AC 2009-733: SURVIVING ABET UNDER THE NEW CRITERIA - FROM THE EYES OF NEW CHAIR IN A NEW CE DEPARTMENT

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Surviving ABET Under the New Criteria –
From the Eyes of New Chair in a New CE Department

Abstract

So you are a new department chair and ABET is coming in the near future, who are you going to call? What are you going to do? This paper will cover the processes, experiences and lessons learned by a new department chair preparing for an ABET visit for the first time in a brand new department under the new 2008 Civil Engineering (CE) program criteria. The goal of this paper is to not only assist new department chairs and chairs of new departments, but also chairs of well established departments that have had a visit with some type of weakness at the exit statement. Throughout this process it is important to remember that we are ABET. This new chair is also an ABET Program evaluator (PEV) and took that insight to heart. It is ASCE committees that establish the CE program criteria that supplement the general program criteria used by CE ABET PEVs.

The philosophy of successfully managing the collection of data and presenting the processes and supporting data when the program only has one graduating class will be provided. The preparation for the actual visit, the results of the visit, and the actions taken after the visit will be presented. The analysis of the steps taken, processes initiated, and data collected may provide invaluable insight for an established program trying to prepare to meet old and new accreditation requirements as late as the fifth year of a six-year ABET cycle. The ultimate goal is developing a sustainable assessment process that adequately closes the loop. This paper will also address curricular changes initiated by the program to meet the new CE program criteria and the assessment challenges overcome by a new program.

Introduction

The School of Engineering at the University of Texas at Tyler was established in 1997 with the splitting of a general engineering department into departments of electrical and mechanical engineering. The movement and the addition of the department of computer science from what is now the College of Arts and Sciences in 2002 coincided with the formation of the College of Engineering and Computer Science. With Trane and American Standard air conditioning, Goodyear tire, and oil production plants located in and around Tyler, it was only natural to develop electrical and mechanical engineering programs to support the largest local industries. It was at this same time that UT Tyler began to accept freshmen and shed its previous role as an upper-level University that only accepted students who had completed an associate's degree at a community college. As the College enrollments grew so did the planning to grow the college by adding a civil engineering program.

The Department of Civil Engineering began hiring faculty and admitting students in 2005. The students who made up the first graduating class in 2008 were actually admitted into the mechanical engineering program in 2004 with the anticipation of hiring the first CE faculty member. There were twelve students declared as Civil Engineering (CE) students before the department officially existed. These students were on the path to a May 2008 graduation. The timing could not have been better considering that the next scheduled ABET visit for UT Tyler was fall 2008 based on the accreditation visit in 2002 for the electrical and mechanical programs. A program must have at least one graduate to be considered for accreditation at the time of the ABET visit. Therefore, only one student needed to make it to graduation – ten students walked across the stage in May 2008.

With the growth of the program mainly through freshmen and transfers and most courses within the first two years of a four year program outside of the department, the teaching requirements grew slowly. The first faculty member was a tenured professor hired to start in June 2005 as the inaugural chair. Success as chair and only CE faculty member led to his selection as the Dean in the spring of 2006 while selecting one tenure-track assistant professor and one visiting associate professor to start in August 2006. The program which needed to have at least three faculty members present to gain the Texas Higher Education Coordinating Board final approval hired a tenured professor as the new chair and a tenure-track associate professor to start in January 2007. Approval followed later that year while the program received local approval to hire two tenure-track assistant professors to start in August 2007 and one tenured-track assistant professor to start in August 2008 to replace the visiting associate professor.

The August 2008 hire brought the faculty total to six with an average time of nine months at UT Tyler when the self-study was submitted. The faculty team had an average time of five months at UT Tyler when the ABET record year began. Can a program successfully prepare and pass an ABET visit in one and one-half years with no current assessment process in place, one tenure track assistant professor on staff, and teaching the senior level courses for the first time during the ABET record year? This paper does not present traditional educational research by any means, or does it? This was an experiment with high stakes as to whether a program can be built, assessed, and changes made to meet current ABET criteria and CE program criteria based on the ASCE Body of Knowledge (BOKI).[1] This was the challenge facing the new department chair in spring 2007.

Preparation

<u>Program Educational Objectives (PEO), Program Outcomes (PO), and Changes to the Curriculum</u>

The first step was the development of POs in 2005 that would guide the program to demonstrate accomplishment of the knowledge, skills, and attitudes outlined within the first edition of the BOKI**.**[1] This document modified using Bloom's Taxonomy to define the level of student activity was gaining acceptance to be the basis for the next round of updates to the CE program criteria. The momentum of Policy 465[2] and efforts to change the NCEES model law[3] had to be considered since they called for a broader undergraduate education with the technical depth accomplished through a masters degree or thirty credit hours of post baccalaureate study before sitting for the Professional Exam (P.E.). With an eye on the future and an image of what the East Texas constituencies were asking for, the program outcomes (Table 1) and resulting curriculum were developed (Fig 1).

Table 1: UT Tyler CE Program Outcomes

Graduates:
1. Can apply knowledge of traditional mathematics, science, and engineering skills, and use modern engineering tools to solve problems.
2. Can design and conduct experiments, as well as analyze and interpret data in more than one civil engineering sub-discipline.
3. Can design systems, components, and processes and recognize the strengths and areas for possible improvement of their creative designs within realistic constraints such as regulatory, economic, environmental, social, political, ethical, health and safety, constructability, and sustainability.
4. Can work independently as well as part of a multidisciplinary design team.
5. Can identify, formulate, and solve engineering design problems using engineering models in the four of the five sub-disciplines civil engineering: structural engineering, transportation engineering, construction management, hydrology and/or environmental engineering.
6. Can analyze a situation and make appropriate professional and ethical decisions.
7. Have effective oral, written, and graphical communication skills.
8. Demonstrate a commitment to learning and continued professional development outside the classroom, incorporate contemporary issues during problem solving, and determine the impact of engineering solutions in a global and societal context.
9. Can explain professional practice issues, leadership principles and attitudes, management concepts and processes, and concepts of business, public policy, and public administration.

The real diversion from the well known ABET criterion a-k (Table 1, Outcomes 1-8) was Outcome 9 that covers Outcomes 13-15 in the BOKI (answering the call for a broader curriculum), as well as a curriculum that provides one course in all seven traditional CE sub-disciplines. Many programs focus on providing only coverage of four CE sub-disciplines as required by the CE program criteria based on faculty resources.

The desirable changes being kicked around in 2005 materialized in 2008 with adjusted ABET general criteria and new CE program criteria for 2008 accreditation visits mirroring the undergraduate focused outcomes listed in BOKI as well as adjustments to NCEES model law requiring a masters or thirty post baccalaureate credit hours (technical depth) prior to sitting for the P.E. exam, a second edition to the ASCE Body of Knowledge (BOKII)[4] on the street and committees looking at how to fulfill (demonstrate accomplishment of) the expanded list of equally desirable future CE program outcomes. Since the CE Program at UT Tyler could not properly assess either ABET a-k or their own nine outcomes as written, the outcomes were broken into a larger number of smaller outcomes for their assessment plan. This type of expansion of outcomes is mirrored in the BOKII outcomes such that ABET Outcome (a) is broken into three separate outcomes.

