Engineering Technology Accreditation: Avoid the Pitfalls and Be Prepared

Dr. Barbara L Christe, State University of New York, College of Technology at Farmingdale

Barbara Christe is a professor and the Dean of the School of Engineering Technology at Farmingdale State College, recently arriving on Long Island after 20 years at Purdue University in Indianapolis, Indiana. As a clinical engineer with degrees in biomedical engineering, she has authored several books exploring the branch of engineering technology that supports the safe and effective use of medical equipment in the clinical setting. In addition, Dr Christe’s research has explored the experiences of STEM learners in an effort to understand persistence and to support academic success. Her goal to promote degree attainment, especially by under-represented learners, including women, is well-matched to the Farmingdale campus mission.

Dr. Scott C Dunning, University of Maine

Dr. Scott Dunning is the Director of the School of Engineering Technology at the University of Maine. He serves as the academic dean for approximately five hundred students and directs four engineering technology programs. He is a Fellow of ABET and previously served as Chair of the Engineering Technology Accreditation Commission of ABET. He is the Chair of the Engineering Technology Council of ASEE. He is also a Fellow of AEE and past President of the Association of Energy Engineers.
Engineering Technology Accreditation:  
Avoid the Pitfalls and Be Prepared

Introduction

Developing a self-study to submit for program accreditation review can be a daunting task. The document requires academic programs to step back and look at their educational process with a critical eye. In addition, this examination of a program should begin long before the self-study document is created. Guidance and suggestions can improve the self-study process and may facilitate the best possible presentation of the unique programmatic approach to developing strong student learners.

Preparation of the self-study

Self-study development should begin with a review of the expectations of an accrediting body. Ongoing improvement and criteria compliance is crucial since gathering evidence to present in a self-study document should build on years of planning and data collection. The following areas of focus can be critical to a successful programmatic review.

Identification of stakeholders and constituents

Accrediting bodies encourage close relationships between a program and the constituents of the program. Clear identification of the groups of people who form the stakeholders associated with a particular program is critical for useful exchange of information and continuous improvement. However, programs are encouraged to carefully isolate groups who impact a program, such as state legislators who regulate curricula, as compared with groups who have deep connections with a program, such as employers. This group distinction generally is related to the flow of information about a program. A category of people who offer one-way information flow, for example from a legislative body to a program that prescribes the components of a program (say transfer credit acceptance or admitted student pools) can be viewed as a limited contributor and should not be named as a stakeholder for accreditation purposes.

Constituents for accreditation purposes are groups that participate in two-way information flow, making suggestions as well as offering a critic of new ideas. Most prominently, employers serve as a key group in program review and continuous improvement. Feedback and input from this group who directly observe graduates in the workplace provides insight into the profession and witness the performance of learners in “the real world.” Alumni employed in the discipline may also be excellent sources of recommendations for programmatic improvement. In contrast, at most institutions, the majority of faculty members are no longer employed full-time in the discipline. Thus, utilizing the two-way feedback from key constituents is crucial and integral to accreditation compliance.

When programs serve as transfer pathways to other academic institutions, the landing college may serve as a key constituent and facilitate a deeper understanding of the quality of preparation offered at the first degree curriculum. Tight partnerships between academic institutions will not only benefit students with seamless and successful transfer but will serve faculty with awareness
of changes at either campus. As educators closely associated with every-shifting technologies, programs must remain connected with each other and will ensure accreditation compliance.

Some educators propose that students and parents of students are key constituents. Of course, without learners the program would cease to exist. However, many potential students lack a deep understanding of the profession or solid comprehension of the topics or rigor that should be incorporated into a plan of study. Thus, while students and parents play a crucial role in the success of a program, their input into curricular components, contemporary equipment needs, or emerging topics in the discipline is unlikely to categorized as a constituent for accreditation purposes.

Linking courses and student outcomes

The knowledge, skills, and behaviors that students should possess at the time of graduation are generalized as student outcomes. Accrediting bodies feature expected student outcomes, both generalized, such as critical thinking, and discipline-specific such as knowledge of computer aided drafting. Mapping the student outcomes to particular courses can be an effective way to ensure all accreditation student outcomes are included in the curriculum. As part of the planning for a self-study creation, a complete review of this mapping will ensure that both the current student outcomes are utilized (accrediting bodies revise their outcomes regularly) and that course or curricular revisions have not changed the mapping. Many evaluators begin their programmatic review by examining course syllabi for student outcomes and verifying the mapping provided in a self-study.

