Filling the Toolbox—A Teaching Philosophy

By Michelle Davis

I subscribe to the constructivist view of teaching and learning, that students are responsible for building their own knowledge base. If students ask questions and seek out the answers themselves, they will learn and understand on a deeper level. The teacher's role in constructivist learning is to provide the tools necessary to answer questions, but let the students form their own questions and discover the answers to those questions themselves.

Two such tools crucial in today's world are communication and problem solving. Separately, each is an important skill; when combined, these skills allow a person to dramatically affect his or her environment. No single class (or teacher) can turn a poor communicator into an effective communicator or a herd-following sheep into Albert Einstein, but every little step helps. In my classes, I help students improve their ability to communicate and think critically through short write-to-learn assignments. Effective writing assignments demonstrate both the process and product of critical thinking, as students often learn more about the complex issues involved in a problem while they are writing their views on it. Additionally, writing often helps clarify a difficult reading assignment. To help students comprehend scientific-style papers, I have each student write a four-sentence summary, with one sentence each for the paper's introduction, methods, results, and discussion, plus four additional questions that they had about the paper. Succinctly and accurately summarizing is a valuable skill that both demonstrates and improves critical thinking skills.

I also believe that most students learn by doing, so my classes incorporate many hands-on examples, case studies, and problem-based assignments. Changing a flat tire seemed easy when your driver's education instructor told you how to do it; only by trying to change a tire on the side of the road can you see all the hidden difficulties and challenges and truly learn how to do it. My classes try to incorporate all the steps of the process. First, I present background information on a topic and offer general guidance and examples, then I let students work on hands-on exercises and, as a class, we discuss their questions. Next, I assign a task or problem for them to complete on their own or as part of a group. The final step, and probably the most important, is the debriefing and discussion following the assignment, where students are able to self-assess their own learning. This stepwise progression of learning teaches fundamental skills while still allowing creativity and independent thought, leading to a deeper understanding of the subject.

Important to me personally, I strive to develop class materials that could serve as a reference in the students' future classes or jobs. There are some classes that I have taken and then never thought about again. Then there are the few select classes from which I still pull out my blue binder of class notes to look things up. In constructivist learning, students learn best when they seek out knowledge. Ideally, this would occur during the semester, but in many cases a certain question or problem does not arise until later. I want students to remember the tools they learned in my classes, even if they forget the specific details.

Therefore, I focus much of my effort on preparing class handouts. All handouts are stand-alone documents, with that day's topics, details from the lecture, and descriptions of the hands-on exercises. By building these detailed handouts with useful information, a complete course will be a personalized, textbook-like reference for the students. At the end of the class, I also give students a CD that has the files of all the handouts, presentations, and exercises from the class. I would love to have one of my classes be in a frequently referenced blue binder on someone's bookshelf.

As the detailed handouts would imply, my classes are relatively structured and organized. Part of each day's handout is a general outline of what we will be discussing, so students can know what is up next. Structure does not have to be confining or constricting; it just lets the students understand the teacher's plan and helps them be involved in the process of their own learning. Structure does not preclude discussion or stifle creativity and critical thinking; it improves them by focusing all minds on a single task or topic.

My handouts and assignments also include additional references, in case the student ever needs to learn more about a specific topic. Teachers often research class topics extensively, but then act like students are on a "need-to-know basis," only giving them some of the information. When I find specific books, articles, or websites that are particularly interesting or applicable to that day's topics, I include those references in the handouts. I feel that this helps students realize that we are *all* going through the learning process. Students sometimes assume that the teacher knows everything, so this simple act helps show them how we learned the material and, more importantly, that we are still in the process of learning it.

I hope to help produce the next generation of leaders, scientists, and engaged citizens. At the end of my classes, students will question and critique research that affects all parts of their lives. They will begin to think independently, forming their own opinions and not always following the crowd. They will think critically, creatively, and logically about how to approach problems, and then apply some of the tools learned in my classes to solve these problems. And if it takes some students a little longer to gain these skills than just the semester that I am their teacher, they will still have the blue binder from my class sitting on their bookshelf, ready to help them discover their own solution.