Documentation of Outcomes and Assessment

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Abstract

The Process by which EC 2000 Criterion 2, Program Educational Objectives, and Criterion 3, Program Outcomes and Assessment are implemented in continuous improvement of a program must be documented. The parameters set forth to assess the Program Outcomes are an essential part of the documentation required and contained in the Program Self-Study Report, Section B.3., Outcomes and Assessment. The proof of effectiveness of The Process is to be contained in (a) this documentation and (b) the presentation of this documentation. The assessment of the program by the constituents, and the resulting enhancements in the program are the feedback and output, respectively, of The Process that must be clearly presented in the documentation. This paper focuses on the preparation of this documentation of Section B.3., The Process, the program constituents, specifically, the faculty, the Advisory Board, and the students.

Introduction

This paper was written to document the information deemed necessary for a successful program assessment under the EC 2000 Criteria. The focal point is the documentation required for the Assessment and Outcomes Section, B.3., of the Program Self-Study Report. This paper was written after the preparation for a visit had been completed. The driving force was to share information, which would have been useful at the beginning of a methodical preparation for an accreditation site visit under EC 2000 and establishment of The Process for continuous program improvement.

Two assumptions must be made at the outset of preparation for an ABET site visit and the subsequent process for continuous program improvement.

- Assumption Number One – The program is accreditable.
- Assumption Number Two – There is a commitment to the preparation of documentation that will validate the first assumption.

The first assumption is that the program under discussion meets all criteria for accreditation. The second assumption is that sufficient data is available to realize the documentation required to support the program in each criterion. With these assumptions, the problem to be addressed is the presentation of an acceptable set of documentation for Assessments and Outcomes.

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This paper is organized into five parts: Constituents, Faculty, Students, The Process, and Documentation. Constituents include those groups that have a vested interest in the program. Faculty is group responsible for the program assessment, implementation, and improvement. The Process is the continuous improvement of the program. Documentation is the presentation of information from which an evaluation can be made.

**Constituents**

Constituents directly involved in The Process include students, faculty, alumni, and employers.

Lines for program communications with constituents must be established. University/college catalogs, student handbooks, and web pages provide the main lines of public communications with constituents. The challenge in these communications is to ensure that these documents are written to be understood by all constituents including employers, alumni, students, faculty, legislators, prospective students, and the parents/guardians of prospective students.

Input for the assessment of Program Outcomes must be solicited from employers, alumni, students, and faculty. Caution should be used in soliciting information from employers. With nearly three hundred engineering schools in this country and many programs in each school, employers could be overwhelmed with requests for Program Outcome assessments. This is a major problem which must be given attention if employers are to be willing and candid contributors of assessment data.

Alumni are a fertile population for Program Outcome assessment data. There is a shift in the data related to time since graduation. The source of information transfer becomes less clear the longer the graduate works in the field. This must be recognized and accounted for in analyzing this data. Surveys sent as attachments to letters from department chairs/heads have a higher rate of return than those distributed from an institutional office. The alumni database including current address information is a major asset in collecting the alumni input to the assessment process. The better-informed alumni population will respond better to the requests for assessment data.

**Faculty**

Faculty involvement in The Process is demonstrated by buy-in, support, and involvement.

A major parameter that must be presented in the documentation is the input of the faculty to the program. This must confirm (a) the buy-in to the process of assessments and outcomes, (b) the support of the faculty for the process of assessments and outcomes, and (c) the involvement of the faculty in the process of assessments and outcomes. Each of these faculty attributes can exist in the absence of the other two. Hence, caution must be taken to insure that all three of these attributes exist and are documented. Documentation must be discernable in the written documentation as well as in the interviews that are conducted by an evaluator.

The faculty is the driving force of The Process. It is responsible for, and acts as an organized group to enact changes, and effect outcomes in the program. The faculty is the group of individuals responsible for implementing The Process on a day-by-day basis.

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Faculty committees will be entrusted with the major responsibilities of program assessment, implementation of program enhancements, and evaluation of outcomes. The process, the dynamics by which these activities take place, must be clearly outlined and documented. Various flow charts have been drawn to illustrate the process\(^3\). Similarity between these flow charts exists because they relate to the activities associated with Criterion 2, Program Educational Objectives, and Criterion 3, Program Outcomes and Assessment. A flow chart derived from the statements of Criterion 2 and Criterion 3 is shown in Figure 1.

