

EXEMPLARY WORKSITE LEARNING PROGRAMS

**Fostering Business and
Education Collaboration**

Featuring winners of the 2000 Exemplary Worksite Learning Award,
sponsored by

CATERPILLAR

The following people generously contributed their programs' narratives for the creation of this report:

Skye Lewis, Lincoln County School of Technology

Ted Boudria, Bristol Tech Prep Consortium

Diana Johnson, Rock Valley College/CEANCI

Editors:

Teresa Rollins is editor of the National Tech Prep Network newsletter and coordinator of the Exemplary Worksite Learning Award.

Mark Whitney is manager of the Publication Services Department at CORD.

Kay Liston is an editor at CORD.

David Bond is director of the National Tech Prep Network.

Copyright 2001 CORD
Waco, Texas

ISBN 1-57837-320-4

CONTENTS

Foreword.....	v
Introduction.....	1
Apprenticeship 2000.....	5
Introduction.....	5
Building the Solution.....	6
Start-up, Curriculum Development, and Articulation.....	6
Teachers, Instructors, and Staff Preparation.....	7
Funding, Facilities, and Equipment.....	8
The Program.....	9
Maintaining the Program.....	10
Conclusion.....	10
Awards.....	11
Program Awards.....	11
Individual Awards.....	11
Outlook.....	12
Other.....	12
Bristol Tech Prep Consortium’s Women in Technology.....	13
Introduction.....	13
Building the Solution.....	14
The Program.....	16
Maintaining an Exemplary Program.....	21
Legal Issues.....	22
Conclusion.....	22
Awards.....	23
Presentations by Staff Members and Students.....	24
Contacts.....	25

Rock Valley College/CEANCI:	
Tech Prep’s Virtual Company	27
Introduction.....	27
Building the Solution/The Program.....	29
A Day in the Life of a “Virtual Company” Student	34
Maintaining an Exemplary Program.....	37
Conclusion and Results.....	38
Appendix.....	40
What to Ask Yourself First.....	40
Glossary	44
Web Sites	47
Helpful Information for Worksite Programs.....	47
Related Sites.....	47
EWSLA Recipients on the Web.....	47

FOREWORD

Over the past several years, Caterpillar Inc., along with many other manufacturing companies, has seen a decline in both the number and the skill level of available workers nationally. Several print sources including *Time Magazine*, January 20, 1997, and Hudson Institute's *Workforce 2020* evidenced this decline. During the early '90s, in an effort to recruit industrial skilled trades workers, Caterpillar Inc. contacted seven major manufacturers—including Boeing, Lockheed, and Pratt Whitney—that were closing plants or downsizing and received no responses on available workers. Advertisements were also run in Illinois, Indiana, Iowa, Missouri and Wisconsin. While the advertisements generated 650 responses, none of the applicants was qualified. These statistics reinforced the need for work-based learning models that would adequately train qualified industrial workers.

Faced with intense competition for skilled tradespeople locally and nationally, Caterpillar Inc. decided to launch a collaborative, long-term effort to “grow its own” skilled trades workforce. We partnered with educators, administrators, businesses, industry, labor, and governmental agencies to develop the nationally acclaimed 2+2+2 Skilled Trades Development Process. With lessons learned from that initiative we have been engaged in several similar, successful initiatives, across various manufacturing career clusters, to develop skilled workers for the future.

Our experiences have caused us to recognize the need for innovative work-based learning programs, which can be used as models throughout the country, to prepare skilled workers for the future. In support of that need, Caterpillar Inc. has sponsored the Exemplary Worksite Learning Award since 1997. Caterpillar strongly believes that progressive work-based learning brings

relevance to the education process, and we have a continuing commitment to the sponsorship of this award.

Terry Hoyland
Senior Education Relations Consultant
Caterpillar University
Caterpillar Inc
1999–2001 NTPN Advisory Board Member

INTRODUCTION

This is the fifth report published by the National Tech Prep Network providing information on successful programs in which students learn by participating in hands-on classroom activities and by taking part in worksite experiences. The three featured programs are the Exemplary Worksite Learning Award (EWSLA)¹ winners for the year 2000. The EWSLA was established by CORD and NTPN in 1994 to encourage Tech Prep/School-to-Work consortia to integrate meaningful worksite experiences into their curricula. Recipients of this award must meet criteria determined by a national committee of academic and business representatives in four major areas: 1) program overview, encompassing curriculum-based activities, assessment methods, and documentation of time spent at the worksite by students; 2) professional development and experiences; 3) employer involvement; and 4) results, including measurable student improvement rates such as grades and retention as well as measurable benefits to business partners and the community.

Following is a brief description of each winning program. After this introduction are the three narratives, each written by a program's consortium, about how the programs were developed and how they came to be award winners. The appendix contains a section on questions to ask before beginning a worksite learning program, a glossary, and a list of URLs for the web sites of the EWSLA recipients and web sites that provide additional information on starting worksite programs.

¹ In 1997, Caterpillar Inc. began to provide funding for the EWSLA, including the cash awards, plaques, and administration of the awards.

**APPRENTICESHIP 2000
LINCOLN COUNTY SCHOOLS
LINCOLNTON, NORTH CAROLINA**

A four-year European-style education program, Apprenticeship 2000 was initiated in 1995. It starts as a youth apprenticeship and continues into an adult apprenticeship, training young adults in the following trades: tool and die maker, CNC-machinist, plastics technician/mold maker, machine technician, quality technician, and electronics technician.

Apprenticeship 2000 is an 8,000-hour training program in which 6,000 of the hours are hands-on training at the worksite with designated full-time trainers and mentors and the other 2,000 hours are related classroom instruction at the community college. At the end of the 8,000 hours, students earn manufacturing technology degrees.

Apprenticeship 2000 has grown to a partnership of many companies in the Lincolnton area. Today six companies—Julius Blum Inc., Max Daetwyler Corp., Sarstedt, AmeriTech, Akkuma, and Timken—as well as the local community college and 27 high schools are involved.

**BRISTOL TECH PREP CONSORTIUM
WOMEN IN TECHNOLOGY PROGRAM
FALL RIVER, MASSACHUSETTS**

The goal of the Women in Technology (WIT) work-based learning program is to prepare high school women for careers and further education in manufacturing technology and related engineering fields.

WIT students are enrolled in a Tech Prep cluster that links seamlessly to Bristol Community College's engineering career and transfer associate degree programs. In addition to the community college, the WIT program is supported by regional employment boards, local chambers of commerce, Texas Instruments, Inc., in Attleboro, Massachusetts, Cisco Systems in Lexington, South Carolina, and five secondary schools.

Three months prior to the selection of students, a team of engineers from Texas Instruments, advocates, and school instructors designs and develops a series of projects. The projects are challenging, yet not impossible to develop. Students spend two days a month, over an eight-month period, at Texas Instruments working with engineers to complete their projects. Texas Instruments employees use completed projects every day, and blueprints for each design are kept as reference. Students are expected to create an operational manual consistent with models that have been developed by TI engineers.

The program has been conducted for three years and has served over 50 young women.

**ROCK VALLEY COLLEGE
BUSINESS AND FINANCIAL SERVICES
YOUTH APPRENTICESHIP
ROCKFORD, ILLINOIS**

The Tech Prep Business and Financial Services Youth Apprenticeship provides career exploration in the classroom and the worksite for high school juniors and seniors interested in careers in business, accounting, and finance. At Rock Valley College, the students explore global trade, international marketing, strategic planning, and day-to-day operations in an interactive team environment called the Virtual Company.

