A Look at ABET Accreditation – Understanding the Basics

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Abstract

Professional accreditation has become a defacto standard that implies quality of curricula and graduates, with ABET now accrediting programs in more than 28 countries outside the United States. While the focus in recent years has been on having a continuous improvement process that closes the loop and provides a mechanism to ensure a high quality education, there are many other issues that programs must address in the self-study report. Issues range from ensuring that policies and guidelines, which meet ABET criteria, are in place to having proper documentation that provides needed evidence. This paper briefly reviews ABET accreditation policies and procedures and provides details regarding the basic requirements that need to be fulfilled to ensure a successful ABET visit. This is discussed from the perspective of an institution that has been recently visited for its engineering technology programs and is preparing for a similar visit for its engineering programs. This information is especially helpful to an engineering program that plans to go through accreditation for the first time.

Introduction

ABET has a long history of accrediting engineering, engineering technology, applied science, and computing programs in the United States, and has been associated with quality education that seeks to assure that graduates of accredited programs are prepared for professional practice [1, 2]. In addition, graduation from an ABET-accredited program is a requirement for many professional engineering licensing bodies. A recent report by the Center for American Progress states "*Unlike most institutional accreditors, ABET uses outcome measures to ensure that students, employers, funding sources, and society can be confident that programs it accredits meet the quality standards to produce students who are prepared to enter a global workforce [3].*"

In response to demand and to support a broader goal of increasing the quality of global technical education, the ABET Board of Directors approved accreditation outside of the U.S. in 2006 [4]. As a result, ABET has become an international accreditation body that accredits more than 500 programs in more than 28 countries outside the United States. These countries include Austria, Bahrain, Chile, China, Colombia, Ecuador, Egypt, Germany, India, Indonesia, Jordan, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, Oman, Palestine, Peru, Philippines, Portugal, Qatar, Saudi Arabia, Singapore, South Africa, Spain, Turkey, United Arab Emirates, and Vietnam [5]. It is important to note that programs may be accredited under one of four accreditation commissions: Engineering Technology (ETAC), Engineering (EAC), Computing (CAC), and Applied Sciences (ASAC). These commissions differ in several accreditation criteria.

While the focus in recent years has been on having a continuous improvement process that closes the loop and provides improvements that ensure a high quality education [6, 7], there are many other issues that programs must address to ensure a smooth accreditation visit. Such issues range from ensuring that policies and guidelines, which meet ABET criteria, are in place to proper record keeping that provides the required evidence [8, 9]. Understanding accreditation policies, procedures, and requirements greatly improves a program's ability to manage processes in preparation for assembling the self-study report. This is not a simple task and programs are encouraged to seek help from professional organizations, including ABET, who provide many useful online resources and hands-on training workshops. Such workshops provide attendees with a good overview of the whole process and enough detail to get started in the right direction. They also describe what to expect during the on-site visit and what takes place after the visiting team leaves the campus [10].

Another key event that institutions must take advantage of is the Institutional Representative Day. The authors consider this as an important opportunity that facilitates building a strong working relationship between the institution and the visiting team chair. After the initial introduction and meeting, however, it is critical to maintain a respectful and friendly channel of communication with the team chair. Making the Chair (and visiting team) feel appreciated is essential. This includes responding to their requests promptly and acting on their feedback in a timely and respectful manner, while keeping in mind that the main objective of the ABET visiting team is to ensure that the program is achieving its stated PEOs and student outcomes. The following sections focus on the ABET policies and procedures and provide details about the EAC criteria that need to be fulfilled to ensure a successful accreditation visit.

Understanding the Basics

Program Educational Objectives - Program Educational Objectives (PEOs) for the 2016-2017 EAC review cycle are defined as "*broad statements that describe what graduates are expected to attain within a few years of graduation.*" Furthermore, PEOs are based on the needs of the program's constituencies and must be consistent with the mission of the institution. Engineering and engineering technology programs typically have three to six PEOs that are developed and reviewed annually by the program constituents. Program constituents normally include employers (may be serving on the advisory board), alumni, and faculty.

Student Outcomes - "*Student outcomes refer to what students are expected to be able to do by the time of graduation.*" At the writing of this document, all engineering programs are expected to have student outcomes (a) – (k), as stated in the Criteria for Accreditation Programs. While additional student outcomes may be articulated by the program, they are needed only if (a) – (k) outcomes do not fully produce graduates that attain the stated program educational objectives. It is important to note that any additional student outcomes must be assessed and included in the continuous improvement process.