Carefully note that course outcomes (what knowledge and skills are acquired in a particular course) are not directly linked to programmatic course outcomes. For example, a course outcome may be to apply Thevenin’s Theorem to a complex circuit – an important skill to an electrical engineering technology student. While this course outcome may map nicely to a problem solving student outcome, the two outcomes are not equivalent and should not be conflated.

Programs are encouraged to use a judicious approach in the assignment of student outcomes to each course. Accreditation team members have seen courses that claim to be applicable to every student outcome prescribed. However, best practice suggests that the most closely aligned student outcomes be associated with a course, rather than all or most of the program student outcomes.

Role of the advisory board in meeting criteria compliance

A program advisory board should serve the program, offering advisement about the curriculum and other program components, with knowledge of the current and future aspects of the technical field associated with the program. The role of the advisory board in the compliance with accreditation standards is critical. For example, ABET Criteria 2, 3, and 5 are specifically associated with the activities of the advisory board. Generally, the composition of an advisory board and frequency of meetings are left to the discretion of the program. However, the program should receive input and feedback regularly from a diverse constituent group who can offer a
discipline-specific perspective associated with graduate workplace performance or transfer student success. Most importantly, the documentation of these exchanges can serve as a reliable record of emerging technology discussions as well as recommendations and ideas for the future. This record can serve as an invaluable tool when faculty composition changes over time. In addition, meeting minutes, email exchanges or other records can provide accreditation compliance to document the close relationship between the program and the advisory board.

Key constituents/advisory board members are expected to meet with the accreditation team in most site visits. Thus, as soon as the dates of the visit are known (generally months ahead of time), notify the key constituents of the program and explain the importance of their time to meet with the accreditors. A worrisome site visit occurs when few if any key constituents or advisory board members are available to meet with the evaluators.

**Number of faculty**

A reverberating question on many campuses is associated with the “sufficient number” of faculty and the use of adjunct faculty. Will accreditation standards be met with the existing instructor pool? Few specific requirements are in place with the exception of faculty preparation requirements (ATMAE and ABET both have some restrictions regarding degree attainment) and full-time program responsibility. Thus, “reasonableness” is the general benchmark used by accreditation. When preparing the self-study, authors should examine the teaching, scholarship, and service load of program instructors with emphasis on sufficiency. Will students or faculty report long delays in grading or heavy teaching loads? Candid discussions with campus administration prior to the self-study preparation may be needed to shed light on the limitations or constraints faced by programs regarding class size, teaching load, laboratory availability, service expectations or research requirements.

**Policies and procedure requirements**

Each accrediting group features policies and procedures that regulate the release of information to the public. Prior to an accreditation visit, programs should review the latest requirements to ensure compliance, especially on websites and in printed materials. These often change and programs are expected to be up-to-date or make efforts to become compliant. For example, ABET requires three types of information to be available to the public: the program educational objectives, the student outcomes as well as headcount data, including enrollment and the number of graduates. This information should be “easy” to locate. Consider asking someone who is not from the program or institution to assess the difficulty in finding this information. In addition, use a search engine like Google to identify any hidden web pages or webpages managed by the institution that contain outdated information.

The timeline for review is also highly regulated by accrediting bodies and awareness is critical. For example, new programs are eligible for ABET review as soon as one graduate has been produced. Thus, new programs should be highly vigilant to follow the timeline carefully to ensure that all graduates earn an ABET accredited degree (accreditation can be retroactive after a visit) if constituents expect an accredited program (for PE licensure, for example).
The academic year prior to the self-study due date

A pivotal part of preparation for a visit is the engagement of faculty in the process. The identification of tools that can motivate instructor contributions to the preparation efforts may be critical to success. The use of faculty workshops, incentives, and one-on-one consultations may be valuable, incorporating strategies identified in the work by Bern, et al [1].

ABET on-site review requires samples of student work and course materials, typically textbooks, assignments, and exams. Since some courses may be taught only once per year, planning is generally required to gather the display materials. Policies and procedures may not specify exactly which courses must be documented or how much material is required. However, general recommendations include courses that are tied to the attainment of student outcomes (continuous improvement criterion), courses that are related to meeting curricular requirements such as professional and ethical responsibilities (curricular criteria), and courses that demonstrate compliance with discipline-specific expectations (program criteria). Thus, it is likely you will need to provide samples of student work related to assessment performance indicators (sorted by student outcome) as well as samples of student work that document inclusion of discipline-specific topics (sorted by course). Most accreditation bodies do not have requirements associated with the format of student work samples (electronic versus paper). However, careful organization is important so that reviewers can find what they need to verify compliance but do not need to sift through an entire course management system (say Blackboard) in order to find student work.

