

ENGINEERING ACCREDITATION: PROCESS AND CHALLENGES

Tamer Ceylan

University of Wisconsin-Platteville

E-mail: ceylan@uwplatt.edu

Phone: (608) 342-1367

ABSTRACT

This paper summarizes the important aspects of the experience gained before, during, and after the recent ABET (Accreditation Board for Engineering and Technology) accreditation visit for the engineering programs at the University of Wisconsin-Platteville. From an engineering educator's perspective, it provides information on the critical process issues and challenges with the hope that it could assist other engineering programs seeking accreditation or re-accreditation.

INTRODUCTION

All seven engineering programs at the University of Wisconsin-Platteville went through the ABET accreditation process recently. This paper summarizes observations and reflections of an engineering educator about this experience. The author has been familiar with the process as a result of six engineering accreditation visits in his academic career since 1982.

The engineering accreditation process has eight criteria (Criteria for Accrediting Engineering Programs, 2006). It would be a mistake to think that a program deemed good or even strong in the collective and subjective opinion of the program faculty should therefore be accreditable. It is certainly important to be a good program; at the same time, to be accreditable, the program needs to satisfy the specific criteria set forth by ABET.

The entire accreditation (or re-accreditation) process can be divided into three main phases: preparation for the visit, site visit by the accreditation team, and the post-visit period. A sound preparation before the visit should normally make the next two phases much easier but how certain issues are handled during and after the visit could have a significant effect on the outcome of the process if the process does not go very smoothly.

A great deal of information on this subject is available from ABET (Accreditation Board for Engineering and Technology, 2007). Much has been written about engineering accreditation criteria and process over the years. Despite this fact, there are certain aspects and details of the process that are not normally covered in most publications. Yet, if known, they would be helpful

Proceedings of the 2006 ASEE North Midwest Sectional Conference

to a program seeking accreditation or re-accreditation by ABET. Rather than repeating what has been commonly disseminated, this paper will attempt to bring such issues to the surface.

PHASE I PREPARATION FOR THE VISIT

By far, the first phase is the most important of the three. The most critical aspect of the first phase is how to prepare for a successful visit. This includes the essential steps that need to be taken in a timely way, an awareness of most common problem areas during the accreditation process, and how to effectively address the issues related to them. If a few key faculty members attended an ABET training session, this would be quite helpful.

Generally speaking, there is not a single best way of handling accreditation-related tasks. Multiple approaches and methods, if implemented properly, could lead to a successful outcome. One reasonable approach is to form a program committee in charge of accreditation. Usually a more narrowly focused committee on assessment would work even better. Another possible variation is to give all assessment and curriculum issues to a single committee. However, in most cases, it is better to form an assessment committee that keeps close contact with a separate curriculum committee. If two or three persons serve on both the assessment and the curriculum committees, this would greatly facilitate communication between the two bodies. Care needs to be exercised in forming a strong assessment committee. In addition, it is advisable to make one knowledgeable and enthusiastic person, typically the committee chair, clearly in charge of the overall assessment process.

It is not unusual to receive communication from the program evaluator prior to the visit. Normally this is done to ask for additional information or clarification. Depending on the program evaluator, this communication could be minimal or rather detailed. Each engineering school has its own way of handling these issues. A reasonable way would be to share all communication between the program evaluator and the program with the ABET team chair and the college dean.

At this point, a review of the eight accreditation criteria and common problem areas would be helpful. The first seven criteria are common to all engineering programs. The eighth is the program criteria. Clearly, all eight criteria are important and must be satisfied. Normally, concerns expressed in a previous visit receive close scrutiny. Common problem areas will be discussed for general information only.

Criterion 1 on Students (admission requirements, advising, performance, placement of graduates, etc.) is not a common problem area. Student transcripts should provide evidence that the program requirements are met. Student advising should be effective, consistent, and documentable. There should be sufficient documentation on acceptability of credits for transfer students, especially for engineering topics courses. The program evaluator asks for a random sampling of some transcripts to see if the program is following its own rules.