The faculty decided that the large number of elective choices in the current curriculum (Fig 1) to be offered to a very small number of senior CE students (10 in 2007-2008 and 11 in 2008-2009) would not be sustainable. The decision to limit electives was based on the belief that 2008 criteria would materialize, only six full-time faculty for the foreseeable future, limited adjunct faculty funds until research funding stream established, a desired limit of two courses each semester for faculty to support research growth (also a contractual requirement for only two courses each semester during the first year), East

Texas constituency needs, faculty expertise, teaching senior courses for the first time during the record year by new faculty teaching these courses for the first time, and no guaranteed coverage of all outcomes, especially Outcome 9, through the elective choices available. Immediate curriculum changes that would affect the first senior class were instituted.

Department of Civil and Environmental Engineering
Bachelor of Science in Civil Engineering
2005-2006 Curriculum

Freshman Year

First Semester (Fall)			Second Semester (Spring)		
	Course	Hrs		Course	Hrs
UNIV 1300	Freshman Seminar	3	CENG 1201	Civil Engineering Graphics	2
ENGL 1301	Grammar and Composition I	3	ENGL 1302	Grammar and Composition II	3
MATH 2413	Calculus I	4	MATH 2414	Calculus II	4
CHEM 1311	General Chemistry	3	PHYS 2325	University Physics I	3
CHEM 1111	Chemistry I Laboratory	1	PHYS 2125	Physics I Laboratory	1
ENGR 1200	Engineering Methods	2		Fine and Performing Arts Elective	3
	Semester Credit Hours	16		Semester Credit Hours	16

Sophomore Year

First Semester (Fall)			Second Semester (Spring)		
	Course	Hrs		Course	Hrs
CENG 2336	Geomatics	3	CENG 2253	Civil Engineering Measurement	2
CENG 2331	Civil & Environmental Engineering Computing	3	MENG 3306	Mechanics of Materials	3
ENGR 2301	Engineering Mechanics—Statics	3	MATH 3305	Differential Equations	3
MATH 3404	Multi-Variable Calculus	4	ENGR 2302	Engineering Mechanics—Dynamics	3
PHYS 2326	University Physics II	3	ECON 2302	Microeconomics	3
PHYS 2126	Physics II Laboratory	1	PHIL 2306	Introduction to Ethics	3
	Semester Credit Hours	17		Semester Credit Hours	17

Junior Year

First Semester (Fall)			Second Semester (Spring)		
	Course	Hrs		Course	Hrs
CENG 3338	Civil Engineering Materials	3	CENG 3361	Applied Engineering Hydrology	3
MENG 3310	Fluid Mechanics	3	CENG 3351	Transportation Engineering Systems	3
ENGR 3301	Probability & Statistics for Engineers	3	CENG 3333	Building Codes, Contracts and Specifications	3
ENGR 4306	Engineering Economics	3	CENG 3336	Soil Mechanics	3
	Additional Science Elective	3	CENG 3325	Structural Analysis	3
	Semester Credit Hours	15		Semester Credit Hours	15

Senior Year

First Semester (Fall)			Second Semester (Spring)		
	Course	Hrs		Course	Hrs
CENG 4351	Transp. & Regional Planning w/Laboratory	3	CENG ( )	Engineering Design Elective	3
CENG ( )	Structural Design Elective	3	CENG 4315	Senior Design II	3
CENG ( )	Construction Engineering Elective	3	HIST 1302	United States History II	3
CENG 4115	Senior Design I	1	POLS 2306	Introduction to Texas Politics	3
HIST 1301	United States History I	3	ENGR 4109	Senior Seminar	1
POLS 2305	Introduction to American Government	3		World or European Literature Elective	3
	Semester Credit Hours	16		Semester Credit Hours	16

Total Program Credit Hours: 128

Figure 1: 2005-2006 Curriculum

CENG 4317 Structural Steel Design was selected as the structural design elective (fall senior year, Fig 1 and Fig 2) based on the overwhelming number of steel design companies in the East Texas area. Concrete design was not ignored and starts with an introduction in the Steel Design course and greater coverage through foundation design within the second semester senior design course (CENG 4315). CENG 4371 Environmental Engineering Design was selected as the second engineering design elective (spring senior year, Fig 1; moved to fall of senior year, Fig 2) to ensure the first group of seniors had at least one environmental course to meet growing East Texas needs. CENG 3333 Codes, Contracts, and Specifications was combined with CENG 3338 CE Materials (w/lab) (Fig 1) into CENG 3434 CE Materials, Codes, and Specifications (w/lab) (Fig 2). The combining of topics seemed natural in that codes and material capabilities (ASTM specifications within the labs) ultimately leads to the specifications prepared for contractors. Contract writing was moved to a graduate level. Combining these two courses allowed for the addition of CENG 3371 Introduction to Environmental Engineering (Fig 2) for those students graduating in 2010 and later. Once the students take CENG 3371, CENG 4371 will focus only on design. ENGR 4306 Engineering Economics (Fig 1) was replaced with CENG 4339 Construction Management (Fig 2) which includes a large section on engineering economics. The coverage in CENG 4339 of planning, scheduling, estimating, bidding, cost control, and project management combined with topics in CENG 3434 provides the desired foundational coverage for construction management. These changes allowed the construction management elective (Fig 1) which had three courses (two sequential) listed to be replaced by CENG 4341 Leadership, Business Practices, Public Policy, and Asset Management (Fig 2) which focuses primarily on Outcome 9 (Table 1) as well as partial demonstration of Outcomes 6, 7, and 8. Additionally, CENG 4341 assists students in seeing the bigger design picture and the nuances of teamwork, leadership and management in the senior design sequence. Even though it is desired to eventually cover public policy in the first environmental engineering course, coverage was needed immediately when CENG 3371 was not being taught and CENG 4371 was being taught for the first time. When adequate public policy coverage is present in CENG 3371, then new BOKII topics that will be added in the future can be absorbed into CENG 4341.

The changes above require an additional credit hour (CENG 3434) in an already constrained 128 credit hour program. Therefore, CENG 2331 Computer Applications (Fig 1) was removed and the computer skills tied to real applications added to CENG 2336 Geomatics (Excel and MathCAD) and CENG 2353 Measurements (MatLAB and programming) (Fig 2). CENG 2353 was increased by an additional credit hour (was CENG 2253, Fig 1) to accomplish the additional computer application requirements. An additional credit hour was already being quietly consumed since most students were taking Technology’s three credit hour course TECH 1300 AutoCAD as a replacement for the CENG 1201 two credit hour course that had not been offered due to limited CE departmental resources (Fig 1). This change now became permanent leaving one additional credit hour for CENG 3434 (Fig 2).