Curriculum - The curriculum must be designed so that it includes courses that lead to the attainment of the student outcomes and lead to the fulfilment of the Program Educational Objectives [11]. In addition to ensuring that the minimum appropriate requirements are met (one year of college level mathematics and basic sciences, one and one half-years of engineering

topics, and a general education component), it is important that the curriculum provides students with a major capstone design experience based on the knowledge and skills gained in earlier coursework. Furthermore, any applicable program criteria, as determined based on the program title, must be satisfied. These criteria address specific requirements in the program's areas of specialization. While it is an easy task to show that minimum requirements are met, the challenge lies in demonstrating that adequate attention is given to each curriculum component in such a way that graduates attain the desired student outcomes and the stated program educational objectives.

Facilities and Institutional Support - Adequate facilities and institutional support are essential to the success of any engineering or engineering technology program. Without suitable classrooms, offices, laboratories, library and computing resources, staff and support offices, the program is unlikely to be able to provide the necessary environment to attain the desired student outcomes. Therefore, the administration must be aware of the program needs and be committed to providing the appropriate support to guarantee its success.

Students and Faculty - Faculty are the single most important factor when it comes to accreditation. In addition to teaching responsibilities, they are intimately involved in student advising and counseling, program and university service, transfer credit evaluation, and verification of graduation requirements. It is therefore important that the program has sufficient number of faculty to cover all curricular areas and provides faculty with appropriate support and professional development activities to stay current in their fields.

Continuous Improvement - ABET emphasizes the relationship between assessment, evaluation, and continuous improvement. It describes assessment as "*one or more processes that identify, collect, and prepare data to evaluate the student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured.*" It also explains that "*evaluation determines the extent to which student outcomes are being attained.*" The word "extent" is of major importance, as it implies there is normally room for improvement. This offers the opportunity to identify weaknesses and address them to reach a higher level of quality. ABET Criterion 4 states that "*the results of these evaluations must be systematically utilized as input for the continuous improvement of the program.*" The continuous improvement process is normally depicted by a simplified flowchart as shown in Figure 1.

Closing the loop is critical as it leads to improvements in teaching and learning at both the course and program level. It is important that the self-study report includes examples of improvement or clearly shows evidence that improvement was not necessary. To sustain the assessment process with minimum effort, the program should rely on simple, systematic, and effective processes [12, 13]. This includes the development of clear rubrics to assist in evaluating student performance in achieving student outcomes. While a number of courses should be used in the assessment process, the capstone design course is widely viewed as one of the most important courses. It can be used to provide evidence in support of the assessment of several student outcomes. This is the case since this course allows students to be involved in a major design experience based on knowledge and skills acquired in earlier coursework.
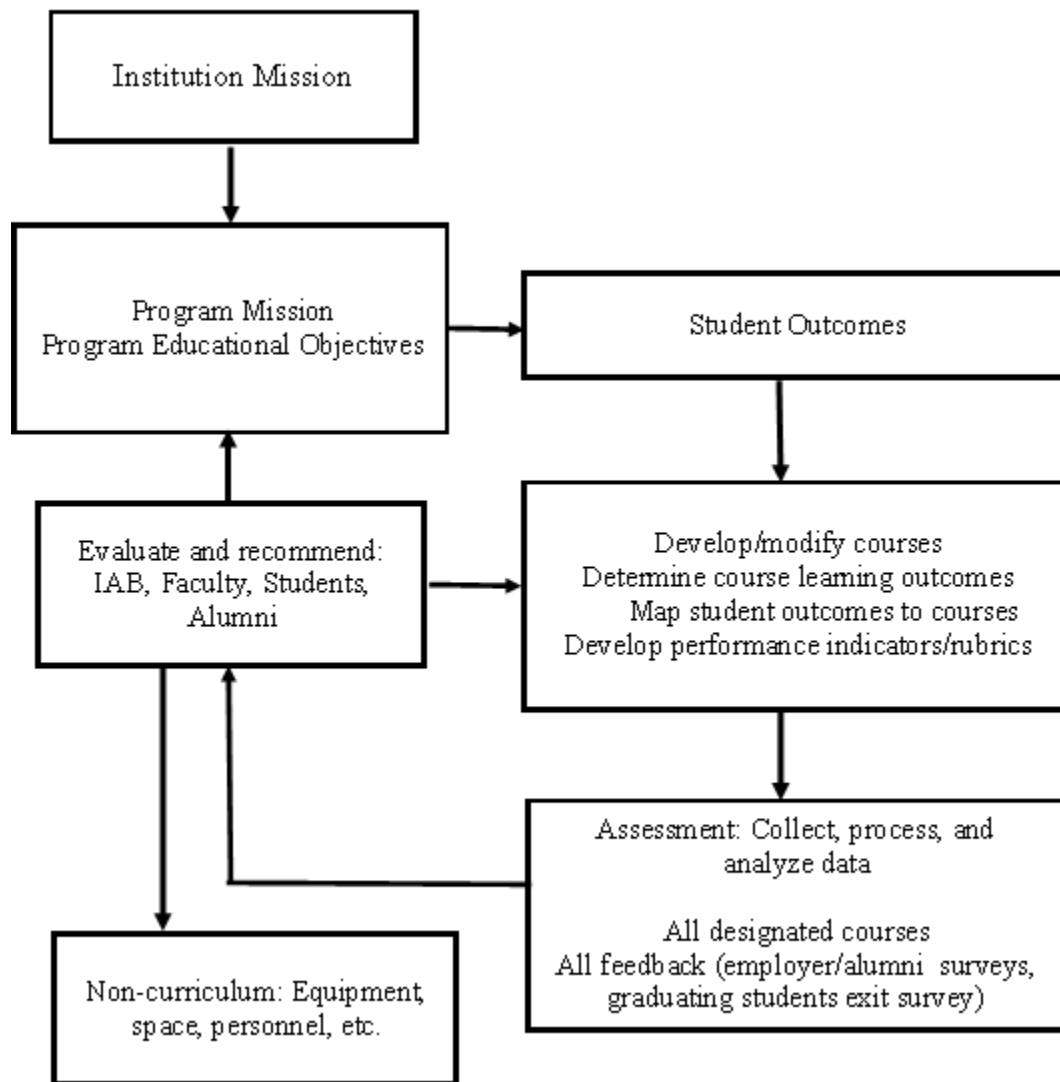
Figure 1. A Simplified Continuous Improvement Process

