Toward a Kinder, Gentler ABET

David E. Clough

Department of Chemical and Biological Engineering
University of Colorado
Boulder, CO 80309-0424

Abstract

The thesis of this presentation is that the ABET 2000 process is beset with problems in design and execution that will inevitably lead to significant change within the next few years. ABET 2000, however well intended, is entirely too burdensome for the benefits it delivers, and its burdens are well beyond the constraints placed on an engineering faculty at a research-oriented university.

We will review in brief how ABET arrived at its current state and present evidence that educational initiatives must align with the goals and objectives of the research faculty at major universities for those initiatives to have lasting impact there. Frank, anonymous feedback from a cross-section of engineering faculty will reveal that ABET 2000 is in trouble, lacking the grassroots faculty support necessary for a stable accreditation system. The claim will be put forward that any such system must derive broad support, from more than a few true believers, and must not reflect a faddish wave of buzzwords.

To conclude, we will present a few notions of a revised accreditation process that could be, at once, less burdensome on faculty and universities, and more effective than ABET 2000 because of the broad support it might engender. The nature of this presentation will be to stimulate lively follow-on debate and discussion at the conference.

Outline

- Background and perspective – where am I coming from on this?
- ABET 2000 is in deep trouble – a research faculty view
- Teaching, research and how to achieve educational change (& improvement)
- Proposal for change in ABET – an acceptable, effective scheme
Background and perspective

I have followed and participated in accreditation activities since the late 1960's, and, although I do not consider myself to be a charter member of the latest embodiment of engineering accreditation, ABET 2000, I have generally been an advocate for ABET at the University of Colorado over the past 15 years. For the Department of Chemical Engineering at Colorado, I am considered to be the architect of our ABET 2000 process, and many of our process components have been adopted by the other engineering programs here. At the same time, I have fought against stubborn and increasing resistance on the part of my faculty colleagues to maintain a functional ABET process. Concurrently, I have been a staunch supporter of ABET 2000, but, recently, I have had increasing doubts about its viability.

Nearly all faculty in my department are research active. Typically, a faculty member supervised a research group of 4+ graduate students, 1-to-2 postdocs, and several undergrads. This faculty member's research program has annual expenditures of $300,000+. It is pleasing to me that the faculty in my department also have a strong commitment to teaching and mentoring undergraduate and graduate students. We do not have the tradition of neglecting our undergraduate program in favor of our graduate research program. Most faculty are considered to be good, conscientious teachers. They do struggle to balance their efforts in teaching and research. Be it fair or not, it is reality that our faculty typically work 70+ hours per week. They are stressed and stretched, and they have little tolerance for activities they perceive to be unproductive.

At the University of Colorado, we had an ABET 2000 visit in the fall of 1999. The results were mixed: several programs received "next general review" ratings, there were programs with "two-year reports", and one program required a revisit within a year. Our programs' ABET 2000 processes had not been long established, we were early in the game, so perhaps these results were expected. Although our many programs had all established ABET 2000 processes with annual cycles, it is my current observation that most programs have been unable to sustain these annual cycles. This is particularly true of the department that received the "cleanest" review. By the book, these programs will be unable to demonstrate an ongoing, annual ABET process for our Fall 2005 general review visit. I understand that this phenomenon is common at other institutions across the US.

The University of Colorado instituted its own program review process in 1980. This is independent of the campus' general external accreditation (North Central). Each program unit on campus (both academic and auxiliary) is reviewed in depth on a 7-year cycle. This includes self-study, internal and external reviews and includes all elements of the unit's program, not just undergraduate. These program reviews factor into resource allocation, and, in the current economic climate, into program elimination.

My Department of Chemical Engineering has a long record of periodic review, including input from external constituencies, and continuous program improvement, long preceding ABET 2000. If anything, the advent of ABET 2000 has stifled these activities.
As I understand the history, in the 1980's, there were demands for change in ABET from a group of engineering deans, primarily from research institutions. They wanted an accreditation system that allowed for more program flexibility and less bean counting. There had been much complaint about the counting of design and science credits. Accountability for engineering design had carried over as a theme from the 1970's.