Tech Prep students have the unique opportunity to start and operate an international business with four components—computer office applications, virtual companies, business mathematics, and banking and finance. The virtual business is not a simulation; it is a business backed by a sponsoring company in the area. Students learn principles of business math and finance, office technology, and both oral and verbal communication skills.

During the junior year of high school, students spend five mornings a week attending the Virtual Company course at the college. The worksite component begins in the summer and continues through the senior year. Apprentices must complete 500 hours of work with their sponsoring companies. During the senior year, the apprentices attend one class each semester at Rock Valley

College and continue to work with their sponsoring companies. At the completion of the apprentices' senior year, they receive 14 college credit hours from the college.

APPRENTICESHIP 2000

Introduction

In today's booming economy it is possible to remain competitive only by using the newest technology to acquire and build upon high technical skills. A few classes in school and a few weeks of on-the-job training are no longer enough. Apprenticeship 2000, a four-year European-style education program, was launched in 1995 in North Carolina. It starts as a youth apprenticeship and continues as an adult apprenticeship, training young adults in the following trades:

- Tool and die maker
- CNC-machinist
- Plastics technician/mold maker
- Machine technician
- Electronics technician

Our goal is to provide top-quality education for our future specialists so companies can satisfy customers' needs with high-tech equipment and stay competitive in a global market. The Apprenticeship 2000 group developed an 8000-hour training program, in which 6000 hours of hands-on training is done in the companies with designated full-time trainers and mentors and 2,000 hours of related classroom instruction takes place at the community college, where students earn manufacturing technology degrees (a dual training system).

Initially two companies, Julius Blum Inc. and Max DaetWylar Corporation, collaborated to find a solution to not having a pool of future skilled tradesmen. Apprenticeship 2000 has grown to a partnership of many companies in the local area. Today six companies, the local community college (Central Piedmont

Community College), and 27 high schools (our recruiting partners) are involved. The North Carolina Department of Labor plays an important role in the partnership as well.

The process used to introduce the Apprenticeship 2000 program to schools and the community began with a “call” to the surrounding

school systems’ workforce development directors. The director then put the wheels in motion for the program to be advertised to the schools and the communities.

Our goal is to provide top-quality education for our future specialists.

Building the Solution

START-UP, CURRICULUM DEVELOPMENT, AND ARTICULATION

A partnership was soon developed with the North Carolina Department of Labor. “Standards” and “work processes” were developed and registered. Two levels of related instruction were developed with the high schools and community colleges. Lincoln, Catawba, Gaston, and Mecklenburg Counties’ school systems joined to develop and provide the high school curriculum. Central Piedmont Community College was able to offer the courses and customize the curriculum and schedule requirements to meet the needs of the program.

The high schools were charged with promoting the program to their students and making the connections necessary for students to enter the apprenticeship. Company specialists reviewed course content and curriculum with college instructors and designed a course of study to meet the industry needs. This effort produced the AAS degree in manufacturing technology that will officially become part of the Community College Course Library in August 2001.

The articulation agreements were established; they include:

High School	Community College
Technical Drafting I, II Computer Operations Metals Manufacturing I	Mechanical Drafting Microcomputer Operation Blueprint Reading Hand Tools Drill Press Basic Lathe Operation

Articulation is an ongoing process. It is continuously reviewed and new courses are added as new trades become part of the Apprenticeship 2000 program.

Other companies became involved, and the consortium quickly grew to six manufacturing companies working in six counties with eight local education associations. From two companies with seven apprentices in 1995 to six companies and 46 apprentices today and 14 of 15 graduates still with their sponsoring companies, Apprenticeship 2000 has plenty to brag about.

Apprenticeship 2000 has plenty to brag about.

TEACHERS, INSTRUCTORS, AND STAFF PREPARATION

Trainers and mentors are highly motivated and qualified individuals. Apprenticeship graduates with many years of experience, craftsmen, and educators with master’s degree certifications comprise our faculty. Every member of this team is a “lifelong learner.”

The companies work closely with six counties and their school systems in our recruiting area, providing half-day workshops for guidance counselors, teachers, industry education coordinators, and administrators. These workshops are used to orient school staffs to our program and discuss the issues that face industry

today and how Apprenticeship 2000 can help to meet those needs. One employer, Julius Blum, also offers College Tech Prep/JobReady Teacher Academy internships and provides an “apprenticeship experience” for high school instructors.

Apprenticeship 2000 partners participate in many career day information meetings for high school and middle school students and their parents, during which career opportunities are shown and explained.

Trainers attend many Central Piedmont Community College classes and work with the instructors to develop course content that is applicable to industry needs.

Understanding and working with teenagers is vital to the success of the program. Yearly seminars such as “Train the Trainer” and “Coaching for Excellence” provide trainers with the skills to accomplish this. Such seminars are a requirement on a yearly basis.

Every member of this team is a “lifelong learner.”

FUNDING, FACILITIES, AND EQUIPMENT

The cost for a company to join Apprenticeship 2000 is minimal and results in sharing costs for only brochures and other joint efforts, but the commitment is large. A company must commit to an 8000-hour program incorporating its own type of hands-on training with designated trainers and mentors. Incorporating the related classroom instruction for the manufacturing technology degree is important for the management. Not to underestimate the training cost itself, a close figure for the investment per student at Blum is \$80,000. Each company had to evaluate what it would take in facility and equipment for this program. At Julius Blum an investment of approximately \$1.5 million was made for training equipment and a 4300-square-foot training center was built for the program.

The Program

Although each company trains its apprentices in a company-specific manner, each apprentice must meet all core competencies. The first year is a combination of bench work, hand-tool orientation, and learning the work environment. Second-year apprentices learn conventional machining skills and begin attending CPCC. The third year is the beginning of specialization training for the apprentice, with in-depth study and practice during the final year.

Apprenticeship 2000 began with two companies, two trainers, and seven apprentices. Four of the first apprentices graduated in 1999. Two additional companies joined during the second year, and another eleven apprentices were indentured for a total of 19 apprentices and six trainers. By the following year, Apprenticeship 2000 had expanded to six companies, 33 apprentices, eight full-time trainers and five part-time mentors.

Recruiting qualified students has been one of the toughest challenges for this program. Successful applicants to the program must have excellent math skills, 2.5 GPA, and good attendance and must be seniors at least sixteen years of age. Apprentices must have completed algebra 1 and 2, geometry, drafting, and computer applications by graduation. Drafting and computer applications are articulated toward the AAS degree.

The high school senior typically attends classes each morning and works approximately four hours each afternoon. Second- through fourth-year apprentices work four days per week at their companies and attend CPCC one full day. Apprentices are paid for time spent in class as well as on the job. A progressive wage scale is set, and apprentices are evaluated on six-month intervals. An evaluation at the company is averaged with the current-semester GPA to determine wage progression.

Recruiting qualified students has been one of the toughest challenges.

Maintaining the Program

Although this consortium of partner companies has no formal agreements and pays no dues or fees, the cost for marketing and advertising is generally split equally among all. Representatives from each company visit and make presentations at local high schools, serve on advisory committees, and attend career fairs. The companies have open house for teachers, students, and parents, provide shadowing experiences for students and teachers, and serve as mentors for area schools. These companies support area schools and make many donations of both time and money.

Conclusion

Tech Prep helps us to prepare young people for technical careers and therefore ensure the survival and growth of our industry.

