

Academic Assessment Report
BEST PRACTICES IN STUDENT LEARNING OUTCOMES
(B.S. DEGREE / CROP SCIENCE)
(MAY 2018)

Contact

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CSES Mission

The mission of the Department of Crop, Soil, and Environmental Sciences is to provide superior education programs at the undergraduate and graduate levels, conduct innovative research and extension programs in the crop, soil, and environmental sciences and provide superior service for citizens of Arkansas and the nation.

Program Goals

(Program goals are broad general statements of what the program intends to accomplish and describes what a student will be able to do after completing the program. The program goals are linked to the mission of the university and college.)

1. Graduates have the discipline-specific knowledge in crop sciences required to perform successfully in private, government, or academic entry-level positions.
2. Graduates are able to critically analyze, synthesize, and evaluate new information to make informed decisions.
3. Graduates have the ability to solve complex, multidisciplinary problems.
4. Graduates are able to prepare and synthesize information to effectively communicate, both orally and in writing.

Student Learning Outcomes

(Student Learning Outcomes are defined in terms of the knowledge, skills, and abilities that students will know and be able to do as a result of completing a program. These student learning outcomes are directly linked to the accomplishment of the program goals.)

1. Students will demonstrate the discipline specific knowledge required to function as crop science professionals.
2. Students will demonstrate the ability to critically evaluate situations or scenarios to arrive at well thought out and supported decisions and outcomes.
3. Students will demonstrate the ability to work through and solve complex, multidisciplinary problems.
4. Communication skills
 - a. Students will demonstrate the skills required to effectively communicate technical/scientific information in oral platforms.
 - b. Students will demonstrate the ability to integrate, organize, and effectively present written reports of technical/scientific information.

Assessment Measure for Outcome 1

- Achievement is measured using **pre- and post-assessment**.
- This is a **direct** measure of student learning.
- Pre- and post-assessment includes 25 test questions from the CPSC faculty covering crop science/physiology, weed science/pest management, crop production, and soil fertility/plant nutrition. These areas represent essential concepts for discipline-specific knowledge of students completing a crop science degree.
- The initial pre- post-assessment was generated by CPSC faculty during the spring 2016. Target populations are at least half of the (incoming) and half of the fall graduating CPSC class.
- Scores are calculated for each assessment with the range, average, and median calculated for the cohort of pre- or post-assessments. We target calculation of the change in scores from pre- to post-assessment.

Acceptable and Ideal Targets (not required for indirect measures)

- The use of pre- and post-assessments are a relatively new initiative for CSES; therefore, we remain unsure of how “incoming” students in particular will perform on the pre-assessment.
- Acceptable: We are initially targeting a 50% increase in the mean and/or median test scores between the two populations (incoming and graduating students).
- Ideal: We are initially targeting an 80% increase in the mean and/or median test scores between the two populations (incoming and graduating students).

Key Personnel (who is responsible for the assessment of this measure).

- In 2015-2016, we expected CSES 2103 Crop Science (SP), a required course for all CPSC student, to be the target course for the pre-assessment. We revised this to utilize the CSES recruiter to target incoming CPSC students in 2016-2017. In 2017-2018, incoming CPSC students in the fall were again targeted using the CSES recruiter, while CPSC students enrolled in the CSES 1203 class were administered the pre-assessment in the spring 2018.
- CSES 4013 Advanced Crop Science, a required course for all CPSC students, was moved to spring semester in 2018. Students enrolled in the CSES 4013 class were administered the post-assessment in spring 2018.

Summary of Findings

- Pre-assessment was administered to four incoming students in the fall and six in the spring (one through the recruiter and five in CSES 1203). Scores ranged from 28 to 56 % with an average of 46 % and a median of 50 %.
- Post-assessment results obtained from 13 students in the spring 2018 revealed scores from 48 to 92 % with an average of 73 % and a median of 76 %. While the range of scores was wider than 2016-2017, the average and median increased slightly from a prior average of 67 % and median of 66 %, respectively.
- The change in scores were above the acceptable target; the average score increased by 59 % and the median score increased by 52 % between the pre- and post-assessment.

Recommendations

- Target courses should continue to be CSES 1203 and CSES 4013 for the pre- and post-assessment, respectively. There is concern among the CPSC faculty that students are being advised to enroll in CSES 4013 too soon within their program; students should enroll in CSES 4013 in their final spring semester.

- Another couple of years of pre- and post-assessment results should allow discussion and determination of appropriate target achievement levels.

Assessment Measure for Outcome 2

- Achievement will be measured using a critical thinking scenario (administered during class, potentially included on the post-assessment for learner outcome #1) and assessed using a **critical thinking rubric**.
- This is a **direct** measure of student learning.
- Assessment scenarios will be generated to cover application of critical thinking in crop science contexts.

Acceptable and Ideal Targets (not required for indirect measures)

- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

Key Personnel (who is responsible for the assessment of this measure)

- CSES 4013 Advanced Crop Science, a required course for all CPSC students, is the target course for the assessment.

Summary of Findings

- The target class to implement assessment of critical thinking is CSES 4013 Advanced Crop Science which is now a spring course. Faculty continue to contemplate how to best evaluate critical thinking using the assessment rubric within the context of the course.

