Teaching Philosophy

Samuel Kadziela

I believe that teaching is, most of all, about the end result. When reflecting upon my own experience as a student, I realize that the most memorable teachers I had were the ones who went beyond covering the curriculum. They played a role in shaping and sparking my interests, showed me new directions and possibilities, and advised me regarding my future. They have also given me a good overall understanding of the topic that remained with me long after the details were forgotten. They had an impact on where I am today.

Therefore, my teaching philosophy centers on two fundamental objectives: the impact I want to have on my students, and empowerment. When considering the impact, I am mostly concerned with the long term benefits of the class. For example, how would I want my Calculus student to answer the question "what is a derivative?", asked three months after the final exam? I don't want the answer to be an example of how to differentiate a polynomial. I would be happy, though, with the following: "well, I don't remember the exact definition, but the idea is ...". Thus, I strive to convey to my students a clear understanding of the key concepts, not just their defining properties or the mechanics of their computation. This approach helps me to focus on how to structure the class and what to include in my presentations. In this way, each lecture becomes more than a mere check mark on the curriculum sheet. It is a necessary piece of a larger picture, or a goal, that I as the teacher strive toward, and my class is in expectation of. I feel that I am successful when my students understand how today's lecture fits in the larger framework of the subject we are studying.

My second objective as an instructor is empowerment. A class in mathematics provides the student with a bag of tools, which, at least at their conception, were devised to solve real problems or shed light upon more complicated objects. Thus, the information I teach is useful, and it is essential that the student understands the material. However, I believe that empowerment occurs mostly when the student grasps the potential of the material, not just the material. Hence, my role extends beyond the duties of the classroom. It also involves advice about future classes. It includes showing to the students where to apply the tools learned in my class, and what other tools they will need to fulfill their goals. This is particularly important to early undergraduates, who are often undecided about the direction of their education. They may have an idea of what they want to do, but not how to get there. I hope that when they walk away from my class, they will have gained an understanding of where to use the information, and have a more focused idea of what to do next. Thus, both of my objectives relate to the same issue: what will my students carry out of the class, and how will it impact their lives and the choices they make.

The implementation of this teaching philosophy starts long before I step into the classroom. It begins with my general approach to preparing the lectures. Since my students have access to a great exposition of the material from the textbook, I perceive my role at the blackboard to be different from restating the theorems. After all, what makes one fit to be a professor is not just a handle on the material, but a broader perspective on the subject, its applications, and relation to other fields. Therefore, to be effective, I first try to get to know the needs of my students and detect their level of understanding of mathematics. Then I present the new material by relating it to what they already know, perhaps as a generalization of a method or concept to which they are accustomed. I also try to motivate the need for the new technique, and stress the type of new problems to which it applies.

Another important facet of preparing the lectures is finding real life applications of the material. Such applications have a very wide range of benefits. First of all, they keep the students interested, and sometimes even excited about what they are learning. This atmosphere makes teaching very enjoyable. Secondly, they form a great memorization tool, as now the student sees the new concept in the context of an application that he or she is familiar with. Often times, an obstruction to understanding something new is that it is detached and unmotivated. The problem is not with the concept, but with why to learn the concept. Real life examples remove this obstruction. Such examples may be harder to find for the more advanced and abstract courses, but so far I have had great experiences with this approach. Often, when I have drawn examples from cryptography, computer science or basic physics, I have sparked the interest of many students who seemed unmotivated about the class before. It created discussions outside of the classroom, and advice about future courses. I think that such examples, especially when drawn from my field of research, are a fantastic platform for beginning various student-teacher research projects.

I also believe that the style of presentation plays a large role in learning. For example, humor, in a proper balance, is a great tool to relax the atmosphere and keep the class enjoyable. Enthusiasm on the teacher's part projects onto the students, and highlights the importance of the material. I think that such aspects of public speaking as naturalness, fluency, gestures and conversational manner add greatly to the presentation, and I have worked for a long time on cultivating them. In such a comfortable and relaxed atmosphere, I find it easier to solicit questions, level with the students, and as a result, see them more frequently in my office hours.

One of the main challenges I find in teaching is to break the intimidation factor that restricts the free flow of questions. Overcoming this will probably always be a work in progress, but certainly relaxing the class atmosphere has helped a lot. In addition, when I feel that an important facet of a problem is being overlooked, and the right questions are not being asked, I like in turn to ask the class questions that lead up to the conclusion I want them to make. Another teaching tactic of which I am a strong advocate and regularly implement in my classroom is group work. I prepare in advance interesting but reasonably difficult problems, and ask the class to work on them in small groups. The point is to encourage peer to peer discussions, where the intimidation factor is significantly smaller. The only requirement of the group is that each member have equal level of understanding of the solution, as I may call upon any one to present it at the board. If the nature of the class does not allow for such group work, I have also in the past given group labs to be worked on outside of the class. In either case, I found that such peer interaction raises the comfort level of each individual with the rest of the class, and promotes questions as well.

I thoroughly enjoy teaching, and gain personal satisfaction from seeing my students become excited about math. On more than one occasion, I have been placed on the list of teachers ranked as excellent by their students, even with outstanding ratings. I take that honor as evidence that I have had a positive impact, at least on a portion of my class. At the same time, it is abundantly clear to me that I am not an expert in pedagogy either. There will always be places for improvement, and I welcome the feedback from my students, colleagues and mentors. I look forward to the many years of perfecting this skill.