2006-1999: TC2K: A SUCCESSFUL WORKING MODEL FOR CONTINUOUS IMPROVEMENT

David Cottrell, University of North Carolina-Charlotte

DR. DAVID S. COTTRELL is an Assistant Professor in the Department of Engineering Technology, University of North Carolina at Charlotte. He graduated from the United States Military Academy in 1978 and retired in 2000 after more than 22 years of service with the US Army Corps of Engineers. Studies at Texas A&M University resulted in an MS Degree in Civil Engineering in 1987 and a PhD in 1995. He is a registered Professional Engineer and has taught courses in statics, dynamics, mechanics of materials, graphic communications, engineering economy, and construction planning, scheduling, estimating, and management.

Bruce Gehrig, University of North Carolina-Charlotte

DR. BRUCE GEHRIG brings over 15 years of industry experience and 6 years of university level teaching experience to the program. His academic preparation includes three degrees in civil engineering including a M.S. in water quality and water/wastewater treatment processes and a Ph.D. in water resources planning and management and the delivery of public works projects. He is a licensed professional engineer in both Colorado and North Carolina.

Anthony Brizendine, University of North Carolina-Charlotte

DR. ANTHONY BRIZENDINE currently serves as Department Chair and Professor, Department of Engineering Technology, University of North Carolina at Charlotte. His academic degrees include a B.S. in Civil Engineering Technology (Summa Cum Laude) from Bluefield State College, a M.S. in Civil Engineering from Virginia Polytechnic Institute and State University, and a Ph.D. in Civil Engineering, West Virginia University. He is a Registered Professional Engineer and continues to pursue professional endeavors which focus in areas of Geotechnical Engineering (earth structures/risk analysis/probabilistic modeling/finite element analysis), Continuous Improvement/Outcomes Assessment, and educational pedagogy.

TC2K: A Successful Working Model for Continuous Improvement

Introduction

The Department of Engineering Technology at the University of North Carolina at Charlotte (UNCC) has developed and implemented a comprehensive program leading to an academic environment of continuous improvement consistent with the ABET Technology Criteria 2000 (TC2K).¹ This paper describes the practices, policies, and procedures that supported the evolution of a relevant set of program objectives and outcomes and the development of an integrated, comprehensive infra-structure for assessment, evaluation, and improvement. Further, to address outcomes assessment and evaluation, this paper examines continuous improvement in the Civil Engineering Technology (CIET) Program within the Department of Engineering Technology. Finally, the paper will discuss the practical implementation of the continuous improvement process.

There have been many papers published in the last few years on the topic of assessment as it relates to TC2K. Experts have long debated the pros and cons of assessment at the course level versus program level assessment and the potential for linking student achievement directly to program outcomes^{2,3,4,5,6}. This paper proposes a systemic approach to assessment that links program outcome assessment to course assessment that is currently fully implemented and functioning at the University of North Carolina at Charlotte (UNCC) in the Department of Engineering Technology. Having obtained the highest certification of “Next General Review” during the recent ABET visit in Fall, 2005, this successful methodology recognizes the need for collective as well as individual faculty assessment, evaluation, and input. It provides a mechanism that synchronizes and integrates the actions between the college, the department, and individual faculty. As the primary student interface, faculty provide the foundational student performance assessment data by participating in the **Individual Course Assessment Process (ICAP)**. This process reviews performance criteria in selected courses in light of their mapped support to specific program outcomes. Nevertheless, assessment employs multiple techniques and methods to “triangulate” performance, and this paper will provide a comprehensive look at ICAP as well as the other techniques that support continuous improvement. It will address the formal communication techniques and channels established to integrate activities across organizational boundaries, and it will describe an infrastructure that effectively engages staff and faculty and program constituencies in the continuous improvement planning and implementation. The Engineering Technology Department program represents a successful, holistic approach to systematically assess, evaluate, and improve the Department’s efforts in achieving program objectives and outcomes. The program at UNCC represents an approach to TC2K that not only works but that provides an example for other programs challenged with either transforming or sustaining the continuous improvement mode expected by TC2K.

