Union College Experiences Under ABET Criteria 2000

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INTRODUCTION

Union College participated in the 1997 pilot program for the Engineering Board for Engineering and Technology, ABET, Engineering Criteria 2000. This paper discusses the preparation for, and conduct of, the Fall 1997 visit, from the perspective of the Civil Engineering Department chair. For those who are interested, the whole Civil Engineering Volume 2 Self-study can be found on the World Wide Web at

 http://www.union.edu/PUBLIC/CERDEPT/index.html

This gets you to the Union College Civil Engineering Department home page. The report can be viewed by clicking on the 1997 ABET Report, V2 link. Volume 1 for the Institution, and the Electrical and Mechanical Engineering Volume 2s, can also be accessed via the Web.

PREPARATION

Our status as a pilot school made our preparation somewhat atypical, but our experiences should still give schools with upcoming visits some help in what they should do to get prepared.

We had other conditions that made our preparation different than usual. We were midway through developing and implementing an entirely new curriculum under a General Electric Foundation grant. The first year of the curriculum was implemented during the 1996-97 academic year, the same year that we were preparing for the visit. The second year curriculum was firmed up during the fall of 1996, but the third and fourth years were being developed at the same time we were writing our Volume 2 and preparing for the visit. Furthermore, the 1997 graduates whose transcripts would be reviewed by the visiting team, had followed a different curriculum from the one described in our Volume 2.

Originally the Engineering Accreditation Commission, EAC, had planned to have three years of pilot visits, and we had asked to have our visit delayed until the third pilot study year. The delay of one year would have allowed us to have two years experience with the new curriculum, and would have allowed us to be farther into our assessment process, but it would not have eliminated the problem of having the graduates under a different curriculum. When EAC decided to limit the pilot visits to two years, we requested and were approved for a Fall 1997 pilot visit.

Another unique aspect of the pilot program was meeting with our team six months before the visit. All of the pilot schools met with their respective teams and other ABET representatives in Atlanta in May of 1977. That meeting was designed to iron out procedures for the visit, not to act as a pre-visit to evaluate the program. The meeting gave us the advantage of meeting our team members and learning something about their personalities, and hearing what they would be concentrating on during the actual visit. For example, the civil engineering visitor told me that ASCE (American Society of Civil Engineers) was still very interested in the amount of design in courses listed as having "significant design," and that he would be checking course material

closely. The meeting also allowed us to point out shortcomings in the draft instructions and format for preparation of our Volume 2 Self-study report. As a result we were given the go ahead to use a format more directly focused on the criteria. The admonition we were given was that whatever format we used, our Volume 2 must show how our program met all aspects of Criteria 2000.

We were also developing our assessment program in parallel with our visit preparations. We already had some assessment tools in place, but others were being implemented for the first time. Thus, much of the assessment reported to the visiting team showed that the mechanisms were in place, but did not demonstrate comprehensive feedback and course improvement outcomes. A description of our assessment program is included in a later section.

My advice in preparing for your own visit is to have your assessment program well underway, and to be able to demonstrate feedback and course improvements. Also, study whatever information your discipline provides to you. ASCE gives all department chairs a copy of the *Manual of Evaluation Process, Engineering Criteria 2000,* which contains much useful information on what visitors are going to be looking for, and includes a copy of the Program Deficiency Audit that visitors must fill out at particular times in the accreditation process. You must provide the visitor with information and data which substantiate your attainment of each of the items listed on the Deficiency Audit. It should also be noted that the Deficiency Audit contains all of ABET objectives (a) thru (k).

REPORT

We felt that the best way to demonstrate that our program met ABET Criteria 2000 was to address each of the criteria in turn, and describe how we were meeting that criteria. A topic outline of our report follows:

> BACKGROUND
>> Program modes
>> Enrollment and degree data
> CRITERION 1. STUDENTS
>> Recruiting and Monitoring
>> Advising System
>> Transfer Credit Validation
> CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES
>> Educational Objectives (Mission Statement)
>> Process to Produce and Update Objectives
>> Curriculum and Process to Achieve Objectives
>> Ongoing Evaluation Process to Demonstrate Achievement of Program Objectives
>>> and Improvement in Program
>>> Deficiencies Noted During Last Visit
> CRITERION 3. PROGRAM OUTCOMES AND ASSESSMENT
>> Engineering Division Level
>> Civil Engineering Department Level
>> Course Level
>> Anecdotal Assessment
>> Assessment of Transfer Courses

It appears that it is increasingly important to prepare a comprehensive and convincing Volume 2 Self-study Report. You have to make the case that your curriculum satisfies Criteria 2000 and meets your published program objectives. A well prepared report should provide the visitor with all the information he or she needs to evaluate your program. The visit is then just a verification process, rather than forcing the visitor to dig out additional information.

CRITERIA

The departmental program educational goals and objectives are embedded in the department mission statement. When we began preparing our Self-study, we became aware of the confusion that would result if we tried to demonstrate how we met both our program educational objectives, and the ABET objectives (a) thru (k) of Criterion 3. Therefore, under Criterion 2 we mapped the ABET objectives into the program objectives of our mission statement. After that, all responses were addressed in terms of the department program objectives.

The ABET objectives are somewhat prescriptive, and visitors will naturally key in on them as something to check programs against. Therefore, it is necessary to somewhere tie them into your own program objectives. The mapping has to be convincing if the visitor is to accept that by meeting your program objectives, you also satisfy the ABET objectives.

