Planning for the ABET Program Outcomes in Life-Long Learning and Contemporary Issues

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Abstract
Criterion 3 in the ABET review presents two "softer" criteria in items 3i and 3j, which are "a recognition of the need for, and an ability to engage in life-long learning," and "a knowledge of contemporary issues," respectively. Undoubtedly, a number of engineering programs will elect to determine their own definitions and evaluation policies for these issues in a wide variety of different ways. This presentation is designed to be more of an open dialogue, initiated with examples of how we are planning to address these issues, based on the collective input of the members of our department faculty.

Introduction
As part of the ABET process, all programs are required to provide an evaluation of Program Outcomes 3a through 3k. While quantitative analysis of more rigorous criteria such as 3e, "an ability to identify, formulate, and solve engineering problems," are comparatively straightforward, there are other criteria that are more elusive to evaluate. To evaluate these criteria, it is crucial to first define them, allowing a consensus to be developed on what is being evaluated. ABET leaves "softer" criteria such as 3i and 3j, which refer to life-long learning and knowledge of contemporary issues, respectively, somewhat open to interpretation by the individual programs. Here, we will propose definitions of each as a starting point for discussion, and provide examples of how each were addressed.

Definition of Criteria
In terms of life-long learning, we would suggest definitions to include the ability to use external resources, such as professional literature, government reports, media archives, library resources, data compilations and internet based resources to gather necessary data and information as required to complete projects, and the ability to master new software programs to assist in completing projects.

For the contemporary issues criterion, it is difficult to reach a consensus on whether contemporary issues should focus on contemporary issues in the profession or contemporary issues in society. We propose that the definition of contemporary issues be broadly inclusive, emphasizing that students develop an awareness of contemporary and non-technical issues in their major field and the role of engineering professionals in society globally to gain an appreciation and knowledge base for non-technical issues.

Life-long Learning (3i)
Life long learning can be evaluated in a number of different areas, depending on the nature of the specific program. For example, students can be required in engineering laboratory courses to obtain data from outside sources (e.g., literature search, data in CRC handbook, etc.), with a quantitative portion of their grade being dedicated to this, which can ultimately be translated back to quantitative evaluation of criterion 3i.

Students can also be required in their courses to perform case studies on industrial products or accidents, and evaluated on their reports, forcing them to research the project beyond the confines of the classroom. Alternatively, students can be required to learn rudimentary use of unfamiliar computer programs to solve problems outside of class, and evaluated on these assignments to reflect their ability to learn the use of the program on their own.

As an example, one of the authors (MD) gave an assignment in a Heat Transfer course for students to go to the Web of Science to find any article of interest to them pertaining to heat transfer, to summarize it concisely (to the best of their ability, given the advanced nature of these papers), and to propose a question that they would ask the authors of the paper. The following assignment, the students were required to send an email to the corresponding author to ask their question, and several students received replies. In the case of one student, his correspondence with the author was scheduled for publication as a letter to the editor in the journal! As long as these types of activities are recorded and documented with the department, there is evidence to be presented for "a recognition of the need for and an ability to engage in life-long learning."

Contemporary Issues (3j)

Although assignments can be tracked and documented pertaining to contemporary issues in engineering such as renewable energy, regenerative medicine, and advanced materials, the challenge lies in establishing a basis for evaluating students' knowledge of contemporary issues in global society. As a means to encourage students to pursue knowledge of contemporary issues, we have expanded the General Education requirement beyond humanities and social sciences to include a third category: Contemporary Issues. Although the University of Kansas catalog provides a clear listing of courses that qualify as either humanities or social sciences, the burden was on our program to identify courses to qualify as contemporary issues courses.

Toward this end, we searched the catalog for "contemporary" and "modern" in the course titles and descriptions, and narrowed by committee and then by department faculty to an agreed-upon list of contemporary issues courses at the university. We arrived at a list of over 30 courses, including courses such as "Contemporary Issues in U.S. Politics," "Contemporary Health Issues in Africa," and "Technology and Society in the Contemporary World," to name a few. Other courses not provided on this list can be considered by student petition. The assessment for the ABET criterion for knowledge of contemporary issues can be derived from grades, exit interview questions and alumni surveys.

Discussion

We emphasize that this presentation is intended to serve as a springboard for discussion of ideas and approaches, offering our current approach as a starting point for addressing two of the more enigmatic criteria. Ultimately, the issue is to improve the education of our students, devising better educational tools for conveying an appreciation for and ability to immerse themselves in both life-long learning and contemporary issues in our ever-changing world.

Bibliography

None

Biographical Information

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