

ABET is Coming! Getting Faculty Involved

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Abstract

Faculty participation in outcomes assessment is critical to a successful ABET review, yet many faculty view assessment as merely an additional time-consuming task piled on top of the many things they already have to do. Enthusiasm for outcomes assessment can be in short supply. The Agricultural and Biosystems Engineering (ABE) Department at Iowa State has its ABET review in 2006. We have been working for the past two years to engage our faculty in outcomes assessment, with a fair degree of success. This paper discusses the activities we've used to help fellow faculty members become active participants in learning and outcomes assessment, and how we've addressed impediments to their involvement. We'll discuss the ABE Learning Circle, faculty workshops, curriculum development, and one-on-one assistance provided to faculty to integrate outcomes assessment into the courses they teach. While faculty participation in the process can always be improved, we believe we are well on our way to successful preparation for our 2006 ABET review.

Introduction

Every ABET-accredited engineering program across the country hears the same call every six years: ABET is coming! How programs react to that call varies considerably, from panic to procrastination to (occasionally) a deliberate and considered approach. The task of preparing the ABET self-study report often falls to one or two faculty members, who throw themselves into the task for six months before the reporting deadline, often to the exclusion of their other scholarly duties.

The new outcomes-based ABET accreditation criteria¹ emphasizes that the assessment process should be one of continuous improvement, not a massive outpouring of effort every six years by a few faculty members. Continuous improvement must involve all faculty engaged in teaching and learning within a program, or it is doomed to failure. But, how do you engage faculty when there are so many other demands on their time, many of which relate to promotion and tenure?

The Agricultural and Biosystems Engineering (ABE) Department at Iowa State University has implemented an assessment process that focuses on involving faculty at three different levels: individual courses, the curriculum committee and the faculty as a whole². A map of our outcomes assessment process is given in Figure 1. Our process primarily involves the

assessment of workplace competencies in co-op and internship experiences³, and across students' academic experiences via electronic portfolios⁴. These competencies were mapped to our program's outcomes through engagement with our stakeholders⁵. A summary of the process is given in the next two paragraphs.

Outcomes and objectives are reviewed every three years, in consultation with our stakeholders. The instructor(s) of each agricultural engineering course designate which outcomes and, from the competency/outcome mapping, the competencies the course could cover. In each course, instructors designate key assignments that students should include in their electronic portfolios. Students build electronic portfolios from key assignments, other relevant academic experiences, co-op and internship experiences, and relevant extra-curricular activities. Faculty and external reviewers evaluate the portfolios in the senior year.

The curriculum committee reviews the ePortfolio evaluations, along with the other direct measures of student performance: internship evaluations, evaluations of two-year graduates by employers, and the results of the Fundamentals of Engineering examination. Indirect measures such as student surveys are considered as well. The committee identifies strengths and weaknesses to discover which competencies need increased emphasis in the program. Those results are shared with stakeholders and faculty. Individual faculty get involved in the discussion when, for example, their class addresses the competency of "innovation" and the assessment results point to "innovation" as a weakness in our graduates. Suggested program changes as a result of the assessment process, are voted on by the faculty as a whole.

In designing this assessment and continuous improvement process, we well understood that additional workloads would be difficult to enforce. Everyone has more tasks than they can complete, and assessment does not easily rise to the top of anyone's priority list. Also, we understand that not every faculty member is involved with the day-to-day mechanisms of assessment. We needed to expose them to smaller pieces of the entire process, in a logical manner (we are engineers, after all), over a long period of time (years), in order to bring everyone "up to speed."

With these two principles in mind (caution about additional workloads, and frequent but small chunks of information), we've used a number of different methods to involve faculty in a manner that we believe are not threatening. These are: (1) Investing outcomes assessment in the curriculum committee; (2) involving individual faculty as part of the courses they teach; (2) the ABE Learning Circle; (3) faculty workshops; and (4) one-on-one consultations.

Curriculum Committee

Outcomes assessment (and thus the ABET reporting process) is invested in the curriculum committee. This group of eight faculty members and two staff persons carry much of the formal work of assessing outcomes data. We are fortunate that all members of this committee are engaged and committed, and thus share the workload of the assessment process. Through consensus, the committee has developed an assessment timetable with assigned tasks and staggered deadlines. We are also fortunate that the entire faculty trusts the decisions of the committee, relying on their developing expertise in assessment.