The first group of apprentices graduated in 1999, and their supervisors are very pleased with their skills and work ethics. The students confirm their commitment to the program by achievements, both in school and with the companies. Many students earn 3.5 to 4.0 GPA from Central Piedmont Community College.

Since the program was launched in 1995, Julius Blum Inc. has cut down tremendously on purchases of spare parts. The apprentices in the program take care of almost 100 percent of manufacturing and machining for spare-part needs.

Parents, teachers, and community and business partners have been and remain excited about this program. Parents want their students to be involved.

The future is bright for the program. With successful students graduating from the program each year, new students are being inspired. The program's business and education partners are

Tech Prep helps us to prepare young people for technical careers and therefore ensure the survival and growth of our industry.

working together to continuously add to the number of qualified tradesmen, which makes for a win-win situation for all.

Awards

PROGRAM AWARDS

Award	No. of times received
Recognition of excellence for an apprenticeship program	3
Recognition of outstanding service to apprenticeship in North Carolina	3

INDIVIDUAL AWARDS

Award	No. of recipients
Award for an outstanding engineering student	1
Awards for "outstanding apprentice" in North Carolina	7
National Tech Prep worksite learning award	1
1st-place state machining competition winner	3
2nd-place state machining competition winner	2
Silver medal National Machining Competition (Kansas City, Missouri)	1
Gold medal winners for International CNC machining Trials (Chicago)	2

Award	No. of recipients
12th-place International CNC Machining Competition (Montreal, Canada)	1
National CNC Demonstration competition winners (Kansas City, Missouri)	2

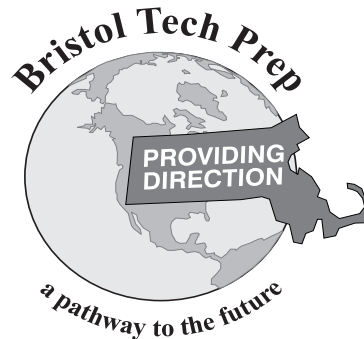
Upcoming participant (September 2001) for International CNC Machining competition (Seoul, Korea)

Outlook

We already have an “apprentice exchange” program in place, in which USA apprentices go to the Julius Blum Inc. headquarters in Austria and, in turn, Austrian apprentices come to the United States. Expansion in this area is being considered.

Other

We feel that, by remaining competitive in world championships, our students are receiving the education necessary to be successful in a global environment.



BRISTOL TECH PREP CONSORTIUM'S WOMEN IN TECHNOLOGY

Introduction

One of the key core indicators in the Perkins legislation is to develop a system that will identify and enroll high school students in nontraditional careers. A nontraditional career is one in which either males or females compose less than 25 percent of the workforce.

To address this key indicator as outlined in the Perkins amendment, the Bristol Tech Prep Consortium was required to integrate a nontraditional program within a Tech Prep framework through the following components: articulation agreements, project-based learning, registration in pathways, SCANS skills, community college connection, teleconferencing experience, and a strong business partnership.

In 1995, the Bristol Tech Prep Consortium located at Bristol Community College in Fall River, Massachusetts, implemented an action plan to establish a series of activities to encourage and enroll high school women in the fields of engineering and technology.

A Women in Technology advisory board was developed, composed of secondary and postsecondary personnel, a business sponsor, and Tech Prep site coordinators. As the components of the program were outlined, advisory board members began to identify student cohorts and develop a series of activities as the cornerstone in increasing the awareness of engineering fields and opportunities for young high school women.

Short-term goals for the program included tours of engineering facilities at Texas Instruments, Sapphire Engineering, Verizon, and Leach & Garner. These companies are all located within a 40-mile radius of the consortium. Booklets outlining careers in engineering were prepared and distributed. A speakers bureau for women was established that enabled young women to listen to female engineers who informed them of their experiences, including obstacles they faced as they entered the fields of engineering and technology.

A long-term goal for the Women in Technology program was to establish a Women in Technology summer institute and a meaningful project-based learning experience that would require high school women to “take on” real-life engineering needs at high-tech manufacturing sites. In addition, follow-up study to evaluate the number of young women who have enrolled in engineering/technology was required by advisory board members.

A long-term goal was to establish a Women in Technology summer institute and a meaningful project-based learning experience.

Building the Solution

Articulation agreements between the Bristol Tech Prep Consortium high schools and Bristol Community College played a pivotal role in the WIT project-based learning experience. Students, who took computer-aided design in high school and received B averages or

better received three college credits. In addition, WIT students who experienced machine technology and/or electronics received up to nine credits if they received B or better from their high school instructors.

Bringing together department chairs from participating schools and the chairperson of engineering at Bristol Community College facilitated the articulation agreement process.

An important outcome of the engineering program itself was an articulation agreement entitled “Engineering Projects.” When the projects have been completed and reviewed, a WIT student can receive an additional three college credits.

In summary, a student has the possibility of receiving up to 12 college credits by meeting the established criteria of the college and the consortium.

A student has the possibility of receiving up to 12 college credits.

As was previously indicated, a Women in Technology Advisory Board was created to implement a series of activities relevant to the various fields of engineering and technology to encourage enrollment while simultaneously increasing the levels of self-awareness.

An additional responsibility required of this group was to take on the project-based learning experience for WIT students at a business site. Schools selected for this experience came from the board members. The WIT Advisory Board meets approximately four times a year, usually at the end of a school day.

Choices for the level of involvement were made available to the 20 consortium Tech Prep high schools by members of the WIT Advisory Board and the director of the Tech Prep consortium.

The Program

The Bristol Tech Prep Women in Technology project-based learning program is designed to prepare high school young women for careers and further education in manufacturing technology and related engineering fields.

WIT students are enrolled in a college Tech Prep engineering/technology pathway that links seamlessly to Bristol Community College's (BCC) engineering career and transfer associate degree programs. In addition to the community college, the WIT program is supported and endorsed by the Workforce Investment Board; local chambers of commerce; Texas Instruments, Inc., in Attleboro, Massachusetts; Leach & Garner, Inc., in North Attleboro, Massachusetts; Sapphire Engineering, Pocasset, Massachusetts; and the Massachusetts Department of Education. High schools involved are Attleboro High School, Bristol-Plymouth Regional High School, Dartmouth High School, Diman Regional Vocational Technical High School, Greater New Bedford Regional Vocational Technical High School, and Taunton High School.

Students spend two days per month at Texas Instruments, Inc., and Leach & Garner, Inc., working with engineers to complete "real" engineering projects over an eight-month period. Schools provide transportation and both businesses provide meeting places, engineers, mentors, materials, and lunches. Students are required to continue their projects at their schools with faculty and mentors.

Three months prior to the selection of students, a team of engineers from both businesses along with teachers, advocates, and community college instructors examines the need to redesign, improve, or create new pieces of equipment used by employees in the companies' manufacturing processes. The projects selected by the companies are challenging to the students but are not needed in one, two, or three months. Completed projects are used every day by employees at Texas Instruments and Leach & Garner. Blueprints for each design are kept on file.

The high school teams meet to review the skills needed for each project and then they select their students. Students must have acceptable academic records, be willing to work extra hours on the project, and be willing to make up the schoolwork missed

Completed projects are used every day by employees at Texas Instruments and Leach & Garner.

during the industry site visits. They must be enrolled in either a technical or a strong science/math curriculum. They must have the technical skills necessary for some component of the project. Students who are selected for the project must have parental permission to participate in the program. Students are treated as “junior engineers” by Texas Instruments and Leach & Garner and are expected to adhere to engineering standards as well as to management policies from both corporations. Since 1997, 99 young women have enrolled in this project-based learning experience: In 1997, the WIT program started with 12 students. There were 12 in 1997, 19 in 1998, 26 in 1999, and 42 in 2000. Students are required to provide presentations of their projects in May to an audience of engineers and civic and educational leaders.