Also, in the late 80's, outcomes assessment swept across the country as the latest hot topic in educational circles. The State of Colorado mandated outcomes assessment starting in 1988. There was a budgetary penalty for any institution that did not comply, and the State provided supplementary funding for assessment programs. During the 1990's, State interest in outcomes assessment waned, support dwindled and disappeared, and assessment activities on campus followed suit. There was strong evidence that the assessment "fad" was becoming passé on campus and in general educational circles.

With this backdrop, ABET went to work in the 1990's to revise its accreditation scheme and embraced outcomes assessment in the creation of ABET 2000.

ABET 2000 is in deep trouble

A central tenet of ABET 2000 is broad faculty involvement in the process. The ABET 2000 process is too burdensome, requiring continuous involvement of faculty in assessment activities, for which they do not have time, and from which they do not recognize benefits in proportion to the effort expended. It is a view widely held by engineering faculty that the considerable investment of resources in assessment are not and will not yield justifiable returns.

An informal survey of faculty from my Department, my College, and from elsewhere across the US, find reactions to and perceptions of ABET 2000 that are surprisingly negative and vitriolic. Although an in-depth survey might be called for to add reliability to the results, I doubt that the results would change much. Perhaps ABET should carry out such a survey as a reality check. In the figure below, I include a representative sample of faculty comments when asked for their reaction to "ABET 2000."

| bad, gray, too subjective |
| work, busywork, useless |
| waste of time, waste of time, hung up on words |
| joke, busywork, e.d.¹ |
| paperwork, frustration, over-regulation |
| absurdly inconsistent review process |
| self-inflicted impotence, fighting city hall |
| lousy new rules |

It would be natural that reading such comments would bring an angry response from many who have been deeply involved with the creation of ABET 2000. That natural response aside, these comments should also arouse a great deal of concern. I have heard it said that ABET 2000 was created by engineering faculty. Given what is likely a broad-based sentiment revealed by the
comments above, that raises the question, "Which faculty?" I would advance the following claim:

ABET 2000 is not supported by most engineering faculty, and is seen in a particularly negative light by research-active faculty.

To refute this claim, I would want to see broad survey evidence to the contrary. Of course, the argument might be advanced that research-active faculty have little interest in education and, in any case, will just have to conform to what is right, aka ABET 2000. Firstly, my experience, especially with my own department's faculty, refutes the first point – I believe that most faculty, whether research-active or not, are keenly interested in the education of their students. Secondly, as I will show below, it is dangerous to posture that research-active faculty must conform. History shows that is the tail attempting to wag the dog.

Teaching, research and how to achieve educational change (& improvement)

Over the past 500 years or so, universities have shown themselves to be remarkably persistent and adaptable organizations. There are revolutions, wars, governments fall, countries disappear, but universities persist. The tension between teaching and research has been evident for more than a century. Although there has been much adaptation and change in universities, most has been incremental. Dramatic attempts to change the way universities go about their business, especially when promoted by outside organizations, such as government funding agencies, are rarely successful. One might claim that the Morrill Act reshaped higher education in the US by creating 80-some new universities within a 20-year period, but that was creation of the new and not modification of the established.

An additional, and crucial, observation is that educational change is only successful when it is congruent with the objectives of the university's scholars, its research faculty. This is illustrated graphically in the figure below\(^1\).

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\(^1\) This analogy is due to Clayton Lewis of the Department of Computer Science at the University of Colorado.
The point of the figure is that an educational initiative that is orthogonal to the direction of the research faculty is doomed! This is the direction that ABET 2000 is taking. All of the arguments in its favor will eventually hold no weight, if this is its direction.

Examples that reinforce this principle abound. In my own department, we have involved undergraduate students extensively in our research programs for over a decade now. Nearly 80% of our undergraduates participate in our research programs at one time during their academic career. The impact on their education has been significant, and this program has received strong, enthusiastic support of our faculty. The faculty see research involvement of undergraduates as congruent with their general scholarly interests. It has been a grand success. In fact, our College of Engineering & Applied Science recently opened a new research facility (the Discovery Learning Center, approx. $20MM) dedicated to the involvement of undergraduates in research.

