2006-1724: BUILDING SOFT SKILLS INTO A CGT PROGRAM: PLANNING FOR ACCREDITATION AND JOB SUCCESS

Jana Whittington, Purdue University-Calumet

Kim Nankivell, Purdue University-Calumet

Joy Colwell, Purdue University-Calumet

James Higley, Purdue University-Calumet

Building Soft Skills into a CGT Program: Planning for Accreditation and Job Success

Abstract

Purdue University Calumet has long supported engineering technology, with some programs finding their roots in World War II industrial training programs. Only recently, however, has the university added a program in Computer Graphics Technology (CGT). The CGT program at PUC was created in 2000 and has grown from 18 students to approximately 200 in 2005. While managing such growth has presented challenging issues for CGT faculty, the faculty have always performed program development with an eye towards future Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET) accreditation in mind. Hence, in creating the associates and bachelor's degrees, and the various program options, the faculty at PUC have planned for future accreditation and job success of the graduates by including technical courses along with many courses in the degrees which emphasize the "soft skills" of engineering technology, such as communication, teamwork, and appreciation for diversity. TAC/ABET Criterion 2 lists the eleven areas of expertise a graduate must possess upon program completion; most people know these as the "a-k" criterion. It is interesting to note that only four of the eleven criteria apply to technical areas. All others cover "soft skills." By working closely with faculty from the Organizational Leadership and Supervision program, the CGT faculty have been able to incorporate courses which emphasize communication, teamwork, and other soft skills. Such courses include Conflict Management, Gender and Diversity, Human Relations in Organizations, Creativity and Problem Solving, and related topics. By including these courses in the degree requirements, the CGT program produces students who are trained in the soft skills required by TAC/ABET and also students who are more job ready and marketable in the workplace.

Background

 Purdue University Calumet (PUC) is a regional campus of Purdue University which is located in the northwest part of the state in Hammond, Indiana, a highly urban area of the state. The campus serves about 9,100 students and is primarily a commuter campus. The student population consists of about half traditional students and about half non-traditional returning students. Both the Organizational Leadership and Supervision (OLS) program and the Computer Graphics Technology programs are part of the Manufacturing Engineering Technologies and Supervision (METS) Department on the Calumet Campus.

The Computer Graphics Technology (CGT) program at PUC was begun in 2000, and has grown exponentially in the last five years, as have CGT programs throughout the country. Because of the relative newness of the CGT degree nationwide, relatively few programs are accredited. Accreditation of the program is a desirable goal, to assess and maintain quality learning experiences for students, and to produce quality graduates. Following the national trend in education, the CGT program intends to pursue ABET (Accreditation Board for Engineering and Technology).
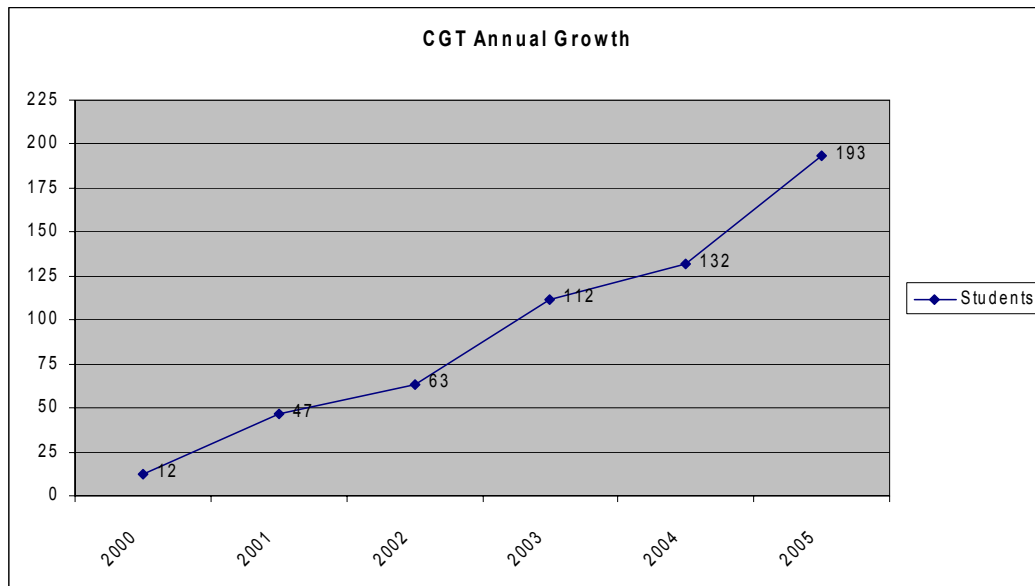
Table 1. CGT Annual Growth at PUC