Teachers from each of the participating schools integrate components of Texas Instruments and Leach & Garner projects into their curricula. They meet at school with team members to review the proposed projects during classroom time. Teachers and students also visit their partnering schools during the eight-month period. Students are expected to understand the language and culture of high-tech manufacturing at the conclusion of this experience. A worksite learning plan covering components of the SCANS skills is an additional requirement for any WIT student who participates in the program.

In 1999, WIT students from Massachusetts teamed with WIT students from Lexington, South Carolina, and designed a template for a mainframe unit at Cisco Photonics in Lexington. To accomplish this, WIT students used teleconferencing and other technical communication systems.

At the conclusion of this program, WIT students create PowerPoint presentations outlining their adherence to the following engineering phases:

Students are treated as “junior engineers.”

1. Conceptual design
2. Preliminary design
3. Critical design
4. Testing
5. Acceptance
6. Web site development

Student assessment for the eight-month project-based learning experience is based on three components. The first component is the successful completion of the project for business. From 1997 to the present, the Bristol Tech Prep Consortium WIT students have completed the following project-based designs:

1. **1997–1998**

Project 7887 (Texas Instruments)—Designed, built, and tested the weld strength of a motor protector-housing unit fixture

2. **1998–1999**

Project 1—Designed and constructed a protector leak test fixture

Project 2—Designed and constructed a multistation circuit breaker test station capable of testing trip closure times on up to six circuit breakers of various sizes

3. **1999–2000**

Project 1—Designed and constructed a cable wiring bracket template to be used by employees at Cisco Photonics

Project 2—Constructed a ZHM Datecs fixture design

Project 3—Designed and built a wire-lead crimp-test apparatus

4. 2000–2001

Project 1 (Leach & Garner)—Redesigned clamping fixture to be ergonomically sound and user friendly

Project 2 (Texas Instruments)—Redesigned 35 HM automated front-end machine

Project 3 (Texas Instruments)—Modified a micro fused straw gauge

Project 4 (Texas Instruments)—Separated a lead frame into halves without causing damage to or bending of parts, which would alter dimensional measurements

Project 5 (Texas Instruments)—Designed and posted a web page for all projects,

www.tauntonschools.org/thw/wit/index.html

The second component to be achieved is the work-based learning plan that must be completed by the employer. Every employer assesses SCANS (Secretary’s Commission on Achieving Necessary Skills) categories with every student. Issues of safety are considered to be an additional component in the evaluation plan.

The third component is the follow-up. Where are they? In measuring the overall student improvement rates of the WIT projects at Texas Instruments and Leach & Garner, we can show that our rate of entrance into Bristol Community

Our rate of entrance into Bristol Community College’s engineering degree program has tripled.

College’s engineering degree program has tripled. From 1997 to 2000, 57 young women have completed the project-based learning experience at Texas Instruments. Of the twelve graduates, seven are studying engineering/technology fields at postsecondary institutions. Two are studying in nontechnical fields at postsecondary institutions. The remaining three have used their experience at Texas Instruments to secure positions in technical fields upon graduation from high school and are attending postsecondary school part time. The remaining 45 students are in

their junior or senior year in high school. At least 32 of these young women have reported that they will attend technical or engineering programs that are either 2+2+2 or 2+4. In addition, Texas Instruments has opened co-op experiences for these WIT students in machine technology and drafting.

In response to the program, high school participation has increased from three to seven schools, with two additional schools waiting to participate. Already for 2001–2002, one school has reported that it has at least 30 young women who are eager to participate in the program.

Recently, a parent in one of the participating schools addressed the local school committee about the positive impact this program has had on her daughter’s career choice. Another example occurred at a vocational school, when a student at graduation indicated that, if it weren’t for this program and the presentations that she made in Chicago and Charlotte, she probably would not have selected a career in mechanical engineering. She was awarded a full scholarship at

Umass-Dartmouth. As Megan Lopes aptly stated, “Before becoming a part of Women in Technology, I wanted to be a microbiologist. Now, I plan on pursuing a career in engineering.”

A WIT high school instructor stated “Clearly, the WIT program is having an enormous impact on the capabilities of the participants. Not only do they get hands-on experience with engineering projects, but also they see how the academic, scientific, and technical knowledge they receive in high school is applied to the real world.”

A student at graduation indicated that, if it weren’t for this program and the presentations that she made in Chicago and Charlotte, she probably would not have selected a career in mechanical engineering.

Maintaining an Exemplary Program

To maintain this growing program, a team of teachers, advocates, and engineers must be available not only to facilitate the project-based experience but also to provide additional schools and businesses with their expertise. Schools also need strong administrative support with respect to establishing the financial resources that are necessary in order to expedite the program.

Additionally, businesses must be able to provide funding for lunches and scholarships and the use of their technology for WIT students who enter the program. Students want to be challenged; they want to create and give something to an organization. Each project must be for a useful item to be used by company employees. Students want to be treated as junior engineers. It is imperative that they be treated in that fashion. When they are, they will rise to the occasion and deliver useful products.

Each project must be for a useful item to be used by company employees.

As a result of this program, plans are under way to have a WIT program developed between the Bristol Tech Prep Consortium in Massachusetts and a Tech Prep consortium in Skagit County, Washington.

Funding for the WIT summer camp, team-building workshops, and project-based learning experiences has come from three resources. Line items come from the traditional Perkins grant to the Tech Prep consortium. Second, the Bristol Tech Prep Consortium has received funding through a grant for nontraditional students from the Massachusetts Department of Education and the Workforce Investment Board's Connecting Activities Fund. Third, BTPC has received over \$10,000 in funding from Texas Instruments, Inc., and Verizon.

Legal Issues

School insurance for the seven high schools was examined as a protection for both businesses and students. Other factors include

- A. Examination of legal issues that were modified under the STWOA
- B. Minimal visitation on floors where machinery is located
- C. All meetings take place in conference rooms at the business facilities.
- D. Machinery (if possible) is brought to the conference rooms for viewing.
- E. Students are required to submit parental permission forms for participation in the program and release of information for the web sites.
- F. A separate insurance policy was purchased for the WIT Summer Engineering Camp.
- G. Employers conduct workshops on safety.
- H. In some cases, students must sign nondisclosure statements and patent rights information forms.
- I. Students are supervised at all times by an engineer, teacher, or advocate.

Conclusion

The WIT program at Bristol Community College has been very successful. The partnership has benefited from the program in the following ways:

- 1. Devices have been developed to reduce time and labor and increase efficiency.
- 2. WIT students have experienced teleconferencing with a distant company along with developing friendships with students in Columbia, South Carolina.
- 3. Scholarships have been awarded to those students planning to continue their education in postsecondary engineering and technology fields.

4. Articulation agreements have been achieved between secondary schools and Bristol Community College in CAD, machine technology, electronics, and engineering projects, which total up to 15 credits for many of the participating schools.
5. Students have a manual and a web site to show to employers in future co-op or technical career endeavors.
6. WIT students have a firm understanding of the skills (both hard and soft) in the field of high-tech manufacturing.
7. WIT students have impacted the physical well-being of employees by redesigning equipment ergonomically.
8. Because of this experience, WIT students have become focused on careers and their self-confidence has increased significantly.
9. Secondary teachers who experience this program have brought information, i.e., from statistical process control classes, back to their classrooms by incorporating it into their curricula.
10. WIT students use diverse learning styles to meet project completion goals.
11. WIT students have acquired knowledge and preparation in interdisciplinary problem solving, teamwork, and critical thinking skills.