Table 1: Civil Engineering Technology Program Objectives

1. Applying general and discipline specific concepts and methodologies to identify, analyze, and solve technical problems.
2. Articulating technical material in a professional manner to potentially diverse audiences and in a variety of circumstances.
3. Contributing within team environments, demonstrating ethical, respectful, and professional behavior in all associations.
4. Recognizing and appreciating the environmental, societal and fiscal impact of the technical professions in a local, national and global context.
5. Demonstrating an individual desire and commitment to pursue continuous self improvement and lifelong learning.

Step 1: Developing Program Objectives and Outcomes

The linchpin of success of any continuous improvement process is the development of both objectives and outcomes that adequately capture the education intent of the Civil Engineering Technology program. The set of educational objectives resulted from a deliberate, extensive long-range planning process. The objectives are consistent with the mission of the university, the college, the department, and ABET accreditation requirements. The Program Educational Objectives (PEO) were established early on in the history of the program and have undergone extensive refinements over the years. These changes occurred as a result of consultation with and guidance from our constituents, feedback from our established closed-loop continuous assessment and improvement process, and analysis of ABET guidelines for accreditation.

The Civil Engineering Technology (CIET) program outcomes reflect the strategy of continuous improvement that is a primary emphasis in the UNCC Department of Engineering Technology. As with the program educational objectives, the program outcomes have undergone an evolutionary process over the years, but have remained the bridge between the Program Educational Objectives shown in Table 1 and the “a-k” requirements of TC2K ABET TAC Criteria 2. The program outcomes for Civil Engineering Technology describe the knowledge and skills of graduates with a Bachelor of Science in Engineering Technology (BSET) from UNC Charlotte at the time of their graduation from the CIET program. As shown in Table 2, the Civil Engineering Technology program outcomes each include a number of sub-outcomes which elaborate and support implementation, assessment, and evaluation of the continuous improvement processes. These outcomes are well-publicized within the Engineering Technology Department and college documents, newsletters, on our website, and in the university’s undergraduate catalog.

Table 2: Civil Engineering Technology Program Outcomes and Sub-Outcomes

<ol style="list-style-type: none"> 1. Use appropriate tools to acquire data and analyze problems in civil engineering technology. <ol style="list-style-type: none"> i. Demonstrate the proper use of appropriate software to solve technical problems. ii. Use proper resources to obtain necessary information. iii. Operate discipline specific lab equipment 2. Demonstrate effective skills in the development and presentation of team projects. <ol style="list-style-type: none"> i. Exhibit effective team skills. ii. Present oral reports. iii. Produce a written reports. iv. Complete assigned tasks in a timely manner. 3. Exhibit knowledge and skills consistent with the expectations of a practicing engineering technologist. <ol style="list-style-type: none"> i. Take part in continued education and/or training. ii. Participate in appropriate activities or organizations, or obtain employment in a relevant position. iii. Perform tasks in a professional manner. 4. Generate creative and realistic solutions to defined problems and projects. <ol style="list-style-type: none"> i. Solve structural technical problems. ii. Solve technical problems to satisfy a given set of specifications. iii. Develop alternate strategies to solve open-ended problems. 5. Recognize the value of diversity, and identify ethical and societal issues in business and technical tasks. <ol style="list-style-type: none"> i. Participate in a diverse group. ii. Discuss ethical and societal issued related to technology. 6. Solve problems and design components, systems or processes appropriate to the discipline of civil engineering technology. <ol style="list-style-type: none"> i. Utilize graphic techniques to produce engineering documents. ii. Conduct standardized field and laboratory testing on civil engineering materials iii. Utilize modern surveying methods for land measurements and/or construction layout. iv. Determine forces and stresses in elementary structural systems. v. Estimate material quantities for technical projects. vi. Estimate material quantities for technical projects. vii. Employ productivity software to solve technical problems. viii. Plan and prepare design and construction documents such as specifications, contracts, change orders, engineering drawings, and construction schedules ix. Perform economic analysis and cost estimates related to design, construction, operations, and maintenance of systems in the civil specialties. x. Select appropriate engineering materials and practices. xi. Apply basic technical concepts to the solution of civil problems involving: 1) hydraulics; 2) hydrology; 3) geotechnics; 4) structures; 5) materials behavior; 6) transportation systems; and 7) water and waste water systems. xii. Perform standard analysis and design in: 1) structures; 2) geotechnical; 3) transportation; and 4) construction or water resources/environmental engineering.
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These program outcomes have been developed in a manner that embraces and encompasses all eleven “a-k” outcomes established in the TC2K ABET TAC Criteria 2 accreditation standards as well as the Civil Engineering Technology program requirements. Further, as shown in Table 3, each course in the curriculum as well as each outcome has been linked or “mapped” to one or more of the eleven Criteria 2 outcomes. Each outcome is expressed in detail through relevant performance criteria, and each performance criterion also appropriately mapped to one of the outcomes required in TAC Criteria 2. The performance criteria for program outcomes 1 through 6 were crafted to ensure that each outcome requirement of Criteria 2 was represented at least once as a primary map. The performance criteria or measures selected as benchmarks for assessing the program’s progress in achieving the outcomes have been directly mapped to the six