The updated curriculum requires a student to take one course in each of the seven traditional sub-disciplines of CE and allows them to take a second course in five sub-disciplines – desired in a broad-based curriculum. Students can gain an elective for depth coverage if they desire it by choosing to replace either CENG 4351 Traffic Engineering: Operations and Control, CENG 4317 Structural Steel Design, or CENG 4371 Environmental Engineering Design with an elective. Removal of one course still results in students taking a two course sequence (with analysis and design) in four traditional CE sub-disciplines as required by the current CE program criteria. The recent removal of the Institutional Core Option (Fig 1) for freshman which was already available for engineering students through ENGR 1200 Engineering Methods, has provided a true elective for CE majors in the spring semester of the senior year (Fig 2).

Department of Civil Engineering
Bachelor of Science in Civil Engineering
2008-2009 Curriculum

Freshman Year

Freshman—First Semester (Fall)			Freshman—Second Semester (Spring)		
POLS 2306	Intro. Texas Politics	3	TECH 1303	Engineering Graphics	3
ENGL 1301	Grammar & Composition I	3	ENGL 1302	Grammar & Composition II	3
MATH 2413	Calculus I	4	MATH 2414	Calculus II	4
CHEM 1311	General Chemistry I	3	PHYS 2325	University Physics I	3
CHEM 1111	General Chemistry I Laboratory	1	PHYS 2125	University Physics I Laboratory	1
ENGR 1200	Engineering Methods (with lab)	2	( )	Visual & Performing Arts	3
	Semester Credit Hours	16		Semester Credit Hours	17

Sophomore Year

Sophomore—First Semester (Fall)			Sophomore— Second Semester (Spring)		
CENG 2336	Geomatics	3	CENG 2353	Civil Engineering Measurement	3
POLS 2305	Introduction to American Government	3	MENG 3306	Mechanics of Materials	3
ENGR 2301	Engineering Mechanics – Statics	3	MATH 3305	Differential Equations	3
MATH 3404	Multivariate Calculus	4	ENGR 2302	Engineering Mechanics–Dynamics	3
PHYS 2326	University Physics II	3	ECON 2301/2	Macro/Microeconomics	3
PHYS 2126	University Physics II Laboratory	1	PHIL 2306	Introduction to Ethics	3
	Semester Credit Hours	17		Semester Credit Hours	18

Junior Year

Junior—First Semester (Fall)			Junior—Second Semester (Spring)		
CENG 3434	Civil Engr. Materials, Codes & Specs	4	CENG 3361	Applied Engineering Hydrology	3
MENG 3310	Fluid Mechanics	3	CENG 3351	Transportation Engr. Systems	3
ENGR 3301	Probability & Statistics for Engineers	3	CENG 3371	Intro to Environmental Engineering	3
CENG 4339	CE Construction Management	3	CENG 3336	Soil Mechanics	3
( )	Additional Science Elective	3	CENG 3325	Structural Analysis	3
	Semester Credit Hours	16		Semester Credit Hours	15

Senior Year

Senior—First Semester (Fall)			Senior—Second Semester (Spring)		
CENG 4351	Traffic Eng: Operations & Control (Lab)	3	CENG 4341	Ldship,Business,Pub Pol,Asset Mg	3
CENG 4317	Structural Steel Design	3	CENG 4315	Senior Design II	3
CENG 4371	Environmental Engineering Design	3	HIST 1302	United States History II	3
CENG 4115	Senior Design I	1	( )	Technical Elective	3
HIST 1301	United States History I	3	( )	World/European Literature	3
ENGR 4109	Senior Seminar	1		Asset	
	Semester Credit Hours	14		Semester Credit Hours	15

Total Program Credit Hours: 128

Figure 2: Updated Curriculum

The curriculum changes provide a broader undergraduate curriculum as envisioned by the Body of Knowledge (BOKI) and implied in Policy 465 with technical depth coverage in a masters or 30 additional post baccalaureate credit hours. Review of Program Educational Objectives (PEO) in spring 2007 did not result in any curriculum changes since the objectives were already broad statements of what a graduate should be able to accomplish four to eight years after graduation (Table 2). Now that the program has alumni as of May 2008, surveying alumni on the accomplishment or lack there of will provide invaluable data that could lead to adjustment of POs, PEOs, and/or the curriculum.

<u>Data Collection Processes</u>

Since the department had no assessment history and the new faculty were not vested in any assessment techniques, the process presented below had less resistance than could occur in more established departments. On the other hand, if starting from a broken or none existent system and processes and/or the faculty team is motivated to be successful during their next ABET visit, the presented techniques would be extremely successful.

The key is multiple sources of data collection with surveys being the least desirable. During the first year of program existence (2005-2006), only three sophomore courses were taught. During the second year (2006-2007) six junior courses were added to the teaching mix as well as graduate level courses. The urgent need to begin establishing a data collection process and collecting viable data was presented to the faculty team on 8 January 2007. A decision was made to accept the course syllabi for the first year of the program existence as the available assessment input (three sophomore courses taught by none of the current faculty), while course assessments would be completed for the fall 2006 courses that had just been completed using available data and limited end-of-course survey data. A sample course assessment framework was provided as guidance and the two faculty present in the fall completed and presented their course assessments to the entire faculty team.

Table 2: UT Tyler Program Educational Objectives

1. Graduates have the knowledge, skills, and attitudes necessary to become engineering leaders and assume responsibility for multidisciplinary engineering design; project, construction, and asset management; and ethical decision making in professional practice.
2. Graduates continue to grow intellectually and professionally through participation in professional society activities, continuing engineering education, graduate studies, and/or self study during their professional career.
3. Graduates have effective oral, written, and graphical communication skills.
4. Graduates become registered engineers.

The initial preparation beyond initiation of annual course assessments was record year course data collection the semester prior to the record year (i.e., Spring 2007) with the current four member faculty team (average of 2 months at UT Tyler). As expected with any new system some faculty forgot to collect some assigned embedded indicator data, some developed inadequate embedded indicators to demonstrate an outcome, and a couple did not complete all portions of the course assessment template and supporting documents. However, the activities were a huge success. Each faculty member could now better understand through their own experience of trying to complete the required documents how important a properly developed embedded indicator and associated assessment is and how each portion of the data and associated assessment completed to include the annual course assessments rolls up into the annual program assessment.

The faculty team also selected additional data collection beyond course assessments and embedded indicators within each course (identified in course assessments and collected in outcomes notebooks). They chose external exams (the engineering fundamentals exam with the students highly encouraged to take the afternoon CE portion), internal exams (gateway exams), senior design assessment rubrics (two course sequence present in curriculum, but not yet taught), external evaluation of senior design and associated presentations, surveys, and external advisory committee input (met once in April 2006).