Timeline and ABET Policies and Procedures - The "Accreditation Policy and Procedure Manual" is a must read document before starting the accreditation process [14]. This document is designed to help programs understand the accreditation procedures and review processes. It also provides plenty of details that may be used to establish a reasonable timeline that meets a program's accreditation goals.   It is important to note, for example, that for a new program to be considered for accreditation, it must have at least one graduate within the academic year prior to the on-site visit. In addition, a Readiness Review (REv) must be completed if the institution does not have other accredited programs under the same commission as the new program. REv is a screening process that requires the submission of a preliminary self-study report that helps determine if a program is sufficiently ready for review. A major advantage of REv is that it reduces the chances of an unsuccessful on-site review visit. The reader is encouraged to review additional details available on the ABET website [15, 16]. Table 1 depicts a potential timeline for a new program.

Table 1: Timeline for the ABET Accreditation Visit for a New Program

Semester/Year	Activities
Year 0 and prior years	• Design curriculum, develop courses and laboratories, teach courses • Create Assessment plans for student learning outcomes (course-based learning outcomes) • Create performance indicators for each student outcome (a-k) • Develop an overall assessment plan (for the program)
Year 1, Fall	• Start implementation of the assessment plan • Collect data throughout the semester
Year 1, Spring	• Continue implementation of the assessment plan • Continue collection of data throughout the semester • Assess, evaluate, and make recommendations for improvement
Year 2, Fall	• Early fall: If new program with no other programs in the applicable commission, submit preliminary self-study report • Make improvements based on last year's assessment results • Continue implementation of the assessment plan • Collect data throughout the semester, start work on the self-study report Note: A program must have at least one graduate before the academic year of the on-site review (this may occur within two years prior to the on-site visit)
Year 2, Spring	• Early spring: submit a formal Request for Evaluation (RFE) for a visit next fall • Continue implementation of the assessment plan • Collect data throughout the semester • Assess, evaluate, and make recommendations for improvement • Finish and submit the self-study report
Year 3, Fall	• Prepare for ABET on-site visit, respond to team requests • ABET visit takes place • Respond to team recommendations, as needed
Year 3, Spring	• Respond to team recommendations, as needed

Conclusion

ABET has become an international accreditation body that accredits educational programs in more than 28 countries outside the United States.   While accreditation is normally viewed as a tedious process, understanding the basic requirements and having a systematic process in place simplifies the task. Details regarding the basic requirements that need to be fulfilled to ensure a successful ABET visit were presented. Special attention was given to programs that are seeking initial ABET accreditation.

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