Teaching statement
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When I came to United States from Iran, there were lots of things that I was fascinated by them. Among these amazingly different things, methods of teaching was one of the most important. I did my undergraduate and Masters studies at Sharif University of Technology in Iran and then I joined the PhD program in Computer Science at Dartmouth College. At Dartmouth, I enjoyed all the classes I took and learned more easily compared to Sharif.

In Dartmouth, I TAed for several courses, I took a teaching seminar class and I taught a course by myself.

The TAing experience in Dartmouth was very valuable for me specially when I TAed for “Computer Architecture” and “Discrete Math”.

I TAed for Computer Architecture three times and on Summer 2012, the instructor for that course was a visiting professor and it was her first time teaching the course. We cooperated a lot in preparing this course. When preparing or grading homework, we discussed and kept track of misunderstandings or confusions that might retained from the lectures.

I also TAed for Discrete Math two times. The class is usually a very populated class with around sixty students. I held special sessions for students who needed more assistance.

As I said, I was fascinated by the amount of time and effort Dartmouth professors would spend to help students in learning, and at the same time I tried to be as responsible when being a TA. I would spend a lot of time helping students. I sometimes had extra office hours for them and helped them for hours when I was showing the students how they can debug their code or circuit.

My learning and TAing experiences at Dartmouth made me eager to get more experienced in teaching. I decided to teach a class in Dartmouth and our chair was kind enough to accept my request. In Winter 2014, I was assigned to teach Discrete Math which is a mandatory course for computer science majors.

To get more prepared for teaching Discrete math, I took the “Teaching Seminar” course in the Dartmouth Mathematics Department. In this course, I learned a lot about methods of teaching. The most helpful part of the course was when we had two weeks of math camp for high school students which provided a good opportunity for me to use what I learned.

In the first week we taught the high school students Probability Theory and in the second one we pursued Knot Theory. The two main goals that we had in these two weeks were 1) Helping the students to enjoy beauty of Math and be curious about Math. 2) Helping the students to appreciate group work and enjoy it. We prepared our lesson plans so that we could full these goals. In probability week, we had a Monty Hall show, card game sessions, Deal or No Deal games, and so on, to evoke students’ curiosity and let them enjoy the math that is hidden in their everyday lives. In Knot Theory week, we started with human knot games, we provided lots of pipe cleaners, cords, and bicycle chains for them to play around with knots, and then after we taught them enough math we talked about the difficulty of the problems in Knot Theory and the fact that Knot Theory
can be used in cryptographic applications such as bit coins. We talked about the applications in Biology and Chemistry, which turned out to be very amazing for the students. We planned most of the lessons with group work. Specifically, we had some worksheets that we wanted the students to work on together. In order to facilitate group work, we used several techniques: 1) Assigning the students who we knew would work better together to the same group. 2) Assigning duties in each group such that all of the group members would work equally. 3) Letting them choose their own group, and then supervising the groups so that we could make sure the groups were working well.

We evaluated by the evaluation plans that we designed as a team. Overall we succeeded in all our evaluations and the results were satisfactory.

The math camp was a very good experience, and provided me with better insight about how I can prepare a more successful lesson plan. The following is a list of useful experiences from Math camp.

I sometimes overestimated my class’s understanding, because there were plenty of students who would get the material faster than others. I tried to overcome this by 1) Making my lesson plan more interactive and calling on different students, especially those who talked less and making sure there is no confusion in the discussion. 2) Having individual and written evaluations and examining them during the break or after the class, to see whether the subject needs to be discussed again this class. (This can be done through homework in college classes.)

As a learner, I was always amazed by solving complicated problems. As a teacher, I think solving complicated problems in class will trigger the students curiosity, interest, and fascination. However, most of the material is usually taught to the students by using simple examples. As a result, bringing complicated problems to class without a well prepared plan will cause a lot of confusions.

I think if we want to attract student attention to complicated problems an effective plan will be: 1) Teaching the students the concept using simple examples. 2) Clarifying the subtleties and the exceptional cases. 3) Bringing hard but interesting problems to their attention (some problems that are interesting to them by nature. For example, card game for Probability ) and letting them to think about it. (Making them a little bit confused.) 4) Breaking the problems to simpler parts that they can solve. 5) Helping them to integrate the simpler results and to use the simpler results to solve the more complicated problems. 6) Reminding them how fascinating it was to solve such a hard problem.

I think the following plan when teaching a new and important concept will be effective: 1) Looking for some prior knowledge that can be connected to the new knowledge. Asking the students’ ideas about the concept, seeing what they already know or whether they have any false information or confusion. 2) First explaining the material intuitively building on their prior knowledge then explaining it rigorously. 3) Coming back to the material again and again throughout the term (probably from a different point of view) and letting the students recap the fundamental ideas over and over. 4) Including questions in the homework related to the material several times in the term. (Provide opportunities that students will review the material, especially if the material will be needed in the next lectures.)

I employed these techniques when I taught my own course in Dartmouth. Discrete math is a little bit challenging for computer science majors since most of them are not really comfortable with mathematical reasoning. In my class, I tried to be available to my students all the time and make the class interactive and lively. I made asking questions easy for students. I gave them a lot of homework and helped them to acquire problem solving skills in my office hours. I used a lot of examples that are motivated from computer science to the material accessible and interesting to students.

In future my main goal in teaching will be trying to fascinate the students and make them inter-
ested in the subject such that they will be curious enough to read about the material independently and maybe even think about research problems related to the subject. My main interest will be to teach theory courses that are closer to my own research interests such as Discrete Math, Designing Algorithms and Data Structures, Combinatorics, Theory of Computation, Complexity Theory, Theory of Languages and Automata, etc.

My main pedagogical goal will be to make my class lively by introducing interesting material. However, I believe talking about interesting parts of the subject will not be appealing unless all of the students have already developed a good understanding of the material. Therefore, my plan will be to make sure all the class has grasped the material as well as I expected them to and then attract their attention by talking about interesting and complicated problems and how they are specially interesting to me. I will let the students enjoy solving complicated problems using their knowledge and even teaching them to be capable of generalizing their knowledge.

Finally, I believe showing responsibility in my teaching duties is a good lesson for the students to be responsible in their own duties. Making the students responsible learners will help them work better in the course, and also it will be a good practice for them to be responsible in their future jobs.