

Teaching Statement

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There is a large number of teachers on both sides of my family, and my father would once in a while talk about what makes a good teacher. The one thing that made a deep impression in my childhood was his statement:

A teacher needs three necessary qualities: knowledge of the subject; knowledge of how to teach; and the will to teach others. Take away any one of them, and you will not have a good teacher.

This statement of my father always lives in my mind as I develop myself as a teacher and as I think about the teachers I have had. One of my favorite comments I have received from my students on my instructor evaluation forms only underlined my father's statement for me:

Knowledge and the ability to convey that knowledge = good teacher.

The statement only takes care of the necessary conditions to be a good teacher. What is sufficient to be a good teacher? My philosophy on this is that I view the word 'teacher' as a synonym for 'guide'. I always aim to guide my students towards an understanding, a discovery and a realization.

Let me illustrate how I put this philosophy into action by the following example, taken from Multivariable Calculus -- a class that I have taught six times at University of Illinois.

My typical lecture starts not with a definition but a situation. Primary mode of learning throughout the ages has been, first, exposure to a phenomenon or a problem, then an abstraction or generalization of the situation, coming up with tools that might help in the general or abstract situation and then going back to the actual setting with these tools, iterating this process if improvement is needed or the situation changes. This is the way I like to structure my lectures as well. I start with a problem and how it may be solved in a limited sense. Then, we look at the definitions that set up the general problem situation, followed by a motivation for some of the ideas, and then we do some examples. For example, I usually have explored some properties of the vector of partial derivatives (i.e. gradients) using very basic geometric understanding of graphs of functions of several variables with my students before I have uttered the word "gradient" or its definition. This way, the students get very familiar with these basic concepts without initially having to worry about definitions and notations. Later, I introduce the definition and terminology, by saying that we might as well give a name to this object or concept. And this is, indeed, the way mathematics developed.

When discussing the method of Lagrange multipliers, I start with a drawing on the board of the contour of an island and a ship in the sea. The ship has been asked to head to the point on the island's coast closest to the current position of the ship. I remind them of the common scene in maritime movies where the ship captain does this by the method of concentric circles centered at the position of the ship, and then I draw a bunch of concentric circles. Within 15 minutes of discussion, the students have discovered and more or less verbalized the method of Lagrange multipliers without me having to utter almost anything. This allows my students to work out a novel problem on their own, which ultimately leads to better and deeper understanding of material on their part.

As a guide, I view myself as having some portion of a leadership role. As a responsible leader would, I evaluate my success by the success of my students. When the situation calls for it, I go beyond the usual duties to make sure that students succeed in learning the material. The three essential components of my teaching ethos are: (i) aiming in my lecture to help them put the knowledge in a nice matrix of thoughts and ideas; (ii) having exams and assignments that gives them the ability to exercise the higher organization of their knowledge and to employ the ideas they have learned more creatively; (iii) along with my help with the material, trying to make sure that they are learning to help themselves by acquiring better study and learning habits.

For me the joy of explaining something to somebody never wears out. The spark of insight that arises in the student after the teacher has explained something in a very intuitive manner is the ultimate reward for the efforts of teaching. Since my middle school when I was a peer tutor through my current university teaching, I always try to improve my teaching methods and every time I teach I learn something new, both in the material itself and in the art and science of teaching.

[For documents that point to my effectiveness as a teacher, visit
<http://www.math.uiuc.edu/~nsheikh/teaching>]