

# **ECEDHA ABET Subcommittee**

## **on**

### **"Assessment – What is Sufficient"**

**Chairman:** John K. Estell, Ohio Northern University

**Members:** Steve Williams, Milwaukee School of Engineering; Jerry Hudgins, University of Nebraska-Lincoln; Ibrahim M. Abdel-Motaleb, Northern Illinois University; Paul Devgan, Tennessee State University; Brian Woerner, West Virginia University

## **Final Recommendations - 10 February 2010**

### **Part A - Recommendations for IEEE-CEAA to implement or to forward to ABET:**

1. With respect to the current ABET EAC Criteria, remove the Criterion 2 (part c) requirement for “. . .an assessment and evaluation process that periodically demonstrates the degree to which these [program educational] objectives are attained.” In addition, the wording in Criterion 4 should be modified so as to not include Criterion 2 as “available information” for continuous improvement. Similarly, for the "Proposed Harmonized General Criteria for Engineering Programs," remove the Criterion 4 requirement that the program must regularly use an appropriate, documented process for evaluating the extent to which the program educational objectives are being attained.
2. In order to provide clarity, IEEE-CEAA and/or ECEDHA should form a Task Force to develop a set of rubrics and guidelines, based upon an appropriate Body of Knowledge, for Criterion 3 assessment that is similar in content and scope to that created by the American Society for Civil Engineers.
3. Request that ABET set up a mechanism that allows the lead society, or its designated agent (e.g., IEEE could designate ECEDHA), the ability to systematically collect and preserve each year's accreditation results for programs under its jurisdiction. There should be two records:
  - a. one containing findings by criterion and by shortcoming before due process, and
  - b. one containing the same information post due process.
4. As a follow-up to Recommendation #3, a Task Force should be formed to review the accreditation results for each year by classifying each reported shortcoming into one of three categories:
  - a. Shortcomings that are actionable by the program.
  - b. Shortcomings that are outside the control of the program, but are actionable by the institution.
  - c. Shortcomings that are outside the control of both program and institution.

## **Rationale behind the IEEE-CEAA / ABET recommendations:**

Regarding Recommendation #1, a program is required under both the present criteria and the proposed "Harmonized" criteria to collect data on alumni who are three to five years removed from their graduation. While the recent ECEDHA Criterion 2 Survey indicated general support for having published educational objectives (68.6% in favor, 13.1% against) and for having a process that periodically documents and demonstrates that the objectives are based on constituent needs (51.3% in favor, 22.6% against), there was a lack of majority support for having a process that evaluates the degree to which these objectives are obtained (45.2% in favor, 28.7% against) and a lack of support for the premise that the information obtained in assessing and evaluating Criterion 2 is worth the time invested by the program (20.9% in favor, 61.7% against). Furthermore, there are a number of reasons that the data collected to assess the extent to which program educational objectives are attained is of limited to no value:

- A. External factors significantly affect the state of the alumni in the intervening three to five years after graduation to the extent that the assessment data become noncausal with respect to the program's educational processes.
- B. The degree of undersampling of the alumni using largely indirect methods (e.g. surveys) often renders the data statistically insignificant. For example, the reported alumni survey response rates as per the recent ECEDHA Criterion 2 Survey had a median of only 15% while the response rates for employer surveys had a median of only 10%.
- C. If the data were considered causal and statistically significant, then there exists a long time constant that exceeds other shorter system time constants that do affect results (such as university institutional and curricular changes, university personnel changes, changes in the economy, etc.). This long time constant includes: (a) detecting a problem via the alumni and employer assessment data; (b) creating and implementing a solution plan; and (c) assessing the effectiveness the solution. The time constant is six to eight years or longer, depending on the solution plan.

If there is a genuine concern regarding certain issues, then steps should be taken through those entities that do play an active role in the graduate's professional life, such as licensure or continuing education requirements through either professional societies or employers. It is not appropriate to saddle an academic program with the responsibility of insuring that graduates achieve a set of educational objectives when that program no longer plays an active role in the professional life of its graduates.

With respect to pursuing Criterion 3 reforms, Recommendation #2 essentially states that we should not re-invent the wheel, nor should we go about tilting at windmills. The American Society for Civil Engineers (ASCE) has already done a lot of work in correlating Criterion 3 to their Body of Knowledge from which we can learn a great deal. In particular, their "Civil Engineering Body of Knowledge for the 21st Century" publication is an excellent resource. (This document is available online: <http://www.asce.org/professional/educ/>) For example, they deal with Criterion 3 assessment by first presenting a mapping of the ABET Criterion 3 outcomes to the CE Body of Knowledge (BOK) outcomes (Table H-1), and then focusing on achieving their