The goal was to have multiple data sources for comparison while limiting the faculty requirements to activities they would already be doing in their courses since they would be teaching many of their courses for the first time during the record year. This selection of data collection would provide multiple, varied assessment techniques that should provide program insight and trend observation.

Analysis of the Data Collected

Course Assessments. The foundation of any program is the courses within it. The course assessment process establishes a consistent format to assess the accomplishment of course objectives which should feed directly into program outcomes. There are three sections to these course assessments that mirror the course assessments for the Civil Engineering Division within the Department of Civil and Mechanical Engineering at the United States Military Academy.[5] The first section describes/defines the course as it was taught through its catalog description (still appropriate?), course objectives, textbook(s) used, the course schedule, graded events, an assessment of facilities and technology available, curriculum integration, and end-of-course feedback questions. The second section assesses the course through evaluating whether the course objectives were achieved, evaluating the end-of-course feedback, evaluating course grade point average (GPA), time required to complete daily requirements, final exam averages, how the course contributes to accomplishment of the program outcomes, what were the results of embedded indicators, and were previous course recommended changes effective (i.e., close the loop). The third section is focused on recommended changes to the course based on the assessment of the course in section two. The most important items of the course assessment are the end of section two: analysis of previous recommended changes to the course; and section three, the presentation of new recommended changes. This methodology ensures all effected by the removal of content or changes to how it is presented and evaluated are part of the decision making process. All decisions are documented in a course memorandum that is sent through the department chair and ultimately filed with the course assessment in the course assessment notebook. The assessment of a course does focus on accomplishment of program outcomes since some courses are the only place a student receives coverage and evaluation of content (knowledge, skills, and attitudes). Courses with large or very large contributions to program outcome accomplishment are prime candidates for an embedded indicator. Assessment of outcome accomplishment may result in course content changes or additional content evaluation of student understanding.

By May 2008, all the required courses within the program had been through at least one annual course assessment. The senior courses had only one course assessment, the junior courses had two course assessments, and the sophomore courses had two course assessments and a syllabus from the first year the course was taught. Annual course assessments with all faculty present encourage discussions of trends that normally would not occur in departmental meetings. When a faculty member notices poor performance on a skill s/he feels should be more advanced, the professor who should be teaching it is asked about the student's performance on the topic. In one example, it was discovered that the pre-requisite course was not teaching the concept at all. A decision was made to add the topic back in and another topic that was not being used by follow-on courses be removed. Additionally, faculty are learning more about the entire curriculum to the point that they better understand how what they teach or do not emphasis affects follow-on courses as well as how a thorough curriculum understanding improves student advising. Annual course assessment documents course performance which ultimately leads to improved course adjustments when the course is taught next.

Embedded indicators. An embedded indicator is a graded event or a portion that directly demonstrates student accomplishment of a program outcome. Within the department, an embedded indicator package is defined as the assignment, the solution, a cut-scale or grading rubric used to grade the assignment or portion of it, an assessment of the students performance that includes how to adjust the course content to improve performance or how to adjust the assignment to better assess the students understanding and sometimes both, and examples of student work: the best performance, the average performance, and the worst performance. These embedded indicators from each course are filed in a notebook for each program outcome. In January 2007, the team discussed the anticipated content of each course and assigned program outcomes to each course based on its perceived ability to have an assignment that would demonstrate a student's accomplishment of an outcome. Much was learned through the data collection in the spring of 2007 and the embedded indicator list was refined for the 2007-2008 record year. The goal during the record year was an average greater than 80 percent for each embedded indicator and any student who did attain at least a 70 percent had to resubmit the portion of the assignment until they scored above 70 percent. The additional submittals did not alter the student's grade.

In May 2008, a two member team evaluated the data collected for each embedded indicator to determine whether students demonstrated accomplishment of each outcome, which embedded indicators to keep, which should be adjusted, which should be removed, and which courses should add an embedded indicator to ensure the data collected adequately demonstrates accomplishment of the outcome (i.e., assessment of the assessment process). During 2007-2008 cycle, each outcome had from three to eighteen embedded indicators collected. Upon review by the two member teams, not all requested data from the 2007 list was collected in each course (mission overload while teaching the course the first time) and some embedded indicators did not directly link to or clearly demonstrate accomplishment as the faculty team thought the assignment would.

Two program outcomes were not met and needed additional as well as better defined embedded indicators, while two outcomes needed substantial discussion before the faculty team could understand what the outcome actually meant and how it could be properly assessed (i.e., professionalism). After the discussions, the data collected properly demonstrated accomplishment of one of these outcomes, while the other was very weakly demonstrated. Many outcomes had too many embedded indicators and only those that most directly linked to the outcome were kept and the rest dropped. In some cases, not enough of the data presented directly linked to the accomplishment of the outcome nor convincingly demonstrated accomplishment of the outcome. In these cases the two member team suggested improvements to embedded indicators and the addition of new indicators with a desired activity focus. The end result was a leaner embedded indicator list for each outcome and ultimately for each course for the 2008-2009 assessment cycle. The most important result of having alternating two person teams assess the data collected for each outcome is the education of the faculty team on assessment and what each outcome means to the program. The refinement of embedded indicators occurs more seamlessly as the entire faculty team is looking for the best method and course for an outcome to be demonstrated and assessed. Trading of embedded indicators between courses to minimize the number of indicators in each course is encouraged.

The ABET program evaluator (PEV) noted after the first day on site that some of the collected indicators did not have a strong link to the outcome but were still present in the assessment data. The question was "What is your process?" The program response was that the process does not always provide a perfect indicator each time just like an activity (lab experiment, demonstration, or course content) in a course does not work the first time it is tried. Faculty allocated time and effort into what was developed and provided and that result was part of the data used to make changes. So all provided data was part of the program assessment for 2007-2008 and must remain. The PEV was pointed to an updated embedded indicator list for 2008-2009 that was more streamlined. The PEV noted that on the surface a few of those indicators might not work as well. Again we pointed out the need to try out different embedded indicators until the faculty develops the leanest list that adequately demonstrates accomplishment of each outcome. In some cases this means in the interim too many embedded indicators to ensure the program can adequately demonstrate accomplishment of the outcome as was the case during the ABET visit. The current suggestions for improvement (actions) were accepted by the faculty and at the end of the 2008-2009 assessment cycle the new data collected (embedded indicator data is collected each year) will be assessed, evaluated and modifications once again suggested. The PEV really liked the assessment of the assessment process and the closing the loop and the bundling of each embedded indicator: assignment, solution, grading rubric, assessment, the best, the average and the worst student work. The ultimate goal is to use embedded indicators to include the senior design rubric to demonstrate the accomplishment of outcomes and use the additional data to further validate results (FE, Gateway exams, external evaluators and surveys). The key area that needed additional emphasis based on the assessment data was the incorporation of engineering constraints prior to the senior design experience. The 2008-2009 assessment cycle has broken out the engineering constraints to be incorporated in assignments during the sophomore and junior years to continue the process started in ENGR 1200 (freshman year) and improve the students use of engineering constraints during design, especially senior design.