Awards

- Bristol Community College has been awarded \$840,000 by the National Science Foundation to develop a CIMS (computer-integrated manufacturing system) two-year degree program for women and nontraditional students.
- Recipient of the National Tech Prep Exemplary Worksite Learning Award, 2000, sponsored by Caterpillar Corporation and NTPN
- City of Taunton, Massachusetts—recognition for outstanding achievement from the Taunton School System

- Athena Award—Achievement Leadership for Women, recipient—Bob Brown Jr., human relations manager, Texas Instruments, Inc.

Presentations by Staff Members and Students

May 1997–2001	Texas Instruments, Inc., Attleboro, Massachusetts
July 2001	Women's International Conference, Boston, Massachusetts
June 2001	Taunton School Committee, Taunton, Massachusetts Attleboro School Committee, Attleboro, Massachusetts Bristol-Plymouth Reg. School Committee, Taunton, Massachusetts
May 2001	Congressman James McGovern, Attleboro, Massachusetts
October 2000	National Tech Prep Network Conference, Charlotte, North Carolina
March 2000	Employer to Employer Conference, Chicago, Illinois
April 1999	Massachusetts Tech Prep Conference, Falmouth, Massachusetts

Contacts

Ted Boudria, Director of the College Tech Prep Program
Bristol Community College
777 Elsbree Street
Fall River, MA 02720-7307
(508) 678-2811 ext. 2339
tboudria@bristol.mass.edu

Lynn Burns, Staff Assistant of the College Tech Prep Program
Bristol Community College
777 Elsbree Street
Fall River, MA 02720-7307
(508) 678-2811 ext. 2541
lburns@bristol.mass.edu

Because of this experience, WIT students have become focused on careers and their self-confidence has increased significantly.



ROCK VALLEY COLLEGE/CEANCI: TECH PREP'S VIRTUAL COMPANY

Introduction

The mission of the Business and Financial Services Tech Prep Program advocates the same mission statement as Rock Valley College. Rock Valley College proves to be an educational leader in providing quality, accessible, lifelong learning opportunities, cultural enrichment, and support for economic and technological development. As does Rock Valley College, our goal is to provide high school students with preparation for successful transfer, competitive employment, and professional and personal growth. Our core values include excellence, diversity, and collaboration. The Tech Prep Business and Financial Services Youth Apprenticeship Program addresses the need to provide an avenue of exemplary career exploration. This exploration takes place both in the classroom and in the worksite for high school juniors and seniors interested in careers in business, accounting, and finance. This year's graduating class from the Virtual Company consisted of nine seniors. Eighteen applicants qualified for the program starting in fall 2001: eleven girls and seven boys.

The model for this program is the International Business Practice Firm (IBPF), which is a simulated business that mirrors the real world. The "virtual" aspect of the program is actually the students' creation of an IBPF, a concept that began in Germany more than 30 years ago as a training curriculum for displaced workers to teach them through hands-on experience (rather than

case studies and role playing) the fundamentals of the business world. These virtual companies communicate, conduct business transactions through virtual banks, buy each others' products, and sell to each other—all the things that occur in the real world of business.

The IBPF is a company set up by students with the assistance of a teacher-facilitator. The

companies function like real businesses, and the only difference is that they cooperate with other IBPFs in a closed network. Linked by technology, each IBPF conducts all operations instrumental in running a business: finance, purchasing, marketing, and human resources. In an authentic office setting the student-employees engage as team members in simulated business firm transactions with other firms both here and abroad.

Historically, the concept is not new. Vocational experiential learning dates back to the 17th century. It was a tool especially used in the fields of vocational rehabilitation, initial training, and adult retraining. In the early 1970s in the United States business/office simulation was a popular format for teaching business education, primarily in secondary schools, although this environment was completely teacher driven.

Today, computer simulations in areas such as marketing and management are popular choices to assist students at the college level in putting theory into practice. However, neither the office simulations of the 1970s nor the computer simulation of the 1990s brings the students close enough to real-world business complexities. In Harriet Diamond's article, "School-to-Work," the enormous need for shifting the educational paradigm is discussed. "It is time for standard classroom instruction methods to give way to dynamic vehicles emulating the work environment. Classrooms can operate as workplace microcosms, encouraging skills necessary to the world of work: communication, collaboration, time management, and problem solving. This concept will create a more energized student population." Based on the need for change

The program addresses the need to provide an avenue of exemplary career exploration.

in the way teaching and learning happen, the IBPF model provides a viable solution.

Through Rock Valley College, these students are exploring global trade, international marketing, strategic planning, and day-to-day operations in an interactive team environment. This program gives the young people of our area a chance to reach their potential in their chosen contemporary careers and to learn specialized technical skills.

Learning specialized technical skills through the worksite experience in local companies has allowed Rockford's young people to be better prepared to step into fulfilling career opportunities. Employer response for today's youth to be work-ready helped us identify the need for the Virtual Company.

**"It is time for standard classroom instruction methods to give way to dynamic vehicles emulating the work environment."
Harriett Diamond**

Building the Solution/ The Program

The successful operation of this reality-based simulation is accomplished by the use of three overlapping systems. Rock Valley College and Tech Prep students are partnering with Century Tool and Manufacturing Company, a local manufacturing company. Experts from this company, which manufactures camping equipment and bird feeders, help teach students about daily operations of an organization. Century Tool employees serve as mentors to the new company "employees" and provide the product line the company will market and sell. The students are able to visit the Century Tool and Manufacturing Company site. The RVC employees are trained in issues of organizational culture, marketing, finance, and management. Insights from Century Tool employee experts and examples of daily operations serve as a

model to assist with students' learning and the virtual company's evolution. The company sponsor, Century Tool, and its employees are devoting time each month to act as consultants to the students in areas ranging from finance to shipping. The objective of the employer's involvement with the student is to provide career exploration outside the classroom. The business sponsor's involvement with the Tech Prep program serves many purposes. The major purpose is for the sponsoring company to contribute to the success of its business community by offering qualified graduates who can enter the workforce with the degree of skill and education necessary to succeed.

Recently, Century Tool Vice President Ron Lundstrom escorted the students on a tour through the company's production facility. This company, along with the other business and financial sponsors, contributes by financially funding each student. Salary and cash scholarships ranging from \$3400 to \$4500 will be given to students upon their successful completion of the program. A considerable amount of time is spent by the sponsoring companies during mentor training, company open houses, rotation of students through their facilities, and the paid worksite experience. The actual worksite component begins in the summer and continues through the senior year. The apprentices must complete 500 hours of work with their sponsoring companies. During the senior year the apprentices attend one class each semester at Rock Valley College and continue to work with their sponsoring companies. At the completion of the apprentices' senior year each receives 14 college credit hours from Rock Valley College.

The objective of the employer's involvement with the student is to provide career exploration outside the classroom.

The second system is a unique opportunity for educational partnerships and a consortium of virtual companies at other United States colleges and universities. We have based our virtual company on the successful program at Mercer County Community College, which is entitled The International Business Practice Firm. The consortium provides a government that regulates the virtual companies. These regulations include taxation of the payroll and any profits as well as articles of incorporation. The consortium is also the banking institution (as well as the source of other investors) for the virtual company. The United States consortium allows access to the other virtual companies throughout the United States and acts as the gateway to the virtual companies around the world. These 2500 international virtual companies are both suppliers and consumers for each other. The consortium will introduce other variables that can range from additional purchases of the company's products to changes in interest rates in order to mirror what is happening in the real world.

