iClicker

6 Simple Activities That Engage Students in Their Own Learning

Dr. Deb Pires, Instructional Consultant and Academic Administrator in the Department of Life Sciences Core Education at University of California, Los Angeles, has transformed her lecture into a more active environment using diverse learning exercises.

Why Active Learning?

Active, "inquiry-guided" learning promotes critical thinking, problem solving, accountability, and the desire for lifelong learning—not to mention better student outcomes.

Deb's student-centered approach allows her to:

- Provide more frequent and immediate feedback
- Help students better process course material
- Help students create personal connections to the material
- Facilitate collaboration, helping students build confidence
- through group work
- Create a sense of classroom community

Deb Pires, PhD
University of California, Los Angeles

"There's recommendation after recommendation about how we need to move away from instructor-centered, lecture-based courses," Pires says. "There's a significant difference between what students [achieve] in an active course versus a lecture course."

Pires asserts large lecture size should not inhibit activities that promote student engagement, especially with the availability of innovative educational technologies (like iClicker/Reef), which give every student a voice.

Below are six simple activities Pires uses to engage students in her lectures. While the examples cited are focused on biology, these ideas can be universally applied across disciplines.

1 Compare and Contrast sets of Data

When looking at data, ask students to examine data against their own experiences, exploring similarities and differences.

For instance, you could look the National Survey data on adults and children living in households with only wireless phones (no landline service). Prior to showing the National Survey results, ask the students the same question about their own lives–to see how many in class only use wireless phones at home.

Display the class-generated graph first. Then display the National Survey graph and have students talk in small groups about the similarities and the differences between their data and the national data. Ask for possible reasons for the differences.

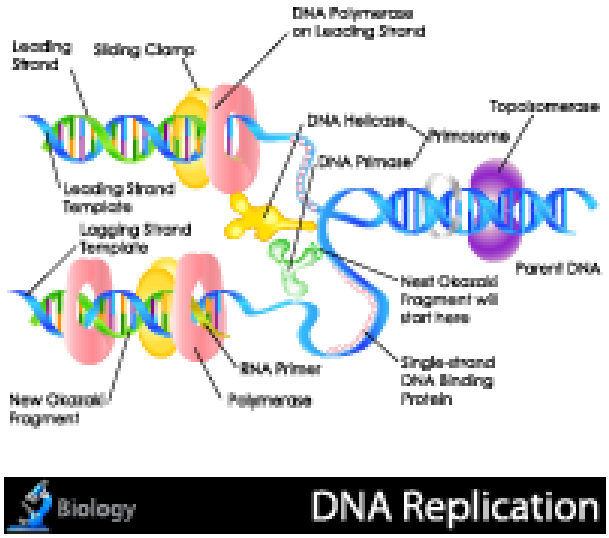
"This is something that I like to do when I use iClicker because then I can go and compile the data for them," she says. "I make a graph that follows the same lines. I will put up that survey first, and then I'll say, 'You'll never guess, but here's what your class data looks like."

2 Ask Students to Draw

Having students draw is an effective way to see if they truly understand a concept. For example, in Pires' biology class, students often have difficulty with DNA and directionality. She encourages students to start drawing a DNA replication at work.

She advises, "Wait and watch them draw, nudging them to just start with what they know. Their drawings don't have to be perfect; it's just a learning experience." Students may need a few hints; she suggested having a few things labeled for them.

"After some further discussion and follow-up questions, students should be able to see that the concept that you're asking them to draw is actually there, in their drawing,"



Deb Pires encourages students to draw DNA Replication at work.

3 Poll Students in Class

A student response system, like iClicker or Reef, can help students process course materials and encourage them to be more prepared for class. "When you want to see how much of the assigned reading your students have internalized or what they actually think about a topic, using a clicker [or mobile device] to pose questions around the reading assignments is efficient and a great, quick assessment," Pires said. Many faculty use student response systems to facilitate peer instruction. Using this technique, you can assess how well the class grasped what they read while indirectly encouraging your students to complete reading assignments before lecture (rather than expecting you to summarize the reading during lecture).

Students can respond via their clickers or mobile devices and you can see the results on your dashboard, and determine whether to take the discussion to the next step or not. If a good percentage of the class has not answered the questions correctly, you can pair students up, ask them to talk through the question with their neighbors, then re-poll. You can display results, and even ask students to explain why they voted a certain way.

Pires urges faculty to "Consider asking your students questions that go beyond the fundamentals or key definitions. You can just as easily ask questions to promote synthesis of course materials or ask your students to connect concepts to the the larger picture."

4 Start Class with a Word Cloud Prompt

Prior to class, ask students to provide a few terms related to the day's topic. At the beginning of class, project a word cloud created from those terms. Then ask students to form groups and discuss three terms in the word cloud other than ones they personally provided. Call on a few groups to talk through their takeaways.

"This method is a good way to see what students are thinking or what they already know as you introduce a topic," says Pires. "It requires students to think about the course and how it relates to their lives and the lives of their peers. It also shows that you are invested in them and what they think about the topic." Free word cloud generators include wordclouds.com and wordle.net, among others.

Many faculty use student response systems like iClicker and Reef to facilitate peer instruction.

5 Build a Model and Break It

Draw or project a figure for the class. List a number of places where the model can be broken. A build-a-model activity works especially well if you use a textbook or resource with figures or models.

For example, in a biology class on the cell cycle, you might say, "Of these things, how many would arrest the cell cycle?" Encourage students to work together moving through the model multiple times. Each time they do so, they have an opportunity to learn the model and how it works. You can survey them to see where they thought the model would break, then continue the discussion with the large group.

"Students will perceive you as someone who's having a conversation with them, and not someone who's lecturing at them," Pires says.

6 Predict Results

This method also begins with a model. In biology, for example, consider using a histogram to show a biological pathway as it occurs in normal cells. Then list two different mutations that might affect that pathway.

Working alone initially, students create their own histogram predicting what would happen in the cell cycle from either of these mutant types. Students can then compare their data to a correct rendering of the histograms, and draw their own correct histograms.

"As they draw, they are asking themselves questions about why their histogram was not correct," Pires says. "Students are in the process of boosting their own understanding, learn new concepts, and think more critically about the material."

Summary

When considering active learning techniques, Dr. Pires encourages faculty to focus on the most important concepts and skills relevant to the subject matter. Pires advises, "Have your learning outcomes clearly in mind and stay centered around those outcomes or objectives. Make your students apply critical thinking skills to answer your questions. Well-defined student learning outcomes are essential to student success in any course."

Employing simple active learning techniques like those outlined here can help to create a sense of community in the classroom with increased student-student and instructor-student interaction.

References and Resources

A few valuable articles and books to consider when developing active learning strategies for your course:

Freeman et al. (2014), Active Learning Increases Student Performance in Science, Engineering, and Mathematics, Proceedings of the National Academy of Sciences in the USA, PNAS 2014 111 (23) 8410-8415, http://www.pnas.org/content/111/23/8410.abstract

Haak et al (2001), "Increased Structure and Active Learning Reduce the Achievement Gap in Introductory Biology," Science, Vol. 332, Issue 6034, pp. 1213-1216.

D. McManus (2005), Leaving the Lectern: Cooperative Learning and the Critical First Days of Students Working in Groups, First Edition. New York, Jossey Bass.