

# Can ABET Really Make a Difference?\*

JOHN W. PRADOS

Department of Chemical Engineering, The University of Tennessee, Knoxville, TN 37996-2200, USA.

E-mail: jprados@utk.edu

*Over the past 15 years, the Accreditation Board for Engineering and Technology (ABET) has implemented fundamental changes in its accreditation philosophy, criteria, and processes: active encouragement of continuous educational quality improvement has replaced an arms-length auditing mentality; accreditation criteria now focus on what graduates have learned and can do, rather than their seat time in classes; better selection, training, and evaluation of program evaluators and team chairs remains an elusive but essential goal. But are these changes driving needed changes in the education of professionals for engineering and related fields? Are such programs becoming more innovative and responsive to the future needs of the profession? How can ABET assure that innovations in accreditation are implemented effectively and produce the desired results? Answers to these and related questions are far from clear, but strategies for moving toward critical ABET goals will be suggested.*

## THE CALL FOR CHANGE

BY THE LATE 1980s, engineering employers and educational leaders were recognizing that the effective preparation of engineers for 21st-century practice demanded fundamental changes in the engineering science paradigm that had dominated engineering education for the preceding 25 years. It was also widely recognized that the Accreditation Board for Engineering and Technology (ABET) had the power to encourage or impede the needed changes. Fortunately, the ABET leadership recognized the need for change and the formation of ABET's Industry Advisory Council more than a decade ago marked the beginning of fundamental changes in ABET's accreditation philosophy, criteria, and processes.

Illustrating this new philosophy is a quote from the 1992 ABET President's Report [1]:

*If ABET is indeed to encourage curricular innovation, it must reorient its accreditation philosophy away from counting of credit hours and detailed specifications, to focus instead on clear definition of educational objectives, significant evidence of faculty and industrial partner participation in defining these objectives, and achievement of objectives as demonstrated by the work of graduates.*

Without such reorientation, the outlook for change was indeed bleak. Despite its best intentions, the pre-1990 ABET could well be characterized as a protector of the status quo:

- Relations with engineering schools were adversarial and arms-length. (ABET's philosophy seemed to be, 'Here are the criteria; you figure out how to satisfy them. If you're wrong, WE GOTCHA!')

- Evaluation Criteria focused on measurable inputs: e.g. numbers of faculty members, curricular distribution (i.e. seat time in given subject areas), detailed laboratory improvement plans, etc.
- Criteria were increasingly prescriptive—from less than one page of General Criteria in 1959 to more than 19 pages of smaller type in 1999.
- Program Criteria provided additional prescription, with additional seat time requirements beyond the General Criteria that specified almost the entire curriculum in a few programs, degree requirements for faculty, etc.
- Program evaluators and team chairs were dedicated and hard-working, but they were often obsessed with auditing (bean counting). It became increasingly difficult to recruit innovative, technically active evaluators from industry and research universities.

## THE VISION FOR CHANGE

In contrast with these characteristics, the following dramatic changes in ABET have been evident since the mid-1990s:

- Relations and communications with engineering schools are significantly improved. Accreditation decisions must now be based *only* on deficiencies reported in writing to the institution at the close of an evaluation visit, and evidence of correction is accepted up to the time of accreditation commission action.
- Evaluation criteria now focus on: what graduates have learned and can do, rather than seat time; continuous improvement for each accredited program; and accountability to employers, students, parents, funding agencies, etc.

\* 8 October 2003.

- The new Engineering Criteria 2000 are far less prescriptive, with the General Criteria now less than three pages in length and Program Criteria limited to specification of faculty qualifications and subject areas (not credit hours).
- Major efforts are continuing with professional societies to obtain more balanced representation from industry and diverse types of engineering schools.

The principles underlying these changes are exemplified in the ABET Vision Statement adopted by the Board of Directors in 1995, which states that, among other ideals, 'ABET will seek to:

- Assure high quality, encourage continuous improvement, and foster innovation in engineering, engineering technology, and engineering related education through accreditation.
- Improve understanding of the accreditation process and broaden involvement and participation in ABET activities. . . .
- Foster cooperative efforts of public and private employers with academe to identify and support needed educational improvements.
- Help make studies represented by ABET programs attractive to every student and prospective student . . . '.

Implementing this vision has been a major focus of ABET leadership to the present.

### CLOUDING THE VISION

Despite the commitment to change, the following major obstacles must be overcome if the accreditation innovations implemented to date are to be sustained:

- Outcomes assessment and continuous improvement, the basis of the new accreditation philosophy and criteria, are foreign to academic experience and culture, leading to a high level of discomfort. From ancient times, predictable slavery has often been preferred to unpredictable freedom. More than 3000 years ago, the Israelites in the desert cried out to Moses, 'Why did you bring us out of Egypt to kill us and our children and livestock with thirst?' [2].
- Developing an effective program of outcomes assessment and continuous improvement requires a significant investment of effort. Once established, less effort is required to maintain such a system, but continued attention is required—one cannot forget about it for six years!
- ABET must resist the powerful human tendency to require excessive documentation.
- A much higher level of professional judgment by program evaluators and team chairs is needed for sound evaluation under EC 2000 than was required with the traditional criteria (although,

with the shorter, pre-1980 criteria, significant professional judgment was required).