Criterion 2 on Program Educational Objectives is a common problem area. ABET defines

Proceedings of the 2006 ASEE North Midwest Sectional Conference

Program Educational Objectives (Accreditation Policies and Procedures, 2006) as “broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve”. Among other requirements, evidence of constituency input in objective setting, periodic evaluation of the objectives, and the process for evaluating the extent to which objectives are attained should receive special care. Objectives should be measurable. A process to review and update them should be in place. It is essential that results of evaluation are used to develop and improve the program outcomes.

Criterion 3 on Program Outcome and Assessment is another common problem area. ABET defines Program Outcomes (Accreditation Policies and Procedures, 2006) as “narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire from the program.” An engineering program can determine its program outcomes as long as they include all “Criterion 3 a-k outcomes” (Criteria for Accrediting Engineering Programs, 2006) in some way. ABET defines Assessment (Accreditation Policies and Procedures, 2006) as “one or more processes that identify, collect, and prepare data to evaluate the achievement of program outcomes and program educational objectives”. One of the greatest challenges for a program is to demonstrate that all their graduates have outcomes 3 a-k. This certainly does not mean that the program should document the satisfaction of each criterion for each graduate. However, a review of the documentation should make a reasonable person to conclude that the Criterion is being satisfied. Classifying course materials by outcome within a course is a possible approach, but there are equally acceptable other approaches. It is important that the results of the assessment process are applied to the further development and improvement of the program. The assessment loop at various levels (course-, curriculum-, and program-level) should be closed and this process should be documented. The outcomes assessment should be based on direct measurements of student learning. The evaluators look for assessment analysis results.

Criterion 4 on Professional Component could be a problem area if sufficient care is not used. Among other requirements, the curriculum should culminate in a major design experience and incorporate appropriate engineering standards and multiple realistic constraints.

Despite its extreme importance, Criterion 5 on Faculty should not be a problem, assuming that a program has competent faculty .

Assuming that a program has acceptable facilities and funds for upgrading them, Criterion 6 on Facilities should not be a problem.

Despite its importance, assuming a supportive institution and sufficient funding, Criterion 7 on Institutional Support and Financial Resources should not be a problem. ABET tries to ascertain the quality of leadership at the department, college, and university levels.

Criterion 8 (Program Criteria) could be a problem area if sufficient care is not used. Each program must satisfy applicable Program Criteria.

PHASE II SITE VISIT

This phase of the process has a short length, most typically two days from Sunday afternoon to Tuesday afternoon. This phase usually contains more excitement and surprises than the other two do. The program evaluator follows a schedule of activities arranged prior to the visit but has the option of making changes if the evaluator deems necessary. Normally the evaluator focuses on a predetermined set of issues based on the program self study reviewed prior to the visit and on previous communication.

Normally the program evaluator schedules a short meeting with each faculty member and asks several questions. The evaluator might speak casually; however, the evaluator tries to obtain information on predetermined key issues. It would be helpful if more experienced faculty members in the program shared their experience from previous visits with new faculty members. The exact nature of the questions depends on the personality of the evaluator and the focus chosen before the visit based on the self study. For this reason, the following list of possible questions from an evaluator is provided only to give a general idea about what to expect.

What are the major strengths of your program? What are your concerns for the program? How do you keep current professionally? What are your professional goals for the next year? How do you rate the current leadership at the department and college levels? (Questions about teaching load, class size, salaries, and institutional support are also possible.) How were the educational objectives determined? Are they measurable? What is the involvement of your constituencies in the process? How do you know when you achieved your objectives? What is your personal involvement in the assessment process? What did you do in your classes regarding the assessment process? What is your feedback process for improvement? What actions were taken for improvement as a result of the assessment process?

