

## Teaching Philosophy

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Thomas Edison famously said that genius is one percent inspiration and 99 percent perspiration. What he did not say, presumably because it wouldn't surprise anyone, is that inspiration comes first. However brief a moment in time it may represent, the proverbial flash of inspiration is what motivates and gives meaning to all the subsequent labor and sweat; it provides the vision or *telos* that distinguishes brilliance from competence, dedication from drudgery, and true intellectual accomplishment from work that is soon forgotten.

Both inspiration and perspiration are necessary, and neither alone sufficient, for attaining academic excellence in a college education. Yet while we as educators tend to have fairly well understood methods for fostering diligence in studying, inspiration is a more subtle and elusive goal: you can invite the muse, but you cannot force her. The heart of my teaching philosophy is that, despite this subtlety, it is possible to systematically create conditions that will call inspiration to appear and flourish, and to motivate the efforts that follow. This is what I strive to do in my classroom.

In practice, effective teaching entails three distinct tasks: choosing content, recognizing the cognitive process by which this content can be translated and understood, and directing the personal and social dynamics in the learning environment. When all three elements are addressed effectively, a certain transformation occurs: we might say that the muse visits. Students become eager to learn and apply what they know, and knowledge flows like water downhill.

Selecting content for courses on energy and environment, not unlike other fields, always requires editing curriculum down from a spectrum of interesting and important topics to a smaller number of key ideas that can reasonably be explored within a semester. I select material based on two main criteria: practical necessity and opportunity for fundamental insight. Factual information is necessary if students will use it in their future work but would have difficulty acquiring it on their own outside of class. Fundamental insights include scientific principles and logical reasoning that allow students to understand facts deeply enough so that they could have predicted them, or can re-derive them if they forget. They also include the recognition of context and connections among different pieces of information, which not only enhances memory but embodies the very essence of a liberal arts education. The ultimate connection, of course, is between the abstractions on the board and the students' direct personal experience that imbues it with meaning for them.

To present complex information effectively, I must first dissect the cognitive process by which I myself know and understand it. To me, the single most important practice in preparing academic material is to relentlessly question steps that I might have assumed to be obvious, and recognize they may not be so to the learner. This self-reflective process structures material into logical sequences of concepts building onto another: what, exactly, did I have to know already in order to make sense of the next thing? Finally, attention to the cognitive process serves as a great equalizer of elementary and advanced subjects: from this perspective, it is no less fascinating to teach multiplication than second-order differential equations.

Clarity in substance directs the process of communicating the material. I rely extensively on diverse visual aids, aim to provide tactile experiences whenever possible, make liberal use of analogies, take special care to make assumptions or intermediate steps explicit, and emphasize spelling out technical concepts (including mathematical equations) in clear English language. Though I very much enjoy the aesthetic quality of a good lecture presentation, students

ultimately need to discover knowledge directly by themselves. To this end, I provide them with opportunities to actively make facts and ideas their own. I ask provocative questions, challenge students to consider diverse perspectives on the material, encourage them to question problem boundaries and assumptions, and insist that they listen and talk to each other.

The process of discovery in itself opens the door for the muse. But it can only happen in an unobstructed mental and emotional environment, one that is free of the worries and preoccupations that often get in the way of truly paying attention. My final task as a teacher, then, is to cultivate such a conducive state of mind: individually, and collectively as an ambience in the classroom. In a nutshell, I would describe this conducive state as one of complete intellectual integrity, or a transcendence of the petty and personal into participation with what is true, good, and beautiful.

One surprisingly powerful way to influence students' behavior, and even their internal attitudes, is to model what is expected. I strive to model complete honesty and accountability to my students, while emphasizing the distinction between objective accomplishment and judgment of a person's value. To learn is to establish new synaptic connections in our brains by repeated use; mistakes are simply feedback to guide the iterative process. This perspective makes it possible to relieve students' performance anxieties while at the same time insisting on top academic standards. I set a tone for the learning community by catching the students being good, encouraging appropriate collaboration, and above all maintaining a sense of humor. Finally, I allow time for reflecting upon the larger significance of our work in the classroom. In the moment that a student speaks in class without regard to being evaluated, but with the sincere intention to contribute toward collective benefit, the veil of distraction has been lifted.

When all of these factors fall into place, the classroom becomes a sanctuary that we enter with the expectation of having a positive experience. With this expectation comes the ease of leaving our other 'baggage' behind, being receptive to the aesthetic of thought, and cultivating a sense of joyful pride in our own intellectual process. Combined with the students' intrinsic desire to do good, this experience enables them to derive full meaning from their academic education, and to become inspired for their hard-working contribution as future professionals.