

**Successful Administration of a Distance Learning Program:  
CSET Bachelor's Degree Completion**

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Abstract

This paper focuses on the issues facing the department head that relate to the emergence and management of a highly successful distance-learning program in an engineering technology department. Should your engineering technology unit develop distance learning courses, certificates, and degrees? If so, how can the ET department head motivate faculty to become involved? How is the development of course materials funded? How are faculty compensated? What about training, software and hardware resources? What expertise is needed? How can both faculty and administrators balance on-campus and online courses with respect to faculty workload? What are the issues related to assessment and accreditation? Specific answers to these questions and others are provided as they apply to The University of Toledo's highly successful degree-completion program, a program which uses web-based courses to provide place-bound community college EET graduates access to its bachelor of science degree in Computer Science and Engineering Technology (CSET).

This paper is not about the many issues related to teaching an effective distance learning class, rather it is about how to start, grow, and manage a distance-learning program in an engineering technology department with limited departmental and institutional resources.

Introduction

The Computer Science and Engineering Technology (CSET) program began at The University of Toledo in January of 1999. It is a four-year Bachelor of Science degree offered through the Department of Engineering Technology, which is one of six academic departments within the College of Engineering. The program has been accredited by the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone (410) 347-7700.

The CSET program is hands-on education that includes hardware and software aspects of computer design, computer networks, and computer applications programming. Computer design emphasizes the structure of computers and requires expertise in computational applications, digital design, microcomputer systems and computer architectures. Computer networking emphasizes the assembly of individual computers into a network environment and requires knowledge of network hardware and software protocols. Computer applications programming emphasizes the use of computer software in engineering technology and requires both low-level and high-level programming techniques, the use of mathematical algorithms, and a general knowledge of computer operating systems. The CSET program provides students with an in-depth understanding of computer hardware and software at the machine and system level.

Graduates of the CSET program are considered engineering technologists and are valuable additions to high-tech corporations throughout the country who are developing, maintaining, and marketing computer systems. Computer-related occupations represent one of the fastest growing employment areas in both Ohio and the United States. According to the US Bureau of Labor Statistics, demand for these professionals is expected to grow by 118% between 2000 and 2006. Baccalaureate graduates are typically employed as network technologists, telecommunications specialists, and network support specialists. LAN administrators, web programmers/designers, web server administrators, network administrators, network engineers and LAN managers. The average starting salary is \$35,000.

Graduates of the CSET program have the opportunity to obtain industry standard certifications: such as A+, CCNA, MCSE, and CNE. Graduates are also eligible to sit for the F.E. examination in Ohio and many other states as the first step toward registration as a Professional Engineer (P.E.).

#### CSET Degree Completion

The University of Toledo CSET program is unique in Ohio – it is the first of its kind to be a combination of Electrical Engineering Technology and Computer Science. It is a balance between hardware and software. The CSET degree completion program is a dual-admissions program. Students are simultaneously admitted to The University of Toledo and the partner community and/or technical college. All the work is completed at the community and/or technical college or through distance learning via the Internet. This allows students to earn their bachelor's degree without ever having to come to Toledo.

During the first two years students work toward an Associate of Applied Science degree in Electrical Engineering Technology (or a similar program) at a partner community and/or technical college. During the last two years students work to complete their bachelor's degree in Computer Science and Engineering Technology from UT.

In the original design of the program, the classes for the last two years are offered in the following formats: one-third from the community college catalog (e.g., humanities, social science, mathematics), one-third as web-based distance learning, and one-third with in-class instruction at the community college by University faculty. The Department has received funding from the State of Ohio, Ohio Learning Network (OLN) to move all technical courses to an online format. This would provide students with easier access to these courses. The program can be completed on a full-time or a part-time basis. An optional three-semester alternating co-op work experience can be selected by students in the program.

The table below illustrates the enrollment in the CSET degree completion program. There are a total of 127 students currently enrolled in the program with approximately 60% in the lower-division courses and 40% taking upper-division courses.

SCHOOL	FROSH/SOPH	JUNIOR/SENIOR	TOTAL STUDENTS
Central Ohio	3	2	5
Cincinnati State	3	3	6
Columbus State	4	1	5
Cuyahoga	0	0	0
Jefferson	0	0	0
Lakeland	4	3	7
Lorain	21	30	51
Northwest State	3	3	6
Sinclair	1	2	3
Stark State	36	8	44
<b>TOTAL</b>	<b>75</b>	<b>52</b>	<b>127</b>

One of the strengths of the program is the overall design. The CSET Degree Completion Program was developed with the idea of providing the student with the opportunity to enroll in an associate degree program, yet complete the baccalaureate degree without the traditional problems associated with transferring to new programs and institutions. This program adopted the philosophy of providing an integrated experience for the student from the commencement of study.

