to what a student goes through in trying to learn a new subject for the first time. Thus in my believe good teaching skills help to develop good intuition for a subject which in turn helps to do good research.

Experiences : Teaching Undergraduate Courses : In Spring 1999, I was assigned as a *Graduate Student Instructor (GSI)* for Stat-101 and Stat-134 courses. That was my first ever formal experience with teaching. Stat-101 and Stat-134 are upper division introductory courses on basic Probability Theory. The students were from very different backgrounds and interests. Apart from Mathematics and Statistics majors, there were students who were planning to do Electrical, Mechanical and Civil Engineering, Computer Science, Operational Research, Physics, Biology and other Bio-Sciences, Economics and other Social Sciences. It was simply a challenge to work with this diverse group with the aim of motivating and helping them with their study of basic Probability Theory. My involvement with the course was to lead weekly discussion hours, holding office hours to help students with problems, and also to help the instructor in charge to grade and set exams and homework problems. Of course it was the discussion hours and office hours which were the most exciting part of the job.

Being a complete beginner, I took a very simple style of teaching in the discussion hours. Rather than going over the concepts as abstract mathematical facts, I used to lead the discussions with some simple but interesting examples where the concepts would be used as important tools. This process not only helped the students to understand the concepts better but also, made the discussions more interactive and informal. The office hours were much trickier though, since the students used to come with their very specific questions. I made a rule of not giving a direct answer, but letting the students talk through what they thought would be a way to answer their own questions. It gave them more confidence and better understanding of the course material. By the end of the semester it was clear to me, that my methods were working. This fact became more transparent after seeing the overall good performance of my students. A year later in Spring 2000, I was again assigned as GSI for the same courses. This time I was more confident about my teaching and applied my previous methods which were again proved to be successful.

In Fall 1999, I worked as GSI for Stat-20 course. This was a lower division course on basic concepts of Statistics and Probability Theory. We avoided symbolic manipulations as much as possible, and worked through various interesting examples. My main teaching style for this course was to draw simple pictures to explain the concepts.

Teaching Graduate Courses : In both Fall 2000 and 2001, I worked as GSI for Stat-205A, the graduate course on measure theoretic probability. Teaching a graduate course is much different from teaching an undergraduate course. In an undergraduate course one mainly teaches the basic and hence the most important concepts. Moreover, the students are also more enthusiastic to learn things which are not directly related to their own interests. So I think it is much easier for a good teacher to motivate the students while teaching an undergraduate course. While in a graduate course like Stat-205A one learns some non-trivial classical probability results, which may not look very appealing to

a student who does not come with an interest in abstract Mathematics. At the same time Stat-205A gets enrollments from students of various different disciplines with their own focused interests. It was a challenging exercise to try to motivate this diverse group that the study of Probability Theory from an abstract viewpoint is important and useful for them.

My new teaching approach was to treat the sections as though they were new language study sessions. The most important part was to make the students realize that what they were learning was not just some abstract nonsense but, some part of an universal language, which would give them necessary skills to “communicate” among themselves irrespective of their backgrounds and interests. In every session I used to lead the discussion by pointing out various important interpretations and applications of some purely Mathematical concepts or problems. This automatically used to bring some spontaneous responses from the students which almost always ended in a debate among them in the language of Mathematics. This way not only they started “talking” in Mathematics but, while doing so, they also started appreciating the need of this rather precise language.

It was quite apparent from the great enthusiasm with which the students participated in the discussions, that my new approach was quite effective and helpful. Also, I found by meeting students individually in my office hours that they were pretty happy with this new learning experience. Because of this success the Department of Statistics nominated me for the *Outstanding GSI Award*. I received the award from the GSI Center of the Graduate Division, University of California, Berkeley on May 2002. Moreover as a recognition of my successful new teaching style the GSI center also awarded me the *Teaching Effectiveness Award, 2002*, based on my essay “Mathematics : The Universal Language of Science.”

Teaching as an instructor with full responsibility : In Fall 2002, with great excitement I found that the department had assigned me as the instructor in charge for Stat-134 course. This was definitely the most exciting teaching experience of my career so far. All my previous experience as GSI helped me a lot to design the course. Still I have to admit that it was completely different than just being a GSI and working under the guidance of an experienced professor. This time my duties not only included going to sections and helping students with their problems but, actually designing, lecturing, and planning everything about the course on my own. Throughout the semester I followed my earlier simple style of introducing new concepts through motivating examples, thus making the lectures as interactive and informal as possible. Along with that this time while lecturing or holding office hours, I also explained the necessity of having formal Mathematical treatment of some the concepts. With no surprise I found that the students never objected to doing Mathematics after they have understood the concepts well. When the semester was over this time I was a little apprehensive, after all this was one truly great experience I had, and I wanted to see the best of it. Finally I was thrilled to see the end semester course evaluation from students, not only my over all performance was rated excellent, I got a median score of 6 out of 7, but also I received a lot of very good remarks from many students. Naturally I was very pleased and hoped same would be true in my future assignments.

Achievements : To me the best achievements of my teaching are the great comments I have received from the students when they wrote their end semester course evaluations. It was always a great pleasure and satisfaction to see that the students actually felt that my teaching helped them to learn the subject better. I must also say that I learned as much from teaching a course as taking one. Indeed, several times while doing my research I felt that some of the basic concepts may not have been so clear in my mind, if I hadn't had the chance of teaching. I believe, receiving the *Outstanding GSI Award* and *Teaching Effectiveness Award* from the GSI center has given me more confidence on my teaching style. I offer this last anecdote : In Spring 2002, a few months after I finished teaching Stat-205A, I met one of the students, and she told me that she would definitely do another course on probability, if I am teaching one. Certainly, that was one of the best reward I have received in my teaching career so far.