

## **Using conceptually-based interactive teaching methods at two- year colleges**

Jessica Smay, San Jose City College

### **What strategies have you or your program used to meet one or two of the challenging aspects of teaching at a two-year college?**

One of the main strategies I use to meet several of the challenging aspects of teaching at a two-year college is to use conceptually-based interactive teaching methods. This strategy helps address the issues of 1) lack of resources, 2) teaching a very diverse student body with non-majors, under-prepared students, and students with diverse learning strategies, and 3) keeping the course of introductory Geology fresh and exciting for me and the students.

The conceptually-based interactive methods I use include Lecture Tutorials and Conceptests. Lecture Tutorials are purchased by the students in the form of a workbook they bring to class each day. After I lecture on a topic, I have the students turn to the related page and work in pairs to complete the worksheet. These worksheets focus on misconceptions, helping the students build scientific understanding of the concepts. Conceptests are multiple choice questions included in my PowerPoint lecture where I ask the students to vote on the correct answer, and if necessary discuss their vote with peers and vote again.

During a time when the Physical Sciences Department has minimal funds, it is important to find ways to make the classroom interactive without spending too much money. Neither of these activities cost the school much money (except a small fee to print out voting cards with the letters A B C and D printed on them). Conceptests are frequently used in other schools in conjunction with a clicker system. The voting cards I use are much cheaper, and they are equally effective, giving me feedback about my students' progress and giving the students feedback as to how well they know the material. It is not necessary to purchase an expensive clicker system to do these things.

Without funds to pay graders or TA's, it is difficult to assign extensive homework. These methods help to prepare students for exams and give them the feedback they need to help them determine what they need to study. Because some students prefer being tutored by a fellow student than by the instructor, the interaction between students gives them a chance to get answers to their questions without the need to pay for a TA or tutor.

The student body is extremely diverse at my school (similar to many community colleges), and I have found that the students come in with a wide range of backgrounds, interests and goals. These interactive teaching methods allow the students to use different skills to learn the concepts involved. Depending on the particular Lecture Tutorial or Conceptest, the students may use listening, speaking, writing, sketching, and labeling skills, each of which may help the student learn the concepts better.

The benefits of using these conceptually based interactive methods extend to many different groups of students. Under-prepared students get feedback as to how well they understand the material and what they need to learn. Students who will not major in science have the opportunity to see that science is not memorizing science vocabulary, but is more conceptual. Future teachers may be inspired to use similar techniques when teaching science or any other topics.

The group work also allows the students to bring their own personal background knowledge into the discussions, which enriches the experience in a way I cannot do by lecturing in the front of the class. Recently I had students talk about local superfund sites polluting the groundwater and nearby flood protection structures being built in the downtown area. They were directly involved in projects that relate to geology, so the other students in the class and I all benefited from these discussions. The interactive nature of the class allowed these students to be comfortable with bringing up this information.

As I teach introductory geology for the 25<sup>th</sup> and 26<sup>th</sup> times this fall semester, it is important to continue to convey excitement about the topic to my students. It is easier for me to do this in shorter lectures with interactive breaks in between to avoid the tendency to begin to drone on (or at least that is probably what it sounds like to my students). Activities such as Lecture Tutorials allow me to mingle with my students and get to know them and remind myself that this is the first time these particular students have been introduced to these amazing geological concepts and that these ideas are really exciting!

In summary, teaching with interactive techniques has helped to address the challenges of several of the challenges that may be an issue at a two-year college. The low cost of Lecture Tutorials and Conceptests help reduce the cost of running my classroom, which is important at my community college. The diverse student body benefits from a variety of teaching methods that address their many learning styles. Both my students and I benefit from the way it generates excitement for the topic through discussion and deep thought. I continue to enjoy teaching introductory geology, and based on student feedback, my students really enjoy taking this course.