CGT Annual Growth

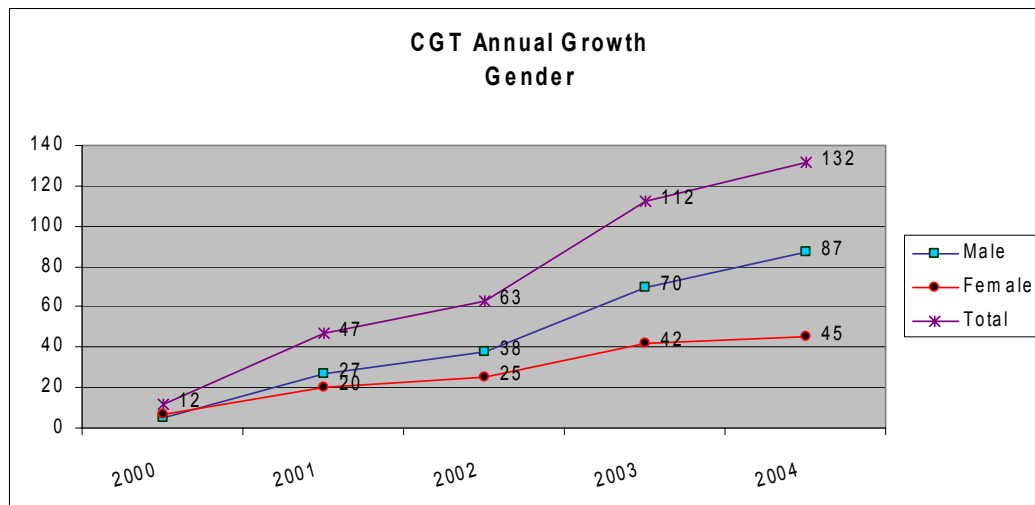| Year	Students
2000	12
2001	47
2002	63
2003	112
2004	132
2005	193

Table 2. CGT Annual Growth by Gender at PUC

CGT Annual Growth Gender

Year	Male	Female	Total
2000	5	7	12
2001	27	20	47
2002	38	25	63
2003	70	42	112
2004	87	45	132

Table 3. CGT Annual Growth by Ethnicity at PUC

CGT Annual Growth
ETHNICITY

	2000	2001	2002	2003	2004
Afro-American	0	5	8	14	15
Alaskan/Native American	0	0	0	0	1
Asian	0	1	1	3	1
Caucasian	10	35	44	79	92
Hispanic	1	5	10	13	20
Not Provided/Other	1	1	0	3	3
Total	12	47	63	112	132
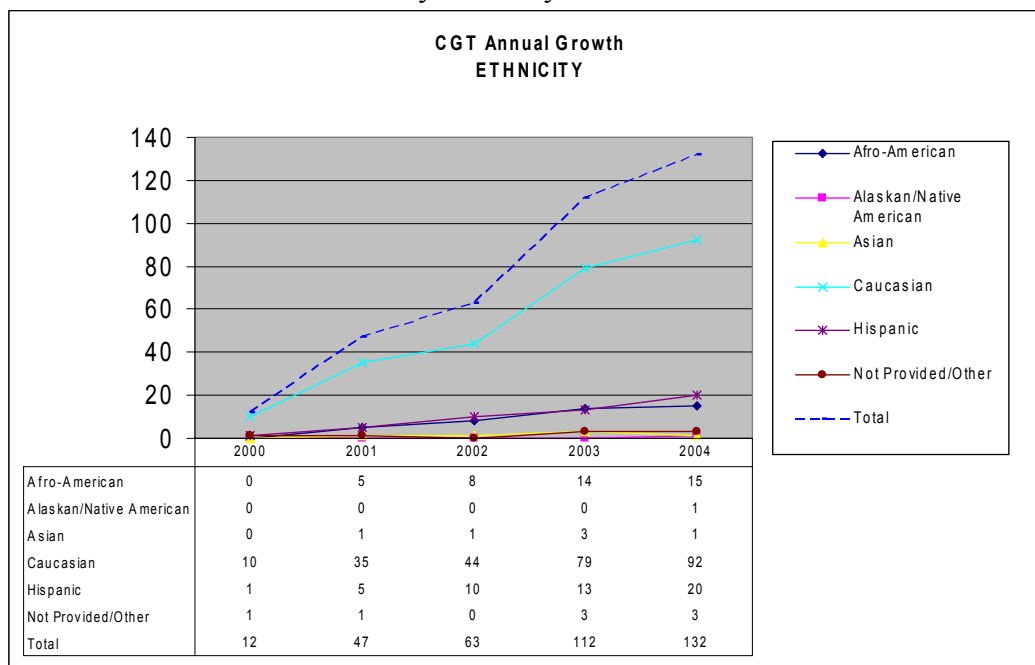
The majority of students in the CGT program are traditional college age students. The CGT program offers both Bachelor's and Associate's degrees, with options in multimedia, game and animation, along with certificates in web design and electronic publishing.