At the completion of the apprentices' senior year each receives 14 college credit hours from Rock Valley College.

The third system is that Rock Valley College/CEANCI pursues this endeavor as a top priority. The Rock Valley College administration has encouraged and financed the exploratory phase. Rock Valley College invested \$69,000 to properly equip the virtual classroom or business laboratory. Of that amount, half was generously donated as a grant from the Rock Valley College Foundation. The college employs a full-time professor who teaches the business and financial students international business, business math, desktop office skills, presentation skills, and finance. The classroom is specifically dedicated to the virtual company and compatible activities. The facility is set up as a model office. This includes furniture, computers, business application software, LCD projector, scanner, color printer, office equipment, and office supplies.

Grant monies and the sponsoring companies' money continue to fund this program. The business division director and two faculty members carried out the initial evaluation, strongly recommending the establishment of a virtual company at Rock Valley College. This strong support has been echoed by all Rock Valley College constituencies that have become aware of the program. The implementation committee was formed and the first two virtual companies were offered in the fall semester of 1999. Support by Rock Valley College administration allowed rapid progress toward this goal.

This program was devised for college students, and Rock Valley College Tech Prep was the first to adapt the program to make it viable for high school students. Because of the excitement of program recognition, Jim Wittman, Ph.D., business professor for Rock Valley College, has applied for and has received a grant for \$20,000 to further expand the program to include 25 high school teachers.

The Tech Prep program at Rock Valley College/CEANCI serves as a liaison-coordinator for the management of college credit, curriculum development, and contact hour requirements for the high school students.

The Business and Financial Services Youth Apprenticeship is an industry-driven program; thus, the business partners' involvement is crucial. Business sponsors open their facilities to the students for tours and they provide a mentor in each department to work with the student. Business partners participate in the initial phase of the program (interviewing potential students) and play a decisive role in recommending whether a student is accepted into the program.

The business partners' involvement is crucial.

The students are high school sophomores who have completed algebra 1, English 9 & 10, and keyboarding/computer skills; earned 2.0 grade point averages (on a 4.0 scale); and maintained good attendance records and the ability to meet preemployment requirements. Students must also have their own transportation during the summer program and their senior year.

Employers also become more involved in business and educational partnerships by serving on a variety of teams alongside educators. The Design and Leadership Team consists of the business sponsors and secondary and postsecondary educators at the decision level. Business partners serve on these teams as chairpersons and members who structure the worksite experience, determine the curriculum, set eligibility standards, and develop program design. Financial support is given by the company sponsors as an hourly wage and a cash scholarship amount payable to each student upon successful completion of the program.

Tech Prep is responsible for meeting all state and federal grant guidelines. Tech Prep staff members are liaisons for students, parents, educators, and their business partners.

The Virtual Company Course, serving as a “capstone” course for the Tech Prep students, allows both students and instructors to observe the progress of learning in an application environment. Students experience the integration of theory and practice while implementing business objectives and learning the daily operations of a global company through human resources, finance, purchasing, and marketing.

The Virtual Company Course allows both students and instructors to observe the progress of learning in an application environment.

A Day in the Life of a “Virtual Company” Student

Let’s start at the beginning. Once the pre-business and financial services sophomore student attends an open house or an in-school Tech Prep presentation, the fun begins. An application is filled out and turned in to the school’s Tech Prep liaison or the student’s counselor. After all the criteria are met, the student interviews with business and financial services company sponsors. Then the final phase: “Congratulations, you have been chosen to participate in the program!”

Matt Parkins (fictional character) is now a Tech Prep business and financial services student! Matt has gone to his counselor after his acceptance to the program and arranged his junior year of classes to correlate with his Tech Prep classes. Matt can hardly believe that his employment future has already started. “I wanted to be involved in Tech Prep because where else could I get this opportunity?” Matt remarked. “I am still in high school, taking college classes, and already involved in the international market.”

Following are some of Matt’s thoughts at the beginning of his junior year as a Tech Prep student.

Today is the first day of my junior year in Tech Prep. I am off to the office by 7:00 A.M., so that I can arrive early for the 7:25 A.M. start time of my first class.

Wow, our office consists of a dozen computers, laser printers, fax machine, dedicated phone lines, new furniture, an overhead projector, and all the other office necessities! This is anything but virtual.

I will be attending classes here five days per week from 7:25 A.M. to 8:55 A.M. in the virtual company classroom/lab at Rock Valley College. The four classes

“I am still in high school, taking college classes, and already involved in the international market.”

that I will take during my junior year are Business 103, Business Mathematics; Office 129, Information Processing; PCI, Introduction to Windows; and Business 297, Career Application Laboratory. I am told that these classes will help me be able to start a company! Starting a company is what we will be doing as a group during my junior year at the virtual company. I can tell already that one of the advantages to this program is that I will be able to meet many different students from different high schools. Most kids in high school never get that opportunity!

So, the first thing that we are going to do is to start our own company via computer technology. We will decide how much each student wants to invest

(from my allowance?) and write a business plan that will justify the investment with appropriate returns. We also need to create articles of incorporation, set up accounts with a virtual international bank based in New Jersey, and begin to research target markets to sell our product line. Our company's product line will be modeled after our sponsor and supporter, Century Tool and Manufacturing Company, Inc., in Cherry Valley, Illinois. Century Tool makes quality camping equipment. We have decided to call our company, "Happy Camper," and we will sell Century Tool camping equipment.

Our class will be working together in four groups, or departments: Human Resources, Purchasing/Shipping, Finance, and Marketing. In each department, one student is assigned to be the vice president and another the manager and three are associates. Responsibilities mimic those in a typical company: The vice president focuses on long-term, conceptual issues, the manager is concerned with meeting daily objectives, and the associates carry out the tasks that meet those objectives. There are four vice

"Most kids in high school never get this opportunity!"

presidents who will meet as an Executive Committee, and each of the four will be named president on a rotational basis. I can already see the benefits of working in a company subdivided into groups. I will be learning many valuable workplace skills such as problem solving, using written and verbal communication, office machine technology, and, most important, teamwork. Not many high school juniors are given the opportunity to learn real-life work skills in an area of possible future employment.

“Not many high school juniors are given the opportunity to learn real-life work skills in an area of possible future employment.”

Not only can I bring these skills to the workplace, but after my junior year I will already have eight articulated credits.

During our junior year I am told that we will tour sponsoring companies. At the end of this year, we will design a PowerPoint presentation to present to business sponsors, teachers, administrators, and parents. We will then be paired with business sponsors as their apprentices. The summer between our junior and senior years I will work a minimum of two hundred hours at my assigned sponsor. I will actually be getting paid and I didn't even have to look for a job! Someone already wants me! During my summer job I will be able to rotate through different departments, giving me another opportunity to see where I really fit in. I think the main attraction of the Tech Prep program to me was that I would not be faltering after high school. What will I do? I now will have a basis from which to start a career. I will have the practical as well as the educational experience to list in my portfolio.

I know that I have a lot to learn, but I can see the employment direction toward which I am heading. I can't wait to see what the senior year of Tech Prep holds for me!