There is a long history that supports the validity of this principle\(^2\). This leads to my unavoidable conclusion:

ABET 2000 in its current form is not sustainable at research institutions and must change. The sooner the change is made, the better. Otherwise, confrontation will ensue, and institutions may drop accreditation entirely (there is already some early evidence of this). Many departments will be unable to demonstrate an ongoing, annual ABET process during their second ABET 2000 review.

Proposal for change in ABET – an acceptable, effective scheme

Many faculty view ABET’s review of their undergraduate program to be based in a premise of suspicion, that is, that it is suspected that we are really not doing a very good job educating engineers in this country. Of course, the evidence of technological accomplishments and progress of the past decades argues the contrary. Faculty need to perceive an accreditation program that is based on the premise that we are doing an excellent job, and that incremental change will only lead to a higher level of excellence. Positives reinforcing positives.

I suggest that ABET needs to review engineering programs with the following principles in place:

1. Examine programs in a minimally invasive manner.
2. Determine whether the curriculum, as delivered, meets minimal standards for the degree awarded.
3. Determine whether the faculty and facilities are sufficient to deliver the degree program.
4. Investigate whether there is an active, periodic mechanism for program improvement that involves review by and input from external constituencies (alumni, employers, colleagues).

Some might claim that this is exactly what ABET 2000 accomplishes, but many faculty would differ. In their minds, how should ABET change? Here are several suggestions:

\(^2\) This is amply documented by Larry Cuban in his book, *How Scholars Trumped Teachers.*
1. Streamline and sharpen the outcomes assessment criteria a through k. Eliminate nebulous criteria that are difficult, if feasible at all, to assess with any certainty, requiring significant effort and expense for little gain. Simplify, simplify!

2. Eliminate burdensome and costly information acquisition and assessment activities, especially where fair judgment shows little bang for the buck.

3. Allow flexibility in the feedback improvement mechanisms. Accommodate concurrent review activities (local reviews, advisory committees) even if they don't quite fit the ABET model.

4. Minimize documentation, scrutiny, and the time required by all.

A faculty colleague summed it up in a phrase, "Back off!"

Concluding remarks

I write this paper with some trepidation, but I feel that it is something that must be done. I wonder whether I strike a resonant chord with many engineering faculty across the country. I fear that it does. My career as an engineering faculty member and administrator spans nearly three decades now. I have generally been an optimist and a promoter of new ideas and programs. Some of these have achieved success and stuck. With others, I have had to face the music, and it has not been easy to give up on something in which I truly believed. But, when the cards are stacked clearly against you, that is the way it goes.

I am optimistic that ABET will adapt ABET 2000 so that it survives and is successful. To do so, it will be necessary for some to swallow their pride and commitment and face the reality. It is a necessary condition that the accreditation scheme be workable and acceptable to the majority of engineering faculty, and, in particular, the faculty at research institutions. That is clearly not the case at this point in time.

If I have made the reader angry, I apologize. If it turns out that I am way off base, I will seek forgiveness. If the reader believes I have hit the nail on the head, please don't celebrate – there is much work to be done.

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3 Epilogue: I received a note from a participant at the ASEE conference where this paper was first presented. He wrote, "I wanted to jump up and give you a standing ovation when you finished your talk. But then, I thought better of it since our next ABET visitor might be in the audience."
Bibliographic Information


Lewis, Clayton, Department of Computer Science, University of Colorado, personal communication.

Biographical Information

David E. Clough is Professor and Associate Chair of Chemical Engineering at the University of Colorado, Boulder, CO. He joined the faculty at Colorado in 1975. He served for seven years as Associate Dean for Academic Affairs of Colorado's College of Engineering and Applied Science. He is responsible, in part, for initiation of numerous educational program and facility innovations at the University of Colorado, including the Integrated Teaching & Learning Laboratory, the Herbst Program of Humanities, and the Women in Engineering Program. Clough has been active in ASEE since early in his career. He has served as Rocky Mountain Section Chair and Zone IV Chair of ASEE. He lives in a log home in the Rocky Mountains.