

Teaching Tips/Notes



Combining Study Case and Learning Group Approaches to Teaching Agricultural Environmental Management Systems

Undergraduates interested in learning Agricultural Environmental Management Systems often observe this applied course late in their college career, resulting in a need for different techniques in teaching beside traditional lecture. Other teaching approaches are needed to enhance student ability to better understand the subject matter and improve the thinking skill to integrate student knowledge into the “real world” problems. One important aspect to consider in teaching agriculture courses is that students learn more about agriculture through experiences that link classroom activity to field work and engaging a broad range of topics (Parr et al., 2007).

Agricultural Environmental Management Systems course have been taught using combination of lecture (90%) and assigned laboratory (10%) activities. Lecturing provides advantages, such as a time-honored teaching approach and a good organization because the materials are derived from published textbooks, and allowing students to have an optimal access relative to resources needed (Little & Sauer, 1997). However, the effectiveness of lecturing as an educational technique has been brought to question for many years (Aher-Rindell, 1999). Previous studies show lecturing creates passive learning, poor information retention, limited learning and low thinking skills (Aher-Rindell, 1999; Crowther, 1999). Assigned laboratory activities related to soil erosion, aggregation and water movement in soils provides insufficient knowledge for students. Lab reports and informal interactions with students indicated that students’ knowledge and understanding of course content was limited. Their skill and understanding to apply the knowledge to new problems and integrate the lab results into what they found in the farm was poor. These students had limited understanding in applying basic concepts of soil aggregation and soil-water relationship to solve practical problems regarding to the impact of agricultural management on soil properties. To address these issues, a combination of study case and learning group approaches were applied.

A study case-based learning provides opportunity for students to more actively engage in the subject matter of course, especially in agricultural sciences (Ha & Shively, 2005 and Simmons et al., 2005). A learning group approach is an important education technique that can effectively assists students regarding to multi-situations in agriculture by interacting various knowledge and foster innovation (Jiggin and Röling, 2000; Jordan et al., 2003). At the beginning, students developed relationship by sharing knowledge, goals and solutions to specific cases to get mutual learning. Finally, new knowledge was created from both individual and shared observations (Röling and Jiggins, 1998) which generated new solutions and innovations. By doing this approach, students’ self-esteem and self-confidence increased and the ability to integrate their previous knowledge into more practical problems improved (Rowlands, 1997).

These approaches can bridge the gap between materials learned in class, laboratory and real world problems (Graveel, 1996), as well as provide students with better opportunity to do active learning. Specific cases related to agricultural and environmental problems can help students to investigate the context of the course of materials more deeply. A set of case studies consisting of 20 topics was used as a weekly class activity. The topics were agroforestry, best management practices, biochar, biodiversity, carbon sequestration, conservation reserve program (CRP), cover crops, genetically modified organisms (GMO), deforestation, erosion, land use change, organic farming, overgrazing, pesticides use, soil acidity and salinity, soil quality, tillage practices, traditional ecological knowledge, urban farming, and water pollution.

Students gave positive feedbacks with respect to these teaching approaches. Presentation and discussion of selected cases provided conducive and participatory environment in which the students were taught to be active and more engage to the topics. They eagerly tried to integrate their basic knowledge into the case. These approaches proved that students found better learning environment compared to lecturing technique by allowing them to be more creative in thinking and expressing themselves based on their own opinion and previous knowledge. A student presentation acted as an outlet for capturing student’s creativity and communication skills. However, their skill and performance

during presentation varied substantially. The better students used diverse techniques to deliver their presentations by using videos, demonstrations, bringing soil and plant samples, posters, nice graphs, and applying instructor's suggestions during presentation practices.

In conclusion, these approaches significantly enhanced student learning and thinking beyond the traditional lecture and laboratory activities. However, continued evaluation of the effectiveness is still needed because students have diverse ideal learning environments and styles.

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Submitted by:

Ilin Handayani
Murray State University
School of Agriculture