

## Wes Weimer - Statement of Teaching Philosophy

By this point I've had about a dozen college math courses, but the math teacher who stands out the most in my mind is the one who taught me high school calculus. Among other things, she had thought puzzles on our desks every morning when we came in, she championed the use of calculators during a period of heavy pressure against them, and she brought in sunflowers to help explain infinite series and Fibonacci numbers. She was a teacher who understood the importance of using different kinds of explanations for different students, and that is one of the most important lessons about teaching that I have retained. With that in mind, I'll talk a bit about how I teach, why I like to teach, and perhaps even why you should trust me to teach your students.

*"Boredom will always remain the greatest enemy of school disciplines." -- Fritz Redl*

My personal experience has shown me that not everyone learns the same way and that it's not always easy to predict which approach will work well with a particular student.

When I'm teaching, I spend quite a bit of time using analogies. I compare register allocation to deciding when to wash the mixing bowls and cutting boards while cooking a big meal. Programming with exceptions is like watching a movie with a surprise ending and frequent plot twists. Sending a packet on an IP network is like mailing a postcard. I'll even use multiple metaphors for the same idea when I can find them. It's rare that a single explanation will work for every student in the class, but if I have two or three ways of explaining something I'll have almost everyone covered.

I'm not above using theatrics and I'm not below formal proofs. I'm not averse to using humor -- a laughing (or groaning) student is paying attention. I use voice inflection, I walk around, I overact. More importantly, however, I do whatever it takes until the students (and not just the smart ones in the front) are asking their own questions instead of answering mine. Responding to questions is probably my favorite part of lecturing, but I'll move something to office hours rather than delay the class for an explanation that only helps one student.

*"We cannot hold a torch to light another's path without brightening our own." -- Ben Sweetland*

For many instructors the best part of teaching occurs when a student finally understands a difficult concept. I sometimes wish I were that altruistic. For me the twin best parts of teaching are understanding the material and seeing the big picture. Teaching someone else forces me to have a firm grasp on my own knowledge of the subject. I put quite a bit of stock in structure, layout and motivation. What things do we need to know before we can understand dataflow analysis? For what purpose am I talking about finite height lattices? Where are we and where are we going? Many times I've found that the process of laying something out so that others can understand it gives me a better understanding of it. I count it as a strong success when I see one student successfully explaining a concept to another student using the occasional word or bit of organization from my lecture. I can feel confident that such a teaching student has really learned the material.

*"The aim of education should be to teach us rather how to think, than what to think - rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with thoughts of other men." -- Bill Beattie*

Much has been made of teaching students how to solve problems instead of teaching them how to solve a particular problem. I can't claim that I spend all of my lecture time teaching students how to think -- much of teaching *parsing* is, in fact, teaching *parsing*, and not teaching critical thinking. That said, I do my best to encourage students in that direction by making a habit of soliciting advice on how to solve a problem, even when the solution is "known." I've found that students tend to understand a technique better if I highlight how similar it is to the one they came up with and that they tend to have a better intuition for the next related problem as well.

*"One must learn by doing the thing, for though you think you know it, you have no certainty until you try." -- Aristotle*

I spent one semester as a TA for our undergraduate compilers class. On the student evaluations I received a 4.8 out of 5, tied for the highest score in ten years. I received thank-you gifts from students after the course was over. A recent guest lecture I gave on software engineering garnered this anonymous feedback: "grad student lecture on exceptions was both informative and entertaining. His style of lecturing is not boring." It's difficult to get a good assessment of office hours and advising, but I will mention that for the last few years I've offered a practice version of our department's oral examination for grad students. Others have noted that the practice exam is a strong predictor for the actual exam, suggesting that in one-on-one meetings with students I can tell what they really understand what they don't.

*"Science is what you know. Philosophy is what you don't know." -- Bertrand Russell*

Ultimately, with a statement of teaching philosophy I can only suggest that my past experience will shed light on my future teaching. I teach with analogies and by getting students to ask questions. I like teaching because of the challenges and rewards in laying out, organizing and delivering the material. I encourage students to think through their own solutions to problems. When given the chance to teach, I've done well. I look forward to having more such opportunities in the future.