Table 3. Mapping the Curriculum to the Program Outcomes

Semester	Course Number	Course Title	Program Outcomes*					
			1	2	3	4	5	6
1st Semester (16 hours)	ENGL 1101	English Composition	x	x				
	ETCE 1121	Construction Methods	x					
	ETGR 1100	ET Computer Applications	x					
	ETGR 1103	Technical Drawing I	x					
	ETGR 1201	Intro to ET Practices & Principles	x	x	x	x	x	
	MATH 1100	College Algebra and Probability	x					
2nd Semester (15 hours)	ENGL 1102	Writing in the Academic Community	x	x				
	ETCE 1211	Surveying I	x					
	ETCE 1222	Construction Materials	x	x				
	ETGR 1104	Technical Drawing II	x					
	MATH 1103	Pre-Calculus Mathematics	x			x		
3rd Semester (17 hours)	ETCE 2112	Surveying II	x		x			
	ETGR 2101	Applied Mechanics I	x					
	MATH 1121	Calculus (ET)	x			x		
	PHYS 1101	Introductory Physics I	x					
	PHYS 1101L	Introductory Physics I Lab	x					
		Science Elective	x					
4th Semester (16 hours)	ETCE 2410	Introduction to Environmental Technology	x			x		
	ETGR 2102	Applied Mechanics II	x					
	PHYS 1102	Introductory Physics II	x					
	PHYS 1102 L	Introductory Physics II Lab	x					
	STAT 1220	Elements of Statistics	x					
5th Semester (14 hours)		Social Science Elective					x	
	ETCE 3111	Structural Analysis I	x					x
	ETCE 3121	Foundations and Earthwork	x		x	x		x
	ETCE 3151	Soil Testing Laboratory	x	x				x
	ETGR 3222	Engineering Economics	x			x		x
	ETGR 3071	ET Professional Seminar		x	x		x	
6th Semester (16 hours)	LBST 110x	Arts and Society					x	
	ETCE 3112	Structural Analysis II	x					x
	ETCE 3132	Hydraulics	x		x	x		x
	ETCE 3150	Hydraulics and Materials Lab	x	x				x
	ETGR 3171	Engineering Analysis I	x			x		
	LBST 2101	Western Culture and History					x	
7th Semester (17 hours)	LBST 2102	Global Connections					x	
	ETCE 3212	Structural Steel Design	x		x	x		x
	ETCE 3243	Project Management Technology	x		x		x	x
	ETCE 3252	Intro to Environmental Engineering or	x		x	x		x
	ETCE 3281	Cost Estimating	x		x			x
		Science Elective	x					
		Science Elective Laboratory	x					
8th Semester (17 hours)		Major Elective	x		x	x		x
		Major Elective Laboratory	x	x				
	ETCE 3211	Reinforced Concrete Design	x		x	x		x
	ETCE 3241	Highway Design and Construction	x	x	x	x		x
	ETCE 3293	Building Systems or	x		x	x		x
		Major Elective						
	ETCE 3642	Senior Design Project	x	x	x	x	x	x
		Major Elective	x		x	x		x
	LBST 221x	Ethical and Cultural Critique					x	

*Defined Program Outcomes: See Table 2

program outcomes in addition to identifying opportunities, tool(s), reporting mechanisms, and archival requirements. Collectively, this infrastructure testifies to a functioning process that directly links program assessment activities to program outcomes that is, in turn, linked directly to the TAC of ABET Criterion 2 outcomes and the program criterion specified in TC2K criteria (lead society, ASCE). Table 4 presents the interrelationships between program objectives and the six program outcomes of the Civil Engineering program. As shown, each program objective is associated with at least two program outcomes, the related program criteria, and the primary mapping to Criterion 2 outcomes.