External Exams. A normalized, national exam is an important gauge as to how your students' capabilities align with other peer institutions. The faculty chose the engineering fundamentals exam because it allows comparison of engineering fundamentals from the morning and civil engineering fundamentals from the afternoon portion of the exam – the CE students at UT Tyler are advised to take the CE portion in the afternoon. Since all UT

Tyler CE students must take the Fundamental Exam, the data collected by the testing agency and provided directly to the program is extremely reliable and valuable.

The first ten graduates of the program took the exam in October 2007. Since many of the East Texas engineering firms require an engineer to pass the Fundamentals Exam within the first year of employment, CE students have ample motivation to prepare for the exam which includes attending review sessions and not just taking the exam to meet the graduation requirement. The end result was that eight out of ten passed the exam and the consolidated results from NCEES provide invaluable input that was used, especially in the afternoon section with CE topics, to slightly adjust the focus of assignments within courses (construction management, geotechnical engineering, and environmental engineering) and the movement of the second environmental engineering course (CENG 4371) from the spring to the fall of senior year (Fig 2). The program is committed to not teach the exam, but it will consider adjusting assignments to ensure that students have the correct experiences to best prepare them for future success in their engineering careers to include the FE exam. Additionally, a change today in a sophomore course (i.e., statics) will not be validated by FE for three years when the students are able to sit for the exam.

<u>Internal exams.</u> The faculty chose to develop an FE like exam to be given in late spring of the sophomore and junior years. The exam is called a Gateway exam. The exam could be used as a gateway or entrance into the next year of study, but the exam is currently used to assess student retention of knowledge, especially for topics covered in the fall. Based on the results, course adjustments are considered as well as a homework assignment is provided in the first CE class the following fall to force review of concepts the students did not do well on. There are ten questions per subject area. The sophomore exam has the following subject areas: statics, geomatics (surveying, GPS, GIS, computer skills), measurements (data collection, electrical circuits, computer programming), mechanics of materials, and dynamics. The junior exam has the following subject areas: materials, hydrology, structural analysis, transportation, introduction to environmental engineering, geotechnical, and construction management which includes engineering economics.

The internal exams were administered for the first time in spring 2008. A lab period was used for the junior exam and a class period was used for the sophomore exam to ensure most if not all of the students in a given category took the exam (i.e., highest number possible). The results quickly pointed out the need to have the sophomore exam also taken during a lab period since so many students did not finish the exam. Additionally, the results highlighted that a few questions in each discipline either had no one get the question correct or very, very few. Upon further review of each question by the faculty team, it was quickly discovered that a few questions in each section required a better worded question, a picture, or were asking for higher ability than was asked for within current course content. The faculty team used the results to improve the quality of the exam as well as adjust content in two courses to provide the students with the desired level of experiences the current question required.

<u>Senior design.</u> The two-semester senior design is composed of small assignments and 10, 35, 65, and 100 percent design submittals as well as 35 and 100 percent presentations.

For each activity, there is an associated grading rubric (i.e., cut-sheet). These rubrics are combined into a large spreadsheet where the points are broken out based on the associated outcome the activity is demonstrating. The amount of points assigned and the average are assessed. The faculty feel that most outcomes can be assessed with the students demonstrating their knowledge, skills, and attitudes associated with each program outcome in the senior design. The senior design is already a part of the curriculum and is the best way to bring all of the skills together in the accomplishment of a design. Since the design and presentations are graded, simply breaking the grade out based on each outcome provides an entire course full of embedded indicators.

The overall rubric design somewhat followed the rubric developed at the USMA.[6] However, until the entire course was taught and rubrics for each assignment were developed, an overall assessment as to how each major portion of the assignment linked to what outcome had to wait until May 2008. The developed rubric (Fig 3) not only provided how many points in the course were allocated to each outcome, but the average. The results showed that the desire to have all seven traditional sub-disciplines of CE receive a focus (each project selected will have a greater focus on some CE sub-disciplines) was not achieved. Five sub-disciplines were right on topic, but the transportation requirements (Outcome 5b) were lacking and should have had not only greater emphasis (shown by point allocation), but better performance. The environmental section (Outcome 5e) was barely adequate based on number of points assigned. These results led to an adjustment in how requirements are developed and presented to the students. Additional course content is presented to set the foundation for areas not previously covered in other courses. Some of the content and the associated requirements will be presented by the disciplinary faculty such that the course has moved to a more team venture than previously envisioned. One faculty member will still be responsible for course administration, but every member of the faculty will be part of the team presenting content and grading assignments – a major change coming from within the faculty team.

	BS			NU			Average		
	Raw	Avail	Avg	Raw	Avail	Avg	Raw	Avail	Avg
1a	130.0 /	157.0	82.8	130.0 /	157.0	82.8	130.0 /	157.0	82.8
1b	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!
1c	193.0 /	225.0	85.8	195.5 /	225.0	86.9	194.3 /	225.0	86.3
1d	493.2 /	633.2	77.9	492.1 /	633.2	77.7	492.7 /	633.2	77.8
2	44.5 /	61.0	73.0	42.4 /	61.0	69.5	43.4 /	61.0	71.2
3a	195.0 /	206.0	94.7	175.3 /	206.0	85.1	185.1 /	206.0	89.9
3b	10.0 /	10.0	100.0	9.3 /	10.0	92.7	9.6 /	10.0	96.4
4	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!
5a	333.4 /	438.8	76.0	329.6 /	438.8	75.1	331.5 /	438.8	75.5
5b	32.3 /	51.3	62.9	31.2 /	51.3	60.8	31.7 /	51.3	61.9
5c	153.3 /	177.8	86.2	148.4 /	177.8	83.5	150.8 /	177.8	84.9
5d	139.7 /	169.7	82.3	140.0 /	169.7	82.5	139.8 /	169.7	82.4
5e	111.4 /	118.3	94.2	97.3 /	118.3	82.3	104.4 /	118.3	88.2
6a	402.2 /	440.4	91.3	369.9 /	440.4	84.0	386.1 /	440.4	87.7
6b	50.0 /	55.0	90.9	49.8 /	55.0	90.5	49.9 /	55.0	90.7
7	593.7 /	643.7	92.2	542.4 /	643.7	84.3	568.1 /	643.7	88.3
8a	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!
8b	113.8 /	125.0	91.0	112.4 /	125.0	89.9	113.1 /	125.0	90.5
8c	114.5 /	126.2	90.7	113.1 /	126.2	89.6	113.8 /	126.2	90.1
9a	436.7 /	475.4	91.9	387.8 /	475.4	81.6	412.3 /	475.4	86.7
9b	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!	0.0 /	0.0	#DIV/0!
9c	171.1 /	180.9	94.6	143.4 /	180.9	79.3	157.3 /	180.9	86.9
9d	271.9 /	290.4	93.7	236.3 /	290.4	81.4	254.1 /	290.4	87.5
9e	111.2 /	124.2	89.5	105.8 /	124.2	85.2	108.5 /	124.2	87.4