Student work is expected to be in a range of quality, often characterized as high, medium and low performance samples. Some institutions gather this information electronically and others use paper. Challenges exist at institutions that utilize course management tools like Blackboard and Canvas, although accrediting agencies are working to find pathways to migrate student samples from these sites.

Samples of student work ideally document the process of student learning and not just the assessment grade [2]. Performance on an objective exam, for example, may not be suitable to document student objectives related to group work or the creative synthesis of ideas. Thus, programs should seek to offer evidence of a wide variety of experiences that support student outcomes. The use of rubrics, self-assessment tools, and other creative tools as described in the reference book by Angelo and Cross [3] can offer accreditation reviewers a thoughtful programmatic approach to continuous improvement.

Those seeking ABET review will be required to list all faculty teaching all courses during the academic year prior to the visit, listing each name in two tables in the self-study. This effort includes adjunct faculty, those planning to retire prior to the visit, etc. Everyone who is teaching is listed in the table. In addition, faculty on sabbatical or otherwise on leave should also be listed. The program will need to supply a curriculum vitae for each person listed in the tables. Thus, plan ahead and gather these documents during the semesters prior to the visit. Tracking down an adjunct used once months later to obtain their CV can be very challenging.
The accreditation team members are likely to visit classrooms to both observe teaching and speak with students. Think about course scheduling in advance, ensuring that key subjects will be available during the weekdays most likely utilized for a visit. If a group of students, say seniors, will not have classes during the visit days, consider planning a pizza party or other gathering to offer evaluators the opportunity to meet with these students.

**Writing the self-study**

**What were previous findings?**

To begin, obtain a copy of the final report from the previous visit. Do not assume the program has complete copy or the final copy, especially if changes in leadership have occurred since the last visit. The accrediting body can provide copies of the previous documents for all programs. The purpose of this report retrieval is to review the findings from the previous visit/report. The evaluators are likely to begin with the previous findings, even if the findings were reduced in severity or resolved. Thus, careful scrutiny of previous shortcomings can mitigate any questions during the next review.

**Transcript pre-requisite enforcement and additional documentation**

Program evaluators will review provided program transcripts with careful focus on pre-requisite enforcement. Thus, once transcript protocols are established, review the documentation from each graduate prior to submission to the accreditation evaluators to determine if waiver paperwork exists, should pre-requisites be waived for some reason. Consider offering written explanations that describe a campus policy change, for example, or other situations that may raise concern regarding course sequencing. Written clarifications, copies of transfer agreements, and other exception documentation should be included with transcripts.

Program evaluators will benefit from as much documentation as reasonable to support the academic path reflected on the transcript. Thus, include the curriculum utilized by the graduate (if different than the self-study curriculum) with a summary of changes, as appropriate. In addition, consider flow charts that document pre-requisites, degree audits used to verify graduation compliance with all curricular requirements, and printed pages (or extracted pdfs) from software tools can be very helpful for both academic and non-academic program evaluators.

**Student and graduate knowledge and abilities**

A clear understanding of the difference between what students know at the time of graduation (ABET student outcomes) and what graduates should attain a few years after graduation (ABET program educational objectives) will benefit the program as these phrases are identified, revised, and publicized. The examination of the language of other programs may offer assistance in the crafting of these statements. Be sure to engage program constituents in the review and revision of these statements.
Program criteria

In some accrediting groups, disciplines craft program criteria to differentiate curricula between specialties. The detail in these criteria varies widely but be sure to identify the expectations of the discipline and meet the program criteria.

During the visit

Carefully craft and follow schedules to facilitate interviews, class visits, and information gathering by the team. Detailed schedules with escorts to move visitors from place to place are key to a smooth visit without unanswered questions or missing information. As previously mentioned, consider enticing specific student groups to gather to meet evaluators if the class schedule does not permit their interviews. The accrediting team is likely to have preferences regarding the types of classes and students they would like to interview.