Table 4: CIET Program Outcomes and Objectives mapped to ABET Outcomes

ABET Criterion 2 Outcome	Civil Engineering Technology Program	
	Program Outcome	Program Objectives
a	1i: Demonstrate the proper use of appropriate software to solve technical problems.	1
	4i: Solve structural technical problems.	1, 4
	6i: Utilize graphic techniques to produce engineering documents.	1
	6iii: Utilize modern surveying methods for land measurements and/or construction layout.	1
	6v: Estimate material quantities for technical projects.	1
	6vi: Employ productivity software to solve technical problems.	1
	6vii: Plan and prepare design and construction documents such as specifications, contracts, change orders, engineering drawings, and construction schedules	1
b	1iii: Use proper resources to obtain necessary information	1
	6viii: Perform economic analysis and cost estimates related to design, construction, operations, and maintenance of systems in the civil specialties.	1
c	1iii: Operate discipline specific lab equipment.	1
	6ii: Conduct standardized field and laboratory testing on civil engineering materials	1, 4
d	4iii: Develop alternate strategies to solve open-ended problems.	1, 4
	6ix: Select appropriate engineering materials and practices.	1
	6xi: Perform standard analysis and design in: 1) structures; 2) geotechnical; 3) transportation; and 4) construction or water resources/environmental engineering.	1
e	2i: Exhibit effective team skills.	2, 3
f	4ii: Solve technical problems to satisfy a given set of specifications.	1, 2
	6iv: Determine forces and stresses in elementary structural systems.	1
	6x: Apply basic technical concepts to the solution of civil problems involving: 1) hydraulics; 2) hydrology; 3) geotechnics; 4) structures; 5) materials behavior; 6) transportation systems; and 7) water and waste water systems.	1
g	2ii: Present oral reports.	2, 3
	2iii: Produce written reports.	2, 3
h	3i: Take part in continued education and/or training.	1, 2, 3, 4, 5
i	5ii: Discuss ethical and societal issues related to technology.	3, 4, 5
j	3ii: Participate in appropriate activities or organizations, or obtain employment in a relevant position.	1, 2, 3, 4, 5
	5i: Participate in a diverse group.	3, 4, 5
k	3iii: Perform tasks in a professional manner.	1, 2, 3, 4, 5
	2iv: Complete assigned tasks in timely manner.	1, 3

As an organizational footnote, display materials provided for the visiting ABET Team was organized by program outcome, primarily in digital format. In the case of course materials that corresponds to more than one of the program outcomes, the files were duplicated and housed in each program outcome folder to provide a complete package for each of the program outcomes. Assessment data, results, and recommendations were archived electronically as part of the Individual Course Assessment Process (ICAP) in an ICAP data base to be discussed later. Where appropriate, data obtained from the assessment process was graphically summarized according to program outcomes and/or objectives and used to show trends in achievement of the outcomes. Nevertheless, in addition to the assessment materials, course informational packages including syllabi, handouts (where applicable), graded assignments, projects, quizzes, and examinations were digitally compiled for each course in the curriculum. This information was also archived electronically and made available to the team.

Figure 1. The Assessment Triad – A graphic representation of the Continuous Improvement Infrastructure.

Step 2: Creating the Implementation Infrastructure

The Department of Engineering Technology employs a centralizing assessment process supported by the Lee College of Engineering (COE). The College has been and continues to be seriously engaged in an integrated process of strategic planning, measurement, evaluation, and feedback for the purpose of identifying continuous improvement opportunities. This continuous improvement process began in 1992 under

the leadership of Bill Lee, former CEO of Duke Power Company, when he chaired the College Advisory Committee. Numerous modifications and additions have been made during the past decade to improve the process and its impact. The principle components and overall interaction of the various groups and tools involved in the continuous improvement process are summarized in the assessment triad in Figure 1. The continuous improvement process has a triad structure with components that overlap between the College of Engineering, the Department of Engineering Technology, and individual faculty. The principal components can be summarized as follows:

- Program Educational Objective Assessment (Every other Year) or “**PROBE**” assesses and evaluates Program Educational Objectives at the department level every other year.
- Program Outcome Annual Assessment (Annually)
 - **FAIT**: The **F**ocus **A**rea **I**mprovement **T**eams are comprised of faculty groups that review subject area performance within programs and departments.
 - **ICAP**: The **I**ndividual **C**ourse **A**ssessment **P**rocess focuses on selected courses by documenting review of performance criteria.
- College-Level Administrative Review and Planning (Annually)
 - **SPART**: The **S**trategic **P**lanning and **A**ssessment **R**esource **T**eam serves as a continuous improvement guidance team composed of faculty and faculty associates; **SPART** is the college-wide continuous improvement guidance team composed of a faculty representative from each department/unit and College of Engineering faculty associates from the Office of Student Development and Success (OSDS). This body is charged with development, refinement, and implementation of College of Engineering planning and assessment tools. **SPART** is involved with the interpretation of data from these assessment tools and providing suggestions to departments/units and/or the college on areas of concern with respect to continuous improvement of program objectives, student learning outcomes, and progress towards other strategic goals.
 - **AIM**: **A**ssessment and **I**mprovement **M**eetings convene three yearly intensive assessment and planning workshops involving college leadership including Department chairs, deans, and SPART team members as needed. During the two-day retreats, focused discussions presentations review progress on the previous strategic plan, introduce new endeavors for consideration and lay the groundwork for upcoming initiatives.
 - **CAC**: The **C**ollege **A**dministrative **C**ommittee is made up of the College of Engineering Dean, associate and assistant deans, and department chairs. These weekly meetings allow discussion and refinement of individual topics of concern to the college, supervision of progress on current initiatives and

feedback to departments and programs. An important function of CAC meetings is to monitor topics resulting from AIM retreats to ensure progress on issues important to departmental and college functionality and growth.

The hierarchical relationship between several of the components – ICAP, FAIT, and PROBE – deserves further discussion as it represents the true center of gravity for this effective infrastructure. Figure 2 provides a graphical representation of their interactive nature.

Figure 2. The interactive nature of PROBE, FAIT, and ICAP

PROBE Execution: Program educational objectives as envisioned through Criterion 1 are evaluated through input requested from all constituents on a biannual basis. The process of achieving our Program Educational Objectives defines content and actions that we must take to help graduates accomplish what is expected of them during their first few years after graduation. Inherent in this process is the realization of Program Outcomes that measure the abilities of our students by the time of graduation. The following illustrates strategies and mechanisms employed in the execution of PROBE and Program Outcomes evaluation:

- Student, faculty, alumni, and employer surveys;
- Industrial Advisory Committee meetings with appropriate reviews and candid exchange of ideas;

- The structured Individual Course Assessment Process (ICAP) performed by responsible faculty;
- The Focus Area Improvement Teams (FAIT) activities in terms of ICAP and program review;
- Discussion between FAIT and department leaders and through extensive discussion at faculty meetings.

FAIT – Focus Area Improvement Teams: In the process of assessment for continuous improvement of our programs, courses in the programs housed by the Engineering Technology Department are categorized by discipline. ETGR courses, which are common to all disciplines and are offered at the departmental level, are the responsibility of the department as a whole. Faculty from each of the disciplines participate in the Focus Area Improvement Team (FAIT) process with one FAIT for each program. Current designated or “permanent” FAIT include Civil, Electrical, Fire Safety, Mechanical, Communications, ETGR, and Freshman. Each FAIT has the responsibility for their respective program curriculum and courses. These faculty teams monitor, assess, suggest, and oversee change implementation for program courses and the content thread that they represent. These focus groups have been charged to consider the courses identified as part of a specific area. Their goal is to make sure that topics are covered in a complete and orderly manner, and all prerequisite and co-requisite requirements are met. They are responsible for maintaining the description of these courses on the web site as well as updating the latest copy of the University catalogue. They meet on a regular basis and report their recommendations to the department chairperson. It should be noted that courses may be addressed by more than one FAIT – for example, all laboratory courses designated as writing intensive (W) are maintained within the Communications FAIT as well as the FAIT of the individual discipline. The common metrics and measures defined for Program Outcomes 1 through 5 provide a common reference for discussion and course evaluation among the different FAIT.

