

**Connecticut College of Technology:
Creating Collaborations between Educators and Industry;
The Key to Building a Technological Workforce**

History of the College of Technology

The CT College of Technology is a state-wide, technology and engineering seamless pathway between Connecticut's 12 community colleges and six four-year institutions of higher education that was implemented statewide in 1995. In 2002, a system to system statewide articulation agreement was signed between the COT and the 17 vocational-technical high schools, creating a 2 + 2 + 2 pathway in engineering and technology disciplines. The COT is much more than a series of articulation agreements filed in a file cabinet but includes an infrastructure with faculty and administrative councils that meet monthly and ensure that the COT is a dynamic and responsive entity.

In addition, the COT provides flexible skill standards based curriculum and has established links to business and industry by partnering with the CT Business and Industry Association, the Office of Workforce Development and local business and industries. The COT and CBIA have received several NSF grants including Advanced Technology Education Grants and CSEMS grants that have enabled the COT to successfully strengthen its two ATE curriculum pathways in technology studies and engineering science through curriculum changes and faculty professional development. This paper will focus on a NSF-

ATE professional development grant that was received by the CT Business and Industry Association in collaboration with the CT College of Technology.

The Need for a Technological Workforce

The world no longer caters to global isolationism. The speed and necessity of technological invention has brought world economies together at a pace no one could have imagined even a decade ago. Yet in America, statistics indicate that we are falling behind in our ability to compete with foreign workers in terms of wage competitiveness and technological skill-building.

Employers also cite pending Baby Boomer retirements as a concern. A recent survey of small to medium sized businesses conducted by the Connecticut Business and Industry Association (CBIA) revealed that 69 percent of the companies surveyed expected 40 percent of their workforce to retire within the next 10 years.¹ This is of particular concern to the manufacturing industry where technology has become highly sophisticated. Who is going to take these trained workers' places and what impact will this have on our standard of living? Well-known American inventor Dean Kamen had this to say about the issue:

“In 10 years, unless we dramatically change our priorities and our standards, we will become a second-tier country in terms of technical competitiveness. And that will lead inevitably to becoming a second-tier country in every other way, in everything from standard of living to health to anything else you can name.”

¹ *2003 Survey of Small and Midsize Connecticut Businesses*, Blum and Shapiro and CBIA, p. 25

The challenge as educators, then, is to make important connections with industry so that students and educators alike can take a hands-on learning approach to learning about workplace practices that will give them a competitive edge in today's technological society.

The Advantages of Working with an Employer Association

The Connecticut Community College of Technology, (COT) a virtual college consisting of technology representatives from each of the state's 12 community colleges. COT received a National Science Foundation ATE grant that involved curriculum development for students transitioning from high school to community college and beyond. Because of this invaluable partnership and CBIA's history of working with educators in the workplace, the COT and CBIA were awarded a National Science Foundation ATE grant to provide industry based professional development for two year community college, high school and four year technology and engineering faculty. In addition, faculty was expected to develop and disseminate curriculum from their industry experiences.

Components of the ATE Educator/Industry Collaborative

The CBIA/COT Educator/Industry Collaborative is a three-year \$638,000 grant that brings educators into the workplace through activities such as externships, site visits, workshops, seminars and conferences on cutting edge technologies being used in Connecticut companies. The COT/ CBIA selected a group of 24 math, science, and technology teacher "leaders" to participate for two years over the three-year period. Because a goal of the grant is to build partnerships and transitional programs between

community colleges and high schools, half the teachers are high schools teachers, the other half are community college professors. Another group of teacher “leaders” were selected this fall (2003) for another two-year program. The business areas targeted are engineering (including biomedical engineering), manufacturing and information technology.

The educators are required to participate in a one-to-two week paid summer externship program to be followed by the submission of a curriculum report that reflects the externship experience and work-based learning activity. They are also required to submit an evaluation of student outcomes once the projects have been implemented. Other activities include company visits, and smaller workshops on topics that either highlight a particular technology or build leadership skills in helping the educators connect to business. Culminating each year’s activities is a statewide conference highlighting Connecticut company technologies; open to all of the state’s math, science and technology high school and community college educators.

The ultimate goals of the grant are:

To create **sustained** partnerships between educational systems and industry through a **mutual** understanding of shared experiences. Sustaining the experiences is an important part of the learning which is why the curriculum projects are key to the success of the program. It is hoped that both educators and employers gain a respect and mutual understanding of each other’s challenges, and that the relationship continues beyond the externship timetable.

To **create** collaborations between high school and community colleges to further facilitate student transitions into college. Ideally, through shared externships and work-based projects, it is anticipated that some high school and community college educators

will work together on classroom projects that could inspire students to go beyond a secondary education.

To **create** teacher leaders who will go beyond the curriculum by giving students' work-based activities that will help them connect learning with work expectations. The project hopes to inspire educators to influence other educators to approach teaching in a different way – to present the curriculum creatively and realistically at the same time. To quote popular cartoonist, Scott Adams from “The Dilbert Principle,” ...”Creativity is allowing yourself to make mistakes. Art knows which ones to keep.”