Maintaining an Exemplary Program

Marketing begins with a letter to 5000 parents of regional sophomores from parents of Tech Prep graduates. This effort is continued with a letter sent from their child's high school principal. A response card for requesting additional information is included in each letter. Three to four editions of *Tech Prep Pathways* newsletters are mailed at various times throughout the year to parents, sponsors, and potential Tech Prep participants. The Rock Valley College continuing education catalog, sent to 140,000 homes, also includes a full-page Tech Prep advertisement. The Tech Prep staff increases awareness regarding the Tech Prep programs by presentations to faculty, staff, and students at 14 regional high schools throughout the year. Staff development activities are provided by Tech Prep-sponsored workshops and classes. Specified grant funds for marketing are used for all our marketing projects.

Community Tech Prep awareness is raised through special events such as youth apprenticeship open houses, health career fair (cosponsored by Rock Valley College and three area hospitals), recognition night, student-sponsor pairing events, Junior Achievement participation, chamber of commerce events, and the Girl Scouts math, science, and technology fair.

Students are required to have automobile insurance to be able to drive to their individual worksites and are covered by a liability policy.

Conclusion and Results

The Tech Prep Business and Financial Services program has received the Exemplary Worksite Learning Award for 2000, established in 1994 by National Tech Prep Network and sponsored by Caterpillar Inc., recognizing consortia that have established successful worksite learning experiences for students. The award recipients are judged by the NTPN Advisory Board.

At the National Tech Prep Network Conference, Craig Wares, senior Tech Prep business and financial services student, Belvidere High School, was featured on the student panel, "How Tech Prep Changed My Life: Student Perspectives from Award-Winning Programs." Craig is completing his Tech Prep worksite experience at Rock Valley College in the Accounting and Purchasing Departments.

In addition to the national Tech Prep award, the Virtual Company was recognized in Washington, D.C., at the American Association of Community Colleges Convention in April. The program received an honorable mention award after being chosen from more than two hundred applicants in the External Partnership and Collaboration category by the National Council of Instructional Administrators. This award has resulted in the invitation to make a presentation at The League for Innovation in the Community College 2000 Conference on Information Technology in Anaheim, California, in November 2000. There have been many more conference presentations, and in March 2001 this program received the Award of Distinction at the Connections Conference in St. Charles, Illinois.

An October 2000 Rock Valley College/CEANCI Tech Prep Consortium on-site review report prepared by UIUC, ISBE, and ICCB frequently referred to the Tech Prep/Youth Apprenticeship programs in Rockford, Illinois, as the "Cadillac" of models for combining Tech Prep and work-based learning.

Career Education Associates of Northern Illinois (CEANCI) commissioned a research study to determine satisfaction among the Tech Prep graduate base, as well as to track career and educational pursuits and accomplishments. The survey results showed that the business and financial services graduates are most

satisfied with the Tech Prep program, show the greatest career advancement, and most often recommend the program to their peers. Eighty percent of the graduates are employed in jobs related to their Tech Prep training, and half of those have gained job advancement that they attribute to Tech Prep. Seventy-five percent of the graduates indicated that Tech Prep was beneficial in preparing them for their career goals. One hundred percent of the business and financial services graduates are enrolled in postsecondary programs of study and claim GPA of 3.5 or higher.

In addition to surveying business and financial services graduates, CEANCI surveyed the business partners. Overall findings were positive, with a majority of business partners (70 percent) hiring Tech Prep students as permanent employees, recommending the Tech Prep program (71 percent), and planning to continue their participation in Tech Prep. One hundred percent of the business and financial services partners found Tech Prep students better prepared when compared to other job applicants. The most important attribute of the Tech Prep program among business partners is the quality of the students participating in the program. Almost all, 94 percent, business partners report the supply of suitable employment candidates as the most beneficial aspect of the Tech Prep program to their organizations.

The most important attribute of the Tech Prep program among business partners is the quality of the students participating in the program.

APPENDIX

What to Ask Yourself First

The concepts included in this section are provided to prompt you to think about what is most important when beginning a program. Take time to consider what makes a program strong and why students would be interested in participating. Think about how students can gain experience from completing the program. Consider whether you have included components that are beneficial to everyone involved—students, teachers, and employers.

Basic areas such as funding, legal issues, and staffing must be investigated before the development phase of a new program can begin. The concepts and questions included here highlight the importance of addressing those issues and, in so doing, provide steps toward the implementation of a new program.

Consider the problem that a new program should address.

What is the need for starting a new program? Has business expressed the need for a more qualified workforce? Do students need to be challenged beyond merely observing or working at a job site? What student population would be included? Everyone? Are businesses available that would support a new program? Is your faculty prepared and, if so, willing to help? As a school representative, are you prepared to present Tech Prep concepts to business representatives?

Funding is an issue that must be considered prior to any planning activities.

How will your school obtain funding for the start-up and maintenance costs of a new program? Consider whether local

businesses would contribute to the program. Be prepared to explain how they can benefit from being part of the program. (Remind them, for instance, that the students they are willing to train today will be qualified to serve them well as employees in the future.) Are on-campus facilities available and ready to be used? If not, consider how this will affect the start of a new program. What new equipment must be purchased? Will staff training be needed? Is local and/or state funding available? Is there a staff member who is familiar with locating funding opportunities and writing grant proposals for those funds?

Consider what staff will be needed to help brainstorm, develop curricula, and inform students.

In considering the most appropriate staff to recruit, determine how your new program will be structured and the demands it will make on the teachers involved. The teachers selected must be willing to work long hours to develop curricula and to meet with other teachers for planning. The staff must also be flexible, creative, and willing to try new teaching methodologies and to teach with new learning tools.

Consider whether the teachers have any other work experience that might contribute to course development and teaching strategies. Do these teachers have business contacts from whom they might receive outside training?

Will business representatives come into the classroom to teach? If so, consider how these outside teachers might be selected. What requirements (e.g., state certification) will they have to meet to be able to spend time in the classroom?

Counselors play a key role in the success of a new program as well. They must be informed about all aspects of the program so students are informed and get the opportunity to enroll. A sound marketing plan depends on counselors being well supplied with up-to-date information on the program. By word of mouth, they can help students take an interest in new program opportunities.

The organization of an advisory committee is strongly recommended to help in decision making; it can be beneficial during the organization and development phases.

The people who make up the advisory committee should represent varied backgrounds; diversity on the committee contributes to balance in decision making. Thus, it is a good idea to appoint a heterogeneous group made up of business representatives, teachers, administrators, counselors, students, and parents. Does your school already have an advisory committee with members from the community whose services could be used? Consider the criteria that will be used to select members from the community to sit on this committee. Also consider the goals and philosophies of the program; make sure these ideas are made clear to each member. In selecting your committee, consider how much time members will be able to devote to their responsibilities. Also, think about what their responsibilities will be. How much authority will members be given? How often will the group meet?

After working through structural issues, consider whether enrollment in the new program will be open to all students or limited to students who meet certain requirements.

Think about generally recognized characteristics of a good student, such as having good attendance, earning good grades, and being on track for high school graduation. Now, consider whether these criteria will be used to determine whether or not a student is accepted into your program. Do these characteristics fit the student population with which you work? What are the needs and abilities of a typical student in your school? This is an area in which the advisory committee can provide advice concerning what they consider important characteristics. In developing student acceptance and performance criteria, the advisory committee helps counselors select students for and introduce students to the program. How early will students begin applying for places in the program (i.e., end of school year for the next school year, midyear for the next year)? Think of ways to recruit students into the

program. How will you pique a student's interest about the program? Through counselors? Teachers? Flyers around school?

