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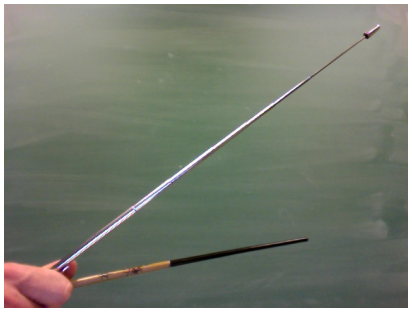
Teaching Statement

When I teach, I want my students to become confident in their ability to do mathematics. How do I pursue this goal?

First, I make myself accessible. This means that I learn the names of my students, I arrive to class early to answer questions as they trickle in, and I end each class by saying "That's it for today, but please stick around if you have more questions." My students are more confident knowing I'm in their corner.

Second, we discuss the pictures behind a concept. Students sometimes feel that even though they can solve the homework, they don't fully understand what is going on. I think that spending time on pictures helps here. For example, consider the equation

$$\mathbf{v} \cdot \mathbf{w} = \|\mathbf{v}\|\|\mathbf{w}\| \cos\theta,$$



where θ is the angle between vectors $\mathbf{v}$ and $\mathbf{w}$. To discuss this equation, I come to class armed with an extendable pointer and a chopstick (pictured). The pointer is vector $\mathbf{v}$, the chopstick is vector $\mathbf{w}$, and my fist is the origin. We discuss how the dot product changes as I vary the angle between the vectors, or as I vary the length of vector $\mathbf{v}$ by extending the pointer. My students are more confident in a topic after we discuss the pictures behind it.

Third, I make our class a conversation. Talking about math can be intimidating for students at first, so joining a mathematical discussion improves their confidence (while passively listening to me talk does not). How do I invite conversation in class? Knowing my students' names is a necessary first step. I give the students frequent opportunities to speak by asking recall questions, such as: "Subset $V \subset \mathbb{R}^n$ is a linear subspace if ... do you remember any of the three conditions?" I also use paradoxical questions, such as: "If $S = \{\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_3}\}$ is a linearly dependent set, then can every vector in S be written as a linear combination of the other two?" Paradoxical questions lead to longer discussions as the students try to reconcile their intuition with an answer they weren't expecting.

Fourth, I prepare my board work carefully. I want my board to read like a terse set of notes, but I don't want to spend all of class time writing furiously. Therefore I plan succinct yet clear language for my board work ahead of time. I believe my students work harder for me after observing how diligently I prepare for them.

I've enjoyed my role as a teacher thus far, and I look forward to future opportunities to teach.

Thank you,
Henry Adams