ABET TC2K Preparation – A Web Based Approach

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Abstract

Purdue University Calumet, like all institutions with ABET accredited technology programs, is preparing for a TC2K visit. And, like similar institutions, Purdue University Calumet (PUC) has invested a great deal of time and energy in understanding the TC2K process and learning how it could benefit PUC programs. During several years of preparation, it became apparent that a web based approach to storing and presenting assessment data, continuous improvement results, and program goals offered many advantages. Hence, this paper presents efforts undertaken at Purdue University Calumet to motivate and train faculty on the new accreditation requirements as well as implementing a web based approach to presenting TC2K data. Perceived benefits to both the institution and ABET evaluators will be discussed.

Introduction

Prior to 2004, TAC/ABET accreditation was primarily concerned with inputs to a program with much emphasis on course topics covered by the curriculum. The adoption of Technology Criteria 2000 (commonly referred to as TC2K), drastically changed the focus of accreditation to the outputs of a program; i.e. what students are capable of doing. The change from accreditation based on program topics to outcomes based assessment is possibly the biggest driver for change in technology education since the beginning of technology programs. While TC2K was adopted in 2000, mandatory evaluations using the new criteria did not start until fall, 2004 visits. The next accreditation visit for PUC programs is fall, 2005. Since the adoption of the new criteria in 2000, Purdue University Calumet has been working towards compliance as discussed in previous papers. PUC technology faculty have worked at understanding the new accreditation process[1], understanding continuous quality improvement[3], building strategic plans[3,4], and developing course embedded assessment techniques to assess and evaluate educational outcomes[5].

At this time, much work remains to be done, but PUC faculty are now comfortable with the continuous improvement process. The faculty are now shifting from an understanding mode to an applying mode, and are starting to get results[5]. With this change in operation mode the question arose as to what method should be used for storing and archiving pertinent documents, records of efforts, and results. PUC faculty members who had attended an ISO/TS16949 Internal Auditor Training from Lloyd's Register[6] recognized similarities between requirements for documentation for ISO/TS certification for

industries and the expectations of TAC/ABET accreditation for educational institutions. In the course, faculty learned that many companies use an internal intranet for easy document access by all employees, generally with a single person controlling the posting of documents. It was with this recognition that PUC faculty members in the Manufacturing Engineering Technologies and Supervision (METS) department decided to post documents on the Internet to provide easy access and central storage for faculty, ABET evaluators, and any other interested parties such as students, parents, other institutions, etc. Hence the title of the paper is ABET TC2K Preparation – A Web Based Approach. The remainder of the paper discusses the details of this web based approach.

Required Information

One of the major challenges of the TC2K accreditation process is developing a system that allows all faculty to be involved in the process. In the past, accreditation under the old criteria required that an institution collect and organize information once every six years (at a minimum) and present it to TAC/ABET. The information was expected to show that the institution met the minimum requirements prescribed by TAC/ABET. Under the old criteria this effort could have been completed by one individual with minimal input and involvement from faculty. The result of the effort was a self-study report submitted to TAC/ABET and collection of student work which supported that appropriate topics were being covered and appropriate feedback was being given to students regarding their work.

Under the new criteria, it is expected that all faculty are integrally involved in an on-going process of improvement that results in graduates that are prepared for the current and ever-changing work place. Therefore, it is now impossible to simply write a report once every six years to show to ABET evaluators and expect this effort to result in an accredited program. Instead, all faculty must now start by being aware of their institution's guiding principles (its mission, goals, and objectives) as well as those of the individual programs and divisions of which they are part within the institution. In addition to being "aware" of these guiding principles, they must also play an integral role in reviewing and updating these principles to reflect the needs of the constituents which they serve. So whereas in the past being unfamiliar with the guiding principles of the institution did not necessarily affect a faculty member's ability to do their job, now it does. Therefore, all pertinent documents must be readily assessable to all faculty members. In light of this it only makes sense to place all important documents on an intranet or internet in order to insure accessibility of the latest version of all documents. The METS faculty found that both intranet and Internet locations are of value for this purpose. The editable version of documents subject to on-going change are kept on LAN directories accessible only to department faculty members while final results such as past assessment data and continuous improvement reports are posted and archived as PDF files on Internet sites.

The METS department faculty have organized these documents and results under two links that are posted on the department's home page for anyone to access. The two links are labeled "Continuous Improvement/Assessment" and "ABET Evaluator Information."

The former provides information intended for faculty, students, parents, and advisory committee members, although much of it is also needed for ABET accreditation purposes. The latter link provides ABET specific information in a format designed to ease an evaluator's task of sorting through all the information needed to assess a program. As will be shown shortly, much of the information in the "ABET Evaluator Information" link is cross linked with the "Continuous Improvement/Assessment" link.

The links are organized so that anyone can easily find all information that is required to view how the PUC technology programs are assessed. This include the institution's and program's guiding principles, the efforts being conducted, the assessment and evaluation of the efforts in relation to the results being achieved, and the documented processes that ensure these things continue to take place.