In an effort to limit additional work, the committee is working to align as many measures as possible to address competencies. Previous assessment tools gave independent sets of data, with no clear way to identify common results. The committee is rewriting our indirect outcomes measures (e.g., graduate surveys, and senior exit surveys) to standardize the questions and make them address the competencies. Other supporting evidence over which there is no "format control" (FE exam results, CSREES reviews, etc.) are still used, though interpreting the results in such a way as to facilitate course or curriculum revisions is sometimes difficult.

Using a timetable with staggered deadlines enables committee to break down the work into manageable chunks, and, once a year, to synthesize the findings from those individual pieces into summary identification of overall strengths and weaknesses of the curriculum.

Individual Courses

Instructors already designate learning objectives for each class. Without too much additional work, faculty are re-interpreting those learning objectives in terms of program outcomes and competencies. We've started this process in faculty workshops and during one-on-one consultations (see the following sections). Faculty also designate assignments already part of the course for inclusion in students' ePortfolios.

Figure 2 gives a common instrument we used in this re-interpreting process. This instrument is based on the method presented by Felder and Brent.⁶ Learning objectives for the course are listed. Faculty evaluate the degree to which each learning objective addresses each program outcome (substantively, moderately, slightly, or not at all). We are now compiling the results to determine the degree to which our courses cover the program outcomes and related competencies.

Some additional questions on the instrument were recently inserted. Feedback from internship evaluations have shown the weakest competencies in our students to be innovation and communication. To help understand how we currently address these competencies in our courses, we asked faculty to list any case-study, open-ended problems, or communication-intensive activities that they use in their class.

ABE Learning Circle

In 2002, we began the ABE Learning Circle, a weekly hour-long casual conversation about teaching and learning. Over coffee and donuts, we discuss issues related to our teaching efforts, including outcomes assessment issues. Attendance is voluntary, and often varies according to faculty schedules. Previous to this effort, there was no forum, other than formal committee or faculty meetings, where faculty, staff and graduate students could talk and ask questions about teaching and learning.

The format of the ABE Learning Circle varies. Sometimes, we start with a "go-round," where a question is asked, and all in attendance have the opportunity to address it. Some of the questions we've used include: "How did you start your class this semester?"; "What should you include on your syllabus?"; "What assessment techniques do you use in your class?"; and "How do you

assign grades?” The ensuing conversation many times lasts past the designated hour, and often diverges into other interesting, but related, topics.

Sometimes, the Learning Circle starts with a formal presentation about some relevant topic (e.g., ABET accreditation or active learning techniques), followed by discussion. Faculty volunteer to make those presentations. Other times, we have visitors join us for conversation. In the fall semester of 2004, the Assistant Dean for Undergraduate Programs for the College of Engineering and the President-elect of ABET (an ISU faculty member) joined us.

The ABE Learning Circle has explored a wide range of topics. They included, no particular order:

- the first day of class
- writing learning objectives
- assigning grades
- academic dishonesty
- electronic portfolios
- competencies
- formative and summative assessment
- Bloom’s taxonomy
- active learning techniques
- ABET accreditation
- capstone design projects
- advising

The response by faculty, staff and graduate students to the ABE Learning Circle has been good. There is a core group of eight to ten faculty members that regularly attend. Many others have indicated that they would like to attend, but schedule conflicts don’t allow them. And of course, having donuts available never hurts attendance.

The ABE Learning Circle allows us to foster an interest in the scholarship of teaching within our faculty. It gives us an informal and non-threatening venue to explore new ideas and to keep important issues in the minds of faculty. It has become an important avenue of communication among faculty to discuss and think about issues related to teaching, learning and assessment. It has also helped in assisting new faculty assume their roles as education professionals, getting them thinking about learning and assessment at the beginning of their careers, and helping them to understand the teaching philosophies of our department.

Faculty Workshops

Each year, between fall and spring semester, the department conducts a faculty retreat. In this one- to two-day retreat, departmental business that can’t be addressed in a normal one-hour faculty meeting (e.g., strategic planning, budgets, etc.) is conducted. For the past three years, a half-day of this retreat has been devoted to “teaching” issues. We have used this half-day as a workshop to talk about outcomes assessment, competency development and ePortfolios, and to make decisions relative to our teaching efforts. ABET is a part of the conversation, but not the focus. Our philosophy is that a good ABET self-study report is the result of an active and effective teaching program, not an objective unto itself.

Each workshop involves the delivery and discussion of information and then tasks for faculty to do. With other demands on their time, faculty don't want to sit listening to the pontification of a supposedly enlightened few.