The faculty will provide the course-by-course assessment of the Program Outcomes. The major task of the faculty will be to come to agreement on the parameters by which each Program Outcome is assessed across the program. This is an iterative process, which must continue until the Program Outcomes can be clearly assessed and sufficient documentation is available to support the assessment.

The faculty is the only source for documentation of the student advising process. Student feedback is a valuable source for evaluating the advising process. Documentation of the advising process will include current lists of advisees – names, e-mail addresses, telephone numbers, and mailing addresses for contacting students, and records of advising sessions and other visits with students. Information retained from advising sessions can include but is not limited to the schedule of courses to be taken, pertinent dates in the students’ program, and notes from advising sessions and other interactions with students.

In summary, the participating faculty is a constituency group that is involved in, informed about, and contributes to The Process, supports and commits the requisite time and effort to The Process, and recognizes the need for and concurs with The Process.

**Advisory Board**

The Advisory Board is a constituency group that requires a balance of participants from both the employer, and graduate communities that participates in the establishment of the Program Educational Objectives, contributes to the assessment of Program Outcomes, and provide input for the enhancement of the program.

The Advisory Board provides one of the major inputs to The Process from outside the program. The credibility of the Advisory Board will be readily apparent from the balance of the credentials of the participants of the Board. The Board should be large enough to contain members from the major employment sectors of the program, and may include faculty from similar programs. Program members of the Advisory Board should include faculty and undergraduate students. Diversity of Board membership with respect to the corporate level of board members and years of experience in industry should be sought. The program will be assessed differently by groups with up to five years of industrial experience, middle-level management, and upper-level management. The perspective from each group is relevant and necessary in the assessment by the Board. The Advisory Board assumes the role as the other organized group providing input and feedback to the assessment of the Program Educational Objectives and the Program Outcomes from the perspective of constituents such as employers, and graduates.
An essential feature in the performance of the Advisory Board is the interaction between the members including the program faculty members of the Board. This board must incorporate the team attribute of listening. The program faculty must demonstrate this attribute as they participate with the Board.

**Students**

Students provide a valuable input to The Process from their input collected from Surveys-to-Portfolios, committee involvement, and from being an informed student.

Students, the product of the educational process, provide one of the best sources of information for assessment. Attention must be given to relate the student provided information with the setting in which the information is collected. For example, in assessment with respect to Program Outcomes, students may give an integrated assessment across courses rather than for the specific course for which an inquiry is made. When this data is compared with the Program Outcomes assessment by a professor for a particular course, which will be specific to the course and not integrated over a set of courses, this integration effect must be recognized. The student survey, stand-alone or associated with a program-wide or university-wide assessment tool should be used each term in each course. This survey should garner input on each Program Outcome.

The student portfolio should provide well-documented information on each Program Outcome. The number of student portfolios may run from one for each student in the program including materials over the four years of the program to a small subset of randomly selected students in the program providing materials over the four years of the program. The management of the portfolio can be driven or maintained on a volunteer basis. The essence of the portfolio is that it can provide a Program Outcome assessment based on student input. The same type of material will be found in the Program Outcome portfolio containing materials accumulated from each course in the program. The difference is that the former, the student portfolio, provides student assessed input, whereas, the later provides faculty assessed student documentation for the assessment of Program Outcomes. Both are important and have their place in the assessment process.

Other student input may include results from normed tests such as the Fundamentals of Engineering Examination, College BASE Test, etc., assessment of group/team interactions, senior exit interviews, employer Co-Op evaluations, student Co-Op evaluations, course evaluations with Program Outcome assessments, student presentations including video presentations, and transcript analysis.

Some student data is extremely difficult to collect but has a very high value is the assessment of a program. This data includes such information as the percentage of students accepting jobs prior to graduation, the percentage of students accepted into graduate programs, job offers per student, companies returning to interview students, and first employer out of school. As alumni surveys are prepared, it is necessary to maintain an address base for graduates. The maintenance of a program alumni database, and close working relationships with the alumni office and institutional research are essential to gathering data.
In preparing for an EC 2000 Criteria evaluation, course exhibits containing student homework, quizzes, tests, examinations, laboratory exercises, laboratory work, (Design Level I), projects (Design Level II), and tasks (Design Level III) are valuable. Heretofore, the value was based on their ability to stand-alone. With EC 2000, examples of the material contained in the course exhibits will be used in the Program Outcome portfolios as discussed later.