During an on campus visit, be prepared to gather and provide evidence of a wide variety to mitigate shortcomings. Request for clarification of various criteria may be easy to obtain or extremely difficult. Working to provide needed evidence during a visit can resolve findings prior to any documentation and reduce workload in the future. Encourage faculty and staff to be available during a visit to gather this information. Some examples of the range of requests include: evidence of instruction (not an assignment) related to a curricular requirement like ethics (for example, a power point presentation or lecture), evidence of travel to conferences or other professional development, maintenance records for laboratory equipment, and union contracts for faculty or staff.

After the visit

The time period from the visit conclusion until the commission meeting the following summer is known as the due process period. This is a key time period in which a program can address any cited findings in the draft report and possibly resolve them. ABET accreditation features three finding categories: Deficiency, Weakness, and Concern. The impact of each finding varies, from a loss of accreditation to no accreditation impact. Draft finding severity levels are provided at the exit interview and may shift over time as additional evidence is provided during due process period.

It is important to recognize that accreditation agencies wish to help programs to resolve shortcomings. The chair of the visit can serve as an important mentor during due process. While accreditation volunteers are not to provide prescriptive solutions, they can help clarify criteria expectations.

Lessons Learned

To help institutions prepare for upcoming visits, ABET provides guidance and summary data from the previous accreditation cycle. Some data shared to programs last summer is insightful. During the 2018 review period, approximately half of the findings initially identified during visits were weaknesses. After the due process period, only half of those findings remained and
75% of those had been reduced to the level of a Concern and that does not impact accreditation duration. The data document the importance of responding to the draft report with additional evidence to mitigate weaknesses.

A closer study of the summary data reported showed that the continuous improvement criterion (ABET number 4) featured the greatest number of findings. It is extremely important for the vitality of a program to have a well-documented continuous improvement plan. Many programs were not able to demonstrate the use of a documented plan that featured assessment measures to determine the extent that student outcomes were attained. In addition, programs struggled to show that student outcome evaluation information was utilized as input for the continuous improvement of the program. To manage effective assessment and continuous improvement, programs should thoroughly research best practices. Guidance articles by Gloria Rodgers [4, 5] can provide numerous ideas to promote compliance. In addition, educators at different institutions may be a source for successful continuous improvement activities [6]. Lastly, some programs use exit exams as a tool to gather data. While this approach may feature some limitations, a review of the use of a comprehensive test as an assessment tool may be fruitful [7].

The second greatest number of the 2018 findings before due process were associated with the Program Educational Objectives (PEOs), Criterion 2, with almost all shortcomings reduced or mitigated during due process prior to the final report. Presenters shared that almost all findings associated with Criterion 2, Program Educational Objectives (PEOs) were associated with the inclusion of the correct people (true constituents) and the regular review process. The criterion associated with Student Outcomes (SOs), Criterion 3, had similar issues – the inclusion of appropriate constituents and a regular review process. This suggests that a thoughtful selection of program stakeholders is critical to ensure that all appropriate groups are involved in the two-way exchange of information associated with program educational objectives and student outcomes.

The curriculum criterion (ABET number 5) was third in the frequency of overall findings, most commonly associated with the advisory board composition and their involvement in the review of the PEOs, SOs and curriculum. This reinforces the importance of the advisory board composition choices as well as the activities of the group.

Common findings associated with Students, Criterion 1, were related to both student advising and pre-requisite enforcement. Accrediting bodies generally do not stipulate the specific characteristics of student advising. However, advising must occur in order to monitor student performance and progress toward degree attainment. In addition, advising must include both academic and career matters. Debate often centers on the use of professional advisors in comparison with faculty member advisement. No right answer is clear, however, quality advising in both academic and career topics is expected from the person or group designed to offer guidance to students.

Findings associated with faculty members (ABET Criterion 6) were generally associated with the size of the instructional group. The guideline to consider to determine the size comes from the criteria which stipulates it must be adequate to maintain stability, oversite and to interact with the students. Most findings associated with facilities (ABET Criterion 7) were related to the laboratory equipment both maintenance and upgrades. Lastly, findings associated with
institutional support (ABET Criterion 8) in 2018 were related to financial support and staffing levels.

**Conclusion**

Successful program evaluation for accreditation purposes depends on a myriad of activities. A review of both best practices as well as common pitfalls and shortcomings can focus efforts throughout the accreditation cycle. In addition, targeted decisions prior to the development of a self-study can promote the success of accreditation review.

**References**