One of the most important steps in program development is determining which curriculum to use: Will existing materials be used, or will new ones be developed?

An ideal time to discuss curriculum issues is when considering which staff members to involve. The staff will play an important part in selecting an existing curriculum or writing new materials. Think about whether the new staff members will be motivated to take on an endeavor like writing a curriculum that meets the needs of the new program. In deciding curriculum issues, consider how best to serve the students in the program. How will students react to a hands-on, project-based instructional approach? Will they become more motivated through the interaction of in-class demonstrations and group learning? Having considered that, think about what curriculum will meet students' needs. When organizing a new program, some educators pull concepts from various sources. For example, in the past, educators have written lesson plans using concepts from existing materials (e.g., concepts from a physical science course already in use) and incorporated those ideas into new materials (e.g., CORD's *Applications in Biology/Chemistry*). Whatever the approach taken by your school, make sure you allow enough time for the teachers to develop lesson plans.

Consider legal and liability issues and how they must be addressed prior to the start of a new program, especially if the program is an apprenticeship and/or involves worksite learning activities.

Any time a student for whom the school is responsible is taken out of the classroom and placed in a workplace, many legal and liability issues must be addressed. Who is responsible for the student at the worksite? If a student is injured at the worksite, who is liable? What kind of equipment will the student be working with

or around, and how does that affect liability issues? Consult legal representatives and members of the advisory committee on issues such as students driving to the worksite or being bused during school hours. What age-related restrictions are placed on what a student can experience while at the worksite? What liabilities does a business face by allowing students to observe or work in its facility? States differ in what they will and will not allow a student to do at the worksite. For more information on work restrictions, visit the U. S. Department of Labor’s web site (<http://www.dol.gov>).

Glossary

This glossary provides definitions of key terms pertaining to Tech Prep and career education. Please note that the definitions may not match exactly the terminology as it is used in your consortium or partnership.

Applied academics

The presentation of subject matter in a way that integrates a particular academic discipline (such as mathematics, science, or English) with workforce applications (hands-on laboratories dealing with practical equipment and devices)

Articulation

A process of linking two or more educational systems in a community to help students make a smooth transition from one level to another without experiencing delays, duplication of courses, or loss of credit

Types of articulation:

2+2—Two years of high school plus two years of postsecondary education

4+2—Four years of high school and the first two years of postsecondary education

4+2+2—Four years of high school, the first two years of postsecondary education at a two-year college, and two years at a four-year college or university

Consortium

A stakeholder group of education agencies and organizations brought together for the development of applied curricula

Contextual learning

The instructional approach, underlying Tech Prep, that states that learning occurs best when students (learners) process new information or knowledge in such a way that it makes sense to them in their own frame of reference. This approach to learning and teaching assumes that the mind naturally seeks meaning in context—that is, the person’s environment—and that it does so through searching for relationships that make sense and appear useful.

Cooperative education

An approach that involves a student’s working for a single employer, usually for pay, under a defined agreement with the school. It can relate closely to the occupational aspects of the student’s educational program. The work experience often lasts for months in a schedule that alternates worksite and school-based learning.

Dual system

Workforce training (youth apprenticeship), commonly found in German school systems, in which classroom instruction is combined with hands-on vocational training

Internship

A flexible type of worksite learning that can involve varying arrangements with an employer. Its main goal is to give students and/or teachers practical experience in a specific field. An internship may be paid or unpaid, and can often last six or more weeks.

Job shadowing

A practice that enables a student to explore a job or career area in detail for the purpose of helping the student choose a career and

course of study. Job shadowing should occur in the eighth or ninth grade and can last as little as two hours or as long as two weeks at one workplace. A job shadowing experience consists of one or more students following and closely observing a worker as he or she goes about tasks at the worksite.

School-to-Work

School-to-Work Opportunities Act programs must include integrated school-based and work-based learning that integrates academic and occupational learning and links between secondary and postsecondary education; the opportunity for participating students to complete a career major; the provision of a strong experience in and understanding of all aspects of the industry a student is preparing to enter; and equal access for students to a full range of program components and related activities, such as recruitment, enrollment, and placement activities.

Tech Prep

A sequence of study beginning in high school and continuing through at least two years of postsecondary occupational education. The program parallels the college prep course of study and presents an alternative to the “minimum requirement diploma.” A Tech Prep curriculum is built on a foundation of applied academics, prepares students for high-skill technical occupations, and allows either direct entry into the workplace after high school graduation or continuation of study that leads to an associate degree from a two-year college.

Youth apprenticeship

A relatively formal worksite learning program in which employers agree to help develop students’ skills in technical areas and in related mathematics, science, communication, and problem solving. The students “learn by doing” in the workplace with the help of mentors. Qualified students receive recognized occupational credentials when they complete their programs.

Web Sites

This section lists URLs for web sites that provide additional information on starting a program.

HELPFUL INFORMATION FOR WORKSITE PROGRAMS

U.S. Department of Education

<http://www.ed.gov>

U.S. Department of Labor

<http://www.dol.gov>

Funding information

<http://www.ed.gov/funding.html>

Laws and liabilities

<http://www.state.sd.us/state/executive/dol/dlm/kidswork.htm>

Secretary's Commission on Achieving Necessary Skills (SCANS)

<http://pueblo.pc.maricopa.edu/MariMUSE/SCANS/SCANS.html>

School to Work

<http://www.stw.ed.gov>

Tech Prep

<http://www.cord.org>

<http://vocserve.berkeley.edu/summaries/714sum.html>

RELATED SITES

National Skill Standards

<http://www.nssb.org>

EWSLA RECIPIENTS ON THE WEB

Apprenticeship 2000

<http://www.cpcc.cc.nc.us/mech/app2000.html>

Bristol Tech Prep Consortium, Women in Technology

<http://www.angelfire.com/ma3/wit/> and

www.tauntonschools.org/thw/wit/index.html

Capital Area Training Foundation
<http://www.catf-austin.org/contact.html>

Inland-Desert Tech Prep Consortium
<http://www.rialto.k12.ca.us/rhs/intern.htm>

Miami Valley Career Technology Center
<http://www.mvctc.com>

Northwest Suburban Education to Careers Partnership
<http://www.ed2careers.com>

Oakland County Tech Prep Consortium
www.oakland.k12.mi.us

Peoria Educational Region for Employment and Career Training
<http://peoria.k12.il.us/perfect>

Rock Valley College/CEANCI: Tech Prep's Virtual Company
<http://ednet.rvc.cc.il.us/techprep/finanYAP.htm>

Stark County Tech Prep Consortium
<http://www.stark.cc.oh.us>

Western Wisconsin School-to-Work
<http://www.western.tec.wi.us>

Order Form

Item code EREWLA-05

Please send _____ booklets	Product Total _____
1-24 at \$6.00 ea.	Add 10% for shipping and handling (\$6 minimum)
25-49 at \$3.50 ea.	
50-99 at \$3.00 ea.	Subtotal _____
100 or more at \$2.75 ea.	Texas customers add 8.25% sales tax if applicable
	Total _____

Name _____

Title _____

Organization _____

Phone _____

Street Address _____

City _____ State _____ Zip _____

Payment Method

Purchase order: Number _____

Credit card (circle one):

MasterCard American Express VISA Discover

Account Number _____ Expiration Date _____

Signature _____

Rush orders are available on request.

Phone orders accepted with credit card only. Call 800-231-3015.

Orders may be faxed to 254-776-3906 or mailed to

CCI Publishing

P.O. Box 21206

Waco, TX 76702-1206