Recommendations

- Crop Science faculty need to resolve how to effectively evaluate critical thinking among CPSC students.

Assessment Measure for Outcome 3

- Achievement will be measured using a problem based scenario (administered during class, potentially included on the post-assessment for learner outcome #1) and scored using a **problem solving rubric**.
- This is a **direct** measure of student learning.
- Assessment scenarios will be generated to cover application of problem solving in crop science contexts.

Acceptable and Ideal Targets (not required for indirect measures)

- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

Key Personnel (who is responsible for the assessment of this measure)

- CSES 4013 Advanced Crop Science, a required course for all CPSC students, is the target course for the problem solving assessment.

Summary of Findings

- The target class to implement assessment of critical thinking is CSES 4013 Advanced Crop Science which is now a spring course. Faculty continue to contemplate how to best evaluate problem solving using the assessment rubric within the context of the course.

Recommendations

- Crop Science faculty need to resolve how to effectively evaluate problem solving among CPSC students.

Assessment Measure for Outcome 4a

- Achievement will be assessed using an **oral communication rubric** during oral presentations where the student has compiled and evaluated the scientific literature as part of a class project and/or completed an independent research project as part of a special problems, research project or internship class.
- This is a **direct** measure of student learning.

Acceptable and Ideal Targets (not required for indirect measures).

- Acceptable: 70% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

Key Personnel (who is responsible for the assessment of this measure).

- CSES 3023 CSES Colloquium (FA), an upper division, professional development, communication-intensive course that should capture at least half of the senior population, is the target course for the assessment.
- CSES 462V Internship, Special Problems, and Honors thesis defenses provide opportunities where students present their experiences to an audience and the oral communication rubric can be used to evaluate communication skills.

Summary of Findings

- CSES Colloquium is a fall course which is required for CPSC students. Most enroll as seniors, although some students are juniors when they take the course. Four of the students enrolled in the course during the fall 2017 were CPSC students; however, only two were seniors, while two were juniors.
- Performance was evaluated during a 12-minute presentation that was given by each student as a member of a four-person research team. Teams selected overarching topics and individuals' subtopics to support a single overarching thesis. Students were taught how to work in a team, research and cite evidence, and develop and deliver a presentation to a scientific audience of peers. Scores were assessed for organization, language, delivery, supporting material, and central message. The breakdown among students is as follows:
 - Organization: basic to proficient with average and median achievement between basic and proficient;
 - Language: achievement ranged and the median was between basic and proficient with the average language skill at proficient;
 - Delivery: basic to proficient with average and median achievement between basic and proficient;
 - Supporting material: basic to proficient with average and median achievement closer to basic;

Central message: basic to proficient with average and median achievement closer to basic;

Recommendations

- The data for oral presentations from this year and the previous year are from a total of six students, three of whom were juniors rather than seniors. Initial assessment suggests that students have at least a basic level of achievement in oral communication skills with achievement closer to proficient for organization and language, but there remains a need to work on delivery, supporting a thesis, and developing presentations to effectively deliver a central message.
- We will continue to collect data during the next few years to assess performance in oral communication. Supporting and delivering a concise, well supported scientific presentation can be difficult, especially when working with others. However, the development of these skills are critical to functioning in the workforce in the applied sciences.

Assessment Measure for Outcome 4b

- Achievement will be assessed using a **written communication rubric** for laboratory reports and technical/scientific proposals where the student has analyzed, synthesized and evaluated information from independent sources as part of a class project and/or completed an independent research project as part of a special problems, research project or internship class.
- This is a **direct** measure of student learning.

Acceptable and Ideal Targets (not required for indirect measures).

- Acceptable: 70% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

Key Personnel (who is responsible for the assessment of this measure).

- CSES 462V Internship, Special Problems, and Honors thesis research provide opportunities where students have completed independent research projects. Students have to write papers in which they organize data and information they have analyzed, synthesized and evaluated to clearly and fluently convey a message.

Summary of Findings

- While an internship or special problem experience is required in the CPSC degree, writing skills were not evaluated during the 2017-2018 year.

Recommendations

- Crop Science faculty need to reevaluate an approach that allows for systematic evaluation of written communication skills among graduating CPSC students.

Overall Recommendations

- Pre- and post-assessment appears to be established, as does assessment for oral communication skills.
- Crop Science faculty need to focus on how to effectively implement assessment of critical thinking, problem solving, and writing skills.
- More data need to be generated during the 2018-2019 academic year before CSES can determine if action is needed to alter assessment, student learner outcomes, and/or curriculum.

Action Plan

- Crop Science faculty need to determine how to effectively implement assessment of critical thinking, problem solving, and writing skills.
- The pre-assessment needs to continue being administered to incoming students in CSES 1203, while the post-assessment needs to continue being administered during CSES 4013. Furthermore, oral communication skills should continue to be assessed in CSES 3023.

Supporting Attachments

- Pre-/post-assessment for CPSC
- Critical thinking rubric adapted from Association of American Colleges and Universities
- Problem solving rubric adapted from Association of American Colleges and Universities
- Oral communication skills rubric adapted from Association of American Colleges and Universities
- Written communication skills rubric adapted from Association of American Colleges and Universities