Discussion

The goal of the CGT program is to plan for eventual accreditation. In terms of eventual accreditation, TAC of ABET in the ET2K is leading the way to a more outcomes-based accreditation process. ABET is a recognized accreditor of college and university programs in technology (also in science, computing and engineering). According to ABET, its accreditation is assurance that a college or university program meets the quality standards which are established by the profession for which it prepares its students. ABET accredits programs only, not degrees, departments or institutions. ABET accreditation, for example, focuses on program educational objectives which are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve: these are then linked to program outcomes, which describe the units of knowledge or skill which students are expected to acquire from the program to prepare them to achieve the program education objectives. [See, for example, the Criteria for Accrediting Engineering Technology Standards effective for the 2005-2006 Accreditation Cycle]. The current Criteria for Engineering Technology are often referred to as the "a-k" criteria.   An engineering technology program must demonstrate that graduates have:

    a.   an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,

    b.   an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,

c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,
d. an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,
e. an ability to function effectively on teams,
f. an ability to identify, analyze and solve technical problems,
g. an ability to communicate effectively,
h. a recognition of the need for, and an ability to engage in, lifelong learning,
i. an ability to understand professional, ethical and social responsibilities,
j. a respect for diversity and a knowledge of contemporary professional, societal and global issues, and
k. a commitment to quality, timeliness, and continuous improvement. (TAC/ABET criteria)

In designing the program options and degrees, the CGT faculty specifically planned for eventual accreditation by incorporating courses which address the "soft skills" of the criteria, such as teamwork, communication, diversity, and problem solving.

The technical aspects of creating this program have been reported previously in [2] and [3]. In designing the program options and degrees, the CGT faculty specifically planned for eventual accreditation by incorporating courses which address the "soft skills" of the criteria, such as teamwork, communication, diversity, and problem solving using the model from Scachitti, et. al. in [4] and shown in Figure 1.

Program Mission
↓
Program Objectives
↓
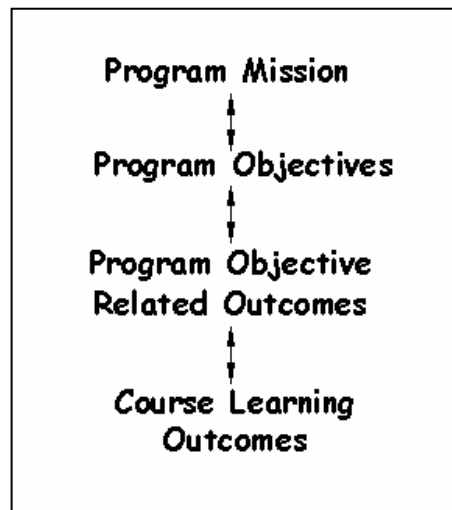Program Objective
Related Outcomes
↓
Course Learning
Outcomes

Figure 1 – Support Structure for Programs

Hence, the program objectives and related outcomes support the ABET a-k outcomes in all eleven areas.