In the January of 2004, we presented the outcomes assessment plan (Figure 1). We were able to make a more detailed and practical presentation than what was in our 2000 ABET self-study, which few of the faculty actually read. In small groups, faculty were asked to discuss and react to the plan, identifying strengths and weaknesses. After this discussion and resulting modifications, the plan was approved by a unanimous faculty vote.

In December 2004, the workshop was a review of outcomes assessment, with tasks related directly to our plan. Faculty worked on mapping class learning objectives to program outcomes (see above). We also presented the student ePortfolios system to them for evaluation and discussion. Faculty assessed student portfolios, providing feedback on the portfolio system.

One-on-one Consultations

In the summer of 2004, we hired a lecturer from the English department to consult with individual faculty about their courses, helping them determine which program outcomes apply to their course, the corresponding competencies, and what key assignments they should designate. Coincidentally, this lecturer also teaches the linked freshmen English composition classes for our departmental learning communities⁷. She spent approximately 10 hours per week over the course of two months in meetings with faculty and compiling the results of those meetings, along with some unrelated duties.

Eight out of 15 teaching faculty participated in these one-on-one consultations. The responses from these eight were universally positive. They appreciated the assistance of someone to guide them through the process and help them probe deeper into what they were trying to accomplish in their course(s). For some, it was the first time they truly reflected on how their individual course related directly to the program outcomes. Also, having a consultant that was essentially an "outsider" to the engineering education process was of great value – she could ask questions that someone supposedly familiar with the process would not consider asking.

Summary

Involving our faculty in the outcomes assessment process and ABET accreditation follows two basic principles: we need to take advantage of what faculty are already doing to avoid additional workloads whenever possible; and to involve faculty in the process frequently with small and manageable chunks of information. Our overall philosophy is that a good ABET self-study report is the result of an active and effective teaching program, not an objective unto itself.

Faculty are involved through their normal activities in individual courses and the curriculum committee, the ABE Learning Circle, faculty workshops and one-on-one consultations. Faculty have "bought into" the outcomes assessment process. They are participating in a positive manner and continue to offer positive comments and constructive criticism.

Some of the efforts in creating the self-study will obviously fall to individuals. However, with the support and assistance from a number of other faculty, we believe we are well on our way to successful preparation for our 2006 ABET review.

References

1. ABET Engineering Accreditation Commission, "Criteria for Accrediting Engineering Programs, 2003–2004" <www.abet.org/criteria_eac.html>, accessed February 25, 2004.
2. Brumm, T. J., S. K. Mickelson, B. L. Steward and A. L. Kaleita-Forbes, "Competency-based outcomes assessment for agricultural engineering programs," *International Journal of Engineering Education*, 2005, in press.
3. Mickelson, S.K., T.J. Brumm, and B.L. Steward, "Using Competency Feedback to Assess Agricultural Engineering Curriculum," *Proceedings of the Annual meeting of the American Society for Engineering Education*, American Society for Engineering Education, Nashville, TN, June, 2003.
4. Brumm, T.J., A. Ellertson and S.K. Mickelson, "Using ePortfolios to Develop and Assess ABET-Aligned Competencies," *Proceedings of the Annual Meeting of the American Society for Engineering Education*, American Society for Engineering Education, Nashville, TN, June 2003.
5. Mickelson, S.K., L.F. Hanneman and T.J. Brumm, "Validation of Workplace Competencies Sufficient to Measure ABET Outcomes," *Proceedings of the Annual meeting of the American Society for Engineering Education*, American Society for Engineering Education, Montreal, Quebec, Canada, June, 2002.
6. Felder, R.M. and R. Brent, "Designing and Teaching Courses to Satisfy the ABET Engineering Criteria," *Journal of Engineering Education*, Vol. 92, No. 1, 2003, pp. 7-25.
7. Harms, P.C., S.K. Mickelson and T.J. Brumm, "Using Learning Community Course Links to Bring Meaning to the First-Year Engineering Curriculum," *Proceedings of the Annual meeting of the American Society for Engineering Education*, American Society for Engineering Education, Albuquerque, NM, June, 2003.

