

Kregenow Teaching Philosophy Statement

The population of students that I interact with most often is undergraduate non-science majors taking a Gen Ed science course to fulfill a requirement. I have several overarching goals for all of my GN courses:

1. Demystify science and math. I want to positively affect the attitudes about science and math that my students will pass on to the next generation.
2. Quantitative reasoning more than arithmetic. (But a little arithmetic too.) This will be the last exposure to a quantitative science that most of my students will ever have in their life. I want to do my part to help create a more scientifically and mathematically literate society. I want my students to become more informed consumers of technical information, because they will see more and more of it throughout their lifetimes.
3. Understand the process of science. I want them to understand that science is a process that involves gathering evidence, making predictions, and constantly testing those predictions. An explanation must be falsifiable to qualify as scientific so they can distinguish pseudoscience from real science.

Here are some philosophies and guiding principles that inform the choices I make in my teaching.

1. Our students aren't us. Not even us thirty years ago. The vast majority of them will not pursue PhDs in technical fields. Their motivation, priorities, and interests are different than mine. The way that I learned best and what motivated me won't necessarily work for them, so I have to be ready to use a different approach. Probably multiple different approaches.
2. Their minds are not blank slates. They have a lifetime of experiences and preconceived notions – indeed sometimes misconceptions – about how the world works. Learning cannot be just a one-way transfer of information: I must elicit and lead them to consciously address their prior ideas, so that they can incorporate new knowledge onto that already crowded mental canvas.
3. Appropriately challenge them. If the tasks I give them are too easy, the students will be bored and get no feeling of satisfaction from succeeding. If the tasks are too hard, the students will feel demoralized. I am constantly seeking that sweet spot of appropriately challenging tasks that make them rise to the occasion. And since I have a range of students, I need a range of tasks.
4. Less is more. I make a conscious choice to cover less material in my course – at least my one-shot GN classes, where I have that luxury. If I race through 20 topics in a semester and they only really get 3 at a deep level, then I believe I have failed. But if I only do 10 and they get 8 at a deep level, I have succeeded. Or rather, we have succeeded. Personally, I favor depth and skill development over breadth and exposure.
5. Active engagement improves learning. Telling is not teaching, and hearing is not learning. Learning is an active process. It's not what I do, but what students do that determines their learning. Therefore my job is to provide appropriate activities and an environment that encourages them to engage in the behaviors that make them learn (Ambrose [1]).
6. Learning is a struggle. Struggle is where change happens. Building new brain synapses requires effort, and it is uncomfortable. If they are not uncomfortable, they are not learning. My task is to find and then guide them into that appropriate level of discomfort, then support them to push through it. See item 3 above.
7. Memorization is not real learning. Make them reach for a higher level: applying, synthesizing, criticizing. If all they are doing to study in college is using flashcards, I believe they are wasting their time and money.

Here is a sampling of a few of the many strategies I have developed to help reach my goals.

* Start harder and stricter, and leave room to ease up over the term. Set expectations high. Front load the workload.

* Provide materials that reach to both the top and bottom performing students, a.k.a. differentiated instruction.

* Tell them that memorization is not real learning. I actually give them a short reading assignment on Bloom's taxonomy (Anderson [2]), and ask them to write about how it applies to their particular classes and studying.

* Finally, be transparent. Each semester I am more and more open with the students about why I've set up the class the way I have, e.g. Drawing their names randomly from a hat lets me hear from a representative sample of the class. I make them explain their reasoning to a peer because research shows that articulating your reasoning helps both the speaker and listener understand better. Rather than obfuscate, I tell them how I write exam questions: I take the most-missed homework problems and just change one word or number to make it a new problem. The list goes on. I now share over a dozen of my rationales, when I used to share none. Letting them in on why I make the choices I do will demonstrate that it is not arbitrary, but rather I have thought very hard to create the best learning opportunity possible for them. This helps them buy in and engage in what I'm – no, we're – trying to accomplish.

References

[1] Susan A. Ambrose, Michael W. Bridges, Michele DiPietro, Marsha C. Lovett, Marie K. Norman, *How Learning Works: Seven Research-Based Principles for Smart Teaching*, Jossey-Bass, 2010.

[2] Lorin W. Anderson, David R. Krathwohl, et. AL, *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*, Allyn & Bacon, 2000.