

Embedding Measures of Learner Outcomes Within Agronomy Courses

Mary H. Wiedenhoef, Michelle D. Cook, Tom A. Polito, Sherry L. Pogranichniy, Lance R. Gibson, and Russ E. Mullen

Introduction

In 2002, the Agronomy Department at Iowa State University began to systematically assess its undergraduate learner outcomes and curriculum that were implemented in the mid-1990s. Neither the learner outcomes nor the curriculum had been comprehensively assessed previously.

The goal of student outcomes assessment is to improve student learning. In the past, student GPAs and end of the semester grades have been used to assess curriculum. However, a passing grade does not necessarily mean that a student has developed the intended knowledge, skills/abilities, or perspectives. In order for grades to be valid indicators of student learning, they need to be based on activities that are linked to the intended learning outcomes of the course. Using exams as the only measure of student achievement has been criticized, because exams are often inadequate indicators of how students perform in real-world settings. Activities, such as projects, case studies, and realistic simulations allow students to demonstrate their ability to integrate the knowledge, skills/abilities, and perspectives acquired in a course or curricula and to reinforce learning.

We sought ways to assess learner outcomes through measures already embedded within courses such as presentations, papers, exhibits, debates, exams, and assignments. Our goal was to make outcomes assessment part of the work that faculty are already doing. At a half-day workshop the following baseline data were collected: 1) departmental learner outcomes addressed in each course, 2) specific assignments and/or experiences used to achieve each learner outcome, and 3) measures used to assess each learner outcome.

Example Agron334 Assignment:

The situation: You are the county Extension agent for Delaware County, with an office in Manchester. You received the following call from a farmer named, Joe Smith, a dairy producer, who lives in your county. You know of him but have never visited his farm. He does not attend extension meetings or workshops, so you were a little surprised that he called you for advice.

The request: "I spent a lot of time and money tilling up an old alfalfa stand and now the new alfalfa seeding looks like crap. I tilled the old stand in June. It was about mid-July when I got around to seeding the new stand. Because I was late, I did not plant a companion crop, which I usually do. I used a herbicide (2,4-DB at 5 pints of product/acre) to control the weeds. The alfalfa stand is really thin. Why?"

2 Agron334 Forage Management

Learner Outcome: Understand basic strategies for efficient and abundant production of high quality forage and pasture crops

Assignment: Use the knowledge and skills acquired in class by developing options for improving forage quality or for resolving a problem in the field.

Students are required to write a memo to the farmer, explaining the reason(s) for the problem and provide at least one recommendation that will resolve or begin to resolve the problem.

Measures: Can the student successfully recognize relevant information and that the forage crop was not successful because of the inappropriate planting date?

Four Examples of Embedded Measures Addressing Technical Knowledge



1

Agron114 Principles of Agronomy

Learner Outcome: Understand basic technical principles and methods relating to seed times and methods.

Assignment: View greenhouse demonstration of seeding depth and fertilizer replacement.

Measures: Can the student successfully answer specific questions on weekly quizzes and classroom exams?

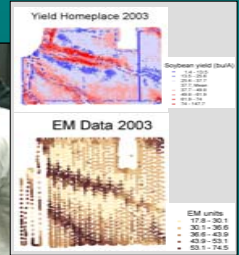
3 Agron392 Systems Analysis in Crop and Soil Management

3

Learner Outcome: Understand basic technical principles and methods relating to production of important crops.

Assignment: Read an article about electrical conductivity (EC) mapping and attend a lecture by an expert in this area. During class, the students create ArcView images of yield and EC maps from the same field. In a narrative they discuss the following: *EC and yields are directly correlated. True or false? Do the yield results for field K confirm this statement? Justify your answer.*

Measures: Can the student successfully recognize and define correlation, use information about EC from written and oral sources?



Discussion

This baseline information revealed where and to what extent each of the desired learner outcomes was being measured. With this baseline, we can systematically collect data from individual faculty on student performance. The data will help the faculty discuss results, make judgments about whether or not our students are achieving the outcomes, and adjust the curriculum or desired outcomes accordingly.

4 Agron402 Watershed Hydrology and Surficial Processes

Learner Outcome: Understand the soil as a resource upon which ecosystems, agriculture, and other land uses depend.

Assignment: Describe stream and riparian quality by completing a standard written form and oral presentation of their information.

Measures: Can the student successfully identify limitations and provide a valid recommendation for remediation?



Bibliography

Wright, B. D. 1997. Evaluating learning in individual courses. In J. G. Gaff and J. L. Ratcliff (Eds.). Handbook of the undergraduate curriculum: A comprehensive guide to purposes, structures, practices, and change. San Francisco: Jossey-Bass
Palomba, C. A. and Banta T. W. 1999. Assessment essentials: Planning implementing, improving assessment in higher education. San Francisco: Jossey-Bass

Acknowledgement

This project was funded through the Excellence in Agronomic Education and Extension Initiative of the Agronomy Endowment, Iowa State University.