As the concept of a degree-completion program developed, we realized students would normally not begin taking courses at The University of Toledo until the coursework in the associate degree program was nearly complete. In this situation, students enrolled in the Degree Completion Program would not have contact with the University until the third year of study. Without periodic contact, students and the program would be at risk. As a result, students are dually admitted to the Community College and the University. This provides a method of maintaining communication with students as they progress through the curriculum and allows time for budget and course schedule planning.

Community college graduates with associate degrees have the option of pursuing a baccalaureate degree at a university by transferring credit from the community college program to the university. Despite articulation agreements, students often find that they must take additional coursework to satisfy program or university requirements. In order to facilitate transfer of the associate degree coursework, we examined the associate degree program at each partner school and carefully identified a sequence of coursework that minimizes the number of additional courses outside of the program that students must take. In situations where it was not possible to achieve complete articulation, "bridge" courses were specified. Bridge courses are courses needed to transform the associate degree experience into one equivalent to the first two years of

the CSET program as taken at The University of Toledo. This articulation planning provides the student with a complete picture of the curriculum when study commences.

During the first two years students work toward an Associate of Applied Science degree in Electrical Engineering Technology (or a closely related program) at the partner institution. During the last two years students will work to complete the Bachelor's degree in Computer Science and Engineering Technology from UT, focusing on computer networking and web-based programming.

All work is performed on the campus of the partner institution. By offering all instruction on the campus of the partner institution, students have the opportunity to complete the program without making a commitment to relocate. This allows students to maintain family and job responsibilities. Classes for the last two years are offered in the following formats:

- one-third from the two-year college's catalog (e.g., humanities, social science, mathematics)
- one-third as web-based distance learning courses (lecture only technical courses)
- one-third with in-class instruction at the two-year college (laboratory based technical courses)

By taking the general education core (i.e. humanities, social science, and mathematics) using courses from the two-year college's catalog, the students are able to take classes at a tuition rate that is significantly lower than the University of Toledo. This can represent a significant cost savings to the student.

The web-based distance learning courses are well developed. One of the concerns with providing this type of instruction is the lack of face-to-face contact or the human element. The original courses were designed to maintain contact between the student and the instructor using e-mail as the primary means of communication. We realized with the early offerings that e-mail alone is not sufficient. From a faculty perspective, students had the ability to e-mail responses to the instructor at any time and became easily frustrated if they did not receive an immediate reply. Despite our commitment to respond to students within 24 hours, students complained of poor instructor response. It appeared that e-mail alone would not suffice as a method of providing feedback to the student.

These early problems were addressed by providing additional support services to the courses. The primary source of information and assignments is the course web site. The web site provides enhanced instructional material based on reading and problem assignments from the required text. Each course utilizes, at a minimum, links to other resources, an interactive chat page, and a listserv.

The laboratory based technical courses will be offered on-site at the two-year college utilizing equipment and facilities on the community college campus. Instructors will be hired from the local community and will be provided with course materials to ensure consistency across the curriculum.

To be successful, the program will require close cooperation between the University and the partner institutions. In order to attract students to the program it must be marketed. The partner schools must take the initiative and are instrumental in providing information about the program. Our largest enrollments are from schools that actively market the program to their students and prospective students. CSET faculty members frequently travel to the partner institutions for open houses, college fairs, and informational sessions. Informational sessions for prospective college students have been productive. High schools students and their parents appear enthusiastic and often ask insightful questions about the opportunities this program provides.

Once students enroll in the program, there is a need for student advising on a continuing basis. Since the students are closely associated with the community college we rely on the partner institution to provide initial advising to the students. Information such as course selection and the mechanics of the program is handled on campus by community college advisors. Additional student support for advising, registration and course selection is provided by an Academic Program Coordinator at the University.

Other student support services that are necessary to the success of the program include the availability of financial aid and scholarships. Application of both financial aid and scholarships requires close communication between the partner institutions and the University. A considerable amount of effort was devoted to identifying contacts at each of the institutions to ensure that each institution's requirements for documentation and reporting were met.

