Best Practices for Active Learning
in the Agricultural, Environmental, and Life Sciences

Exemplars

Rich Alldredge
*Introduction to Statistical Methods*
Washington State University

Ann Kenimer
*Water Quality Engineering*
Texas A & M University

Nancy Markee
*Humans and the Environment*
University of Nevada at Reno

Gary Moore
*Experiential Learning in Agriculture*
North Carolina State University

What is Active Learning?
Active learning, for the purposes of the National Case Study on Learner Centered Teaching (LCT), is defined as *well designed classroom activities that engage students to think at higher levels*. Such activities often involve cooperative and collaborative learning that leads to discussion and the processing of content at higher levels of thinking. Students read, write, discuss, synthesize, analyze, and evaluate information in a way that challenges them to fully and completely consider the material.

Why Use Active Learning?
Education that is enduring involves the acquisition of content and the ability to think critically by applying gained knowledge. Research has shown that some environments maximize this kind of learning experience (Bonwell & Eison, 1991). Classroom activities that promote active reflection of course content have been shown to improve mastery, support self-motivation, and produce a more meaningful learning experience. Active learning methodologies build on students’ present knowledge, allow fuller engagement in the material, offer a foundation for information retention, and promote self confidence so that students become empowered to guide and regulate their own learning (Wilke, 2003).

Active Learning ‘Best Practices’
The following are examples of strategies, philosophies, and approaches utilized by exemplary professors who participated in the LCT Project. Each professor has their own adaptations on active learning methods, yet has managed to come up with activities that yield positive results.

Classroom Examples

‘On-the-fly’ example problems
- Dr. Ann Kenimer makes up problems during class. Because she has not previously worked the problem through, she relies on her students to look up required values and help complete necessary
calculations. Professor and students work through the process together.

**In-class discussions**
- When working with equations, Dr. Ann Kenimer engages her students in discussion, stimulating students by asking questions about relevant properties and factors necessary for the equation.
- Dr. Nancy Markee uses the results from small, in-class activities as the basis of her discussion topics. It is also her practice to break up her lectures by asking questions and asking her students for their opinions.
- Dr. Gary Moore places a large emphasis on discussion. While lecturing, he poses questions to students every few minutes to stimulate discussion.

**Utilizing technology**
- Dr. Richard Alldredge uses video clips in his class. His own research demonstrates that using videos is effective in improving students’ attitudes and performance.
- Dr. Gary Moore uses a PowerPoint® compatible electronic personal response system to keep his students engaged.

**Developing instructor student relationships**
- Dr. Richard Alldredge makes a point of learning his students’ names, despite class sizes of 75-150, to maintain a friendly interaction. He has found that this fosters more student participation within the classroom.

**Student information/data collection**
- In Dr. Richard Alldredge’s class, students complete a statistical analysis on data that they personally create or obtain.
- Dr. Nancy Markee conducts formal debates on current environmental issues. Her students are responsible for collecting the information to be presented in the debate. This activity also teaches students how to research the credibility of data.

**Case-studies**
- When discussing environmental issues, Dr. Nancy Markee uses local case-studies to give relevance and meaning to her topics. She involves students by having them research the case study, and holds them responsible for the information.

**Cooperative Testing**
- Dr. Gary Moore uses a three-stage exam to evaluate his students. Students take the exam individually for a set amount of points, then retake it for fewer points, first in small groups and then finally as a class. The underlying concept is that students learn by
interacting with each other, even during the exam.

**Recommendations**

**Give credence to student reactions**
- In lieu of conducting formal assessments on her teaching effectiveness, Dr. Ann Kenimer gets a sense of what works by watching student responses. She gradually constructs a repertoire of teaching methods by retaining methods that work and discontinuing those that don’t.

**Communicate Expectations**
- Dr. Nancy Markee has had more success with activities after rewriting assignments and providing her students with more detail in terms of her expectations.

**Continually re-engage students**
- Dr. Gary Moore uses a variety of ways to refocus his students’ attention. He uses video animation, group activities, and brief discussions based on questions, among other methods.

**Utilize teaching workshops and faculty development offerings**
- All of our active learning exemplars stressed how important it is to take advantage of all available teaching resources, such as networking with other teachers, consulting the literature, and attending teaching workshops and seminars, to improve their teaching strategies.

For more detailed information on the above exemplars and their courses, please visit: [Active Learning Exemplars](#)

**Additional Resources**
For an excellent compilation of active learning classroom exercises, please visit the following webpage developed by Dr. Kathleen McKinney at Illinois State University: [Active Learning](#)

For specific strategies to help make active learning exercises successful, please visit the following webpage from the Center for Teaching and Learning at the University of Minnesota: [Making Active Learning Work](#)
References


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If you have comments or suggestions for this or other LCT project products, please direct your comments to:

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