own BOK outcomes through rubric-based guidelines. Appendix I of this document provides a complete set of cognitive achievement rubrics (based on Bloom's Taxonomy) for all 24 of the Civil Engineering BOK outcomes. The rubrics present reasonably explicit performance criterion levels for each outcome, including those BOK outcomes that relate to the "soft" ABET outcomes. Additionally, the rubrics indicate a specific performance level for each outcome that students are expected to achieve by the time of graduation. Also included are example rubrics (Tables G-3 and G-4) for measuring both affective and cognitive achievement associated with a particular BOK outcome. The point to be made here is that, by having a set of rubrics adopted by the IEEE-CEAA and appropriately referenced in our section of Criterion 9 (Program Criteria), we can provide a definition of "assessment sufficiency" to our programs without having to force changes at the ABET level. Given that the Criterion 3 outcomes have to serve all engineering programs, not just electrical and computer engineering, developing our own resources for interpreting those outcomes and incorporating them as part of our Criterion 9 program-specific criteria – or at least using this approach to provide guidance to EE and CompE PEVs by clarifying and/or amplifying our interpretation of the ABET Criteria – is the better and easier approach.

Recommendations #3 and #4 involve the review of the results of the accreditation process; essentially, asking ABET to assist us in "closing the loop" on their accreditation process so that each society can see what is and what is not working, then make recommendations for adjustments to be made at the appropriate level. Recommendation #4 is critical to this process, as currently the only data we receive is the breakdown of where, by criterion, shortcomings are observed. The information that is needed for improving the accreditation process is not **where** shortcomings are observed, but the reason **why** the shortcoming was cited, especially as there are occasions where shortcomings are cited for things that are not under the control of either the institution or the program. One telling example about the need for change is from the recent ECEDHA Criterion 2 Survey, where among the comments received were complaints about having "insufficient survey response rates" being cited as a shortcoming by a PEV. Given that the response rate to alumni and employer surveys are out of the control of both the program and the institution, one could make the argument that this is not a valid reason for hitting a program with a shortcoming, and adjusting the PEV training and instructional materials accordingly.

## **Part B - Recommendations for ECEDHA:**

5. Develop and offer a short (30-60 minutes in length) presentation on the essentials of program outcomes assessment to serve as a basic primer for those who are without prior assessment experience. The presentation would be targeted toward first-time chairs and scheduled on the Friday afternoon of the Annual Meeting such that all first-time chairs could attend, but anyone desiring to attend the session would be welcome to do so.
6. Develop and offer one or more workshops focused on ways to streamline the program outcomes assessment process. Example topics include how to report concise information instead of multitudes of raw data from your courses, structured reporting processes that

promote critical and reflective course analysis, and using heuristics to streamline the evaluation of program outcomes. These (and other related) topics can be given as either separate three-hour workshops or combined into a day-long workshop, using a similar fee structure as the ABET Workshop. These workshops could be held in conjunction with the Annual Meeting on Friday in parallel with the ABET Workshop, on Sunday afternoon and/or evening, or on Tuesday afternoon, or some combination thereof.

### **Rationale behind the ECEDHA recommendations:**

At last year's ECEDHA meeting, many of the comments made during the ABET Issues session reflected a fundamental lack of assessment knowledge in several areas. For example, many participants complained about their excessive assessment burden due to the massive amounts of data that they were dealing with; in some cases, it was evident that their institutions were measuring everything, everywhere, all the time. Additionally, very few participants were aware that ABET holds an annual symposium that provides training and information on how programs can improve their assessment and accreditation processes.

For Recommendation #5, it would not be difficult to develop an "Assessment 101" presentation for new chairs; it is even possible that Gloria Rogers of ABET would allow us to use her materials.

For Recommendation #6, there are already proven methods for streamlining the outcomes assessment process that will cut down on the amount of paperwork and reduce the time needed to perform evaluations. Furthermore, ECEDHA member John Estell has given several invited presentations over the years at the ABET Symposium and at other venues, such as the Frontiers in Education Conference, the Academic Chairpersons Conference, and the ACM SIGCSE Technical Symposium, on various ways to streamline the outcomes assessment process. These presentations have been given in a variety of formats, including three-hour workshops. The materials in these presentations essentially focus on doing no more than what is necessary and sufficient for implementing and maintaining a successful and efficient assessment process. Many institutions have implemented the concepts and techniques that John provides in his workshops, and these programs have reported back that their PEVs were very satisfied with the results, with some PEVs even citing them as strengths of the program being evaluated. John Estell is willing to provide the various workshops that he has given at the ABET Symposium (and, if needed, the "Assessment 101" program) to the ECEDHA membership as part of the Annual Meeting. As to why ECEDHA should offer such workshops, please note that this year's "early registration" rate for the ABET Symposium is \$490; factor in travel and lodging expenses, and the cost to attend can easily be around \$1000. Considering that few chairs would be able to justify either the time commitment or the financial expense of a separate trip to an assessment conference, having ECEDHA provide assessment workshops that are tailored to the needs of ECE chairs at part of the Annual Meeting would be both beneficial and cost-effective to our membership.