#### Partnership Building

There appears to be a direct correlation between the effort extended and the enrollment in the program. The effort required by all institutions to make the program successful is considerable. In order to remain an effective and viable program, the two-year college's and the University must maintain a real partnership.

In order to build a partnership we have identified a faculty member to serve as a liaison between the program and the partner institutions. We think it is important to have regular visits with each of the partner schools to address institutional, program, and student issues. This individual should regularly meet with the partner schools to identify the tasks and responsible person to complete the task so issues are resolved in a timely manner.

For the past two years, the University has hosted a day and a half annual meeting for the partner schools in the spring semester. The purpose of the meeting has been to build community among the partner school, share best practices at each of the institutions, and identify goals for the following academic year.

While we would characterize both of the approaches above as successful, the level of communication between and among the partners is not as desirable as it could be. We have considered starting a list-serve to provide a more consistent level of communication.

One of the challenges of building effective partnerships with the community colleges has been the same challenge of providing education at a distance: how to bridge the gap and build a sense of community without continual face-to-face contact.

### Funding

All distance-learning classes at The University of Toledo are offered in cooperation with the Division of Distance Learning. This division is self-supporting based on the tuition paid for all courses identified as Distance Learning courses. The tuition is used to cover expenses including course development, faculty compensation, DL staff, and support personnel. After expenses the “profit” is split evenly between the Division of Distance Learning and the Department of Engineering Technology. The university retains the subsidy.

### Faculty Participation

Within the Department of Engineering Technology all faculty are encouraged to use the web for all handouts and supplemental materials. Course syllabi, homework assignments, project descriptions, and instructor notes are just a few of the materials placed on the course website. In this way, faculty are encouraged to make their courses “web-assisted”. Over time web-assisted courses accumulate a great deal of instructional material on the web and allow an easy transition to web-based courses.

Proceeds from the distance-learning offerings that come to the engineering technology department are used to purchase hardware and software needed by the faculty to further develop their distance learning courses. Additionally, these proceeds can be used by distance learning faculty members for travel and attendance at professional conferences.

Faculty members who teach distance-learning courses, in consultation with the department chair, may elect to teach these classes as part of their normal workload or for extra compensation. If extra compensation is paid the cost is borne by the Division of Distance Learning. Faculty compensation is based on course enrollment and ranges from \$100 for one student to \$2,250 for 25 students. Compensation for additional students is approximately \$100 per student.

Participation in the Department’s distance learning effort, including course development and online teaching, is considered meritorious. Faculty members receive positive contributions to their evaluations in the merit, promotion, and tenure processes for their effective participation in the distance learning and degree completion efforts.

The University’s Division of Distance Learning provides training on the use of WebCT and other software to faculty participating in the distance learning effort. Additionally, the Department of Engineering Technology provides assistance to faculty in the form of colleagues who have previously developed distance-learning courses. The department provides templates for the development of distance learning courses that include listservs, chatrooms, threaded discussion pages, and web page templates.

All faculty members who teach distance-learning courses are provided with a graduate teaching assistant. These teaching assistants provide the faculty member with help in responding to email, the conduct of chat sessions, grading of weekly assignments, and the development of web content. This allows the faculty member to focus on the course content and the interaction with students.

Some of our community college partners (who do not have graduate students) have started to use some of their own students for similar purposes. Those community colleges that require co-op have started to count these activities as a valid co-op assignment for.

#### Hardware

The Division of Distance Learning provides and maintains a centralized web server for all distance-learning courses. In addition the Engineering Technology Department provides a number of low-cost Unix-based servers for individual course usage. These servers are used for programming assignments, web site development, CGI programming, web server administration, and network administration in a variety of CSET courses.

The Division of Distance Learning provides funds to cover the maintenance, upgrading, repair and replacement of these servers. Instructional software used on the Department's Internet servers is also provided by the Division.

#### Conclusions

The Department of Engineering Technology at The University of Toledo is providing a significant service to place-bound community college students and graduates. The use of distance learning as a method for delivering engineering technology coursework is the most appropriate approach for this program. Although not all engineering technology faculty members participate in the current CSET degree-completion program, a significant number are active and enthusiastic participants. Each semester the number of faculty members participating in one or more distance learning courses increases.

The Department of Engineering Technology has plans to expand its degree-completion efforts to include all four programs it offers: electrical engineering technology, mechanical engineering technology, and construction engineering technology.