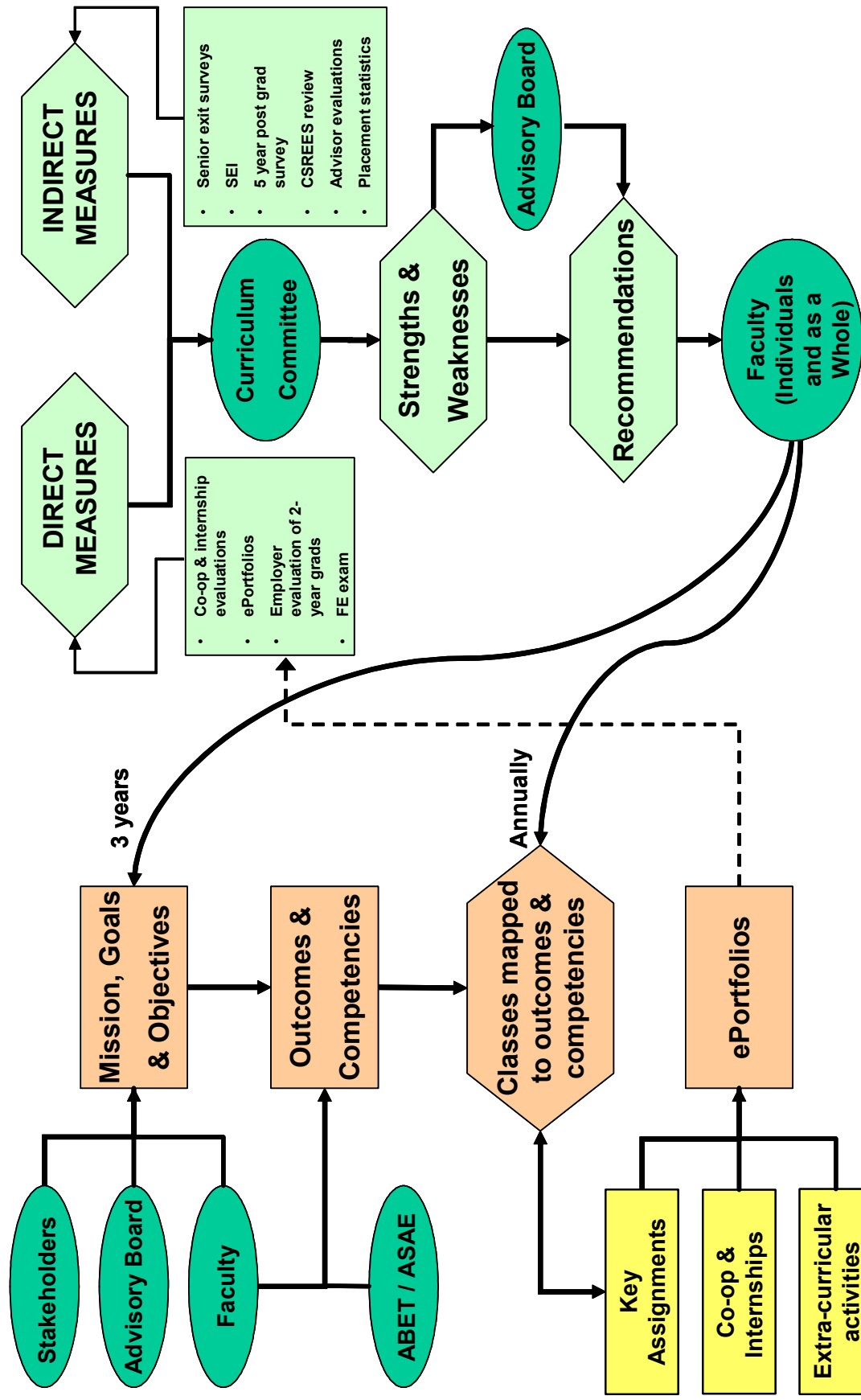


Figure 1. ABE Outcomes Assessment Map.

ABE Faculty Retreat	December 20, 2004
Iowa State University	Course Assessment

Please complete the following course assessment matrix for one of the courses you are teaching. Refer to the ISU Outcomes Matrix and ISU Competency document for definitions.

Course _____ Course Title _____

	Outcomes a	Outcomes b	Outcomes c	Outcomes d	Outcomes e	Outcomes f	Outcomes g	Outcomes h	Outcomes i	Outcomes j	Outcomes k	Outcomes l	Outcomes m	Outcomes n
Outcomes-related learning objectives														

1 = objective addresses outcome slightly, 2 = moderately, 3 = substantively

This course includes:

? Case study (ies). List title(s) _____

? Open-ended design problem(s). List title(s) _____

? A communications intensive activity (specify communication type below):

- ? Written
- ? Oral
- ? Visual
- ? Electronic

List title(s) _____

Ideas to include, if not currently integrating these: _____

Figure 2. Outcomes mapping tool for individual classes.