

ABET Student Outcomes Transition

A 1-7 World - Nathan Engelberth

Background

The Accreditation Board for Engineering and Technology (ABET) reviews programs periodically to renew their accreditation. The Engineering Accreditation Commission (EAC) within ABET updated the Student Outcomes for the upcoming accreditation cycle, requiring all programs to adopt these outcomes as part of their continuous improvement process. Continuous improvement, including student outcomes and course or curriculum adjustment, is crucial to keeping engineering programs relevant for the students entering the job market and to maintain the core concepts.

Project Description

Issue: ABET updated the EAC Student Outcomes for Accrediting Engineering Programs in the 2019-2020 Accreditation Cycle.

Objective: Transition ABE, and ABE courses, to the new 1-7 Student Outcomes and away from the previous a-k Student Outcomes.

Requirement: Programs must demonstrate that they are meeting the ABET Student Outcomes by providing instruction and experiences that pertain to these outcomes, assessing student performance, and applying continuous improvement principles to determine how well the program and students are meeting the Student Outcomes.

Objective: Transition Student Outcomes from a-k to 1-7

Old Student Outcomes a-k:

- a) an ability to apply knowledge of mathematics, science, and engineering [1]
- b) an ability to design and conduct experiments, as well as to analyze and interpret data [6]
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability [2]
- d) an ability to function on multidisciplinary teams [5]
- e) an ability to identify, formulate, and solve engineering problems [1]
- f) an understanding of professional & ethical responsibility [4]
- g) an ability to communicate effectively [3]
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context [4 and new Criterion 5]
- i) a recognition of the need for, and an ability to engage in life-long learning [7]
- j) a knowledge of contemporary issues [4]
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice [new Criterion 5]

New Student Outcomes 1-7:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. [a, e]
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. [c]
3. An ability to communicate effectively with a range of audiences. [g]
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. [f, h, j]
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. [d]
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. [b]
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [i]

Project Methodology

Actions

- **Continuously engage ABE faculty and instructors in the process**
- **Adopt new Student Outcomes (SO) definitions**
- **Evaluate and update Course Learning Objectives (CLO) for all ABE courses**
- **Collect and assess course data to support new CLOs and SOs, utilizing Course Assessment Plans**
- **Identify potential shortcomings when assessing new criteria**
- **Recommend changes to courses/assessments**

Documentation

- **Create/Collect updated course syllabi with new CLOs and SOs**
- **Create, distribute, and collect Course Assessment Plans to identify what course materials will be used to assess the new SOs**
- These are course specific, and list the SOs identified by the instructor

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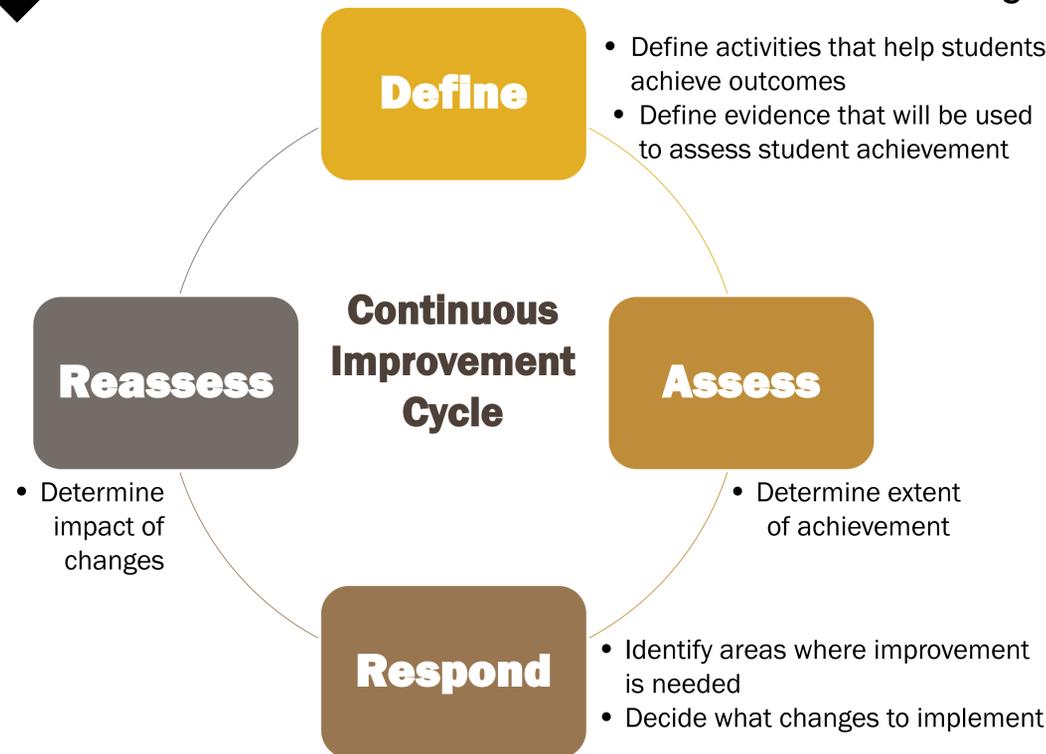
Agricultural & Biological
Engineering

Challenges

- **ABE is a diverse department both program- and course-wise.**
- **Two ABET Accredited Programs, with distinct faculty and course structures**
 - **Agricultural Engineering Two Majors**
 - **Biological Engineering Four Concentrations**
- **34 courses require(d) reevaluation**



Engineering
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Results and Future Work

- Fall 2018 courses are largely complete, and work continues on the Spring 2019 courses.
- ABE will need to continue to work on identifying potential shortcomings of assessing the new student outcomes based after comparing the updated definitions with the analyzed assessment data. Any shortcomings will need to be addressed in future assessment cycles.
- Ultimately this effort is designed to be the start of a transition to a new set of assessment criteria.
- Assessing every course every year is not practical, and a cycle of assessment based on course or student outcome will need to be established as the report is written.