Summary of Year One Activities

The first group of teacher leaders learned about program expectations and met industry representatives from the targeted business areas at a team orientation. This was followed by site visits to General Dynamic's Electric Boat, a nuclear submarine building company and Gerber Scientific, makers of signs and optical equipment. A seminar on fuel cell technologies being developed for the automotive industry was conducted at United Technologies (UTC) Fuel Cells Corporation. The end of the first year was marked by a statewide conference on Investigative Technologies, highlighting technologies used in: forensics, drug development, internet security, and storm water prevention. Approximately 85 teachers attended. Finally, an appreciation reception was held, bringing together the teacher leaders and employers who participated in the summer externship program to discuss their mutual experiences and how the program could move forward. Clearly, the experiences shared were positive, and ongoing relationships between the educators and corporate sponsors were reinforced.

The focal point of the program is the summer externship program. Teachers were placed in 20 companies and more than 60 employees gave of their time and expertise

in helping the educators understand how technology affects their work. Almost without exception, the employers contacted went beyond the expectations of the teachers. To quote one educator:

“Becton Dickinson’s engineering team welcomed me with open arms. I became a colleague and they shared their experiences and their trials and tribulations. The idea of getting immersed in a manufacturing environment was very refreshing for me. I had a lot of notions, some true and some not so true. Now as I teach, I can deal with actual facts as opposed to supposition.”

Neil English, Tunxis Community College

Companies were solicited based on the educators’ preferences and in keeping within the parameters of the three industry groups targeted. All areas were represented by such companies as: Boehringer-Ingelheim Pharmaceuticals, Pratt and Whitney (makers of aircraft engines), Unilever Home Products (makers of Tetley Tea and Dove Soap to name a few), and Aetna Insurance Company.

Soliciting companies to host teachers during competitive and economically deflated times can be challenging. Nevertheless, among the sponsor companies who participated, there was genuine concern and commitment toward helping these educators understand workplace practices. In many cases, the experience was mutually beneficial. To quote one employer:

“We’re working hard to create linkages with our local schools to fight manufacturing’s stigma of being a sweat shop. It’s easy to become disconnected. So it was fantastic having Neil (a community college professor) with us this summer, working on a project

from beginning to end. I think the educational system needs to know what's going on in our industry. We're working with a lot of advanced technology, and I think teachers and students would be amazed at what we do. We're also constantly working with colleges to create programs that work for us. "

Summerville, A. Becton Dickinson

Sustaining the externship experience

Critical to the success of an externship is to move the experience forward into the classroom, so that educators can share what they have learned with students. The curriculum reports inspired from the teacher leaders' externships reflect the impact the program has had. The following are examples of proposed projects:

An IT professor is creating a brand new data base administration class inspired by her work in the IT department of a large insurance company.

A technology teacher is having his students create a school video which will be aired on the cable TV station he worked at. His stay at the station allowed him to become certified to air programs on cable access.

A biotechnology professor will introduce his students to genetic food development through visits to his sponsoring company and will open up a debate on the pros and cons of genetic food testing.

The Importance of Partnerships

Having access to professors participating in another ATE grant from the Connecticut Community College of Technology proved to be an important resource in building the first group of ATE teacher leaders. As a business association, CBIA could not have succeeded with an ATE project without this valuable partnership.

Other partnerships have also contributed to the success of this project. One enabled CBIA to disseminate the curriculum projects on a statewide web site, the other helped train teachers on pre-engineering software.

Dissemination of project results is an important part of any ATE project requirement. Building a sophisticated Web site to disseminate this information could prove to be costly. Fortunately, through an outreach to a state regional education center, CBIA/COT partnership was able to collaborate with a state-run interactive Web site at no cost that gives teachers the opportunity to post their curriculum plans. Concurrently, the regional site was looking for ways to include college professors on the site. CBIA subsequently revised its Web site to reflect the National Science Foundation ATE grant and the teachers' activities. The curriculum projects were summarized and then directly linked to the formal curriculum Web site run by the state.

Another fortuitous partnership developed between a renowned software companies that enabled 100 teachers to be trained on 3-D pre-engineering software. Partnership for Innovative Learning (PTC), a leading software company that has supplied software to NASA and Raytheon, offered two-day trainings on their Pro-D/ DESKTOP software for 100 teachers, in addition to 300 seats of the software. Community colleges were given discounts on the PRO-E/DESKTOP software version for college level engineering students. These trainings were successful as a direct result of the partnership between

CBIA, another ATE grant through the Connecticut Community College System, its COT and the Connecticut State Department of Technology.

Conclusions

Building bridges of understanding between educational systems and business and industry takes one brick at a time. The cement that keeps the bridge strong can be found in the perseverance and persistence in which outreach is conducted on both sides of the equation. Educators are sometimes hesitant to take that first step toward making a connection with businesses because they don't know how they are going to be received or they don't know how to go about it. Employers, too, while wanting to conduct outreaches, often don't know where they can make an impact or how to make that connection.

To get involved in making these connections, talk to others who have already been there. Or, contact your local business association for information on companies who are already involved with their local schools. Calling the human resources or community relations department of a company you are interested in is a good start. CBIA has an extensive Web site that gives specific information on how to become involved with externships, company visits, mentoring and employer consulting from both the educator and employer point of view.

Educators have to ask themselves if making connections with industry are worth taking valued time from an already overcrowded schedule. For those educators uncertain about making that connection, perhaps words from T.S. Eliot can act as inspiration. "Only those who risk going too far can possibly find out how far one can go."

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