If something seems to go wrong or if everything does not go as expected, this should not necessarily cause a great deal of concern. Most evaluators are very reasonable and experienced people. If you believe that your evaluator happens to be an unreasonable one, it is important to keep in mind that ABET has a number of effective mechanisms to make sure that your program is treated fairly, as will be explained in the next section. It is best to act in a professional manner and to show as much cooperation as possible with the evaluator.

PHASE III POST-VISIT PERIOD

The third and final phase of the process may amount to practically nothing if the first two phases go well. Otherwise, if there are some concerns about what ABET indicated on the last day of the visit, there is a formal procedure that needs to be followed. Communication between the college administration and the team chair is still possible after the visit and can lead to successful and timely resolution of some issues. As a result of providing additional information or clarification, the team chair may choose to take favorable action long before the ABET preliminary report.

A common complaint is that different program evaluators use different standards resulting in inconsistencies from one educational institution to another or from one program to another in the

Proceedings of the 2006 ASEE North Midwest Sectional Conference

same institution. If true, this would cause unequal treatment of engineering programs. One usually hears this during or shortly after an ABET visit mostly for Criteria 2 and 3. Based on our experience, ABET acts in a very reasonable manner in this regard and has a number of effective checks and balances to deal with this issue. ABET evaluators go through training that tries to clarify the definitions of the words “concern”, “weakness”, and “deficiency”. The ABET team takes steps to ensure a uniform treatment of different programs. There is a great deal of information exchange during the time of the visit resulting in a more uniform treatment. The program evaluator’s comments during the visit are not final judgments at all. If necessary, during and after the visit, the team chair can make decisions to make sure that all the programs are treated in a fair and reasonable way. Finally, the Engineering Accreditation Commission (EAC) reviews any remaining issues before making its final decision. By that time, all concerns receive a fair consideration, and the possibility of unequal or unfair treatment is minimized.

If the Commission finds one or more weaknesses or deficiencies in the program, its final decision should be taken seriously. Normally, at that point, it is futile to argue with or fight against ABET. If the final decision is negative, the best approach is to understand what the problems are and to take corrective action as soon as possible to eliminate the problems. One should always be aware of negative groupthink, self-serving rationalizations, and human tendency not to take criticism well, even when the criticism is on target and completely justified. Such a situation naturally forces some changes, and the initial resistance to it should be overcome without any loss of time. This process could be painful. Sometimes a change in leadership may be necessary.

CONCLUSION

This paper reflects an engineering educator’s experience in the engineering accreditation process. There are three main phases in the ABET accreditation process. Each phase of the process has its challenges with some possible ups and downs. Even if the program is strong, there is no substitute for experience, knowledge, and sound preparation.

In the preparation period, it is necessary to carefully plan and coordinate all accreditation- and assessment-related issues. Among the eight accreditation criteria, an awareness of common problem areas, mostly Criteria 2 and 3, is useful. A list of possible questions that can be asked by a program evaluator is provided for the campus visit phase of the process. For the post-visit period, a program should be aware of how ABET resolves consistency issues across institutions and across programs within a single institution. Finally, proper perspective is needed if ABET finds one or more weaknesses or deficiencies.

Based on what we have seen recently, the entire process works reasonably well and could be a rejuvenating experience provided that an educational institution does its part diligently.

REFERENCES

Accreditation Board for Engineering and Technology website www.abet.org. (2007). Accreditation Board for Engineering and Technology.

Accreditation Policies and Procedures, Effective for Evaluations During the 2007-2008 Accreditation Cycle. (2006). Accreditation Board for Engineering and Technology.

Criteria for Accrediting Engineering Programs, Effective for Evaluations During the 2007-2008 Accreditation Cycle. (2006). Accreditation Board for Engineering and Technology.

BIOGRAPHICAL INFORMATION

TAMER CEYLAN is a Professor of Mechanical Engineering at the University of Wisconsin-Platteville. He received his M.S. (1976) and Ph.D. (1979) degrees from the University of Wisconsin-Madison. Dr. Ceylan's research area and teaching interests are in thermosciences.

Proceedings of the 2006 ASEE North Midwest Sectional Conference