- The guiding principles are listed under both department and individual program strategic plans.
- General efforts being conducted are documented in annual department retreat meeting minutes as well as bi-annual industrial advisory board meeting minutes and other various documents
- Assessment and evaluation is documented on various levels. Overall department and program assessment and evaluation results are documented in the annual department assessment report required by the university. Course assessment and evaluation is documented by individual instructors in a standard format. Whereas all of the course information is not yet available via the Internet, some individual instructors have begun to provide this information under links listed as "assessment data" under their individual courses. It is expected that all instructors will provide this information in the future.
- Processes for conducting the above mentioned activities are also on the Internet. Most of the umbrella processes are listed under the departmental continuous improvement plan. Individual processes such as how to document the course embedded assessments via the standard departmental practice or how to collect the information for the annual departmental assessment report are also available.

In addition to the above information, under the "ABET evaluator information" link, information is organized and presented as it relates to the TC2K criteria. For the new TC2K criteria, a program must meet the following criteria[7]:

- Criterion 1. Program Educational Objectives
- Criterion 2. Program Outcomes
- Criterion 3. Assessment and Evaluation
- Criterion 4. Program Characteristics
- Criterion 5. Faculty
- Criterion 6. Facilities
- Criterion 7. Institutional and External Support
- Criterion 8. Program Criteria

Figure 1 shows the organization of the METS Department home page with the two links discussed above located in the lower right hand corner. Note that the department houses

accredited programs in Industrial Engineering Technology and Mechanical Engineering Technology as well as unaccredited programs in Computer Graphics Technology and Organizational Leadership & Supervision which accounts for the page's complexity. Also noteworthy is the fact that the documentation and continuous improvement efforts are at a department level, not a program level. The efforts conducted are for both accredited and non-accredited programs because the efforts are worthwhile continuous improvement activities, not simply accreditation efforts.

Figure 1 – METS Department Home Page

Storing and Archiving of Documents for the Continuous Improvement Process

Clicking on the "Continuous Improvement/Assessment" link shown in Figure 1 brings up the page shown in Figure 2. This page contains the majority of pertinent documents needed by faculty in order conduct appropriate continuous improvement efforts.
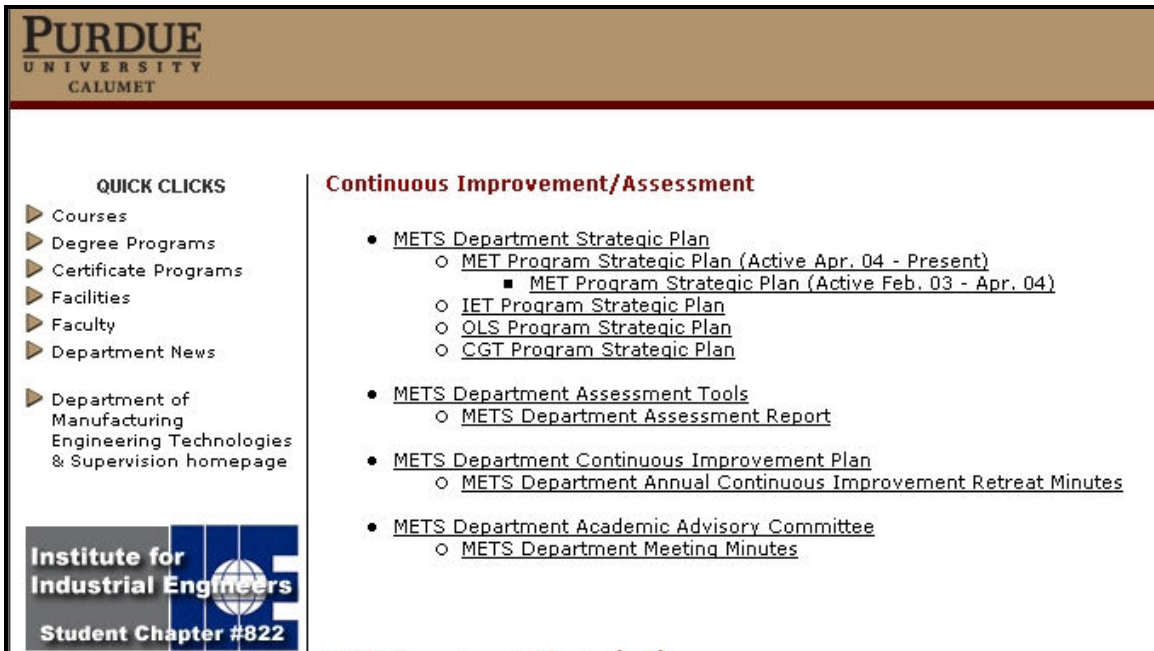
Figure 2 – Continuous Improvement/Assessment Page

As shown in Figure 2, the Purdue University Calumet MET Program continuous improvement process consists of six types of related documents:

I. The METS Department Strategic Plan
    http://www.calumet.purdue.edu/mets/mission.html#dept_sp)

    The METS Department Strategic Plan outlines the department's vision, mission, constituencies, and goals with assessment methods. This plan encompasses the four programs in the department: Computer Graphics Technology, Industrial Engineering Technology, Mechanical Engineering Technology, and Organizational Leadership & Supervision. The department goals are aligned with those of the School of Technology.