Students are a significant part of the educational process and should be a part of the committee structure responsible for assessment of Program Educational Objectives, Criterion 2, and Program Outcomes, Criterion 3. It was recommended above that students be included in the composition of the Advisory Board.

Attention must be given to producing the well-informed student during The Process. This is an educational process in itself and must be integrated into the classroom, advising sessions, seminars, and focus group meetings with students. The well informed student population will be able to make better assessments of the program and hence provide the program with better information from which to make decisions relating to enhancements of both the program and The Process of continuous improvement which includes the assessment process. In particular, the well-informed student population must understand the Program Outcome statements in order to answer questions relating to the Program Outcomes. The student professional organization provides a forum for education about the program and The Process, and for feedback and input to The Process.

**The Process**

The Process of continuous improvement has three identifiable and documented parts – assessment, improvement, and periodicity. Assessment takes place at several levels such as the Advisory Board, the faculty, and the students. As a result of the assessment phase of The Process, improvement takes place through enhancements in the program by way of the normal orderly faculty construct and approval and by the professor in the classroom or laboratory environment at her/his own initiative. The assessment phase of The Process must be placed on a schedule. With an implemented schedule of assessment and through the use of a varied set of tools, the assessment phase should be continuous. Assessment action items should follow prescribed cycles, which may vary, from an academic term to two years. The length of these cycles will in-turn drive other phases of The Process including enhancements to the program.

Other documentation of significant interest will be (a) institutional program evaluation and (b) program curriculum analysis during the period since the last general review. This is another example of a cyclical assessment.

**Documentation**

Documentation for Criterion 3, Program Outcomes and Assessment, is presented the Program Outcome Portfolio. This portfolio can become a massive compilation of information relevant to the program. The Map is a guide to follow in retrieving the information required to make an evaluation of the program based on the assessment material is a vital auxiliary document that can be prepared best by the group that organizes the Program Outcome Portfolio.
The documentation cornerstone for the *EC 2000 Criteria* is the Program Outcome Portfolio. This portfolio contains one volume for each Program Outcome. The assessment of each Program Outcome of the program must be obvious from the material contained in each portfolio. Samples of any material mentioned previously which clearly document the implementation of the assessment and outcome process must be included in the appropriate Program Outcome portfolio.

Some documentation will take the form of summary information that assesses the Program Outcomes. Such documentation includes (a) faculty course assessments, (b) senior exit interviews, (c) alumni surveys, and (d) employer surveys. These four pieces of summary information provide a unique set of data from which to make significant observations because of the time at which each piece is captured with respect to the educational process. Additional information required in *EC 2000 Criteria* includes transcript analysis which contains documentation of an orderly progression through the program, successful completion of the required (a) basic science and mathematics courses, (b) engineering courses to meet the requirements of the program criterion, (c) general education distribution of the college/university, and (d) explanations of unique occurrences during the student’s enrollment in the program.

Since the portfolios will contain a massive amount of information, it will be necessary to provide an organized set of guidelines by which an evaluation of each Program Outcome may be made. The faculty who is most familiar with the portfolios should prepare the guidelines. Faculty who has participated in other parts of *The Process* should test the guidelines. The quality of the Program Outcome portfolios will be assessed in part by the ease with which one can navigate through the portfolios.

The question of necessary and sufficient material to be included in the Program Outcome portfolios is best answered by asking the related question – Do the Program Outcome portfolios provide adequate documentation for assessment of the program? Only the persons closest to the program, the faculty, can ascertain whether or not the parameters and tools of assessment are adequate to present a clear and accurate assessment of the program.

**Conclusion**

The important aspects of *The Process* include the establishment of the Program Educational Objectives, Criterion 2, and the Program Outcomes and Assessment, Criterion 3. Inclusion of and participation by the constituents in *The Process* is required for *The Process* to function. Establishment of the parameters by which the Program Outcomes will be assessed across the program is the task of the total faculty with consensus by the constituents. Documentation, and the presentation thereof, is the testimony of the program included in the Program Outcomes and Assessment, Section B.3. of the Program Self-Study Report.

This paper is presented from the perspective of a program in electrical engineering at a state university. Since no direct references are made to the criteria for accreditation of a program in electrical engineering, the documentation discussed in this paper should transcend program lines.
Figure 1. *The Process*
References