Figure 3: Senior Design Grading Rubric (note Outcome numbers far left)

Surveys. Surveys are the least desirable assessment method due to the ease of putting a survey out on the street with poor quality questions that are more subjective rather than objective and result in a small number of returns. However, surveys are many times required to assess PEOs and their proper use does provide invaluable input. End-of-course assessments by students in each course provide input as to whether the students feel they can accomplish the course objectives and what was the quality of the teaching. The data from surveys can depict trends and changes in student understanding. The current departmental data shows that the students believe the faculty are doing well as teachers (they have had faculty in numerous departments across campus when assessing CE faculty, Fig 4 and 5). When this data is added to other data sources, the picture of whether a student can demonstrate the desired knowledge, skills, and attitudes becomes clearer. The seniors are asked more probing questions about the program to include actual accomplishment of the program outcomes since they have nearly completed the entire program of study. The data collected provides a data point to use in future comparisons as the alumni are surveyed at the one, four, and eight years after graduation. The alumni and their employers are asked similar questions about the POs.

Since the PEOs are focused on what the alumni are able to do four to eight years after graduation, the surveys to alumni and employers ask about accomplishment of PEOs (Table 2). The faculty are also surveyed as to whether the POs and PEOs are being met since faculty are heavily involved in the teaching and assessment of courses, are present as each course assessment, a two member team reviews embedded indicator data collected to evaluate outcome accomplishment, and they stay in touch with many of the students after graduation. Since end-of-course assessments (paper copy to ensure high rate of return) are completed at the end of each semester in every course and used as part of the course assessment, the only real effort is to develop the survey instruments for the senior, alumni, employer, and faculty and retain accurate alumni addresses. Accurate addresses focuses on the need for a high percentage of responses since the number of graduates is currently small and the program wants quality results.

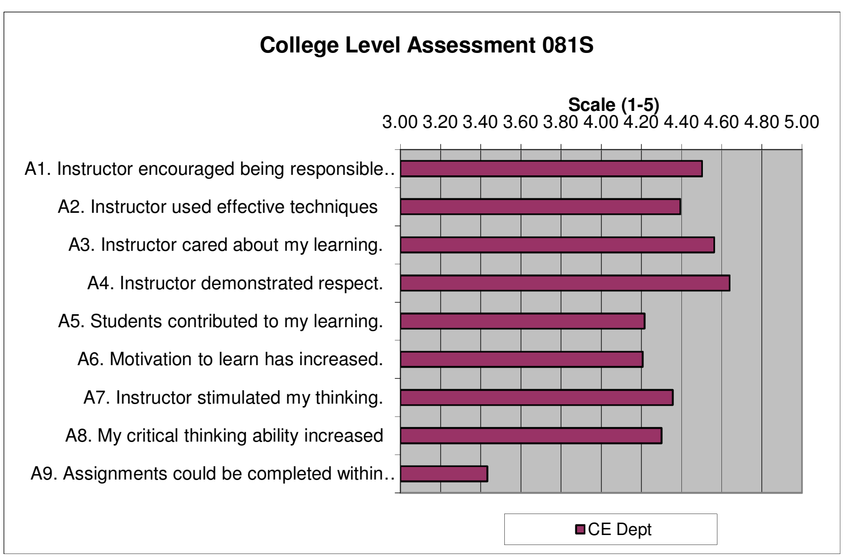

Figure 4: Civil Engineering Department Assessment

The senior, employer, and faculty surveys were administered for the first time in May 2008 with the first graduating class. The seniors had questions also from the future alumni survey to demonstrate the process since the program had no alumni. The employers were asked to treat the seniors who had been interns the previous summer or during the current academic year as if they were graduates to establish a data point for employer assessment of the program (eight employers responded for the first ten graduates). The data was very favorable overall (average over 4 out of 5 on a Likert scale) and provided a single data point. Surveys will be administered each year to the graduating seniors, faculty, alumni and their employers one year after graduation and alumni and their employers four and eight years after graduation. The CE program is working with the university to develop a university wide alumni survey instrument. The program expects the results to improve further once the employers are assessing the alumni a year after they graduated rather before they graduated.

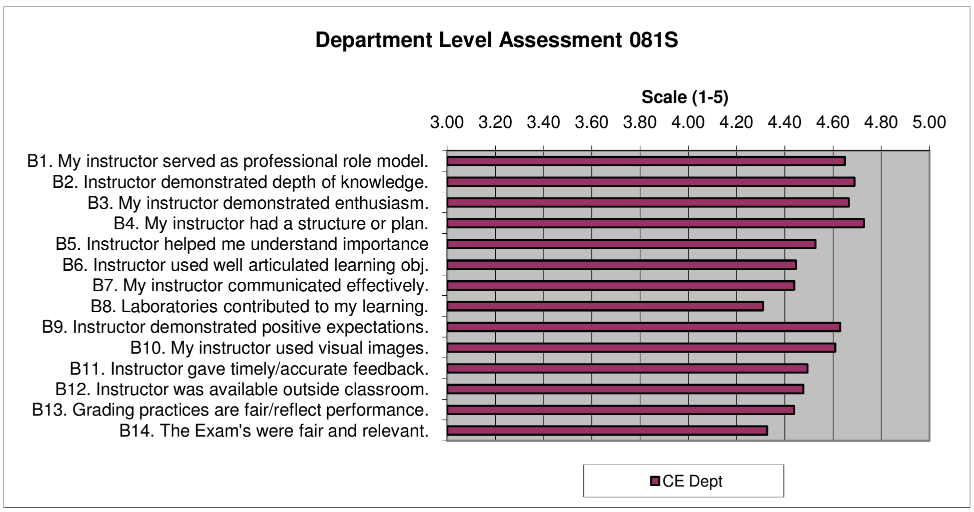

Figure 5: Civil Engineering Department Assessment

<u>External advisory committee.</u> The external advisory committee should mirror the program's constituency base; while at the same time ensure a more global perspective. The UT Tyler CE External Advisory Committee has state legislature, major CE firm, state PE board, ASCE National Board of Direction, ASCE Body of Knowledge committee membership, and local engineering firm representation. The use of external advisory committees or boards appears to be a necessity and all departments are developing an advisory committee if they do not already have one.