Another program in the department, OLS, offers courses in these areas, and the CGT degrees and options currently incorporate seven of these courses as requirements in the CGT degrees. Of course, students may also take courses in management or organizational behavior to fulfill these requirements.

Courses incorporated

Some of the courses which the CGT degrees incorporate are Human Relations in Organizations, Creativity and Problem Solving, Conflict Management, and Diversity and Gender.

Human Relations in Organizations (OLS252) is a study of the basis and organization of individual and group behavior, with a special emphasis on typical supervisory relationships. It is a survey class which introduces students to issues in workplace behavior, such as communications, teamwork, conflict, motivation, and change. This course serves as an introduction to the ABET issues of communication, teamwork and diversity. The course requires students to work in teams and to learn about diversity and communication. The students work with written communication, as well as presentation skills, and study workplace and individual ethics.

Creativity and Problem Solving (OLS350) is a study of the ways an individual can become more creative and how they can develop an environment which encourages creativity from employees. It covers basic problem solving techniques, and also includes communication skills. It is a study of the ways an individual can become more creative and how to develop creative environments. The students work on processes for problem solving and may choose workplace problems for their projects.

Gender and Diversity Management (OLS454) is a course which provides supervisors with the skills required for managing a diverse work force. The course focuses on helping supervisors identify and solve workplace problems arising from cultural, racial, gender, and language differences.

Conflict Management (OLS477) is a course in which students investigate the theoretical and practical aspects of communication, negotiation, mediation, arbitration, and other third-party strategies to reach agreements. Students also practice written communication and teamwork skills in peer review of student work.

These courses, individually and together, foster competency in the soft skills of communication, teamwork, ethics, and respect for diversity, as well as enhancing and learning to apply creativity. The remaining four technical ABET outcomes, a, b, c, and f, are supported by the technical content of the curriculum.

Assessing both the technical and soft outcomes is done using the methods described in [5] through [9]. Since these methods are well documented now, they won't be repeated here.

Conclusion

Requiring courses which teach soft skills to students in the CGT program not only prepares students for the workplace, it prepares the program for eventual accreditation by making sure that the program can meet ABET criteria. In fact, several students in the CGT program are so convinced of the usefulness of these skills that they combine their degrees and get an additional associate's degree in OLS or an additional major in OLS.

Bibliography

[1] ABET website, www.abet.org, access date 01-01-06.

[2] Colwell, J., Whittington, J., Higley, J, "Assessment Measures and Outcomes for Computer Graphics Programs," 2005 ASEE Annual Conference, Portland.

[3] Colwell, J., Whittington, J., Higley, J, "Tools for Using Course-Embedded Assessment to Validate Program Outcomes and Course Objectives," 2004 ASEE Annual Conference, Salt Lake City.

[4] Scachitti, S., Neff, G., Higley, J., "The Next Level in TC2K: Continuous Quality Improvement," 2004 ASEE Annual Conference, Salt Lake City.

[5] Colwell, J., Whittington, J., Higley, J, "Tools for Using Course-Embedded Assessment to Validate Program Outcomes and Course Objectives," 2004 ASEE Annual Conference, Salt Lake City.

[6] Higley, J. B., "Teaching Integrated Design and Manufacturing – Course Structure and Assessment," *The Engineering Design Graphics Journal*, volume 67, number 3, Autumn, 2003.

[7] Neff, G. P., Scachitti, S., and Higley, J. B., "Counting Down to 2004: Some Insights and Strategies for Satisfying TC2K While There is Still Time," *Proceedings of the 2003 ASEE Annual Conference and Exposition*, Nashville, June 22nd -25th, 2003.

[8] Colwell, J. "Some Early Data from Online Course Assessments" *Proceedings of Teaching Online in Higher Education* 2003.   (http://www.ipfw.edu/as/2003tohe/)

[9] Colwell, J. and Jenks, C. "Using Peer Evaluations and Teams in Online Classes", *Proceedings of ASEE/IEEE Frontiers in Education Conference 2004*, October 23-25 Savannah Georgia