ICAP – The Individual Course Assessment Process. Course enhancement is achieved through the ICAP. This process provides the foundation for reviewing and improving course content, ensuring continuity, promoting course enhancements, and identifying areas of deficiency that need improvement. ICAP provides a framework for sharing this information among faculty that teach the same course(s). ICAP also provides a source of information for content threads in a given area, and therefore, is often used by FAIT as the catalyst for program improvement. Each semester, instructors of targeted courses receive ICAP forms via email for each defined measure. They are provided with information as to the previous semester’s recommendations for course improvement or enhancement which in turn may be a compilation of several cycles of suggestions. The instructor is then responsible for providing information as to current sample size, performance with respect to the defined measure, the status of previous recommendations as well as recommendations or observations from the current semester. In this way, a written record of the course history is maintained, learning outcomes are addressed, and a concrete strategy for continuous improvement is in place. All ICAP reports are archived in a database maintained at the departmental level, with college level technical support.

The contents of the ICAP may be compiled and provided to responsible FAIT in terms of program outcome, Criterion 2 outcome, and/or course designation. Faculty meet on a regular basis to solicit input for improvement strategies and/or report their recommended changes to the appropriate FAIT team. FAIT team leaders subsequently share their findings at regular faculty meetings, again, both to report to the larger group and to obtain input. Curriculum enhancement is a regular topic at faculty meetings, where FAIT recommendations are considered and changes are implemented. We have installed the following process improvement initiatives to ensure that the ICAP/FAIT process is implemented:

- Key required courses in the CIET curriculum are identified for continuous assessment and improvement. Courses are selected to ensure a comprehensive coverage of Criterion 2 (a-k) outcomes and CIET program outcomes, which contain Criterion 8 (Program Criteria) topics.
- Each semester ICAP summaries are prepared for the FAIT, with separate reports generated by Criterion 2 outcomes and Program Outcomes.
- Summaries are analyzed within FAIT and, along with recommendations and/or concerns with other courses in the program; a consensus is reached as to the implementation of further enhancements and/or the addressing of any deficiencies.
- FAIT discussions and recommendations are formalized through the FAIT Report form and submitted to the Chair for information and the departmental staff for archiving.
- Recommendations from all FAIT are discussed and implemented, as appropriate, during regular faculty meetings.
- Implementation, modifications, and any further suggestions are recorded in the ICAP database as information to be provided during the next ICAP cycle.
- FAIT information is provided to all program constituents through the PROBE process and input is solicited for inclusion in the record.
- The Department Chair reviews/summarizes ICAP?FAIT?PROBE actions to the College of Engineering and university administrators as appropriate. Pertinent recommendations and information are reported to the faculty.

Step 3: Implementation: Putting Continuous Improvement Processes in Action

The process cycle commences each year in the early fall with the beginning of each academic year. Deans, chairs, and other administrative staff of the college meet for a one to two day Assessment and Improvement Meeting (AIM). During the AIM, participants examine strategic initiatives of the College of Engineering and various aspects of the assessment process and improvements currently in progress as appropriate. Two follow-up AIM reviews are scheduled in the spring and summer of each year and routine progress is monitored at weekly College Administrative Committee (CAC) meetings. As seen in Table 5, the cycle for survey instruments varies from annually for student and faculty surveys, to a multi-year cycle in the case of alumni and employer surveys. The Individual Course Assessment Process (ICAP) and Focus Area Improvement Team (FAIT) meetings operate each semester as does the end of semester Student Evaluation of Teaching.

Measurement instruments developed by SPART, and reviewed by AIM, CAC, and department faculty, include student, senior exit, faculty, alumni and employer surveys, results from the Individual Course Assessment Process (ICAP), reports from Focus Area Improvement Teams (FAIT), results from the Program Objective Evaluation (PROBE), student retention reports, change of major reports, and student exit interviews. Results from most assessment instruments are available to the faculty at the SPART website. FAIT teams also use ICAP reports; make selected use of survey instruments and use student and faculty interviews. Recommendations from the ICAP process pass from one instructor to the next in a given course. These recommendations are also passed from instructor to instructors in follow-on courses via the FAIT process. Table 5 shows a summary of the various tools used to collect data for the Engineering Technology department. These tools are used to assess our program outcomes (PO) and Educational Objectives (PEO) as well as providing data to track perceptions and implement changes for improving all programs housed in the department.