The committee first met in April 2006 during the programs first year and blessed the program outcomes, program educational objectives, and the growth directions for a department that only had one official faculty member (who had just been named Dean) and the newly hired department chair who was present but would not start until Jan 2007. The next meeting of the committee was delayed until October 2008 to allow the program to execute the entire program and collect and assess the data to complete the first annual program assessment during the May-June 2008 time frame. In this case, that assessment was placed directly into the ABET self-study. A program assessment was started during the summer of 2007, but was halted since much of the key data for assessment could not be completed until the senior year had been taught to include the two-semester senior design sequence and FE exams taken. The annual program assessment is valuable data to provide to this body as they provide possible directions the industry may be heading since over 90 percent of each graduating group goes into some type of industry position.

The advisory committee was extremely impressed with the effort to thoroughly assess the program through multiple assessment methods as well as the full implementation of the BOKI as seen in the 2008-2009 CE program criteria. The foresight to begin the process of curriculum changes to implement the BOKI was seen as very insightful. When the program presented that they will begin looking at the implementation of the BOKII as part of its slow loop assessment cycle in the spring of 2009, the advisory committee felt that once again the program would be on the cutting edge of curriculum development by considering the necessary changes early in the process. It is believed that it is only a matter of time before the BOKII is incorporated into the CE program criteria and those in industry felt that the added outcomes are exactly what a student needs to demonstrate. The future plan is an early fall meeting each year to present the results of the annual program assessment that is completed each summer.

External evaluators. Local engineers are very willing to assist the programs in their development of their future employees. The presentations are the easiest place to start. A quick discussion of the grading rubric and most engineers are fully prepared to evaluate the presentation from the perspective of a client/boss. Additionally, once every three years the UT Tyler CE program asks local engineering companies that have been very active in the CE program to evaluate the senior design just as the faculty evaluate it. Five companies reviewed the 100 percent designs from each of the 2007-2008 senior design teams and provided an overall assessment and input on what could be improved and/or what was missing. The program's question for them was: "is this design experience what you would like your future college graduates to have, and if not, what needs to be improved or changed?" These local companies provided invaluable insight into what they are expecting new graduates to be able to do through detailed assessment of the two senior designs. In fact, the marked up material is being used during this year's course as examples of what was completed by peers and how to make subtle improvements in designs, plans, and report layout. The bottom line from local companies: "this design experience is what we would like to have our current college graduates have at the time of graduation" and the requested changes are simply fine tuning. There were a few sub-disciplines where one company felt there was too much emphasis and another felt too little. Much of the differences depended on the primary CE focus of the individual company. Many of the suggestions presented are easy items to include in the current senior design experience and are obvious ways to improve the overall end product. The type of questions these same individuals asked during the 100 percent presentations could not be reproduced by the faculty who are involved with every aspect of the project over the two semesters.

Sustainable Process?

Desired results, data collection, assessment, making decisions, and assessing the results of those decisions is hard tedious work. However, it is no different than the research processes that most of us use on a daily basis. The difference is using the process for teaching and the end result – student learning. Many programs can get their faculty to rise to the occasion and collect some data during the record year, but how about the non-record years? The key is limiting the data collection process to a minimum and tying it to what they are already doing or should be doing. The faculty must be convinced that annual assessment of their course is necessary and will help them prepare the course for the next time it will be taught as well as help assess the program. Since faculty teach 45-50 minute lessons or 30-75 minute lessons or 30-50 minute lessons with a weekly three hour lab, a one hour formal assessment of the course is not too much to ask. Yes, the first time they prepare the course assessment document it may take some time, but the required time will decrease with each successive cycle to include new courses.

The faculty must also be convinced that they need to assess each course assignment and exam to ensure that each activity is accomplishing the desired result. If they are already assessing a course requirement, then the assessment of the assignment or a portion to be used as an embedded indicator is just an extension of something they are already doing. Faculty must assess and document their research to determine if they obtained good results and what future adjustments are required, so why not teaching? If the faculty team can ultimately boil down the number of embedded indicators to the irreducible minimum resulting in an equal spread of embedded indicators across all courses, then they are really just adding a few additional minutes to the tasks they should already be doing.

The remaining data collection does not affect most of the faculty team. The FE is required for graduation and the data is automatically sent to the school. Annual surveys have been developed and only need to be reviewed (and improved) each year before they are sent out. The hardest part is keeping up with contact information for alumni since the current small number of UT Tyler CE alumni can be problematic and requires the program to seek a high response rate. The senior design is already being taught and each assignment is being assessed. Once developed, the rubric only needs to be tweaked each year to improve the balance of points between outcomes. Many faculty are now part of the grading since the design usually includes all seven traditional sub-disciplines of CE. The local engineers are only glad enough to help in any way if given enough planning time (i.e., external evaluation of presentations). Once developed, the Gateway exam questions need to be reviewed (and updated) once a year. The exams are presented in one lab session and can be graded by scantron or a student worker. Presentation of the annual program assessment completed by the department chair each summer is presented to the external advisory committee each fall. The requirement to present results annually ensures that the assessment is completed annually.

Therefore, besides preparing the course assessment documents and filing embedded indicator data, the faculty is generally left to manage research and their courses with the exception of being part of the team to assess the collection of embedded indicators at the end of each academic year (i.e., May). The goal is a faculty driven irreducible minimum list of embedded indicators that demonstrate accomplishment of outcomes without overloading any one course. Thinking about how to demonstrate accomplishment of an outcome is critical in assignment, course, and program design. The presented process is the good tool to develop each member of the faculty as well as the entire assessment team.

Self-Study

Programs are provided a guide as to what needs to be placed within the self-study. The real key is trying to conduct a fair self assessment of the data, present the issues as seen by the program (i.e., the dirt), develop actions to improve the program based on the analysis of the assessment, and present analysis of results and new decisions based on previous changes (i.e., close the loop). Presenting solutions to challenges as well as the steps being developed to address concerns or program shortcomings is critical to providing an open healthy self-study program assessment. The use of the commentary[7] to guide the program as to what to assess and/or desired levels of performance is also critical to a program's success. Collection and assessment of the data collected above allowed the UT Tyler program to critically and honestly develop its self-study.

Results

Only 11 questions were formally presented by the PEV after arrival at UT Tyler. If there are major issues the list of questions are usually presented weeks prior to the evaluation team's arrival. Most questions were just requests for clarification or assistance on locating the data collected and becoming familiar with how it was organized in the assembled notebooks. At the out brief, there were no presented deficiencies or weaknesses! There were two concerns and four observations (paraphrased since the results are not final until the August-September 2009 timeframe). So the experiment was a huge success!

One of the concerns could not be prevented since the program did not have any alumni to survey to determine whether PEOs were being accomplished. The program had piloted the process to collect, document and demonstrate the degree that the PEOs are attained with trial groups of constituents, but there has been no real opportunity to collect and evaluate actual assessment data from alumni and their employers. Therefore, the potential does exist that the program might not be able to demonstrate compliance if the presented assessment process is not carried out. The other concern focused on the wording of one of the PEOs (PEO 3, Table 2). The wording gave the impression that it was describing skills and knowledge that students should have at the time of graduation rather than future career and professional accomplishments. The piloted process discussed in the paragraphs above did satisfy the criterion, but future changes in the wording of the objective or focused data collection by the program could cause non-compliance.