II. The individual program strategic plans
    http://www.calumet.purdue.edu/mets/mission.html

    Each program (MET, IET, CGT, and OLS) has a strategic plan that outlines the program constituencies, vision, mission, Program Educational Objectives with metrics and assessment methods, and Program Educational Outcomes with ABET related criterion and assessment methods. The plans also give some background information along with an explanation of how each plan is used for continuous improvement activities. Each program's objectives are aligned with the department goals. These documents, along with the METS Department Assessment Tools, identify who is responsible for major elements in the process, and the timing and frequency of the activities.

III. The METS Department Continuous Improvement Plan
     http://www.calumet.purdue.edu/mets/mission.html#dept_cip

The METS Department has developed a short, simple continuous improvement plan that is easy to understand and follow. Basically, it follows the Plan-Do-Check-Act procedure. The department undergoes this procedure as a whole and by program at least every fall semester, and more often when needed. Minutes are kept on the department's web site for easy access and archival purposes. This document contains the processes used to establish and review the program objectives and outcomes, to evaluate assessment data, and to decide changes necessary for program improvement.

IV. The METS Department Assessment Tools
http://www.calumet.purdue.edu/mets/mission.html#dept_at

The METS Department has developed ten tools to assess the department as a whole and each program within the department. These tools include the rational and responsible party. The evaluated results of these tools are reported in the department's Annual Assessment Report.

V. The METS Department Assessment Report
http://technology.calumet.purdue.edu/met/METSassessmentreport/index.html

The METS Department Annual Assessment Report summarizes the department's activities in many areas with several areas related to program assessment. Several years worth of data are available on the web site.

VI. The METS Department Academic Advisory Committee
http://www.calumet.purdue.edu/mets/mission.html#dept_aac

This site lists the current Academic Advisory Committee members for each program. An important part of the METS Department continuous improvement efforts is obtaining input from the advisory committee. Meetings are generally held bi-annually, and the minutes are recorded on the web.

Storing and Archiving of Documents for ABET Evaluators

Clicking on the link "ABET evaluator information" from Figure 1 brings up the page shown in Figure 3. This page contains information that ABET evaluators will specifically be looking for.

Figure 3 – ABET Evaluator Page

Each of the sub pages shown in Figure 3 was created simply by copying the appropriate ABET criterion and then adding in program specific information. For ease of understanding, original ABET text is left in black while Purdue University Calumet's response is in blue. A key feature of these pages is live links to the appropriate documents. For example, the MET Program Criterion 1 page is shown in Figure 4.

Figure 4 – MET Program Criterion 1 Page

Another feature of the ABET evaluator page shown in Figure 3 is the link to a TC4 Self Assessment. While not required by ABET, institutions are finding that a self-directed TC4 form can be a useful tool for finding holes in their preparation process. This is provided in addition to the required self study report that all programs must prepare. The

TC4 form is the questionnaire that program evaluators fill out before and during an accreditation visit to produce their findings. Evaluators have a responsibility to avoid overlooking evidence that the program has accumulated and provided in the self study and displays. A TC4 Self Assessment can provide Internet links or references to evidence in the self study or exhibit displays needed by the evaluator but often lacking since the required self study does not bear a one to one correspondence with the TC4 questionnaire. Since much information for the program evaluator's TC4 needs to be entered, links can point to Word or other digital format files which allow easy electronic access to this data.

It can be pointed out that the old TAC general criteria totaled about a dozen pages. The new TC2K general criteria document is about four pages long. The old and new self study instructions are more than 20 pages long and a typical self study can be more than 100 pages in length with no index. The TC4 questionnaire has no instructions other than those contained within and is about 20 pages long.

What's Next?

Like all items in a continuous improvement process, this web-based approach to ABET preparation changes constantly. The body of knowledge and the literature related to TC2K is growing rapidly. PUC faculty will continue to search out best practices that other universities are using and implement them where appropriate.

Some of the plans that the METS faculty already have in the works are to post alumni and employer assessment results and to post results of the current nationally normed test taken by all IET and MET students (The Society of Manufacturing Engineers Certified Manufacturing Technologist test[8]). Posting student display material online is yet another possibility, however the immensity of undertaking this effort must be explored further and will not be available for the 2005 accreditation visit.

Conclusion

Preparing for an ABET TC2K visit is much different than preparation under the old criteria. The continuous improvement requirements necessitate more documents and greater document control but wider access is highly desirable. The faculty in the Manufacturing Engineering Technologies & Supervision Department of Purdue University Calumet has opted to use the Internet as the tool of choice for document control. The advantages to this system are easy access from any Internet enabled computer, easy dissemination, and simple document control procedures.

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Biography

SUSAN SCACHITTI is an Associate Professor of Industrial Engineering Technology at Purdue University Calumet. She holds degrees in Industrial Engineering Technology from the University of Dayton and a MBA in Management from North Central College. She teaches TQM and consults in the area of continuous improvement. Sue is past chair of the IE Division of ASEE and formerly served as division chair, program chair, newsletter editor and treasurer. She has served as a TAC/ABET commissioner since 2003 and program accreditation evaluator since 2001.

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