The improvement process itself continually evolves and strives to operate horizontally and vertically within the college and its units. The continuing development of the process is coordinated by the Strategic Planning and Assessment Resource Team (SPART). As discussed earlier, this body consists of a faculty member from each department, with support from faculty associates in the Office of Student Development and Success (OSDS), who assist with the measurement process and data interpretation. SPART provides a liaison between the College and Departmental units in terms of determining process needs and overseeing data collection and dissemination. SPART members work with faculty, the dean, and the chairs to develop specific measurements, processes, and feedback strategies. PROBE works to develop a comprehensive evaluation within each department and oversees performance on Program Education Objectives. The overall continuous improvement process of the department and college is further integrated with university strategic planning and annual reporting to the Office of the Provost. This provides maximum integration of college and university goals.

Table 5. Assessment Tools Employed by the Engineering Technology Department

Assessment Tool	Item(s) Assessed	Lead Responsibility	Frequency
Student Survey	PO, Perceptions of COE, Program, Facilities, & Support	SPART/OSDS	Every Spring
End of Semester Course Evaluation	PO, Perceptions of Instructors & Programs	ET Department	Every Semester
Alumni Survey	PO, PEO, Perceptions of COE & Program	SPART/OSDS	Every Three Years (Beginning 2000)
Employer Survey	PO, PEO, Perceptions of COE & Program	SPART/OSDS	Every Three Years (Beginning 2000)
Faculty Survey	PO, PEO, Perceptions of COE & Program	SPART/OSDS	Every Spring
Senior Exit Surveys	PO, PEO, Perceptions of UNC Charlotte, COE & Program, Faculty, Facilities, & Support	OSDS/Assistant Chairs/Coordinators	Every Semester
Change of Major Survey	Perceptions of Overall Department and COE	OSDS/Program Coordinators	Every Time a Student Leaves the Department
Individual Course Assessment Process (ICAP)	PO	Faculty	Each Semester, Each Course Taught
Focus Area Improvement Teams (FAIT)	PO, PEO	FAIT Leader(s)	Every Semester
Program Educational Objectives (PROBE)	PEO	Department Faculty	Annually
Faculty Meetings	PO, PEO	Department Faculty	Regular Basis; Usually Monthly
Industrial Advisory Committee Meeting	PO, PEO, Perceptions of Department, Programs, & Facilities	Department Chair	Once Every Semester
Community College Articulation Conference	PO, PEO, Perceptions of Department & Programs	Department Chair	Every Two Years (Beginning 2002)
FE Exam	Fundamentals of Engineering	OSDS/Program FAIT	Fall and Spring Semesters

*Note: ET Students were eligible for the FE in North Carolina for the first time at the end of the Spring 2004 semester.

Conclusion

The multi-layered closed-loop process for evaluating outcomes and the level of achievement of the outcomes is part of the overall centralized assessment system developed by the College of Engineering. Since 1992, the College of Engineering has been engaged in an integrated process of strategic planning, measurement, evaluation, and feedback for the purpose of identifying continuous improvement opportunities. The current objectives and outcomes represent a direct result of that process and reflect a deep commitment to deliver a quality program that is relevant to an ever-changing field and

responsive to the diverse needs of both the industry and our students. In developing these objectives, we strove to ensure that our program and curricula was relevant in terms of being responsible to the lives and careers of our students; attractive to motivate our students and attract high quality students; and connected to the broader needs of our industry.

The development and implementation of the program outcomes and associated assessment measures and metrics represents a significant program improvement. UNCC Department of Engineering Technology now has in place a continuous improvement process that allows curriculum and course content to be critically evaluated on a routine basis. Improvements can be strategically selected to focus on those programmatically areas in the most critical need of improvement. This process represents the mechanism where future continuous improvements to the program will be systematically identified and implemented by a dedicated faculty.

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