The observations focused on 1) having the civil engineering profession (ASCE) as one of the six defined constituencies leading to a consideration to a more streamlined approach to defining constituencies; 2) some of the embedded indicators tried in the first year did not always have a strong relationship with the outcomes and some were used for multiple outcomes (writing assignment used for communication, while the content focused on ethics) within a very extensive set of measures that possibly could become burdensome; 3) chair has done an outstanding job developing a complete and comprehensive outcomes and objectives assessment process and the program is encouraged to develop additional informed and capable faculty leaders in assessment; and 4) based on current departmental growth and increased research requirements, there may be a need to hire additional faculty and increase support resources.

Actions after Visit

The first order of business was to breathe a huge sigh of relief and not think about assessment -- for about one week! The first departmental meeting after the visit was solely on basking in the glow of the results and considering the correct path forward. The team was already doing a lot less work since they were not collecting data on every assignment in every course as was done in the record year. Additionally, the faculty had reviewed the list of embedded indicators collected during the record year and had reduced the collection list by over thirty percent while suggesting methods to improve some of the indicators that were not very effective in their current state but appeared to be the best possible choice. The faculty fully realized that the current and future success was based on the assessment process that was in place with their main focus was the continued annual collection of embedded indicators. The team rededicated itself to stay focused on developing focused embedded indicators and collecting listed embedded indicators for each course with the full anticipation that the assessment of the complete data set in May 2009 (assessment development of additional faculty leaders) would lead to even further reduction in the required number of indicators (assessment of the assessment process).

The program shifted some of their focus to apply the same processes to the newly developing graduate program that would be assessed for the first time under similar conditions employed by the Southern Association of Colleges and Universities (SACS) in the fall of 2009 visit to UT Tyler.

The first concern cannot be addressed until the program is able to develop assessment data from alumni one and four years after graduation. By the time of the next ABET visit the program will be able to collect six years of one year after graduation data and three years of four years after graduation data. The second concern was addressed right away. The first department meeting led to the changing of the wording of PEO 3 from: “graduates have effective written, oral, and graphical communication skills” to “graduates have effective written, oral, and graphical communication skills to meet increasing professional demands.” The updated PEO was sent out to the external advisory committee to begin the approval process from a group that represents our constituencies.

The diligence, foresight, and hard work of the program paid off and resulted in an infant assessment process with one to two years of data having the overall structure of a mature assessment process of well established programs. Of course the assessment process is never on holiday. So while the entire faculty team remains vigilant on collecting embedded indicator data for the 2008-2009 outcome notebooks and completing course assessments (course assessment document, excel of assessment charts, assignment assessment document, outcome assessment document, excel of grades, course assessment memo document, course syllabus), the chair continues to ensure administration and collection of data for the FE, internal gateway exams, surveys (senior, faculty, alumni, and employers), modifying the rubric for the senior design course, applying the same processes to the growing graduate program for the upcoming SACS visit, and establishing the conditions and processes for a possible ABET accreditation of the graduate program in the very near future.

Lessons Learned

Someone must be involved in the active discussion surrounding accreditation, ABET best assessment practices, curriculum design that supports accreditation criteria, ASCE Policy 465, Body of Knowledge Version I and II, and other accreditation activities to know what might be on the horizon. Insightful curriculum design with successfully engrained assessment only happens within a positive developmental environment rather than under duress to meet last minute accreditation requirements.

Write the self-study report as if you are an ABET evaluator (if that someone can be an ABET PEV even better) and place the hard facts of the assessment/evaluation process (i.e., the dirt) in the report while presenting the processes currently in place to correct the problem and/or improve the program. Pilot all processes, even those that cannot be done yet if a new program or an older program just getting their act together. Example: the program had no graduates until a month before the self-study was to be mailed. Evaluation of the PEOs requires data collection from alumni and their employers. So the program developed the survey instruments and piloted it using a portion of the senior survey as if they were alumni and having their employers when they were interns complete their survey as if the seniors were EIT graduates. There was an inherent danger that the employers might find the seniors lacking since they interned before their senior year. However, no matter the results the program was able to show the process they were going to use and provide the first data point to be used with the 2009 alumni and employer surveys as the program looks for trends. Use the commentary and address each and every point presented. Points not addressed could be indicators of problem areas.

Assess the processes being used and note the changes in the self-study (i.e., close the loop). The key is closing the loop on everything. Collect data to demonstrate accomplishment of program outcomes and educational objectives, assess the data, evaluate and document the results against the provided criteria, develop actions for improvement, assess, evaluate, and document the results generated by the actions, and document accomplishment of the outcome and educational objective or establish new actions. This program uses the same process in their course assessment process as in the overall program assessment process.

It might be best to word the program outcomes exactly the same as ABET a-k and simply add additional outcomes to meet those identified within the CE program criteria. Currently a program must show how their outcomes map to the ABET a-k and using the same wording would remove this onerous requirement.

All programs must have an eye on the future accreditation criteria by being part of the annual discussions occurring at the ASEE annual conference. It was not long ago that the BOKI came out and quickly became part of the CE criteria. Raising The Bar makes sense and a Body of Knowledge is the easiest way to define what knowledge, skills, and attitudes new CE graduates should possess. The UT Tyler CE program immediately adopted the new criteria and had the proper curriculum and activities in place when the PEV arrived. The program possibly could have had similar results by simply having a plan in place to show future changes to be able to meet the criteria since this was the first year for the new criteria. However, having a plan in action with results to use for improvement will always be better than just a plan that might not be executed. The UT Tyler CE program is beginning this spring the process of developing plans to implement the BOKII since the CE criteria for 2014 visits just might include the new outcomes not included in ABET a-k and the current CE criteria. The visits in 2014 allow one complete cycle with the current CE criteria that require most of BOKI to be met. Since the requirements listed in BOKII appear to be reasonable knowledge, skills, and attitudes graduates should possess, it is only inevitable that parts of BOKII will begin to creep into future updates to the CE criteria.

Conclusions

The experiment was a success! A program can successfully prepare and pass an ABET visit in one and one-half years with no current assessment process in place, one tenure track assistant professor on staff, and teaching the senior level courses for the first time during the ABET record year. This high stakes experiment as to whether a program can be built, assessed, and changed to meet current ABET and CE program criteria based on the BOKI ensured that the May 2008 and 2009 alumni graduated from an ABET accredited program. If a new program can be successful, more established programs can be as well while limiting the activities for faculty to those they should already be doing – formally assessing their course and course assignments. The rest of the assessment can be accomplished by the administrative staff and department chair through departmental meetings.

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