- As a consequence, the quality of program evaluator training becomes a potential weak link in the entire process.

Although the experience of my own institution with an EC 2000 evaluation visit was highly positive, I have heard disturbing anecdotal reports of other visits and of some professional society evaluator training programs. Also, a number of societies do not require individuals to participate in an evaluation visit as an observer before serving as evaluators themselves.

### DISPELLING THE CLOUDS: THE PATH FORWARD

As ABET moves forward to implement its 'Vision for Change,' its leaders guiding the change must answer four key questions:

- Are the changes to date in the ABET accreditation criteria and process driving the changes needed in the education of engineers, engineering technologists, and engineering-related professionals?
- Are these educational programs becoming more innovative and responsive to the needs of the profession?
- How can ABET assure that the intent of EC 2000 is implemented effectively—both in the accreditation process itself and in its impact on educational programs?
- How can ABET assure that the highest standards are maintained in the selection, training, evaluation, and (if necessary) removal of program evaluators and team chairs?

None of these questions can be answered easily and quickly, but the ABET leadership must ask them continually and work cooperatively with ABET constituents to define viable responses. Among the strategies that might be pursued productively in developing such responses are the following:

- Commission an independent longitudinal assessment of the impact of outcomes-based criteria and accompanying processes on engineering, engineering technology, and engineering-related education, with respect to desired objectives.
- Establish an ongoing process to track and review these assessment results and to recommend accreditation changes as required. The ABET Industry Advisory Council should be an active part of this process.
- Conduct an ongoing paperwork-reduction process, overseen by *industry* representatives with a track record of success.
- Seek support from NSF and industry to develop a challenging, high-quality training and certification system for program evaluators (open also to educators preparing for accreditation).

This might be modeled after the processes for certification of ISO 9000 or Baldrige Award examiners.

- Require such certification to serve as an evaluator or accreditation commission member. It would be desirable to require, also, participation as an observer before serving as an evaluator. For quality control, the process should be administered centrally by ABET, with participating bodies responsible only for training on their Program Criteria.
- Work with participating bodies to develop a uniform, effective process for program evaluator recruitment, selection, evaluation, and, if necessary, courteous removal.
- Recognize that a judgment-based accreditation system is an inherently unstable process. Left to itself, it will degenerate into a bureaucratic checklist of detailed 'must statement' specifications. (This pitfall is not limited to engineers—I have seen it also at work in regional accreditation associations.)

## CONCLUSION

The path forward is never certain, but, given its resolve, ABET has the ability to control its destiny. Let me leave with you this final thought, which appeared on the 'Editor's Page' of the *International Journal of Engineering Education* a few years ago [3]:

*ABET must set high standards for the effectiveness of institutional processes, and not all programs will be able to meet them. However, in the final analysis, ABET's role is no different from that of a truly dedicated faculty member—to set high standards and then do everything in his or her power to help students achieve them!*

*Acknowledgements*—This paper is based on the keynote presentation, 'The Road Ahead', at the 2002 ABET Annual Meeting, 'The 2nd National Conference on Outcomes Assessment for Program Improvement'. I would like to thank the Accreditation Board for Engineering and Technology, Inc., ABET<sup>®</sup>, 111 Market Place, Suite 1050, Baltimore, MD, 21202-4012 (<http://www.abet.org>) for permission to use it.

## REFERENCES

1. J. W. Prados, 1991–92 President's Report, *60th Annual Report*, Accreditation Board for Engineering and Technology, Inc., New York (1992).
2. Exodus 17:3, *New Revised Standard Version Bible*, Oxford University Press (1998).
3. J. W. Prados, 'Editor's Page,' *Journal of Engineering Education*, **86**(2) (1997) pp. 70–71.

**John W. Prados** is Vice President Emeritus and University Professor at The University of Tennessee, where he has served for over 45 years. A consultant for industry, government, and higher education, he was also Senior Education Associate in the NSF Engineering Directorate (1994–97). His professional service includes EAC Chair (1984–85) and President (1991–92) of ABET; Treasurer and Director of AIChE; President and Treasurer of Sigma Xi, The Scientific Research Society; Executive Councilor of Tau Beta Pi; member of the Commission on Colleges and Board of Trustees of the Southern Association of Colleges and Schools; and editor (1996–2001) of the *Journal of Engineering Education*. He currently serves on the Board of Trustees of the F. W. Olin College of Engineering. He is a fellow of ABET, AIChE, and ASEE and is a Registered Professional Engineer in Tennessee. In 1993 he received ABET's highest recognition for service to engineering education, the L. E. Grinter Distinguished Service Award, and for 1997–98 he was named Faculty Macebearer, the highest faculty honor conferred by the University of Tennessee. He holds the B.S.Ch.E. from the University of Mississippi, and the M.Sc. and Ph.D. from the University of Tennessee, all in chemical engineering.