ASSESSMENT AND FEEDBACK

Assessment and feedback are probably the most nebulous parts of Criteria 2000. The

criteria say you have to have them, everyone agrees that they are useful, but no one seems to agree on what you should do or how you should do it. This is probably good in a way, because you don't want everyone using exactly the same assessment instruments and doing the same analysis. Cookie cutter assessment can be as stagnating as cookie cutter curriculums.

Assessment is also a dynamic process. You should be continually evaluating your assessment, but not necessarily on a cost/benefit basis, as it may be difficult to put a dollar value on the benefits accrued due to feedback to improve programs. What you should be doing is evaluating the information you are gathering to see if it really can be used to improve the program, and picking those assessment tools which will give you the most benefit for each dollar invested. You are much better off using two or three good tools than many mediocre tools. With too many tools you also get into data overload.

Union College has had a formal course evaluation process in effect for many years. However, the form used is oriented more toward performance evaluation than toward assessment for course improvement. The results weigh heavily in tenure/promotion decisions. There are 15 graded response questions and six open-ended questions. As part of our assessment process, the engineering division added an additional 16 graded response questions with room after each response for comments. The responses were graded from strongly agree to strongly disagree for statements such as "Designing and conducting experiments related to engineering problems was an important part of this course." Both of these forms were administered at the same time. What we found was that the students paid little attention to the new questions, and made almost no comments. We were afraid that the longer form would also dilute student responses to the faculty evaluation part of the form. Furthermore, the data from this form has not been put to good use in improving course material for subsequent offerings. This is due in large part to a lack of faculty recognition of the new form as a valuable form of assessment. We are presently evaluating whether or not we will continue to use the augmented questionnaire. We may end up splitting up the questionnaires, and administering them at different times. The original idea of combining the questionnaires was so that correlations and comparisons could be made among the responses to both parts. However, no one has developed a useful way to do this yet.

As a department we have found that a valuable form of assessment is customized questionnaires developed by a faculty member for a particular course. Using this approach, a faculty member can gather data on a specific aspect of a course, and use that data to make improvements in the course for the next offering.

We sent out an alumni survey to classes from the even years for the past ten years. We got a good response from these, however the data received basically reinforced what we already knew. In a number of instances, recommendations from alumni were for changes we had already implemented.

We also sent out a senior questionnaire. The data from this again pretty much was in line with what we already knew from the grapevine. However, the data do serve as a validation of anecdotal information.

Performance data for the fundamentals of engineering examination were also included in Volume 2. However, it is not at all clear how these data can be used in assessment.

As an ongoing assessment and feedback tool, the department has set up a file for each

course. After each offering of a course, the faculty member will review all of the assessment data gathered for the course, including comments received from the department chair on course evaluations and class visitations. The faculty member can then estimate the success or failure of the course, and can develop ways to improve the course for the next offering. A short report on the assessment/feedback process and course improvements will be placed in the file.

The department chair attends at least two classes for each faculty member each term. These visits are part faculty evaluation, and part developmental tool. Feedback and suggestions are given to the faculty member concerning possible course improvements.

Departmental meetings are documented through minutes to show curriculum development and application of assessment.

We will continue to monitor and evaluate our assessment process. Tools which do not produce useful information for course improvement will be scrapped, and new ones that are promising will be introduced.

VISIT

More time was spent by the team in going over the course materials than in the past. The trend seems to be for teams to come in on Sunday afternoon and start looking at the materials. They have to spend enough time to adequately assess design content and attainment of program objectives.

Our visitor asked virtually no questions on how we met our program objectives. He did comment on the high quality of our Volume 2 Self-study. So, he may not have had any questions because of the quality of our report and the strength of the assessment/feedback system. However, I think it is more a result of lack of experience with the new criteria. Even though all of our visitors were experienced program evaluators, they were fairly new to the assessment/feedback process. As with any pilot project, they were learning from us at the same time we were learning from them.

Although the instructions did not require it, our visitor would have liked to see a table of faculty professional registration, with the state or states listed, and an indication whether or not the license was current.

WHAT TO EXPECT

Contrary to what we found on our visit, I think you can expect to be asked to explain how your program outcomes demonstrate attainment of your published program objectives. You should also expect some "bean counting" on the part of visitors. There are few quantitative criteria under the new system, however it is a natural tendency of engineers to want to quantify things. Two areas that may be prone to some form of bean counting are the design content of the curriculum and the meeting of all program requirements by all students.

How much design is "significant design?" I haven't seen anything published on this, but have heard 50% thrown about. Also, how many courses with "significant design" do students have to take before they have adequate design experience? These are areas that are open to interpretation, and you have to be able to defend your program as meeting the spirit and letter of "significant design."

Checking to see if all students meet the published curriculum is another form of bean counting. Most programs have to make exceptions and allowances under unusual circumstances such as terms abroad or terms in industry. Therefore, some students may not appear to meet all of the requirements of the published curriculum. If this is the case, you must be ready to justify why the exceptions were made, and that the students still meet all ABET related criteria.

CONCLUSIONS

In retrospect, being in the pilot Criteria 2000 program was a very valuable experience. It forced us to develop and implement an assessment program quickly. Now we will be much more prepared for our next visit, and will in fact have stronger programs because of the process we have established.

As time passes, visitors will become more familiar with what comprises a quality assessment program, so will be asking tougher and tougher questions. Now is the time to anticipate them and implement a sound assessment/feedback program. However, avoid merely copying what other schools have done. Your program has to be customized to your own unique needs, and continually updated and improved.

BIOGRAPHICAL INFORMATION

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